

Investigating the relationship between social capital and self-rated health in South Africa

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Abstract

Much research has examined the relationship between social capital and self-rated health in developed countries. Few studies, however, have investigated this important relationship in developing countries. This study examined this research gap using data from the National Income Dynamics Study (NIDS), the first nationally representative panel study in South Africa. Information regarding social capital - norms of reciprocity, association activity, trust and group membership - was assessed in NIDS. Self-rated health was collected at Wave 1 in 2008, and Wave 2 in 2010 - 2011. The final sample consisted of 8866 respondents. Mixed effects models were fitted to predict self-rated health in Wave 2, using lagged covariates (from Wave 1). The results indicated that individual personalised trust, individual community service group membership and neighbourhood personalised trust were beneficial to self-rated health. Reciprocity, associational activity and other types of group memberships were not found to be significantly associated with self-rated health. Results indicate that both individual- and contextual-level social capital are associated with self-rated health. Policy makers in South Africa may want to consider social capital, in addition to other well-known social determinants of health, when implementing policies to improve the health of its population.

Dedication

I dedicate this work to my friends and family who have been so supportive through this time.

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Abbreviations

ASCAT	Adapted Social Capital Assessment Tool
IV	Instrumental Variable(s)
MBCA	Mutually Beneficial Collective Action
NIDS	National Income Dynamics Study
OLS	Ordinary Least Squares
SCCBS	Social Capital Community Benchmark Survey
SC-IQ	Integrated Questionnaire for the Measurement of Social Capital
SOCAT	Social Capital Assessment Tool

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Part A

Research protocol

1 Introduction

1.1 Background

The concept of social capital has been extensively researched in the fields of sociology, political science and economics for some time (Kawachi and Berkman, 2000). Of note, is sociologist Emile Durkheim's (1951) seminal work *Suicide*, where he suggests that social disintegration is correlated with higher rates of suicide in an industrial society. In recent years, there has been much interest in the relationship between social capital and health, particularly in the developed world. This interest stemmed from epidemiological studies which have demonstrated that the life expectancy of people who are socially integrated is higher than those who are comparably isolated (House et al., 1988; Kawachi et al., 1996). Thereafter, Kawachi and colleagues (1997a) went on to show that in the United States, both increasing levels of trust and higher density of civic associational membership - indicators of social capital - were associated with lower state-level age-adjusted overall mortality rates.

In the public health arena, research concerning social capital is associated with the works of Bourdieu, Coleman and Putnam (see Ferlander, 2007). Their work gives rise to two approaches to social capital: a network based perspective stemming from Bourdieu's work; and one that is cohesion based, derived from Putnam's and Coleman's work (Kawachi, 2010). The network based perspective accounts for social capital as resources accessible through social networks (Kawachi, 2010). In contrast, the social cohesion approach which has been favoured by public health researchers, identifies social capital by its function to encourage certain actions of individuals who are within a social structure (Coleman, 1990; Kawachi, 2010). Examples of social capital from the social cohesion approach are: trust, reciprocity exchanges, norms and sanctions (Kawachi, 2010).

Despite its popularity, there are two criticisms levelled against the social cohesion approach: i) it does not factor in that there is unequal access to social capital between different groups and different individuals depending on the network; ii) it tends to ignore negative effects of social capital (Carpiano, 2010). Importantly, both of these considerations can be dealt with from the network-based perspective (Carpiano, 2010). It is believed that the reason that Bourdieu's work is not as widely applied is due to the lack of visibility in the English-speaking world: i) his detailed conceptions of social capital was in French; ii) when his work was translated into English, it was hidden in a text on the sociology of education (Portes, 1998).

Within the two approaches to social capital, there are also two levels of analysis: individual and group (Kawachi, 2010). In the past, public health researchers have been more inclined to treat social capital as a group-level characteristic since individual social support's effect on health outcomes has already been well-established empirically (Kawachi and Berkman, 2000). More recently however, multilevel analysis has been employed as there has been increased recognition that social capital can impact on both an individual and contextual level (Kawachi et al., 2004). Four mechanisms have

been suggested through which social capital impact on health outcomes on both levels: i) collective action; ii) informal social control; iii) exchange of reciprocity between members of a social network; iv) diffusion of knowledge through information channels (Kawachi, 2010).

1.2 Justification

Since the study by Kawachi et al. (1997a), many more studies have emerged from developed countries that looked at the relationship between social capital and self-rated health (Fujiwara and Kawachi, 2008; Beaudoin, 2009; Giordano and Lindström, 2010; Mohnen et al., 2011; Han et al., 2012).

In South Africa, the social disintegration and destruction of social capital of black communities as a result of colonialism and apartheid has been detailed (Ramphele, 1991; HSRC, 2004). Since the end of apartheid and the transition to democracy in 1994, South Africa's central policy theme has focused on the importance of social capital and the beneficial role it plays towards a cohesive society and the well-being of its people (Burns, 2009). However, there has been a paucity of research regarding the multifaceted relationship between social capital and various health outcomes in South Africa. The few studies that have been carried out did not have a nationally representative sample (Campbell et al., 2002; Gilbert and Soskolne, 2003; Pronyk et al., 2008; Cramm and Nieboer, 2011). The one study that used a nationally representative sample only looked at depression (Tomita and Burns, 2012).

More importantly, all of these studies were cross-sectional in nature thus limiting the evidence for causality as reverse causation cannot be ruled out. This study, however, makes use of data from two waves of a panel study, the National Income Dynamics Survey (NIDS) (see "Methods" section for more details). A longitudinal perspective can therefore be obtained as the same individuals are followed over time. The major advantage is that it provides stronger evidence for the relationship between social capital and self-rated health as there is a clear temporal sequence: social capital indicators in Wave 1 are used to predict self-rated health in Wave 2. Lastly, this is the first known longitudinal study using multilevel analysis to examine the relationship between social capital and self-rated health in South Africa using a nationally representative sample.

1.3 Objective

To assess the relationship between social capital in 2008 and self-rated health in 2010-2011 using the NIDS dataset, controlling for individual-level, household-level and district-level confounders.

2 Methods

2.1 Source of data

The National Income Dynamics Study (NIDS) is a panel study launched by the Presidency of South Africa and was conducted by the Southern Africa Labour and Development Research Unit (SALDRU) based at the University of Cape Town. NIDS intends to aid in describing and explaining various socioeconomic indicators and phenomena: income, labour, education, health and well-being (Leibbrandt et al., 2009). The first wave of the NIDS survey took place in 2008 and the second wave between 2010 and 2011. NIDS used a stratified, two-stage cluster sample design to sample households in the nine provinces of South Africa (Leibbrandt et al., 2009). Firstly, 400 primary sampling units (PSUs) were chosen from a master sample of 3000 PSUs identified by Statistics South Africa in 2003; thereafter 400 PSUs were randomly sampled within each stratum of the 53 district councils, which were also proportional to the master sample’s allocation of PSUs in each strata (Leibbrandt et al., 2009).

At the end of Wave 1, 7305 households were successfully interviewed, corresponding to a response rate of 69% (Leibbrandt et al., 2009). The questionnaires were developed in line with certain research questions. Relevant to social capital was the desire to shed light on “social heritage, including education and employment dynamics, the impact of life events (including positive and negative shocks), social capital and intergenerational developments” (Leibbrandt et al., 2009). Questionnaires were piloted at 159 households before the final implementation of the study which speaks to the questionnaire’s reliability. In each household, a household member that was knowledgeable about the household answered the household questionnaire; whereas individual questionnaires were administered to each member of the household (Leibbrandt et al., 2009). The adult questionnaire interviewed individuals who were 15 years or older.

The specific questionnaires that are used for this study are: Wave 1 Adult, Wave 1 Household, Wave 2 Adult Phase 1, Wave 2 Adult Wave 2 Phase 2. These questionnaires can be accessed through DataFirst, a data repository hosted by the University of Cape Town (<http://www.datafirst.uct.ac.za/catalogue3/index.php/catalog/175>). Responses from the Proxy questionnaire were not included as questions related to social capital were not asked. Further, as the outcome of interest is self-rated health, only the individuals who have provided answers for the related question will be included in the analysis. Specifically, out of the 16878 adults interviewed at Wave 1 in 2008, 15538 respondents provided relevant answers yielding a response rate of 92.06%. However, out of the 16878, only 15491 were successfully followed up at Wave 2 in 2010 - 2011. Moreover, out of the 15491 successfully followed up, only 12903 provided responses to self-rated health in 2010-2011, the outcome of interest. Therefore, 71.65% participants out of all 16878 participants from 2008 will be included in the analysis¹.

¹ The sample size in the final analysis may be smaller than 12903 however, as observations with missing variables are automatically excluded from the multilevel analysis.

2.2 Measurement

2.2.1 Outcome of interest: Self-rated health status in 2010 - 2011

Section J of the NIDS individual questionnaire for adults asks the question: “J1. How would you describe your health at present? Would you say it is excellent, very good, good, fair, or poor?” Mortality is a widely used health indicator in public health. Self-rated health was chosen as the indicator for health in this study given that it has been established as a consistently significant predictor of mortality in many different contexts (Idler and Benyamini, 1997; DeSalvo et al., 2005), including South Africa’s (Ardington and Gasealahwe, 2012). Further, there have also been studies to show that self-rated health outperforms other biologic indicators of health when predicting mortality (for example, see Jylha et al., 2006). Lastly, self-rated health has been one of the most widely used health indicators to study the relationship between social capital and health. This study conforms to this convention. Given these reasons, self-rated health will be used as a proxy for health in this study. The five categories of self-rated health will be collapsed into two, where 1 = poor health (“fair” and “poor”) and 0 = good health (“excellent,” “very good” and “good”) following previous studies (Kawachi et al., 1999; Lamarca et al., 2013). On a related note, one may need to wary of potential common methods bias as both self-rated health and social capital indicators (described below) are based on a respondent’s subjective answers from the same questionnaire.

2.2.2 Measuring social capital in 2008

It needs to be said that there is no set definition of social capital and studies have varied in the conceptualisation of the dimensions of social capital: structural/cognitive social capital, some further divide this into bonding/bridging/linking, and others have used a single item of trust as a proxy for social capital. Even within the approaches, there are differences in the operationalisation of social capital. The indicators of social capital in this study are limited to the ones that have been elicited in the NIDS household and adult questionnaires. Five such indicators that can be conceptualised by the social cohesion approach to social capital have been identified: reciprocity, generalised trust (trust in strangers), personalised trust (trust in familiars), (perceived) associational activity, and group participation. The first four items relate to the cognitive component and the last item relates to the structural component of social capital (Derose and Varda, 2009). There appears to be face validity with all five of these measures as they correspond to those identified in an extensive literature review. Content validity is also present as the cognitive components of social capital conceptualised here deal with “what people feel” and the structural component relates to “what people do” (Harpham et al., 2002). Further, a knowledgeable member in each household was asked about the perceived reciprocity and associational activity in his/her neighbourhood. Responses regarding generalised trust, personalised trust and group participation on the other hand, were collected from every available member of the household. Lastly, personalised trust and generalised trust are considered

separately as previous studies have shown that the identity of the object of trust matters when the relationship between trust and group participation is considered (Haddad and Maluccio, 2003).

a) Norms of reciprocity This question was only asked in Wave 1 of the NIDS in the household questionnaire (section D).

“D.33.1 How common is it that neighbours help each other out?”

- i. Never happens
- ii. Rarely happens
- iii. Not common
- iv. Fairly common
- v. Very common”

Responses i), ii) and iii) will be categorised as “low reciprocity” and iv) and v) as “high reciprocity.”

a) Associational activity This question was only asked in Wave 1 of the NIDS in the household questionnaire (section D).

“D.33.1 How common is it that neighbours do things together?”

- i. Never happens
- ii. Rarely happens
- iii. Not common
- iv. Fairly common
- v. Very common”

Responses i), ii) and iii) will be categorised as “low associational activity” and iv) and v) as “high associational activity.”

b) Personalised trust This question was asked in both waves in Section M of the adult questionnaire.

“Imagine you lost a wallet or purse that contained R200 and it was found by someone who lives close by. Is it very likely, somewhat likely or not likely at all to be returned with the money in it?”

The responses will be categorised as:

Low trust = not likely at all

Moderate trust = somewhat likely

High trust = very likely

c) Generalised trust This question was also asked in both waves in Section M of the adult questionnaire.

“M11. Imagine you lost a wallet or purse that contained R200 and it was found by a complete stranger. Is it very likely, somewhat likely, or not likely at all to be returned with the money in it?”

The responses will be categorised as:

Low trust = not likely at all

Moderate trust = somewhat likely

High trust = very likely

d) Civic participation This question was also asked in both waves in Section M of the adult questionnaire.

“M9. Please indicate if you belong to any of the following groups:

- i. Stokvel
- ii. Burial Society
- iii. Community garden group
- iv. Farmer’s society
- v. Sewing group
- vi. Sports group
- vii. Study group
- viii. Singing/music group
- ix. Youth group
- x. Informal trader’s group
- xi. Men’s association
- xii. Women’s association
- xiii. School committee
- xiv. Water committee
- xv. Development committee

xvi. Tribal authority

xvii. Other

Membership in religious group was not asked explicitly, which may have led to what appears to be a gross underestimate that was captured in membership of “other groups” compared to previous panel studies done in South Africa (see [Haddad and Maluccio, 2003](#)). For this reason, religious group membership will not be considered. Following previous studies that investigated the relationship between social capital and health and well-being, the different groups will also be divided into categories according to their functions ([Campbell et al., 2002](#); [Haddad and Maluccio, 2003](#)):

- financial (stokvel, burial society),
- production (farmer’s society, informal trader’s group, community garden group, sewing group),
- community service (school committee, water committee, development committee, youth groups, women’s association, men’s association),
- political (tribal authority, trade union²),
- private interest (singing/music group, study group, sports group);

A new variable `civ_assoc` is also derived where any membership will mean `civ_assoc=1` and no membership will indicate `civ_assoc= 0`.

2.2.3 List and definition of variables

Table A.1 summarises the social capital variables that will be used. The lowest unit of geographical information that is available from the NIDS Wave 1 dataset are PSUs derived from census enumeration areas; this will serve as the “neighbourhood” level. This is appropriate as a PSU comprises of an enumeration area with 74 households.³ Individual-level personalised trust, generalised trust and group participation (as depicted in the table) will then be aggregated to the neighbourhood-level for the purpose of multilevel analysis. Neighbourhood-level personalised trust and generalised trust will be obtained by aggregating individual scores within households and neighbourhoods thus obtaining mean scores for the trust indicators. As the items of norms of reciprocity and associational activity were only asked at the household-level, these indicators will not be considered at an individual level and the neighbourhood-level variables will be obtained the same way as the trust indicators. Regarding neighbourhood-level group membership, the proportion of those that are members of one or more groups will be obtained per neighbourhood using the “`civ_assoc`” variable as previously described.

² Trade union membership was asked in another question and has been incorporated as such.

³ More enumeration areas are combined together to form a PSU if there are fewer than 74 households. All the enumeration areas under one PSU are also of the same settlement type.

Lastly, Table A.2 describes all the covariates/factors (identified by a preliminary literature review) at the individual, household and neighbourhood level considered for the multivariate analysis.

3 Analysis plan

The software Stata 11.2 (StataCorp, Texas) will be used to carry out data cleaning, data exploration and analysis. Specifically, for preliminary analysis, descriptive statistics of all variables will be provided. Bivariate analysis will be conducted to identify key predictors for model building purposes. Given the hierarchical nature of the data, For multivariate analysis, the command `xtmelogit` from Stata will be used to conduct a multilevel mixed-effects logistic regression. The data structure assumed will be as follows: individuals (level 1) are nested within households (level 2), which in turn, are nested within neighbourhoods (level 3).

4 Ethics

The study uses data available in the public domain through the Southern Africa Labour and Development Research Unit (SALDRU) at the University of Cape Town. Consequently, there should be no research ethics issues arising from its use. Nonetheless, ethics approval will be obtained from the University of Cape Town's Human Research Ethics Committee.

5 Stakeholders, reporting and implementation

The findings of this study will be communicated through publications, in the forms of a journal article and policy brief. The journal article will be submitted to appropriate peer-review journals and it will also be made available to SALDRU for the use of their data.

Table A.1: List of social capital indicators

Variables	Original categories	Newly defined categories
Personalised trust	1 = Very likely; 2 = Somewhat likely; 3 = Not likely	1 = High/moderate trust; 0 = Low trust
Generalised trust	1 = Very likely; 2 = Somewhat likely; 3 = Not likely	1 = High/moderate trust; 0 = Low trust
Reciprocity	1 = Never happens; 2 = Very rare; 3 = Not common; 4 = Fairly common; 5 = Very common	1 = High reciprocity (Fairly common and Very common); 0 = Low reciprocity (Not common, Very rare and Never happens)
Associational activity	1 = Never happens; 2 = Very rare; 3 = Not common; 4 = Fairly common; 5 = Very common	1 = High reciprocity (Fairly common and Very common); 0 = Low reciprocity (Not common, Very rare and Never happens)

List of social capital indicators (cont.)

Variables	Original categories	Newly defined categories
Group participation	<p>M9.1: 1 = stokvel member; 0 = non member; M9.2: 1 = burial society member; 0 = non member; M9.3: 1 = community garden group member; 0 = non member; M9.4: 1 = farmer's association member; 0 = non member; M9.5: 1 = sewing group member; 0 = non member; M9.6: 1 = sports group member; 0 = non member; M9.7: 1 = study group member; 0 = non member; M9.8: 1 = singing/music group member; 0 = non member; M9.9: 1 = youth group member; 0 = non member; M9.10: 1 = informal trader's group member; 0 = non member; M9.11: 1 = men's association member; 0 = non member; M9.12: 1 = women's association member; 0 = non member; M9.13: 1 = school committee member; 0 = non member; M9.14: 1 = water committee member; 0 = non member; M9.15: 1 = development committee member; 0 = non member; M9.16: 1 = tribal authority member; 0 = non member; M9.17: 1 = member of other groups; 0 = non member</p>	<p>1 = Member of financial group (M9.1 and M9.2), 0 = non-member; 1 = Member of production group (M9.3, M9.4, M9.5, M9.10), 0 = non-member; 1 = Member of private interest group (M9.6, M9.7, M9.8), 0 = non-member; 1 = Member of community service group (M9.9, M9.11, M9.12, M9.13, M9.14, M9.15), 0 = non-member; 1 = Member of political group (M9.16 and E14), 0 = non-member.</p>

Table A.2: List of independent variables

Variable	Type of variable	Range/coding
<i>Individual-level covariates</i>		
Age	Ordinal	1 = 15 - 21, 2 = 22 - 35, 3 = 36 - 59, 4 = 60+
Sex	Binary	1 = male, 0 = female
Race	Categorical	1 = White, 2 = Black, 3 = Coloured, 4 = Asian/Indian
Marital status	Categorical	1 = married/living with partner, 0 = other
Education	Ordinal	1 = Primary school or less, 2 = completed primary school and some high school, 3 = completed high school
Employment status	Binary	1 = unemployed, 0 = employed
Health status in 2008	Binary	1 = poor health, 0 = good health
Urban	Binary	1 = rural formal/tribal authority areas, 0 = urban formal/informal
Obese ⁴	Binary	0 = BMI < 30, 1 = BMI ≥ 30
Smoking	Binary	0 = non-smoker, 1 = smoker
Number of household members	Discrete continuous	1 - 25
<i>Household-level covariates</i>		
Per capita household income quintiles	Ordinal	1 = lowest 20% to 5 = top 20%
<i>Neighbourhood-level covariate</i>		
Neighbourhood living environment deprivation index ⁵	Continuous	

⁴ Section N of the NIDS Adults individual questionnaire involves measuring the height and weight of the respondents. Checks are built in whereby field workers have to re-do measurements at least once to make sure that they are correct. Body mass index (BMI) is derived from these measurements by using the standard formula: (weight in kg)/(height in metres)²

⁵ This was derived by principal component analysis from five items in the NIDS dataset, namely, the proportion of households: 1) without piped water on site/in dwelling/borehole; 2) without flush toilet on site/pit latrine with ventilation pipe; 3) answering no to "Is your refuse or rubbish removed at least once a week by local authorities?"; 4) Without electricity from mains/generator; 5) In informal dwelling/shack; per neighbourhood. These items were adapted from the "Living Environment Deprivation" domain in the South African Index of Multiple Deprivation 2007 (Wright and Noble, 2009).

6 Logistics

6.1 Time line

The study is expected to take just over eight months. Below is a table detailing the tasks and time assigned to each task:

Task	Duration*
Concept plan	2 weeks
Plan for objectives	1 week
Data cleaning for Wave 1 dataset	1 week
Protocol	3 weeks
First draft of literature review	8 weeks
Revision of protocol	1 week
Data cleaning for Wave 2 dataset	1 week
Analysis	3 weeks
Journal Manuscript	2 weeks
Policy brief	1 week
Final draft revisions	2 weeks

Table A.3: Time assigned to tasks

*Duration excludes weekends

6.2 Budget

There will be no direct costs incurred to the author as the data is freely available for the purposes of academic research. The statistical software used for analysis is provided by the University of Cape Town and all other softwares used are open source (i.e. BibTex).

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Part B

Literature review

1 Theoretical review

1.1 Theories of social capital

1.1.1 Background

The notion that social relations affect the well-being of individuals is not a new one, particularly in the field of sociology. A notable example is Durkheim's investigation into the social causes of suicide in a number of European societies (1952 [1897]). Through his analysis of 26000 suicides recorded during the 19th century, Durkheim theorises that egoistic suicide⁶ is due to society being "not integrated at all points to keep all its members under its control." (p. 373) The solution that he puts forth to decrease suicides is through the re-integration of the individual into communal life (Durkheim, 1952 [1897]). In other words, Durkheim believes that social integration is a protective factor of suicide.

While social capital is linked to the idea of social integration, the two do not share the same meaning. Characterised as "capital," it may be necessary to reflect on the term which originated from Marx. According to Marx (1933 [1849]), capital - an input into the process of production - is accumulated through the creation of surplus value made possible by the exploitation of the working class on part of the bourgeoisie. In neoclassical economics, capital is further distinguished between physical capital and financial capital. The former refers to inputs of production such as machinery, whereas the latter is money that is used to set up or sustain a business (Varian, 2006). Human capital, less tangible than physical and financial capital, is accumulated when an individual invests in improving his/her capabilities via on-the-job training and further education (Becker, 1962). As a type of capital, social capital can be seen as sharing characteristics with other types of capital in that investment in such will result in some payoff or utility (Lin, 2001).

In contemporary times, one of the earliest appearance of the term "social capital" can be found in Jane Jacob's *The Life and Death of Great American Cities* (1961). The book examines urban planning policies in the 20th century where it criticises urban renewal⁷ that took place at the time as having detrimental effects on the residents and the existent communities (Jacobs, 1961). Regarding social capital, she writes:

"If self-government [in a good city neighborhood] is to work, underlying any float of population must be a continuity of people who have forged neighborhood networks.

⁶ Durkheim focuses on three main types of suicide: egoistic, altruistic and anomic suicide. His definitions are as follows: "Egoistic suicide results from man's no longer finding a basis for existence in life; altruistic suicide, because this basis for existence appears to man situated beyond life itself. The third sort of suicide [...] results from man's activity regulation and his consequent sufferings." (p. 258)

⁷ It involves the relocation of businesses, the demolition of structures and the relocation of people amongst other things.

These networks are a city's irreplaceable social capital. Whenever the capital is lost, from whatever cause, the income from it disappears, never to return until and unless new capital is slowly and chancily accumulated." (p. 138)

Subsequently, the economist Glenn Loury used "social capital" in his seminal paper *A Dynamic Theory of Racial Income Differences* (1977). His central thesis was that social relations between racial groups impact on an individual's achievement because these relations result in differential acquisition of human capital. The consequence of this observation was that laissez-faire economic policies with equal opportunity laws by themselves cannot eradicate the difference in economic positions between race groups (Loury, 1977). In his conclusion, he writes:

"An individual's social origin has an obvious and important effect on the amount of resources that is ultimately invested in his or her development. It may thus be useful to employ a concept of 'social capital' to represent the consequences of social position in facilitating acquisition of the standard human capital statistics." (p. 176)

Loury does not develop the concept of social capital any further in the paper, but since then numerous definitions from a variety of disciplines have appeared as summarised in Table 1. From the multitude of definitions presented, it would appear that what they agree on is that

social capital refers to resources rooted in social relations to enable actions and interactions of individuals or groups.

There are consequences for those receiving the resource. It is acknowledged that these consequences can be both beneficial and harmful (Portes, 1998; Fukuyama, 2000; Putnam, 2000). Portes (1998) sums up four harmful consequences: "exclusion of outsiders, excess claims on group members, restrictions on individual freedoms, and downward leveling norms." (p. 15) Additionally, the mechanisms by which social capital translates into benefits (or harms) are through:

- flow of information (Coleman, 1988; Lin, 2001; Burt, 2001);
- social control, norms and sanctions (Coleman, 1988; Putnam, 1995; Fukuyama, 2000);
- exercising influence i.e. by actors with greater power and/or amount of capital (Bourdieu, 1986; Lin, 2001);
- support from members in social networks i.e. family, friends and/or group members (Portes, 1998).

Table B.1: Some definitions of social capital

Author	Field	Definition
Bourdieu (1986)	Sociology	“Social capital is the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition - or in other words, to membership in a group - which provides each of its members with the backing of the collectivity-owned capital. [...] The volume of the social capital possessed by a given agent thus depends on the size of the network of connections he can effectively mobilize and on the volume of the capital (economic, cultural or symbolic) possessed in his own right by each of those to whom he is connected. ” (p. 248 - 249)
Coleman (1988)	Sociology	“Social capital is defined by its function. It is not a single entity but a variety of different entities, with two elements in common: they all consist of some aspect of social structures, and they facilitate certain actions of actors - whether persons or corporate actor - within the structure. Like other forms of capital, social capital is productive, making possible the achievement of certain ends that in its absence would not be possible. [...] A given form of social capital that is valuable in facilitating certain actions may be useless or even harmful for others. [...] social capital inheres in the structure of relations between actors and among actors.” (p. S98)
Putnam (1995)	Political science	“By analogy with notions of physical capital and human capital - tools and training that enhance individual productivity - ‘social capital’ refers to features of social organization such as networks, norms and social trust that facilitate coordination and cooperation for mutual benefit.” (p. 2)
Portes (1998)	Sociology	“[social capital] is the ability to secure benefits through membership in networks and other social structures” (p. 8)
Glaeser et al. (1999)	Economics	“an individual’s social capital is that individual’s social characteristics - including charisma, status, and access to networks - that enable that person to extract private returns from interactions with others.” (p. 3)
Fukuyama (2000) ⁸	Political economics	<p>“social capital is an instantiated informal norm that promotes cooperation between two or more individuals. [...] By this definition, trust, networks, civil society, and the like, which have been associated with social capital are all epiphenomenal, arising because of social capital but not constituting social capital itself. [...] The economic function of social capital is to reduce the transaction costs associated with formal coordination mechanisms like contract hierarchies and bureaucratic rules.” (p. 3)</p> <p>“If we define social capital as instantiated, informal norms that produce cooperation, economists have a straightforward explanation of where it comes from: social capital arises spontaneously as a product of iterated Prisoner’s Dilemma games.” (p. 13)</p>

Some definitions of social capital (cont.)

Author	Field	Definition
Burt (2001)	Sociology	“Social capital is the contextual complement to human capital. [...] ... a social-capital metaphor [is one] in which social structure is a kind of capital that can create for certain individuals or groups a competitive advantage in pursuing their ends. Better connected people enjoy higher returns.” (p. 32)
Grootaert and van Bastelaer (2001)	Economics	“institutions, relationships, attitudes, and values that govern interactions among people and contribute to economic and social development.” (p. 4)
Lin (2001)	Sociology	“investment in social relations by individuals through which they gain access to embedded resources to enhance expected returns of instrumental or expressive actions ⁹ ” (p. 17)
Robison et al. (2002)	Economics	“Social capital is a person’s or group’s sympathy toward another person or group that may produce a potential benefit, advantage, and preferential treatment for another person or group of persons beyond that expected in an exchange relationship.” (p. 19)

⁸ When applied in economics, social capital tends to be perceived as norms of cooperation and trust among individuals, with these measures elicited via experimental games (see section 1.3.1). If treated as a private good, the outcomes of cooperation are usually linked to positive and negative externalities i.e. side effects that were not accounted for in the cost of cooperation as a result of cooperation (Fukuyama, 2000).

⁹ Lin defines instrumental actions as those the result in "gaining of added resources not previously possessed by ego" and expressive actions as those that assist in "maintaining of possessed resources." (p. 19)

From the literature, there still exist some disagreements in the way social capital is understood. Some of these include:

- whether it has to be instantiated to be considered social capital (Fukuyama, 2000) or it includes potential resources to be reaped (Bourdieu, 1986);
- whether it is essentially a public good (Coleman, 1988; Putnam, 1995), private good (Fukuyama, 2000) or both (Lin, 2001);
- whether it is a group attribute (Putnam, 1995), an individual attribute (Bourdieu, 1986; Portes, 1998; Glaeser et al., 1999) or both (Grootaert and van Bastelaer, 2001; Lin, 2001);
- whether it is a class good entitled to the dominating class (Bourdieu, 1986) or a public good available to any social-structural features (Coleman, 1988; Putnam, 1995);
- whether it is defined by its function (Coleman, 1990; Putnam, 1995) or a specific form (Fukuyama, 2000; Robison et al., 2002);
- whether it is the network structure or relations and their associated features (‘social cohesion’ school such as Putnam, 2000), or the resources derived from the network structure such as new information (‘social network’ school such as Bourdieu, 1986; Burt, 2001; Lin, 2001);
- whether social capital can be defined as capital in Marx’s sense (see Robison et al., 2002);
- whether dense and closed networks¹⁰ within groups (Bourdieu, 1986; Coleman, 1988) or bridges/‘structural holes’ between groups yield more desirable outcomes (Burt, 2001).

Semih-Akcomak (2011) provides further discourse on more divergent views on social capital. Serageldin and Grootaert (1999) however, are of the opinion that the distinctions drawn in the definitions of social capital are mainly “artificial and unnecessary” as different types of social capital can co-exist and mutually reinforce each other.

1.1.2 Developments in social capital theory

Woolcock (1998), while agreeing with the general definition provided previously, refines the concept of social capital as defined by Bourdieu, Coleman and Putnam, and provides a framework in which the dynamic nature of social capital can be captured. Specifically, Woolcock states:

“(a) the nature and extent of social relationships vary within and among different institutional sectors, b) the tasks performed by these relationships necessarily change as economic exchange becomes more sophisticated, and (c) that both ‘too little’ and ‘too much’ social capital at any given institutional level can impede economic performance.”
(p. 168)

¹⁰ A closed network refers to one where all members belonging to that network know each other.

He recognises that there are different dimensions to social capital at both the micro- and macro-level and distinguishes intra-community ties, extra-community ties and state-society ties. These ties interact differently depending on the autonomy and effectiveness of the state. Moreover, the same dimension of social capital can also impact very differently on a society depending on the amount of social capital that it has of each type. The impact of social capital on the welfare of a society then, is context dependent. It then follows that social capital is something that should be optimised rather than maximised (Woolcock, 1998). Moreover, one can possibly relate this framework to the three dimensions of social capital that have been applied in recent empirical studies: bonding, bridging and linking social capital (i.e. intra-community ties and bonding social capital; extra-community ties and bridging social capital; state-society ties and linking social capital.)

Granovetter's seminal paper *The Strength of Weak Ties* has often been cited when examining bonding and bridging social capital. He defines strong ties as those which are inclined to be concentrated within certain groups, while the odds of weak ties linking members of different groups are higher than ties that are strong (Granovetter, 1973). Additionally, the stronger the tie between two individuals, the more in common they have with each other (Granovetter, 1973). Furthermore, it was observed that of those who found a job through personal contacts, 73% of these personal contacts were mere acquaintances (corresponding to 'weak' ties), not close friends (corresponding to 'strong' ties)¹¹. He explains this (initially) counterintuitive observation with the following: "those to whom we are weakly tied are more likely to move in circles different from our own and will thus have access to information different from that which we receive." (p. 1371) In the same paper, Granovetter (1973) provides anecdotal evidence that suggests weak ties are essential to developing opportunities for individuals and integration into communities while strong ties, encouraging micro-level cohesion, can result in fragmentation on a meso scale. Robert Putnam (2000) echoes these ideas with his conceptualisation of bonding and bridging social capital¹²:

"Of all the dimensions along which forms of social capital vary, perhaps the most important is the distinction between bridging and bonding. Some forms of social capital are, by choice or necessity, inward looking and tend to reinforce exclusive identities and homogeneous groups. Examples of bonding capital include ethnic fraternal organizations, church-based women's reading groups, and ecumenical religious organizations. [...] Bridging networks, by contrast, are better for linkage to external assets and for information diffusion. [...] Bonding social capital is, as Xavier de Souza Briggs puts it, good for 'getting by,' but bridging social capital is crucial for 'getting ahead.'" (p. 22-23)

¹¹ The strength of ties is proxied by the frequency that the respondent has seen the person that initially gave the respondent information regarding the job. Granovetter defines the following categories of frequency of contact: i) often = at least twice a week; ii) occasionally = more than once a year but less than twice a week; iii) rarely = once a year or less. (p. 1371)

¹² As a cautionary note, bridging social capital may be associated with weak ties (and bonding social capital with strong ties) but the terms are not synonymous. While all bridges are necessarily weak ties, not all weak ties are bridges; and under certain conditions, some strong ties can be a bridge (see Granovetter, 1973). For example, bonding ties that are weak can refer to members of a gardening group in the same block of a neighbourhood - similar demographics and social identity, but not necessarily very close friends (see Ferlander, 2007).

In other words, bonding social capital refers to within-group relations where members of the group are fairly homogenous (i.e. race, gender, occupation, socio-economic status), whereas bridging social capital concerns with between-group relations and the individuals involved are more dissimilar to each other. The bonding type is also more amenable to being a coping mechanism for every day needs, whereas the bridging type helps with progressing beyond the necessities. Putnam (2000) further acknowledges that bonding and bridging social capital are not mutually exclusive types as it is clear that some groups such as online social platforms both ‘bridge’ (i.e. across geographical locations) and ‘bond’ (i.e. mutual interest over pop idols). While this is the case, Putnam (2000) stresses that the two are not interchangeable and the conceptual differentiation must be taken into account for analysis.

Linking social capital, is the same as the bridging type in that the individuals are dissimilar in some respect, but the linking type takes into account power differentials that are present in some relations or networks. Szreter and Woolcock (2004) defines it as follows:

“We would define linking social capital as norms of respect and networks of trusting relationships between people who are interacting across explicit, formal or institutionalized power or authority gradients in society.” (p. 655)

A primary example of linking social capital in South Africa is municipal ward committees, where committee members are members of the community representing various interests within the community and the ward. Via the representative of the ward (or Ward Councillor) who is *de facto* an elected civil servant, a fully functional committee should be able to give direct input and weigh in on decisions about: the provisions of municipal services, the municipality’s performance and the annual budget amongst others (Department of Provincial and Local Government, 2005).

It may also be important to differentiate formal and informal connections, and horizontal and vertical ties. Formal connections are those created through formally established groups such as workers unions, political parties, nonprofit organisations and religious groups. Informal connections refer to those that are formed through: greeting neighbours in the morning on the way to work, inviting friends over for dinner, or gathering at a pub to watch local sports games. Again, like bonding and bridging social capital, some arrangements could overlap both formal and informal ties, but the conceptual distinction is important as it reflects differences in “social standing, life cycle, and community attachment.” (Putnam, 2000; p. 94). In South Africa for example, with the exception of religious groups, it is plausible that those with higher socioeconomic status are more likely to be involved with formal groups than informal groups as there is often a substantial cost (time and monetary) to be involved in formal groups. Horizontal ties are those where the actors involved are relatively equal in terms of their status and power (i.e. volunteers at a nonprofit organisation) whereas vertical ties refer to those where there is a clear hierarchy in status and power between actors in a network (i.e. Ward Councillor, ward committee members and community members) (Ferlander,

2007). Bonding and bridging social capital then, involve horizontal ties, and linking social capital involves vertical ties (Ferlander, 2007).

Another common distinction in social capital is that of cognitive and structural social capital proposed by Uphoff (1999). This distinction, he asserts, is as important as the one made between renewable and nonrenewable resources for natural forms of capital (Uphoff, 1999). Specifically, he defines the two categories as follows:

“The structural category is associated with various forms of social organization, particularly *roles, rules, precedents* and *procedures* as well as a wide variety of *networks* that contribute to cooperation, and specifically to mutually beneficial collective action (MBCA)¹³, which is the stream of benefits that results from social capital. The cognitive category derives from mental processes and resulting ideas, reinforced by culture and ideology, specifically norms, values, attitudes, and beliefs that contribute cooperative behavior and MBCA [emphasis in the original].” (p. 218)

From this distinction, Uphoff (1999) proposes that structural social capital ‘facilitates’ mutually beneficial collective action, while cognitive social capital ‘predisposes’ people towards it. Furthermore, the two types are related and mutually enforcing but one can observe structural types unlike cognitive types, which generally need to be verbally elicited (Uphoff, 1999). A number of tools designed to measure social capital have used Uphoff’s categorisation - for example, see the Adapted Social Capital Assessment Tool by Harpham et al. (2002).

Lastly, despite disagreements on the definition of the concept, it is important to note that the application of social capital theory is broad. Within the social sciences, research in connection with social capital (or ideas of social capital such as social cohesion, social support, trust etc.) has been conducted in at least seven areas (Woolcock, 1998):

1. families and youth behaviour problems;
2. schooling and education;
3. community life in physical settings;
4. community life in virtual settings;
5. work and organisations;
6. democracy and governance; and
7. general cases of collective action problems.

An overview of the relevant literature in these areas is provided in Woolcock (1998, p. 193-194).

¹³ According to Krishna and Uphoff (2002), ‘mutually beneficial collective action’ involves substantial transaction costs which overcome free-riding. Further, by iterative cooperation, individuals involved can obtain greater satisfaction over time - a positive externality - even though they may not necessarily gain from these actions all the time (Krishna and Uphoff, 2002).

1.1.3 Criticisms of social capital theory

To begin, the often cited observations described in Durkheim's *Suicide* that there seemed to be a positive association between social disintegration and suicide have been disputed. It has been pointed out that his convenient exclusion of attempted suicides and fatalistic suicides may have biased his conclusions (Kushner and Sterk, 2005). In fact, Durkheim's critics indicate that should attempted and fatalistic suicides¹⁴ have been included, a contradicting conclusion would emerge: those who are embedded within social structures and more integrated (i.e. women) are more likely to harm themselves (Kushner and Sterk, 2005).

With regards to more recent discourse, economists have tended to be sceptical about the term social capital (see Arrow, 1999 and Durlauf, 1999). For example, Durlauf (2002) writes: "the concept [social capital] itself has proven to be too vague to permit analyses whose clarity and precision matches the standards of the field [of economics]." (p. F477) Anderson and Mellor (2010) give three other reasons for the scepticism:

- i) it is inherently difficult to translate a concept across disciplines where different disciplines focus on specific aspects of the construct;
- ii) economists are generally trained to explain social phenomena as a consequence of individuals' actions (as opposed to contextual influences);
- iii) the lack of reliability of surveys that elicit subjective interpretations of attitudes from individuals.

Szreter and Woolcock (2004) claim that the concept of social capital will be subjected to continuous debates much like 'class,' 'gender' and 'race,' becoming one of the 'essentially contested concepts' of the social sciences. They speculate that the contestation is due to differing ideological and political inclinations among scholars of social capital (Szreter and Woolcock, 2004). As a result, there exists abundant definitions of social capital which lends the concept to be operationalised in many different ways. Also, very few studies of social capital have provided a historical context as Szreter and Woolcock (2004) did. This allowed one to determine the nature of the state, and how and why some types of social capital worked to improve welfare, while others did not (see also Narayan, 1999). Needless to say, the combination of different operationalisations and lack of context makes analysis and comparison of studies difficult.

Portes (1998) points out that one needs to distinguish between the sources and the consequences of social capital as the line often gets blurred. The lack of distinction between the source and consequence of social capital could be attributed to the different conceptualisations of social capital (i.e. function vs form). The other reason could be that many studies rely on secondary data sources

¹⁴ Durkheim defines fatalistic suicide as suicide "deriving from excessive regulation, that of persons with futures pitilessly blocked and passions violently choked by oppressive discipline." (p. 276n) However, he deemed that this type of suicide has "little contemporary importance" without further justification.

which are not designed to ask specific questions regarding social capital, or questions that only capture limited dimensions of social capital. Both of these result in researchers often having to rely on proxies to do analyses (Harpham et al., 2002). An example is using level of crime as a proxy for social capital - did higher levels of crime prohibit people from involvement in associational activities¹⁵, or is it due to lack of social control¹⁶ that encourages crime? Naturally, there could be a feedback mechanism where increasing associational activities could foster some type of social control which could lead to a decrease in crime. However, it does not take away the necessity to work out which came first, and placing the study in context may help in doing so. The direction of causality is important as it leads to different policy prescriptions.

The same could be said for different conceptualisations of social capital - different conceptualisations lead to different mechanisms that translate social capital to well-being. In turn, this leads to varied policy recommendations. For example, Wilkinson (1996) seems to view social capital as societal social cohesion. This is analogous to social support on an individual level. Here it acts as a buffer against stress with direct and indirect physiological responses beneficial to health. The beneficial psychosocial effects of a cohesive society as a result of relatively equal income distributions, is seen to be more explanatory of health inequalities than absolute income levels in developed countries (Wilkinson, 1996). Lynch and colleagues (2000) argue that Wilkinson's narrow conceptualisation of social capital does not give due credit to material living conditions, which they see as a principle explanation for health inequalities. Material living conditions are related to absolute income levels and may for instance be observed through unsafe housing conditions. The different causal mechanisms of health inequalities proposed by Wilkinson and Lynch are likely to result in policy recommendations that have different focuses. Similarly, Ferragina (2009) provides a critique to Putnam's use of social capital that turns attention away from structural causes - political, legal and political institutions - of desegregation (or in Putnam's terms, having low stocks of bridging social capital) in modern society. Ferragina and others are of the opinion that economic inequality contributes to desegregation thereby impacting negatively on the development of a nation (see also O'Connell, 2003). This contrasts with Putnam's vision of revitalising American civil society - with the responsibility seemingly to fall upon the individual citizens themselves - that will impact on the development of a nation (Putnam, 2000). In other words, the contention lies whether changes in social capital are significantly and independently contributing to better developmental outcomes, or whether it is the presiding political and economical ideologies that change stocks of social capital, much like how the ideologies influence developmental outcomes. Again, the positioning of social capital in the causal pathway to development outcomes will influence the policies prescribed for development.

To conclude, it may be enlightening to quote Woolcock (1998): social capital is "a crucial but enigmatic component of the development equation, precisely because it can enhance, maintain, or destroy physical and human capital." (p. 186) Difficulties of applying the social capital concept abound, most public health researchers agree that there is value in social capital - in one form or

¹⁵ A type of social capital as classified by Putnam (2000)

¹⁶ A type of social capital as classified by Coleman (1990)

another (Szepter and Woolcock, 2004; Kawachi, 2010). Further conceptual development of social capital is more likely than not to result in the concept playing an important role in public health and other development research.

1.2 Social capital and health

Much like in other fields of social science, there has been much debate about the application of social capital theory in public health research. Part of the problem is that social capital is a concept that was imported from sociology, and it was not developed specific to the health field. Among health researchers, the definitions of Bourdieu (1986), Coleman (1988) and Putnam (1995) have been cited the most (Ferlander, 2007; Derose and Varda, 2009).

From the usage of these three definitions and conceptualisations, Kawachi et al. (2010) identifies broadly two approaches to social capital in public health research: the social cohesion school¹⁷ represented by the works of Putnam (1995; 2000) and Coleman (1990)¹⁸, and network theory school represented by Bourdieu (1986)¹⁹.

The defining feature of the social cohesion school is that social capital tends to be treated as a group characteristic, where a group can be an organisation, a community or a state/province (Kawachi et al., 2010). The focus of analysis is on the contextual effects on health. Additionally, social capital is generally conceptualised as social trust, norms of reciprocity, and the extent of exercising of sanctions (Kawachi et al., 2010). On the other hand, the network theory school treats social capital as both an individual and group characteristic (Lin, 2001; Kawachi et al., 2010). Social capital is typically operationalised as social support, information channels and social credentials (Lin, 2001; Kawachi et al., 2010).

The scale of the group can lead to different hypotheses regarding the mechanisms through which social capital impacts on health outcomes (Kawachi et al., 2010). As an individual-level attribute, the mechanisms through which social relationships may influence health are: social support, social influence, social engagement, person-to-person contact (can restrict or promote exposure to infectious disease agents) and access to material resources (Berkman and Glass, 2000). In turn, these five mechanisms operate through: influencing health behaviours (i.e. social influence may encourage/discourage binge drinking among young adults), psychological mechanisms (i.e. emotional

¹⁷ Navarro (2002) refers to this approach as “communitarianism.”

¹⁸ Kawachi (2010) argues that Coleman’s broad functionalist definition of social capital gives rise to similar operationalisation of the concept similar to Putnam’s approach. Moore et al. (2006) however, regards Coleman being in the network school given that he approaches social capital in terms of resources accessed through social networks. That Coleman regards social capital as resources accessed in networks is not immediately clear from his definition; nonetheless, Coleman does focus on the structure of networks (i.e. closed vs open, and simplex vs multiplex) in contrast to Putnam.

¹⁹ It needs to be said that the distinction in the definitions of social capital between the two schools provided by Kawachi et al. (2010) is not readily clear. They state that the social cohesion school is characterised by the following: “social capital has been conceptualized as the resources [...] available to members of social groups.” (p. 3) They then go on to say that the network theory school defines “[social capital] in terms of the resources that are embedded within an individual’s social networks.” (p. 3) It may thus be useful to employ the analogy provided by Szreter and Woolcock (2004): “...‘mainstream’ social capital literature, represented paradigmatically by the work of Putnam, regards social capital as the ‘wires’ (or social infrastructures) while network theorists regard it as the ‘electricity’ (or social resource).” (p. 5) Features of the ‘wires’ such as social trust and norms of reciprocity are also part of social capital, according to Putnam’s (1995) or the social cohesion conceptualisation.

support to buffer against psychological stress) and physiologic pathways (i.e. getting money to see a doctor for diagnosis) to impact on individual health (Berkman and Glass, 2000). As a group-level characteristic, the different mechanisms have been theorised to be: collective efficacy, informal social control (particularly in closed networks), norms of reciprocity, and via information channels that diffuses health knowledge which exist within network structures (Kawachi, 2010)²⁰. These then have an effect on health outcomes through affecting health-related behaviours, access to services and amenities, and psychosocial processes (Kawachi and Berkman, 2000). To summarise, the mechanisms through which social capital influence individual health outcomes differ depending on whether social capital is considered an individual or group characteristic. One may then argue that both levels of mechanisms impact on health via affecting one or more of the following: health-related behaviours, access to services and amenities, and psycho-physiological processes. Social capital has also been considered beyond the scale of neighbourhood: municipal/county, state/provincial and cross-national levels of social capital have all been considered. Particularly at the macro-level, Kim et al. (2010) notes that policy-related mechanisms may also play a role in affecting physical health outcomes.

There has been various definitions of ‘health’ used in social capital research (Ferlander, 2007). The following is a list of health indicators that have been employed to investigate associations between social capital and health (Derose and Varda, 2009; Almedom and Glandon, 2010; Kim et al., 2010; Lindström, 2010):

1. Physical health indicators:

- (a) all-cause mortality,
- (b) life expectancy,
- (c) self-rated health,
- (d) cardiovascular diseases,
- (e) cancer,
- (f) obesity,
- (g) diabetes,
- (h) infectious diseases.

2. Mental health indicators:

- (a) a wide range of depression scores

3. Mechanisms through which social capital can impact on health:

- (a) health-related behaviours such as smoking, binge drinking, physical activity and drug use, and

²⁰ Through Coleman’s lens, these group-level mechanisms may be seen as actual social capital.

- (b) the extent of health care access measured by access to care, health insurance coverage, and trust in providers.

1.3 Methodologies

Generally, there have been four methods to measuring social capital: economic experiments based on game theory to elicit trust and cooperation (Anderson and Mellor, 2010), qualitative studies (Whitley, 2010), social network analysis (Lin, 2001; Lakon et al., 2010; van der Gaag and Webber, 2010), and surveys (Harpham et al., 2002; Grootaert et al., 2004). Below is an overview of these approaches.

1.3.1 Economic experiments

Fukuyama (2000) gives an economist’s perspective on where social capital comes from: “social capital rises spontaneously as a product of iterated Prisoner’s Dilemma games.” (p. 13) Social capital, often conceptualised by economists as cooperative norms and trust generated through repeated interactions among individuals, is modelled using game theory (Anderson and Mellor, 2010). Two frequently used experiments to observe cooperation and trust are: trust experiments first devised by Berg et al. (1995) and public goods experiments (see Isaac et al., 1984).

Briefly, a two-person trust game involves, say, subjects X and Y. A version of the following ensues²¹: X receives an initial endowment (usually some cash amount) and decides how much (if at all) to give to Y. Y then decides how much of the money he/she will return to X. X’s action is then generally interpreted as the degree of trust. The Nash equilibrium²² for the trust game is that X will not pass any money to Y as Y has no incentive to return any amount of money to X (Anderson and Mellor, 2010). However, results from various experiments find that some X’s do pass some of their initial endowment and this ‘trusting behaviour’ is associated with both individual-level (i.e. gender) and contextual-level variables (i.e. culture) (Anderson and Mellor, 2010). Moreover, from a trust experiment conducted by Glaesar et al. (2000), it was found that respondents’ answers regarding generalised trust do not correspond to ‘trusting behaviour’ (cited from Anderson and Mellor, 2010). It is not surprising that what people say and what people do are at times inconsistent; the moral of the story is to interpret responses from surveys regarding generalised trust with caution.

Public good experiments, on the other hand, usually involve a group of finite subjects ($i = 1, 2, \dots, n$). Each individual receives an initial endowment a_i and has the option to contribute c_i to a public pot ($c_i \leq a_i$), where the total contributions T (i.e. $T = \sum c_i$) will be multiplied by some factor f (f

²¹ There are many variations of trust games. Sometimes the interactions are repeated, sometimes the initial amount passed from X to Y is increased by a pre-determined multiplier.

²² Sethi (2008) provides the following definition: “A pure-strategy Nash equilibrium is an action profile with the property that no single player can obtain a higher payoff by deviating unilaterally from this profile.” (p. 540)

> 1). The amount fT will then be divided among the subjects equally and each subject i will receive fT/n . In the scenario of a Prisoner's dilemma where nf is greater than $a_i - c_i$ (i.e. the amount that was not contributed), the Nash equilibrium predicts that no one will contribute. However, similar to results from trust games, participants of public good games generally contribute a non-zero amount the first time the game is played (Anderson and Mellor, 2010). Individual variables such as gender have not definitively predicted greater cooperation; however contextual variables such as different nationalities and heterogeneity within groups have been associated with significantly different rates of cooperation (Anderson and Mellor, 2010).

Drawing from the results of economics experiments, it appears that controlling for individual attributes is important for empirical studies of social capital. Multilevel studies could be a solution to distinguishing compositional and contextual determinants of social capital. Caution also needs to be exercised regarding self-reported subjective responses in surveys regarding trust.

1.3.2 Qualitative studies

Qualitative research methods refer to a range of methodologies such as ethnography, focus groups and key informant interviews. Different methodologies can answer different types of questions, much like different quantitative research methods (i.e. cross-sectional studies vs randomised control trials). Generally, the aim of qualitative research is to generate comprehensive accounts from individuals and groups of people by conversation, observation and analysis of documents (such as letters and photographs), while situating the subjects of interest into context (Kruper et al., 2008). Contrary to a more deductive approach to data analysis preferred by quantitative research, qualitative research is mostly inductive, letting meaning to manifest from the data collected (Kruper et al., 2008).

Applied to social capital, still an evolving concept in the field of public health, qualitative research may be very useful to explore social capital's potential in different contexts. Also, in depth analysis can help shed light on current debates surrounding the concept of social capital and what it signifies in different contexts, how it could impact health, what types of social capital to measure, and how to measure social capital (Whitley, 2010). Different contexts could yield different meanings attached to social capital and its related components; for example, it was found that in Vietnam, the term 'community' was more geographically defined (one's neighbouring surroundings) whereas in Peru, it was more functionally defined (i.e. support provision regardless of geographical boundaries) (Da Silva, 2006, from Whitley, 2010). Despite the benefits of conducting social capital related research using qualitative methods, the number of quantitative studies far outnumber qualitative studies (see Whitley, 2010). For South Africa, social capital research may benefit from qualitative studies to explore what social capital means to populations of different locations and socioeconomic status (SES), and how/if social capital, after taking into account SES, impact significantly on health outcomes. Certainly, results of qualitative research can also better inform the measures of social capital that quantitative studies can use in the South African context.

1.3.3 Social network analysis²³

Social network analysis, or sociometric techniques, have long been in use in the fields of sociology and anthropology. It might be useful to reiterate that social capital from a social network perspective is defined as the resources that can be accessed by members of a social network and these can come in the form of financial, human or cultural capital (Bourdieu, 1986). Further, social capital can be considered an individual and collective asset (Lin, 2001). Following from Bourdieu's and his own definition, Lin (2001) identifies three elements that needs to be considered when measuring social capital: resources that are 'embedded' in a social structure, the accessibility of the resources by actors within the social structure, and the mobilisation of the resources to either maintain current resources ('expressive actions') or gain new resources that were not formerly possessed ('instrumental actions') by the ego²⁴. These elements are then generally assessed by one of three techniques: saturation survey, name generator and position generator (Lin, 2001). The saturation survey maps pre-define social networks with full details of the location and embedded resources within each node²⁵. The advantage of this approach is the level of detail it can generate, but the depth of information gained is a trade-off with the breadth; saturation surveys are only effective when the size of the network is small. The name-generator technique, as the name suggests, starts of with a list of names given by an ego that are linked to the ego. Information is collected about the relationship between that person and everyone on the list, and also among each other. One can also obtain information about the network resources, and their characteristics and diversity (Lin, 2001). Lastly, the position generator samples positions that are linked to important resources such as position of authority, occupational prestige or position linked to a specific sector, and a respondent is asked whether s/he knows anyone in that position or job (Lin, 2001). The outcomes of interest here are: the number of position accessed, the distance between the 'highest' and 'lowest' position accessed, and the 'highest' position accessed (Lin, 2001). Additionally, these outcomes can shed light on how social institutions and social stratification are linked (for example, see Lin et al.'s examination of family enterprises in Taiwan).

Treating social capital as an individual asset, the sampling techniques mentioned above are usually employed to map out *egocentric* networks (Lakon et al., 2010). As a collective asset, *sociometric* networks are constructed instead, where all ties within the group of interest (i.e. all workers in one company) are considered, not just the ones mentioned by one focal actor (Lakon et al., 2010). While the specific computations for the two levels differ, analysis at both levels concern themselves with the resources embedded in the network and the location of actors in the network. Examples of indicators for resources include the range, variety, composition of resources in the network and contact resources, and for location: strength of tie and access to a 'bridge' (or being in a position

²³ Definitions provided in the footnotes under this section are adapted from Lakon et al. (2010).

²⁴ When examining individual-level social capital, an ego is the focal individual of an egocentric network. An egocentric network is one that is defined from the perspective of the ego for some relationship i.e. work colleagues. For group-level social capital, an ego can refer to a company, a community or a state.

²⁵ A node is a graphical representation of an actor in a sociogram.

of ‘structural holes’ as defined by [Burt, 2001](#)) ([Lin, 2001](#)). The relevance of the content of resources is obvious - an actor can only have the potential to access what is available, and one can see the distribution of resources among actors. The location of an actor in a network is important because it directly impacts on the accessibility and mobilisation of resources available in the network i.e. a company executive is more likely to have access to a large loan from a colleague compared to a blue-collar worker in the same company ([Lin, 2001](#); [Lakon et al., 2010](#)).

There have been calls for public health research to take a social network approach to analysing the relationship between social capital and health (see [Carpiano, 2010](#)). A frequently cited reason is that the three elements of social capital address the inherent inequality in the formation, accessibility and mobilisation of social capital by individuals, unlike Putnam’s approach ([Carpiano, 2010](#); [Lakon et al., 2010](#)). Still, applying a network perspective to social capital in public health research still requires much development. [Carpiano \(2010\)](#) suggests that further qualitative research is needed to understand the determinants of neighbourhood conditions and in turn, what they mean to social capital available to members of the neighbourhood. He further proposes that mapping out resources available to actors can enhance the understanding of how social capital may be beneficial and detrimental to health ([Carpiano, 2010](#)). A resource-based approach may only be feasible when the goal of social capital is made explicit; [van der Gaag and Webber \(2010\)](#) give straightforward examples stating that the type of social capital (or resource) one needs to get a promotion would be different to the type needed to gain acceptance into a prestigious educational institution. Analogously, different resources are needed for improving different types of health outcomes. For example, a rare medical condition will require a specialist while the common cold will not. Thus, when taking the social network approach, one may need to be fairly specific about the type of health outcome when looking at the relationship between social capital and health. No firm conclusions can be drawn from such analysis otherwise. To this extent, network studies that have been carried out in the field of social epidemiology have often had to obtain sensitive medical and/or behavioural information about members in the network of interest ([Marsden, 2006](#)). An example is looking at sexual behaviours and HIV prevalence in a network of high risk individuals. Informed consent from participants and confidentiality of data collected need to be carefully considered when conducting network studies ([Marsden, 2006](#)).

1.3.4 Surveys

Many early studies of social capital have used secondary data collected from social surveys. Although the intention of these surveys were not to measure social capital directly, the data has been used to understand certain limited dimensions of social capital. The General Social Survey (in the U.S.), World Values Survey and country-specific Household Surveys (mostly in developed countries) have been frequently used in social capital research to examine a variety of economic, political and health indicators. However, as [Harpham et al. \(2002\)](#) notes, many of these measures of social capital are unsound as they are consequences/outcomes of social capital rather than social capital itself. This is

particularly problematic if the proxy itself is a predictor of some outcome i.e. high violent crime rates that correlate with mortality measures. It would be difficult to conclude convincingly that it was social capital not high crime rates that has affected mortality measures. Further, Stone (2001) has this to say regarding the tautological reasoning: “research reliant upon an outcome of social capital as an indicator of it, will necessarily find social capital to be related to that outcome, without empirical means to explain why, or indeed whether, this is so [emphasis in original].” (p. 5) On a related note, with regards to research examining social capital and health, Harpham (2010) notes that some social capital indicators that have been used should be more appropriately classified as intermediate variables: “enjoyment of area, desirability to move/stay, neighbourhood quality/desirability (noise graffiti, litter, greenery, facilities), security/crime.” (p. 51)

Efforts have also been made to develop tools that explicitly measure social capital such as the Social Capital Assessment Tool (SOCAT) and the Integrated Questionnaire for the Measurement of Social Capital (SC-IQ)²⁶ both by the World Bank (Grootaert and van Bastelaer, 2002 and Grootaert et al., 2004 respectively), the Adapted Social Capital Assessment Tool (ASCAT) by Harpham and colleagues (2002)²⁷, and the Social Capital Community Benchmark Survey (SCCBS) by the Saguaro Seminar (2002) which is administered in the United States.²⁸ Interestingly, all these surveys include elements of social capital that are from both the social cohesion and social network perspectives. This is probably due to the fact that categorisations of “bonding, bridging and linking” social capital (used in SCCBS) and “structural and cognitive” social capital (used in SC-IQ and ASCAT) require information from both the social cohesion and social network perspective. Also, there is some overlapping with regards to the operationalisation of social capital among the two schools i.e. both use information regarding formal/informal ties and the strength of ties. The dimensions of social capital measured by SC-IQ, ASCAT and SCCBS are summarised in Table 2.²⁹

As suggested in previous sections, social capital has been conceptualised and measured at the micro- (individual/household), meso- (‘community’ or neighbourhood) and/or macro-level (national). There are two ways to measure ecological-level (meso- and macro-level) social capital. The first is by aggregating individual responses of social capital to the level/area of interest (‘neighbourhood’, ‘community’, provincial, or national). Stone (2001) justifies this approach to be appropriate as it gives an indication of the stock and distribution of social capital within an area. The other ecological-level indicators of social capital are those characteristics of the group that are directly observable i.e. paid newspaper circulation, congregation size, union membership, number of voluntary organ-

²⁶ SC-IQ was adapted from SOCAT for developing countries.

²⁷ ASCAT was adapted from SOCAT and shortened for easier administration in routine household surveys.

²⁸ See also Stone, 2001 developed for the Australian context. She has suggested various measurements of community social capital using surveys through the social network lens: the structure of social relations defined by features of the network measured by its type, size, geography, density, heterogeneity, direction of ties; and quality of social relations measured by norms of trust (between familiars or ‘personalised’, between strangers or ‘generalised’ and institutional) and reciprocity.

²⁹ SOCAT is not summarised here as it is a tool that integrates both qualitative and quantitative elicitation of social capital. Further, social capital is collected at the household, community and organisational levels, all with different instruments. For details, please consult Grootaert and van Bastelaer (2002).

isations, number of blood donations, voter turnout, donations to charities etc. Harpham (2010) advocates for both individual- and ecological-level social capital to be measured. By doing so, both the compositional³⁰ and contextual³¹ effects of social capital can be taken into account as each has a different association to health (Harpham, 2010).

Some individual attributes that should be included in the analysis between social capital (at micro-, meso- or macro-level) and health include: sex, age, length of stay in current residence, education, employment, race/ethnicity, homeownership and socioeconomic status (Harpham, 2010). A multi-level analytical approach may be a solution as i) it allows for explicit testing for cross-level interactions between ecological-level social capital and individual characteristics; and ii) it can demonstrate whether ecological-level social capital does in fact have an independent effect on individual outcomes (Kawachi et al., 2010).

³⁰ A compositional effect would be one where observed spatial variation in outcomes is explained by the different individuals that make up the geographical area of interest (Macintyre and Ellaway, 2000).

³¹ A contextual effect would be one where observed spatial variation in outcomes is explained by features of the social or physical environment in the area of interest (Macintyre and Ellaway, 2000).

Table B.2: Dimensions of social capital used by SC-IQ, ASCAT, and SCCBS

SC-IQ ³²	ASCAT ³³	SCCBS ³⁴
1) Groups and networks	1) Participation in organisations	1) Social trust
2) Trust and solidarity	2) Institutional linkages	2) Political participation
3) Collective action and cooperation ³⁵	3) Frequency of general collective action	3) Civic leadership and associational involvement
4) Information and communication	4) Specific collective action	4) Giving and volunteering
5) Social cohesion and inclusion	5) Degree of citizenship	5) Faith-based engagement
6) Empowerment and political action	6) Links to groups with resources	6) Informal social ties
	7) Links to parallel groups	7) Diversity of friendships
	8) General social support	8) Equality of civic engagement
	9) Emotional support	
	10) Instrumental support	
	11) Informational support	
	12) Trust ³⁶	
	13) Fellow feeling	
	14) Reciprocity and co-operation	
	15) Social harmony	
	16) Sense of belonging	
	17) Perceived fairness	
	18) Perceived social responsibility	

³² Structural social capital: 1). Cognitive social capital: 2). Mechanisms through which social capital operates: 3) and 4). Outcomes of social capital: 5) and 6) All dimensions are measured at the individual level (Grootaert et al, 2004).

³³ Structural social capital: 1) - 7). Cognitive social capital: 8) - 18) (Harpham et al, 2002).

³⁴ Bonding, bridging and/or linking social capital can be determined by a combination of the dimensions (Saguaro Seminar, 2002).

³⁵ Grootaert et al. (2004) advise that collective action be considered an output measure of the defined cognitive and structural social capital.

³⁶ Harpham et al. (2002) point out that there is some evidence that shows membership of organisations is not strongly associated with trust and suggest that these two dimensions of social capital be modelled independently. This indicates the necessity to take an inductive approach in empirical studies whereby factor analysis or principal component analysis is carried out to examine the clusters that form from the data extracted from social capital surveys. This allows one to verify empirically that the theorised correlations between different dimension of social capital are valid (Piazzo-Georgi, 2001).

1.3.5 Multilevel analysis of social capital and health

If one or more of the following is the case:

1. the observations analysed are associated with some spatial or temporal effect;
2. the causal processes are theorised to take effect at more than one level simultaneously; and
3. there is a fundamental interest in describing variability in the population of interest on top of explaining average relationships,

multilevel modelling will be appropriate to use (Blakely and Subramanian, 2006).

The following example of a simple multilevel (2-level) analysis has been adapted from Kawachi et al. (2010). Given individual i and neighbourhood j , let y be a continuous individual health outcome, and x be an individual measure of some dimension of social capital (dichotomous outcome, 1 = high, 0 = low). The individual/level-1 model can be characterised by:

$$y_{ij} = b_{0j} + b_1 x_{1ij} + e_{0ij} \quad (1)$$

where the intercept b_{0j} is the mean of the health outcome in neighbourhood j for those reporting high social capital; b_1 is the slope which can be interpreted as the change in y for individuals that reported high social capital; and e_{0ij} is the residual or error term of the individual/level-1 model³⁷. Let b_{0j} be a random variable such that:

$$b_{0j} = b_0 + u_{0j} \quad (2)$$

where u_{0j} captures the specific neighbourhood j 's effect on the mean health outcome b_0 when $x_{1ij} = 0$, independent of the reported social capital. Moreover, u_{0j} is most appropriately treated as a random effect as neighbourhood differences are not due to random error (in which case a fixed-effect approach should be taken), but rather, neighbourhood differences should play a role in predicting individual outcomes (Kawachi et al., 2010). Equation (2) can further be expanded to include a neighbourhood-level social capital \bar{X}_{1j} , which is the proportion of individuals reporting a high level of social capital in the j^{th} neighbourhood:

$$b_{0j} = b_0 + a_1 \bar{X}_{1j} + u_{0j} \quad (3)$$

³⁷ Rewriting equation (1) in a more general form $y_{ij} = b_{0j} + \mathbf{b}\mathbf{x}_{ij} + e_{0ij}$, \mathbf{x} can be extended to a vector of individual-level variables such as gender, age, ethnicity, education, socioeconomic status etc., with corresponding regression coefficients in vector \mathbf{b} (Kawachi et al., 2010).

Substituting equation (3) into (1) gives the following:

$$y_{ij} = b_{0j} + b_1x_{1ij} + a_1\bar{X}_{1j} + (u_{0j} + e_{0ij}) \quad (4)$$

Ceteris paribus (all else equal), a one-unit change in \bar{X}_{1j} will result in a marginal change of a_1 in y_{ij} . That is, given all else equal, a one-unit change in the stock of neighbourhood social capital will result in an increase or decrease (depending on the sign) of a_1 in an individual's health outcome. Equation (4) represents a mixed-effects model where the outcome variable y_{ij} is expressed as the sum of a fixed component $b_{0j} + b_1x_{1ij} + a_1\bar{X}_{1j}$, and a random component $(u_{0j} + e_{0ij})$. Moreover, neighbourhood social capital, an ecological variable, is conceptualised as having a direct effect on the health outcome in equation (4).

There are two other ways that neighbourhood social capital \bar{X} can be conceived to impact on individual health y_{ij} : cross-level effect modification in the relationship between x and y (i.e. neighbourhood social capital modifies the effect of individual social capital on individual health), and having an indirect ecological effect where \bar{X} affects x which in turn affects y (Blakely and Subramanian, 2006). The different types of ecological effects is depicted in the diagrams in Figure 1, where a) represents a direct ecological effect as modelled by equation (4), b) shows cross-level effect modification, and c) indirect ecological effect (adapted from Table 13.2 of Blakely and Subramanian, 2006).

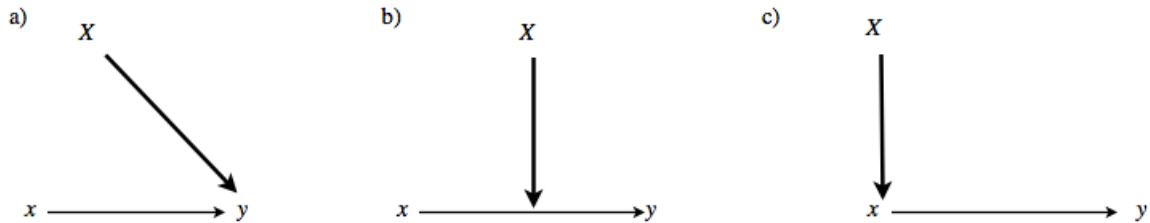


Figure 1: Three types of ecological effects

Lastly, repeated measures from longitudinal panel studies can also be considered with multilevel modelling (Dobson and Barnett, 2008). For instance, repeated measures are on level 1, the different subjects are on level 2, and neighbourhoods on level 3 (Blakely and Subramanian, 2006; Dobson and Barnett, 2008).

1.4 Conceptualisation of social capital and chosen methodologies

The data used for this thesis comes from the National Income Dynamics Study (NIDS), which is the first panel study conducted on a national level in South Africa. The first wave of NIDS was conducted in 2008, and the survey was designed to monitor various dimensions of “well-being” over time. The second wave of NIDS was completed between 2010 and 2011. Social capital was explicitly

mentioned in the dimension “social heritage, including education and employment dynamics, the impact of life events (including positive and negative shocks), social capital and intergenerational developments.” (Brown et al., 2012, p. v) Specifically, one of the contributors of the panel study writes that NIDS “provides an important opportunity to examine the impact of social capital on well-being and social cohesion since data on participation in community and civic organisations has been collected [...] along with information on life satisfaction, happiness, trust, perceived income status of the household and expectations concerning economic mobility in the future.” (Burns, 2009, p. 1) It would seem that the conceptualisation of social capital that NIDS most closely follows is that of Putnam’s work, with “participation in community and civic organisations” as social capital, and the latter (life satisfaction, happiness, trust, perceived income status and expectations of economic mobility) as determinants of social capital. However, it needs to be noted that only membership was asked, information regarding the frequency or degree of participation in the groups by respondents were not collected in the study. Also, these are formal networks. Informal networks were not really considered in NIDS i.e. number of close friends and acquaintances, and the quality of those relationships. It has been found that formal and informal networks have differential associations with health (Ziersch and Baum, 2004). Without considering this aspect of social capital, this presents a limitation in this thesis.

There is some debate surrounding whether trust should be conceived of as social capital; some have argued that trust is a precursor to the formation of social capital (Uslaner, 2002), others have claimed that it is a byproduct of social capital (i.e. Fukuyama’s definition). In this thesis, trust will be conceptualised as social capital as all four major social capital surveys mentioned previously have done so. A distinction will be made between generalised trust and personalised trust, however. Respondents of NIDS were given the following scenario to consider: “Imagine you lost a wallet or purse that contained R200. Is it very likely, somewhat likely, or not likely at all to be returned with the money in it?” Generalised trust would be the situation where the wallet was found by a “complete stranger” and for personalised trust, by “someone who lives close by.”

While Burns (2009) acknowledges that different types of social capital - namely bonding and bridging - have differential impact on well-being, NIDS did not collect data that allows one to differentiate whether the community groups and civil organisations are bonding or bridging networks. That is, one would require information regarding the composition of the groups: race, gender, age, number of members, the extent that groups have contact with other community groups etc. It is also impossible to distinguish between horizontal and vertical networks as information pertaining to whether groups are linked to institutions such as local government and non-governmental organisations were not collected. Furthermore, while norms of reciprocity and associational activities (dimensions of social capital after Putnam) were asked in the first wave, these were no longer asked in the second wave of NIDS. Instead, perceived violence and various types of criminal activities in the neighbourhood were asked. These may be better conceptualised as intermediate variables between social capital and well-being, and will therefore not be considered as social capital in this thesis (recall Harpham, 2010).

Given the limitations in the NIDS dataset, social capital in this study lends itself best to Uphoff (1999)’s dimensions: structural social capital and cognitive social capital. These dimensions can also be applied to Putnam’s definition of social capital, which was the intended conceptualisation of NIDS. It is unfortunate that different dimensions of social capital are not comparable between the first and second wave. Thus, each item of social capital, over and above the overarching dimensions of structural and cognitive, will be considered separately in the analysis. These items are detailed in Table 3 below.

Table B.3: Social capital indicators collected in NIDS

Social capital dimension	Wave 1	Wave 2
Structural (formal networks)	Community group/civic organisation membership	Community group/civic organisation membership
Cognitive	Generalised trust	Generalised trust
	Personalised trust	Personalised trust
	Norms of reciprocity	-
	Norms of associational activity	-

Following previous studies of social capital and health, self-rated health³⁸ will be used as the health outcome. A number of systematic reviews have shown that self-rated health, is a strong and independent predictor of mortality (Idler and Benyamini, 1997; DeSalvo et al., 2005) and other physical health outcomes (Wu et al., 2013). In the South African context, self-rated health has also been shown to be a significant predictor of mortality (Ardington and Gasealahwe, 2012). Strong evidence that shows associations between self-rated health and mental health is lacking, however. One study conducted in Burkina Faso indicated that self-rated health was associated with chronic diseases and functional limitations but not with depression (Onadja et al., 2013); another study conducted in the United States on subjects over the age of 65 showed that depression was strongly associated with poor self-rated health (Han, 2002). Hence, for the purpose of this thesis, self-rated health will be considered a proxy for physical health.

³⁸ This is in reference to responses assessed by a single-item of global health rating: a variation of “How would you rate/describe your health at present? Would you say it is excellent, very good, good, fair or poor?”

2 Empirical review

2.1 Objective

The aim of the thesis is to examine the relationship between social capital and physical health using quantitative methods. For this reason, only quantitative studies that include physical health indicators will be appraised. The review will inspect the following: type of study designs, objectives of the studies, social capital indicators adopted, health indicators (dependent variables) used, analytical techniques, and summaries of the findings. Special attention has been given to retrieve studies conducted in South Africa and other developing countries. The review will conclude by identifying some gaps in the literature and assist further in situating this thesis. Note that this is not a systematic review, but a structured literature review.

2.2 Reviewed studies from developed countries

A total of twelve studies from developed countries are reviewed from 1997 to 2013. PubMed, MedLine and Google Scholar were used to search and identify studies. Studies were chosen to reflect different contexts, manners in which social capital has been conceptualised, and a variety of study designs with corresponding methodologies. Five studies are from the United States, two from England and Japan respectively, and one each from Canada, Australia and South Korea.

Table B.4: Empirical studies of social capital, and health outcomes in developed countries

Author (year)	Type, location and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes [data source(s)]	Analytical methods	Results
Kawachi et al. (1997)	Cross-sectional ecological study, U.S., 1990 N = 7654, Age ≥ 18	To test three hypotheses: i) State variations in income inequality predict the extent of investment in social capital ii) The degree of investment in social capital predicts state variation in total and cause-specific mortality iii) There is little residual direct association between state income inequality and mortality after investment in social capital has been controlled [state variations in poverty using the Robin Hood Index]	<i>Contextual level only</i> i) Civic association membership Per capita group membership at state-level ii) Social trust (aggregated to state-level from individual responses) “Do you think most people would try to take advantage of you if they got the chance, or would they try to be fair?” “Generally speaking, would you say that most people can be trusted or that you can’t be too careful in dealing with people?” iii) Norms of reciprocity (aggregated to state-level from individual responses) “Would you say that most of the time people try to be helpful, or are they mostly looking out for themselves?”	All-cause mortality, cause-specific mortality (coronary heart disease, malignant neoplasms, cerebrovascular disease and unintentional injuries) [Compressed Mortality Files, 1990]	Simple correlation, ordinary least squares (OLS) regression	1) Found an inverse relationship between income inequality and per capita group membership, and positive association between income inequality and lack of social trust 2) High levels of social trust and per capita group membership were associated with lower overall age-adjusted mortality rate, malignant neoplasms, infant mortality and stroke. These associations remained statistically significant after adjusting for state variations in poverty. 3) Lack of reciprocity was associated with higher overall age-adjusted mortality. Conclusion: it is plausible that income inequality leads to increased mortality via disinvestment in social capital.

Empirical studies of social capital, and physical health in developed countries (cont.)

Author (year)	Type, location and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes [data source(s)]	Analytical methods	Results
Kawachi et al. (1999)	Cross-sectional ecological study, U.S., 1993 and 1994 N = 167259, Age ≥ 18	To provide a contextual analysis of social capital and self-rated health, with adjustment for household income, health behaviours and other individual-level covariates. [sex, race, age, health insurance coverage, health checkup in last 2 years, obesity, smoking status, household income, education, living alone]	<i>Contextual level only</i> 1) Civic trust (aggregated to state-level from individual responses) “Do you think most people would try to take advantage of you if they got the chance, or would they try to be fair?” “Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?” 2) Reciprocity (aggregated to state-level from individual responses) “Would you say that most of the time people try to be helpful, or are they mostly looking out for themselves?” 3) Voluntary groups' membership: church groups, sports groups, professional societies, political groups, fraternal organisations Per capital group membership at state-level States then were grouped a priori into 3 levels of trust, reciprocity and group membership: high, medium, low based on cutoff points defined by one standard deviation of the overall mean across all states.	Self-rated health status: 1 = fair/poor, 0 = excellent/very good/ good [Behavioral Risk Factor Surveillance System, 1993]	Logistic regression	1) Living in areas with low level of trust was associated with an odds ratio for fair/poor health of 1.41 (95% CI = 1.33-1.50) compared to those who live in areas with high level of trust. 2) Living in areas with low level of reciprocity was associated with an odds ratio for fair/poor health of 1.48 (95% CI = 1.41-1.57) compared to those who live in areas with high level of reciprocity. 3) Living in areas with low group membership was associated with an odds ratio for fair/poor health of 1.22 (95% CI = 1.14-1.32) compared to those who live in areas with high group membership.

Empirical studies of social capital, and physical health in developed countries (cont.)

Author (year)	Type, location and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes [data source(s)]	Analytical methods	Results
Veenstra (2000)	Cross-sectional, Canada, 1997 N= 534, Age \geq 18	To describe the relationships between individual-level elements of social capital - trust, commitment and identity in the social-psychological dimension; participation in clubs and associations and civic participation in the action dimension - and self-rated health status in Saskatchewan. [household income, education, employment status, age, religious affiliation, gender, marital status, number of children, home ownership]	<i>Individual level only</i> 1) Social-psychological dimension 10 items of political trust, 8 items of trust in neighbours, 3 items of trust in people from respondent's communities, 2 items of trust in people from respondents' part of Saskatchewan, 9 items of trust in people in general 2) Action dimension A civic participation index derived from 11 items which cover the respondents' perceptions of local/federal/national governments' performance.	Self-rated health status: 1 = excellent/good, 0 = fair/poor	Logistic regression	None of the items of trust under the conceptualised social-psychological dimension or civic participation under the action dimension of social capital were found to be statistically significantly associated with self-rated health status.

Empirical studies of social capital, and physical health in developed countries (cont.)

Author (year)	Type, location and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes [data source(s)]	Analytical methods	Results
Kavanagh et al. (2006)	Cross-sectional, Australia, 1998 N = 14495, Age ≥ 18	To provide empirical evidence for the debate regarding the importance of neo-material and psychosocial explanations in a multilevel study of self-rated health in Tasmania. [individual: age, gender, Indigenous status, marital status, education, most recent occupation, household income, smoking status; contextual: statistical local area (SLA) socioeconomic level proxied by Index of Relative Socioeconomic Disadvantage]	<i>Contextual level only</i> 1) Bonding social capital 2 items of social trust 2) Bonding and bridging social capital neighbourhood integration, neighbourhood alienation 3) Linking social capital 5 items of trust in public and private institutions 4) Social capital resources 2 items of neighbourhood safety, and 1 for political participation A score out of 10 was derived for each of the first 5 dimensions using principal component analysis, political participation had a possible range of 0 - 7, depending on the number of activities respondents partook in. Area-level social capital was the mean of each the 6 social capital measures within the SLAs.	Self-reported health status: 1 = fair/poor, 0 = excellent/very good/good	Multilevel logistic regression	After controlling for compositional factors and area-level deprivation socioeconomic level, no area-level social capital indicators were found to be statistically significantly associated with self-rated health (results not shown).

Empirical studies of social capital, and physical health in developed countries (cont.)

Author (year)	Type, location and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes [data source(s)]	Analytical methods	Results
Kim et al. (2006)	Cross-sectional, U.S., 2000-2001 N = 24835, Age \geq 18	To analyse community bonding and community bridging social capital in relation to self-rated fair/poor health. [individual: age, sex, race, marital status, education, household income; contextual: %income \leq \$20000, %education \leq high school, mean age, state community]	<i>Individual and contextual level</i> Individual social capital comprises of formal bonding, trust own race, formal bridging, informal bridging and social trust. Formal bonding and bridging were distinguished by the composition of formal groups in terms of race, sex and education. Informal bridging looks at the diversity in a respondent's social network. Community social capital is assessed by aggregating individual responses to generate group means and proportions of the aforementioned individual-level components.	Self-rated health: 0 = excellent/very good/good; 1 = fair/poor	Multilevel logistic regression	Individual formal bonding social capital, trust own race and generalised social trust were all inversely related with poor self-rated health (adjusted OR: 0.77, 95% CI 0.66-0.88; adjusted OR: 0.88, 95% CI 0.79-0.98; adjusted OR: 0.54, 95% CI 0.49-0.59 respectively). Only community bonding social capital was found to be associated with self-rated health (adjusted OR: 0.90, 95% CI: 0.84-0.97).

Empirical studies of social capital, and physical health in developed countries (cont.)

Author (year)	Type, location and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes [data source(s)]	Analytical methods	Results
Fujiwara and Kawachi (2008)	Cross-sectional, U.S., 1995-1996 N = 1888 (or 944 twin pairs), Age: 25-74	To investigate the impact of social capital on physical health among adult twins. [gender, age, race, education, working status, marital status]	<i>Individual level only</i> Cognitive social capital is comprised of two dimensions: i) social trust: "People in my neighbourhood trust each other" High trust = "a lot" Medium trust = "some" Low trust = "not at all"/"a little" ii) sense of belonging: "I don't feel like I belong to anything I'd call a community" "I feel close to other people in my community" "My community is a source of comfort" All three items were measured on 7-point Likert scale and aggregated to form a "sense of belonging" index. Structural social capital is made up of voluntary work and community participation.	Self-rated health: 1 = poor, 2 = good, 3 = very good, 4 = excellent (modelled as continuous variable)	Generalised estimating equations (GEE) model was used when twins were treated as individuals. Fixed-effects model was used to analyse twin pairs.	1) GEE model Both components of cognitive social capital - social trust and sense of belonging - were positively associated with increased self-rated health ($\beta=0.182$, 95% CI = 0.121-0.243; $\beta=0.140$, 95% CI = 0.080-0.199 respectively). Regarding structural social capital voluntary activity was not found to be significantly associated with self-rated health while community participation was positively associated with increased self-rated health ($\beta=0.044$, 95% CI = 0.005-0.083). 2) Fixed-effects model Among monozygotic twins (n = 351), only social trust was found to be significantly associated with self-rated health ($\beta=0.183$, 95% CI = 0.038-0.327). Among dizygotic twins (n = 593), similar to monozygotic twins, only social trust was found to be significantly associated with self-rated health ($\beta=0.148$, 95% CI = 0.027-0.270).

Empirical studies of social capital, and physical health in developed countries (cont.)

Author (year)	Type, location and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes [data source(s)]	Analytical methods	Results
Beaudoin (2009)	Cross-sectional, U.S., 2007 N = 661, Age ≥ 18	To test the influence of bonding and bridging neighbourliness on self-rated health. [body mass index, gender, household income, age, education, ethnicity, perceived neighbourhood composition in terms of ethnicity]	<i>Individual level only</i> Measured by a set of 4 items with a Likert scale of 1 = never to 5 = very often: how often do you borrow/exchange things with your neighbour; how often do you visit your neighbour, how often have you and your neighbours helped each other with small tasks Bonding and bridging dimension was distinguished by whether the neighbour was of the same ethnicity of the respondent. An index for each dimension was then created by summing the relevant items.	Self-rated health: 1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent	Ordinal logistic regression	Bonding and bridging neighbourliness was found to be significantly associated with better self-rated health (coefficients and level of significance are not reported as it was unclear which categories of self-rated health were used for comparison).

Empirical studies of social capital, and physical health in developed countries (cont.)

Author (year)	Type, location and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes [data source(s)]	Analytical methods	Results
Giordano et al. (2012)	Longitudinal, U.K., 2000-2007 N = 8114 [4 Waves of British Panel Household Study]	To investigate temporal relationships and associations between self-rated health and time-lagged explanatory variables. [social class, education, household income, social support proxied by marital status and frequency of meeting with friends/family, age, gender, smoking status, time]	<i>Individual level only</i> 1) Generalised trust “Would you say that most people can be trusted, or that you can’t be too careful?” 1 = can trust, 0 = can’t trust/it depends 2) Social participation i) Active membership in: political party, trade union, environmental group, parents’/school association, tenants’/residents’ group or neighbourhood watch, church organisation, voluntary service group, pensioner’s group, social club or working men’s club, sports club or Women’s Institute. ii) Frequency of talking to neighbours (1 = more than once a week, 0 = otherwise)	Self-rated health: 1 = good health in 2000, 0 = change to poor health in 2003, 2005 or 2007 Model 2: 1 = poor health in 2000, 0 = change to good health in 2003, 2005 or 2007	Logistic regression with random intercept and lagged explanatory variables Model 1 dealt with the subsample that reported good health at baseline (n = 5689). Model 2 dealt with those that reported poor health at baseline (n = 2425)	1) Model 1: Lagged “lack of trust” at time $t - 1$ is associated with poor self-rated health at time t (adjusted OR = 1.25, 95% CI = 1.10 - 1.42). 2) Model 2: Lagged “trust” and “talks with neighbours” time $t - 1$ is associated with good self-rated health at time t (adjusted OR = 1.25, 95% CI = 1.05 - 1.49; adjusted OR = 1.28, 95% CI = 1.05 - 1.55 respectively).

Empirical studies of social capital, and physical health in developed countries (cont.)

Author (year)	Type, location and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes [data source(s)]	Analytical methods	Results
Iwase et al. (2012)	Cross-sectional, Japan, 2009 N = 2155, Age: 20-80	To examine the potential differential association between bonding social capital and bridging social capital, and health outcomes in Okayama. [age, gender, living with parents/children, education, smoking, body mass index]	<i>Individual level only</i> Classifying groups into bonding and bridging social capital by assessing the homogeneity of the groups with respect to gender, age, group and occupational backgrounds. The following six groups were asked: parents and teachers association, sports clubs, alumni associations, political campaign clubs, citizen's groups and community associations.	Self-reported health status: 1 = fair/poor, 0 = excellent/very good/good	Logistic regression	1) Bridging social capital was inversely related with ill health in both sexes though women seem to benefit more than men as shown in stratified analysis [adjusted OR for women = 0.24, 95% CI = 0.11 - 0.54; adjusted OR for men = 0.47, 95% CI = 0.22 - 0.99]. 2) Bonding capital was not consistently associated with better health in either sex. Conclusion: the results suggest that bonding and bridging capital have different effects on health.

Empirical studies of social capital, and physical health in developed countries (cont.)

Author (year)	Type, location and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes [data source(s)]	Analytical methods	Results
Poortinga (2012)	Cross-sectional, England, 2007 and 2009 N = 17572, Age ≥ 18	To examine: 1) the associations of different aspects of bonding, bridging, and linking social capital with individual self-reported health; 2) whether the different aspects of bonding, bridging, and linking social capital help buffer against the detrimental health influences of neighbourhood deprivation. [gender, age, marital status, children in household, employment status, neighbourhood deprivation proxied by 2004 Index of Multiple Deprivation]	<i>Contextual level only</i> 1) Bonding social capital was assessed by 4 items that examined bonding social cohesion (neighbourhood cohesion, trust, sense of belonging) and civic participation. 2) Bridging social capital was assessed by 4 items that examined bridging social cohesion, and heterogeneous socioeconomic and ethnic relationships. 3) Linking social capital was assessed by 6 items that examined political participation, political activism, political efficacy and political trust.	Self-rated health: 1 = fair/poor/very poor, 0 = very good/good	Multilevel logistic regression	1) For bonding social capital, both bonding social cohesion and civic participation were associated with lower odds of poor self-rated health [adjusted OR = 0.80, 95% CI = 0.77-0.83; adjusted OR = 0.75, 95% CI = 0.69-0.81 respectively, both p < 0.001]. For bridging social capital, only bridging social cohesion and heterogeneous socioeconomic relationships were significantly associated with self-rated health [adjusted OR = 0.84, 95% CI = 0.80-0.88; adjusted OR = 0.91, 95% CI = 0.88-0.95 respectively, both p < 0.001] For linking capital, only political efficacy and political trust was significantly associated with self-rated health [adjusted OR = 0.87, 95% CI = 0.84-0.90; adjusted OR = 0.79, 95% CI = 0.76-0.82 respectively, both p < 0.001] 2) Different aspects of bonding, bridging and linking social capital do not buffer against detrimental influences of neighbourhood deprivation (8 out of the 9 interaction terms were statistically insignificant).

Empirical studies of social capital, and physical health in developed countries (cont.)

Author (year)	Type, location and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes [data source(s)]	Analytical methods	Results
Fujino et al. (2013)	Cross-sectional, Japan, n.d. N = 4735 (age range not defined)	To examine the contextual effect of workplace social capital on systolic blood pressure with consideration to individual factors based on the job-demand-control model. [sex, age, employment grade, body mass index, walking, exercise, number of cigarettes per day, quantitative workload, qualitative job overload, physical demand, job control, interpersonal conflict, supervisor support, coworker support]	<i>Individual and contextual level</i> Relational workplace social capital of individuals is measured by the extent to which: 1) a respondent felt at ease when talking with supervisors /co-workers, 2) supervisors/co-workers were relied on when work difficulties were encountered, 3) supervisors/co-workers were willing to listen to a respondent's personal problems. Responses were based on a likert-scale, 1 = strongly agree to 4 = strongly disagree. Scores of "co-worker support" and "supervisor support" were obtained by adding individual responses giving a possible score range of 3 to 12. Three additional social capital measures were derived: those who answered "strongly disagree" to questions 1), 2) and 3) were classified as having lack of conversable sense with, lack of trust in, and lack of helpfulness from supervisors and co-workers. Workplace social capital was proxied by: 1) Group means of supervisor and co-worker support were obtained within each workplace by aggregating individual responses. 2) Proportions of a lack of conversable sense, trust and helpfulness with supervisors and co-workers at each work place.	Systolic blood pressure (SBP), diastolic blood pressure (DBP)	Multilevel linear regression	1) Higher levels of workplace co-worker support are associated with lower SBP among women ($\beta = -3.59$, $p = 0.034$). No relationship was found among men. 2) No significant associations were found between workplace supervisor support and SBP in either sex. 3) Lack of trust in and helpfulness from co-workers were associated with increased SBP among women ($\beta = 0.61$, $p = 0.002$; $\beta = 0.43$, $p = 0.001$ respectively). No relationship was found among men. 4) No significant association found between workplace social capital and diastolic blood pressure in any sub-samples.

Empirical studies of social capital, and physical health in developed countries (cont.)

Author (year)	Type, location and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes [data source(s)]	Analytical methods	Results
Han (2013)	Longitudinal, South Korea, 2009 and 2010 N = 5482, Age ≥ 18	To examine the association between social capital at the individual level and administrative-area levels and individual self-rated health while adjusting for various confounders at multiple levels using a multilevel analysis with longitudinal data from Seoul Welfare Panel Study. [individual covariates: gender, age, education, marital status, employment status, smoking status, regular exercise, self-rated health in Wave 1; household-level covariates: household income, housing type, disabled household member, car ownership; area-level covariates: area socioeconomic deprivation index which looks at the proportion of car ownership in households, median household income, proportion of households receiving public assistance, proportion of single-parent households with children under the poverty line]	<i>Individual and contextual level</i> 1) Perceived helpfulness assessed by 1 item: “There is no one from whom I can get help or lean on in times of trouble” where 1 = Strongly agree to 5 = strongly disagree. This was dichotomised to 1 = high perceived helpfulness (those who answered “disagree” and “strongly disagree”) and 0 = low perceived helpfulness for the remaining responses. 2) Organisational participation was assessed by the degree of participation (1 = very active to 5 = no participation) in 11 different organisations: alumni associations, groups composed of people with same family name and same family origin on the paternal line, hobby groups, civic/community groups, volunteer/charity groups, education/academic organisations, tenants groups, political parties and professional organisations. A binary variable was derived where 1 = any participation in any groups, and 0 = no participation in any groups. Area-level social capital was obtained from individual social capital using ecometric techniques.	Self-rated health status at Wave 2: “good” = 1 (very healthy/healthy); “poor” = 0 (fair/unhealthy, very unhealthy).	Multilevel logistic regression	1) Regarding individual-level social capital, both higher perceived helpfulness and organisation participation were associated with higher odds of good self-rated health [adjusted OR = 1.24, 95% CI = 1.01-1.52; adjusted OR = 1.31, 95% CI = 1.02-1.69 respectively, both p < 0.05] 2) Area-/contextual-level social capital was not significantly associated with self-rated health.

2.2.1 Summary of studies in developed countries

Study design: Out of the twelve studies reviewed, ten were cross-sectional studies and only two were longitudinal studies. As noted by the authors of the cross-sectional studies, causality cannot be inferred in the relationship of social capital and health (self-rated health and physical health outcomes) as reverse causation cannot be ruled out. The two longitudinal studies, however, each took a different approach to modelling self-rated health. [Giordano et al. \(2012\)](#) split the full sample into two cohorts: one that consists of respondents that had good self-rated health at baseline (Model 1) and another cohort that had bad self-rated health (Model 2). The outcome of interest in Model 1 was “change to bad health” compared to no change, and in Model 2, the outcome of interest was “change to good health” compared to no change. However, change to bad/good health can occur at three possible time points after baseline. If the change occurred at time t , the covariates used (including social capital) would be lagged i.e. independent variable at time $t - 1$. In [Han \(2013\)](#)’s paper, the full sample was used and self-rated health at time t was the predicted outcome, with covariates at time $t - 1$ (including self-rated health at time $t - 1$) as predictors.

Studied samples: The studied samples have varied from nationally representative ones to communities in a specific state ([Veenstra, 2000](#); [Kavanagh et al., 2006](#)) or city ([Iwase et al., 2012](#); [Han, 2013](#)), the workplace ([Fujino et al., 2013](#)), and twins ([Fujiwara and Kawachi, 2008](#)).

Health indicators: Only two studies did not use self-rated health status as the outcome of interest: [Kawachi et al. \(1997\)](#) used all-cause and cause-specific mortality rates and [Fujino et al. \(2013\)](#) used systolic and diastolic blood pressure (both continuous variables). In other words, only two studies used objective health indicators while the majority have used a subjective measure of health. Common method bias can occur when self-rated health is coupled with certain facets of social capital that rely on subjective responses ([Fujiwara and Kawachi, 2008](#)). On another note, self-rated health has been treated as a continuous variable ([Fujiwara and Kawachi, 2008](#)), ordinal categorical variable ([Beaudoin, 2009](#)) and binary variable. Of those that were binary variables, the five-category self-rated health combined “excellent,” “very good,” and “good” together, and “fair” and “poor” were collapsed into another category. Where there were only four categories, “excellent” and “good” were collapsed together, and “fair” and “poor” into another. The different types of health variables then corresponded to different analytic methods: ordinary least squares and generalised estimating equations were used for continuous outcomes, ordinal logistic regression for ordinal categories of self-rated health, and logistic regression for binary outcomes.

Covariates (excluding social capital indicators): Individual-level variables that have been controlled for include: age, sex/gender, ethnicity/race, marital status, education, household income, number of children, home ownership, smoking habits, obesity/body mass index, living alone, health insurance coverage, religious affiliation, employment status, occupation type, health checkup in

last two years, perceived neighbourhood composition in terms of ethnicity, social support, living with parents/children, frequency of exercise, housing type, having a disabled household member, car ownership, workload, job control, degree of interpersonal conflict, social class. Associations between covariates and self-rated health are not always reported; however, for those that are, the variables that have consistently shown significant associations are: age, race, education, marital status, employment status, household income and body mass index/obesity. Being male has been found to have differential association to self-rated health compared to females in: [Veenstra \(2000\)](#), [Kawachi et al. \(1999\)](#), [Kavanagh et al. \(2006\)](#), [Giordano et al. \(2012\)](#), [Iwase et al. \(2012\)](#) and [Fujino et al. \(2013\)](#). In [Kim et al. \(2006\)](#), [Beaudoin \(2009\)](#) and [Han \(2013\)](#), however, this association was not significant. Smoking status has also been inconsistent: [Han \(2013\)](#) did not find this to be significantly associated to self-rated health status while [Kawachi et al. \(1999\)](#), [Kavanagh et al. \(2006\)](#) and [Giordano et al. \(2012\)](#) did.

Contextual-level variables usually measure characteristics of the area of interest (neighbourhood/community/state): income inequality, index of poverty/deprivation, percentage of population that received below high school education and the mean age. The only contextual-level variable that demonstrated a significant association with self-rated health in more than one study was an index of poverty/deprivation in the area of interest as shown in [Kavanagh et al. \(2006\)](#) and [Poortinga \(2012\)](#). Both studies all showed that neighbourhood deprivation is associated with higher odds of poor self-rated health.

Social capital indicators: The two most frequently used dimensions of social capital in studies post 1999 are: bonding/bridging, and structural/cognitive social capital. Only [Kavanagh et al. \(2006\)](#) looked at linking social capital, but bonding and bridging social capital were combined into one index, rendering it difficult to distinguish the potentially different effects. There were also studies that only included a single item to proxy for cognitive social capital: [Han \(2013\)](#) used a single item that assessed “perceived helpfulness” and [Giordano et al. \(2012\)](#) had one question on “generalised trust.” Both of these studies used data collected from a panel study which could explain their limiting approach as questions pertaining to social capital can only take up a small section of the whole questionnaire. However, it has been noted that questions that rely on single-item responses lack reliability ([Harpham, 2010](#)). Then, [Beaudoin \(2009\)](#) perceived social capital as “neighbourliness,” which included items that assessed reciprocity and informal ties, but did not consider any formal associational activities. [Iwase et al. \(2012\)](#) only considered structural social capital but distinguished between bonding and bridging structural social capital. Lastly, regarding [Fujino et al. \(2013\)](#), only (workplace) cognitive social capital was considered but one may argue that horizontal and vertical ties could be distinguished as items of trust and helpfulness were related to co-workers (equal power/status at the workplace) and supervisors (unequal power/status at the workplace).

Individual-level social capital, contextual-level social capital or both: Four studies considered social capital as solely a contextual-level variable, five as strictly an individual-level variable and three accounted for social capital as both an individual-level and contextual-level variable. Both studies led by Kawachi (1997; 1999) considered social capital as a contextual-level variable at the time that researchers were trying to distinguish social capital from the well-established individual-level factor, social support (see Kawachi et al., 2004). However, only considering social capital as a contextual variable ignores the compositional effects of social capital, and the potential interaction between the two levels of social capital. Similarly, the studies that only considered individual-level social capital could not comment on the contextual effects of social capital or the potential interactions. Giordano et al. (2012) justified their use of individual-level social capital by citing multilevel studies that found contextual-level social capital being able to explain, if at all, only a very small amount of total variation (maximum 4%) in individual health status. They further express their concerns with the methodological problems to obtain group means of social capital by aggregating individual responses to the area of interest. Interestingly, Han’s multilevel study also found no area-level social capital to be significantly associated with self-rated health. However, instead of using group means, econometric methods which give more precise estimates of contextual variables were used.

The relationship between social capital and self-rated health found in the reviewed studies has been inconsistent. Among those that considered individual-level social capital:³⁹

- Veenstra (2000) found that none of the social capital indicators used in his study were significantly associated with self-rated health;
- Fujiwara and Kawachi (2008) found that only cognitive social capital was significantly associated with self-rated health (positively associated with better self-rated health) but not structural social capital;
- Beaudoin (2009) found that both bonding and bridging “neighbourliness” were positively associated with better self-rated health;
- Iwase et al. (2012) found that bonding (structural) social capital was not significantly associated with self-rated health but bridging social capital was (inversely related to poor self-reported health); and
- Giordano et al. (2012) found that only “generalised trust” was associated with self-rated health (present lack of trust was associated to future poor self-rated health) but not social participation.

Among those that considered contextual-level social capital:⁴⁰

³⁹ All five studies took into account compositional factors.

⁴⁰ Kawachi et al. (1997) was an ecological study which did not consider compositional factors.

- [Kawachi et al. \(1997\)](#) found that high levels of social trust and per capital group membership were associated with lower levels of age-adjusted all-cause mortality rate and other cause-specific mortality rates;
- [Kawachi et al. \(1999\)](#) found that lower levels of civic trust, reciprocity and voluntary group membership, were associated with higher odds of poor self-rated health;
- [Kavanagh et al. \(2006\)](#) found that no bonding, bridging or linking social capital were significantly associated with self-rated health;
- [Poortinga \(2012\)](#) found that different aspects of bonding, bridging and linking social capital were significantly associated with self-rated health.

Among those that considered social capital at both an individual and contextual level:⁴¹

- [Kim et al. \(2006\)](#) found that only community bonding social capital was associated with self-rated health (but not bridging), whereas higher stocks of individual-level bonding social capital and generalised trust were associated with decreased odds of poor self-rated health;
- [Han \(2013\)](#) found that both individual-level social capital indicators (one cognitive and one structural) were associated with higher odds of good self-rated health but no administrative-area-level social capital were found to be significantly associated with self-rated health.

2.3 Reviewed studies in developing countries

Fifteen studies from developing countries between 2000 and 2013 have been reviewed. As mentioned previously, extra attention has been dedicated to retrieve studies conducted in South Africa and other developing countries. PubMed, MedLine, African HealthLine, Google Scholar have been used in the search and identification of such studies. Search terms that were used include: “social capital,” “health,” “South Africa,” “Africa,” “sub-Saharan Africa,” “low-middle income,” “developing,” “southeast Asia,” “Asia,” “South America,” and “latin America.” The results were: eight studies from sub-Saharan Africa (six of which were from South Africa), three in Asia, four in South America and one in Europe. Compared to developed countries, the number of studies that appeared in search results for developing countries were significantly fewer.

⁴¹ Both studies took into account compositional factors. [Fujino et al. \(2013\)](#) was not included here as individual-level social capital associations were not reported.

Table B.5: Empirical studies of social capital, and health outcomes in developing countries

Author (year)	Type, country, and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes	Analytical methods	Results
Rose (2000)	Cross-sectional, Russia, 1998 N = 1904, Age \geq 18	To test the extent that health variations in Russia are due to involvement with or exclusion from social networks [education, age, gender, total household income from all sources, subjective socioeconomic status]	<i>Individual level only</i> 1) Social integration measure by nine items: membership in a formal organisation, church attendance, living in a village where face-to-face contacts facilitate informal networks, primary reliance on government's welfare state network for help, family membership in the communist party and opinion forming networks. 2) Two measures of attitudes that arise from and/or predispose individuals toward involvement: generalised trust, and sense of being able to control one's life. 3) Use of anti-modern networks, market networks and informal networks in a variety of situations. 4) Health-specific behaviours: friends will help if ill, exercise, smoker, makes informal payments to doctors	Self-reported physical health (continuous): 5 = very good, 4 = good, 3 = average, 2 = poor, 1 = very poor.	OLS multiple regression	Generalised trust, sense of being able to control one's life, and use of market networks and informal networks are positively associated with better self-reported physical health (all $p < 0.05$).

Empirical studies of social capital, and physical health in developing countries (cont.)

Author (year)	Type, country, and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes	Analytical methods	Results
Campbell et al. (2002)	Cross-sectional, South Africa, 1998 N = 1211, Age: 13-60	To investigate the possible associations between social capital and HIV (human immunodeficiency virus)-related sexual health [age, gender]	<i>Individual level only</i> Civic engagement/participation measured by levels of membership of a range of community and social groups: stokvels, churches, political parties, sports clubs, burial societies, youth groups, residents associations and women's groups.	HIV status	Multivariate analysis of variance	<p>Positive associations between social capital and sexual health among men: Church membership decreases likelihood of casual partners among all men and alcohol consumption among older men. Sports club membership decreases the likelihood of being HIV positive among young men.</p> <p>Positive associations between social capital and sexual health among women: Youth group membership decreases likelihood of being HIV positive and casual partners among young women. Sports club membership decreased the likelihood of being HIV positive but increased likelihood of condom usage.</p> <p>Negative associations between social capital and sexual health: Stokvel membership increased the likelihood of being HIV positive and alcohol consumption among young men. For women, it increased the number of casual partners and alcohol consumption among younger age groups.</p> <p>Conclusion: the effects of associational membership on sexual health are ambiguous.</p>

Empirical studies of social capital, and physical health in developing countries (cont.)

Author (year)	Type, country, and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes	Analytical methods	Results
Gilbert and Soskolne (2003)	Cross-sectional, South Africa, 1997 N = 2947 (age range unspecified)	To analyse the relationship between health and a range of social factors in Soweto, a relatively socially and economically deprived community. [age, gender, marital status, living arrangements, household structure, education, household income, employment status, type of settlement, basic living condition]	<i>Individual level only</i> ⁴² 1) Perception of quality of the living environment measured by three items: an evaluation of Soweto as a pleasant place to live, whether participants would recommend it to family and friends, and whether they or their family have been exposed to crime. 2) Access to social resources: use of library, bookshop, Bill of Rights, and community policing.	Self-assessed health: 3 = good, 2 = fair, 1 = bad (ordinal) for univariate analysis; 1 = good/fair health, 0 = bad health (binary) for multivariate analysis	Non-parametric chi-squared test for univariate analysis, logistic regression for multivariate analysis	After controlling for socioeconomic covariates, those who perceived a low quality of living and have low access to social resources are more likely to report poorer self-assessed health, compared to those who perceived a good quality of living and high access to social resources.
Gregson et al. (2004)	Cross-sectional, Zimbabwe, 1998-2000 N = 2268, Age: 15-24	To describe the relationships between memberships of different forms of community groups and young women's chances of avoiding HIV. [age, education, marital status]	<i>Individual-level social capital</i> 1) Group membership in: youth, sports, AIDS, women's, church, cooperatives and farmers groups, burial societies, savings and rotating credit societies, and political parties. 2) Whether the groups were perceived to be well- or poor-functioning.	HIV status (0 = HIV+/"did not avoid infection," 1 = HIV-/"avoided infection")	Logistic regression	1) Members of well-functioning groups were less likely to be HIV+ (or less likely to have "avoided HIV infection") compared to those who were not members of any groups or were members of poor functioning groups (adjusted OR = 1.33, p = 0.039). 2) Members of youth groups were less likely to be HIV+ while those belonging to savings clubs and political parties were more likely to be HIV+.

Empirical studies of social capital, and physical health in developing countries (cont.)

Author (year)	Type, country, and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes	Analytical methods	Results
von Maltitz (2005)	Longitudinal, South Africa, 1998-2004 (2 waves) N = 1717 Age \geq 15	Identify the effects that seven different categories of network social capital have on individual self-rated health, using household- and individual-level panel data from the Kawzulu-Natal Income Dynamics Study. [household welfare, age, gender, race, education, marital status, household composition, urban/rural, number of ill persons in household]	<i>Individual- and contextual-level social capital</i> Individual: total memberships in church groups, finance groups, production groups, private interest groups, community groups, political groups, other groups. Household: sum of individual memberships per household. Cluster/community: availability of civic/social groups in the communities determined by focus groups.	Self-rated health: 0 = fair, poor, very poor 1 = good, very good	Random effects probit regression where health and covariates were both modelled at time t . Multinomial probit model was used where the reference group was "no change in health", 1 = deterioration in health, 2 = improvement in health.	$t = 1998$ No individual-level social capital was significantly associated with self-rated health when both were considered at time t . At the household level, both finance and service group memberships were significantly associated with higher probabilities of good self-rated health ($\beta = 0.070$, $p \leq 0.05$; $\beta = 0.441$, $p \leq 0.05$ respectively). At the community level, availability of church groups was associated with higher probability of poor self-rated health, whereas the availability of finance groups was associated with higher probability of good self-rated health ($\beta = -0.013$, $p \leq 0.01$; $\beta = 0.03$, $p \leq 0.01$ respectively). $t = 2004$ At the individual level, membership in "other groups" in 1998 was associated with higher probability of good self-rated health in 2004 ($\beta = 6.627$, $p \leq 0.01$). No household- or community-level ⁴³ social capital in 1998 was significantly associated with self-rated health in 2004.

Empirical studies of social capital, and physical health in developing countries (cont.)

Author (year)	Type, country, and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes	Analytical methods	Results
Yip et al. (2007)	Cross-sectional, China, 2004 N = 1218, Age: 16-80	To examine empirically relationships between social capital and health and well-being. [age, gender, household size, household income, household assets index, occupational status, education]	<i>Individual and contextual level</i> Structural social capital was proxied by organisational membership in: farmer's association, trade association, woman's association, groups formed for various cultural activities, and political parties. Cognitive social capital was measured by twelve items about trust, reciprocity and mutual help. Factor analysis confirmed that all twelve items loaded in a one-factor solution so an overall score for "trust" was derived. Individual mean levels of structural and cognitive social capital was aggregated to the village level.	Self-reported general health (binary): 0 = excellent/good, 1 = fair/poor	Multilevel logistic regression	At the individual level, party membership and trust is significantly associated with lower odds of poor self-reported health. At the village level, neither trust nor any organisational membership was significantly associated with self-reported health.

Empirical studies of social capital, and physical health in developing countries (cont.)

Author (year)	Type, country, and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes	Analytical methods	Results
Pronyk et al. (2008)	Cross-sectional, South Africa, 2004 N = 1063, Age: 14-35	To examine associations between social capital and HIV risk among poor households in Limpopo. [age, education level, marital status, current employment/school enrolment, have had children in females, duration of local residence, non-fixed asset index]	<i>Household-level social capital</i> 1) Structural social capital was measured by group membership (religious affiliations, economic groups, political groups, sports groups, cultural groups and other) and level of membership (1 = member, 2 = active attender, 3 = group leader). 2) Cognitive social capital was an aggregate score from 9 items that measured: perceived levels of reciprocity and community support; perceived solidarity in responses to a crisis event; and participation on collective action.	HIV prevalence at follow-up and incidence	Logistic regression ⁴⁴	1) Among males, cognitive social capital was a significant predictor of HIV prevalence at follow-up ($p < 0.05$), but not incidence. Structural social capital was not a significant predictor in either HIV prevalence or incidence. 2) Among females, cognitive social capital was not a significant predictor of HIV prevalence or incidence. However, structural social capital was associated with higher odds of HIV prevalence and incidence (both $p < 0.05$).

Empirical studies of social capital, and physical health in developing countries (cont.)

Author (year)	Type, country, and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes	Analytical methods	Results
Borges et al. (2010)	Cross-sectional, Brazil, 2009 N = 363 Age: 15-17	To examine the association between social capital and self-rated health among the youth, and to distinguish between the different forms of social capital (cognitive vs behavioural/structural, and bonding vs bridging). [sex, age, ethnicity and educational background]	<i>Individual-level social capital (14 items adapted from SC-IQ)</i> 1) Behavioural social capital (also known as structural) was assessed by 4 items: participation in community activities during the past twelve months, time/money contributed to a community project, whether the youth belonged to a group, whether they had a close friend, and whether they got together with people to have food or drink in the last month. 2) Cognitive social capital was assessed by 6 items: trust in others, perceived helpfulness of neighbours, perceptions of whether the youth could borrow money from others in times of need. 3) Bonding vs bridging capital was assessed by 4 items: whether the youth has associated with others from different backgrounds in terms of ethnicity, economic, social status and religion (yes = bridging, no = bonding).	Self-rated health status: 0 = very good/good/fair, 1 = poor/very poor	Logistic regression	1) In the behavioural social capital dimension, only one item - not contributing time to a community project - was significantly associated with poor self-rated health (adjusted OR = 1.9, 95% C.I. = 1.1-3.7). 2) In the cognitive dimension, having no one to borrow money from and agreed that some was likely to take advantage of them, were both significantly associated with poor self-rated health (adjusted OR = 2.1, 95% C.I. = 1.1-4.3; adjusted OR = 2.9, 95% C.I. = 1.2 - 7.2 respectively). 3) Only those that reported not to have gotten together with people of different social status were significantly associated with poor self-rated health (adjusted OR = 2.3, 95% C.I. = 1.1 - 5.2).

Empirical studies of social capital, and physical health in developing countries (cont.)

Author (year)	Type, country, and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes	Analytical methods	Results
Modie-Moroka (2009)	Cross-sectional, Botswana, n.d. N = 388, Age > 18	To describe the relationships among neighbourhood characteristics, social capital and health outcomes among low-income urban residents in Francistown, Botswana [age, marital status, income, employment status, religion, housing quality, education, number of people in house, number of children, migration status, rural-urban linkage, ownership of property, alcohol and smoking habits, environmental quality/neighbourhood deprivation]	<i>Individual level only</i> A social capital index which scored two categories of social capital: perceived social capital on an individual level and an objective measure of community participation. Perceived social capital was determined by 37 items with Likert-type scales (1 = Strongly disagree to 5 = Strongly agree) which explores the dimensions of community integration, trust, strength of civic associations and personal involvement in the community. These items totalled to create a score. (It was unclear how community participation was objectively measured.)	World Health Organisation's health-related Quality of Life (HrQoL) scores: physical and level of independence domain	Bivariate correlations, hierarchical moderated multiple regression	In the multivariate analyses, environmental quality was a strong independent predictor for all domains of health after controlling for all covariates. Social capital was a significant effect modifier for physical health and level of independence domains. As a main effect, higher levels of social capital was significantly associated with better scores in the physical health domain but not level of independence.

Empirical studies of social capital, and physical health in developing countries (cont.)

Author (year)	Type, country, and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes	Analytical methods	Results
Cramm and Nieboer (2011)	Cross- sectional, South Africa, 2007 N = 1020, Age>18	To test the hypothesis tht social capital, conceived as a socioeconomic condition, affects health among poor communities. [marital status, age, gender, employment status, education, income, housing quality measured by presence of leaky roof and formally built house, and neighbourhood quality measured by crime in the area and residents receiving rent]	<i>Individual-level social capital</i> Participants were asked to rate their agreement on a four-point scale with regards the following statements: i) Social cohesion “People in this neighbourhood are friendly.” ii) Reciprocity “People in this neighbourhood help each other without being asked.” iii) Trust “People in this neighbourhood trust their neighbours.” The scores of all the above items were totalled and divided by three to obtain an overall social capital score.	Self-rated health status: 4 = excellent, 3 = very good, 2 = good, 1 = fair, 0 = poor.	Ordinal logistic regression	Higher scores of social capital was related to an increased odds of good health (adjusted OR = 1.65, $p \leq$ 0.001).

Empirical studies of social capital, and physical health in developing countries (cont.)

Author (year)	Type, country, and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes	Analytical methods	Results
Hurtado et al. (2011)	Cross-sectional, Colombia, 2004-2005 N = 3025, Age ≥ 18	To examine associations of different components of social capital with self-rated health in Colombia. [age, sex, marital status, education, monthly household income, employment status, urban/rural origin]	<i>Individual level only</i> ⁴⁵ 1) Structural-formal social capital was assessed by associational membership and non-electoral political participation. 2) Structural-informal social capital was assessed by participation in civic activities and volunteering. 3) Cognitive social capital was assessed by reciprocity and interpersonal trust.	Self-rated health: 1 = very good/good, 0 = fair/poor	Principal component analysis, multilevel logistic regression	1) Only interpersonal trust demonstrated significant association with self-rated health: higher levels of interpersonal trust were associated with decreased likelihood of poor self-rated health (adjusted OR: 0.64, 95% CI = 0.48 - 0.85) 2) When associational membership was disaggregated into the different groups, it was found that membership of farmers/agricultural and gender-related organisations was significantly associated with higher odds of fair/poor self-rated health compared to non-members (adjusted OR: 1.82, 95% CI = 1.21 - 2.74; adjusted OR: 1.70, 95% CI = 1.01-2.87 respectively). On the other hand, membership in other groups was negatively associated with fair/poor self-rated health (adjusted OR: 0.82, 95% CI = 0.67-0.99). 3) When stratified according to rural/urban origin, it was found that: 3.1) Cognitive social capital was associated with higher odds of very good/good self-rated health (adjusted OR = 0.78, 95% CI = 0.67-0.91) but non-electoral political participation was associated with higher odds of fair/poor self-rated health (adjusted OR = 1.51, 95% CI = 1.09-2.09); 3.2) Only interpersonal trust was significantly associated with self-rated health: higher levels of interpersonal trust was associated with better self-rated health (adjusted OR = 0.54, 95% CI = 0.35-0.83).

Empirical studies of social capital, and physical health in developing countries (cont.)

Author (year)	Type, country, and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes	Analytical methods	Results
Ronconi et al. (2012)	Cross-sectional, Argentina, 1997 N = 6287, Age \geq 65	To estimate a causal effect of individual-level social capital on health using a measure of informal social interactions as social capital. [age, marital status, education, income per capital within household, household size, distance to nearest public hospital, contamination problem in neighbourhood; two items relating to transportation problems and lack of public transport were included as instrumental variables]	<i>Individual-level social capital</i> An “Informal Social Interactions Index” was constructed from three binary variables (yes/no): ⁴⁶ i) whether or not a person often meets with friends; ii) whether or not a person often meets with relatives; iii) whether or not a person reports living alone. The index is generated by adding the first two items and subtracting the last.	Self-rated health: 0 = no health problems, 1 = some health problems (treated as a continuous variable)	Limited information maximum likelihood model using two instrumental variables (IV)	Having informal social interactions is significantly associated with health problems in both men and women ($\beta = -0.676$ and -0.674 respectively, both $p < 0.01$).
Lamarca et al. (2013)	Cohort, Brazil, 2008-2009 N = 685, Age \geq 13	To investigate the association of neighbourhood and individual social capital with consistent self-rated health in women between the first trimester of pregnancy and 6 months post partem. [age, ethnicity, number of children in family after pregnancy, education, occupation, family income, family structure, housing condition, prevalence of diabetes, hypertension and urinary infection during pregnancy (self-reported)]	<i>Individual and contextual level</i> 1) Neighbourhood social capital was scored (out of 100) from items that measure social trust, social control, neighbourhood security and political efficacy. 2) Individual social capital was assessed by Five items that pertains to social networks and nineteen to social support (material, affective, emotional, positive social interaction and informational support).	Self-rated health status: “good” = excellent, very good, good; and “poor” = fair, bad.	Multilevel logistic regression	1) Low individual social capital assessed by the extent of social support and social network is a significantly associated with women who consistently had poor self-rated health compared to those who consistently had good self-rated health (adjusted OR = 0.82, 95% CI = 0.73-0.90; adjusted OR = 0.61, 95% CI = 0.37-0.99 respectively). 2) No significant association was found for neighbourhood social capital.

Empirical studies of social capital, and physical health in developing countries (cont.)

Author (year)	Type, country, and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes	Analytical methods	Results
Sujarwoto and Tam-pubolon (2013)	Cross-sectional, Indonesia, 2007 N _{mother} = 3450, N _{children} = 4612	To examine the relationship between mother's social capital and children's health [mother's characteristics: age, education, height, self-reported health status, kinship ties, household below median per capita expenditure; child's characteristics: age, gender, birth weight; community characteristics: per capita community expenditure, received underdeveloped village funds, village heads with graduate education or more, urban/rural]	<i>Individual and contextual level</i> 1) Mother's social capital was based on a score (out of 5) based on the participation in: community meetings, cooperatives, voluntary labour, village, upkeep and women's associations. 2) Community social capital was an aggregate score of the availability of the following: village cooperatives, youth groups, religious activities, family groups and neighbourhood security groups.	Child height-for-age, weight-for-age	OLS with IV approach	1) OLS without IV: All else equal, a one unit increase in the mother's social capital score is associated with 0.023cm increase in height; and 0.051kg increase in weight (both p<0.05). All else equal, a one unit increase in the community social capital score is associated with 0.026kg increase in weight (p<0.05). 2) OLS with IV: All else equal, a one unit increase in the mother's social capital score is associated with 0.179cm increase in height (p<0.001); and 0.147kg increase in weight (p<0.05). All else equal, a one unit increase in the community social capital score is associated with 0.043kg increase in weight (p<0.05). Remark: the effects of a mother's social capital and community social capital are greater on a child's health when instrumental variables are used.

Empirical studies of social capital, and physical health in developing countries (cont.)

Author (year)	Type, country, and year of study	Objectives of the study [covariates]	Social capital indicator(s)	Health outcomes	Analytical methods	Results
Chola and Alaba (2013)	Cross-sectional, South Africa, 2013 N = 13381	To examine how individual and neighbourhood level social capital, and neighbourhood deprivation relate to self-rated health using a multilevel analysis. [gender, marital status, age, education, employment, recipient of grants, urban/rural, smoking, neighbourhood deprivation]	<i>Individual and contextual level</i> 1) Civic participation was evaluated on individual membership in at least one or more groups out of 18 (1 = member, 0 = not a member in any of the 18 groups). 2) Social trust was assessed by a question that asked individuals the likelihood of a neighbour returning a lost wallet containing R200, to which participants responded: very likely, somewhat likely, and not likely 3) Contextual social capital was a summative index that included the following questions: i) "How common is it that neighbours help each other out?" ii) "How common is it that neighbour do things together?" iii) "How common is it that people in your neighbourhood are aggressive?" iv) "How common is burglary and theft in your neighbourhood?" Responses of "never happens" (1 point) to "very common" (5 points) were recorded for each question and summed to have a final possible range of 0 to 20. These questions were recorded at the household level and aggregated up to the neighbourhood level. ⁴⁷	Self-rated health: 1 = good/very good/excellent, 0 = fair and poor	Multilevel logistic regression	1) Neither of the individual-level social capital variables examined, social trust and civic participation, were found to be significantly associated with self-rated health. However, a significant positive association was detected between neighbourhood-level social capital and good self-rated health after controlling for all covariates. 2) When the analysis was stratified by province, it was found that social trust was positively associated with good self-rated health in the North West but negatively associated with good health in Limpopo. On the other hand, neighbourhood social capital was negatively associated with good health in the Western Cape and Mpumalanga, while the reverse is true in North West and Gauteng.

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- ⁴⁷ Although the paper does not explicitly examine the concept of social capital and its impact on health, this was the first study, to the author's knowledge, to examine social factors, some of which can be considered components of social capital, on self-rated health in South Africa. The authors state the following: "The intention of this paper is to examine what variables within those included in the survey might further our understanding of the relationship of the relationship between health and social characteristics, rather than to focus on the complex and problematic nature of the concept 'social capital.'" (p. 196) Furthermore, family and social networks measured by number of close family and friends within walking distance, and number of visits to relatives and friends, were not considered as "social capital" and not included in multivariate analysis.
- ⁴⁸ While von Maltitz reported that no lagged community-level social capital was significantly associated with self-rated health, the table of results on p. 123 indicate otherwise; the availability of finance and service groups were more likely to report poor self-rated health, and the availability of production and political groups were more likely to report good self-rated health.
- ⁴⁹ Pronyk et al. stated that a logistic regression was used to model HIV prevalence; however, it is not clear how this was done given that HIV prevalence is a continuous variable.
- ⁵⁰ Hurtado et al. fitted a multilevel random intercept null logistic regression model and found not significant variation of self-reported health at the departmental (meso) level therefore social capital was only examined at the individual level.
- ⁵¹ Nowhere do Ronconi et al. explicitly state how the three items that formed the "Informal Social Interaction Index" were dichotomised. It is therefore not clear how their measure of social capital is associated with having health problems. The conclusion that the authors give is also ambiguous at best: "social capital matters in the determination of health" but they do not say whether it matters positively or negatively for health. Given that increased age has generally been found to be positively correlated with poor self-rated health, one can possibly assume that the same relationship exists between social capital and "some health problems" as the signs for the coefficients of age and the Informal Social Interaction Index are the same.
- ⁵² It was not explicitly stated in the paper whether items iii) and iv) were reverse coded.

2.3.1 Summary of studies from developing countries

Study design: Out of the fifteen studies reviewed, thirteen were cross-sectional studies and only two were longitudinal studies. One of the longitudinal studies was von Maltitz (2005) who used two waves of panel data in 1998 and 2004 using social capital and other covariates in 1998 to predict self-rated health in 2004. The other was a cohort study by Lamarca et al. (2013) which selected a part of the full sample that did not report a change in self-rated health status between baseline and exit i.e. good self-rated health at baseline and exit, and bad self-rated health at baseline and exit. These two groups then were compared with regards to the covariates and social capital indicators.

Studied samples: The studied samples have varied from nationally representative ones (Rose, 2000; Hurtado et al., 2011; Chola and Alaba, 2013) to communities in a specific province (von Maltitz, 2005; Yip et al., 2007) or within specific communities (Campbell et al., 2002; Gilbert and Soskolne, 2003; Modie-Moroka, 2009; Cramm and Nieboer, 2011), the youth (Gregson et al., 2004; Pronyk et al., 2008; Borges et al., 2010), the elderly (Ronconi et al., 2012), pregnant women (Lamarca et al., 2013) and mother-child pairs (Sujarwoto and Tampubolon, 2013).

Health indicators: Most studies used subjective health indicators, one of which used certain dimensions of the World Health Organization's health-related quality of life scores (Modie-Moroka, 2009), while the rest used self-rated health status. Objective health indicators were also employed: Sujarwoto and Tampubolon (2013) had child height-for-age and weight-for-age, Pronyk et al. (2008) had HIV prevalence and incidence, and both Campbell et al. (2002) and Gregson et al. (2004) used HIV status. One may note that there is particular interest in HIV outcomes from sub-Saharan African settings.

Again, the various types of health indicators lend themselves to different analytic methods: linear and non-linear regression models with and without instrumental variables for continuous outcomes, ordinal logistic regression for ordinal categories of self-rated health, and probit and logistic regression for dichotomous health outcomes. The studies that used instrumental variables have sought to determine causality of social capital on the relevant health indicator with cross-sectional data as instrumental variables, if valid, can control for potential omitted variable bias and correct for potential endogeneity (Ronconi et al., 2012; Sujarwoto and Tampubolon, 2013).

Covariates (excluding social capital indicators): Individual-level variables that have been controlled for include: age, gender, race, education, household income/asset index, subjective socioeconomic status, marital status, living arrangements, household structure/composition, employment status, urban/rural, basic living conditions, household welfare, number of ill persons in household, duration of local residence, ownership of property, alcohol consumption, smoking habits, religion,

migration status, housing quality, perceived neighbourhood quality, distance to nearest hospital, prevalence of illness and kinship ties.

Associations between covariates and self-rated health are not always reported. Further, a number of papers studied samples according to age and gender which can impact on how certain covariates impact on self-rated health. Hence, the trends of associations described here will only examine the papers that do not have such restrictions. Consequently, only age has consistently been found to be associated with self-rated health (increased age with increased poor self-rated health). Gender was found to be significantly associated with self-rated health in some instances (Rose, 2000; Campbell et al., 2002; Gilbert and Soskolne, 2003; von Maltitz, 2005; Pronyk et al., 2008; Chola and Alaba, 2013), but not in others (Yip et al., 2007; Cramm and Nieboer, 2011). This inconsistency was similarly found for race/ethnicity, education and household income.

Only three studies had contextual-level covariates. Modie-Moroka (2009) used an environmental quality score to proxy for neighbourhood deprivation; Ronconi et al. (2012) adjusted for area-level fixed effects and Chola and Alaba (2013) adjusted for neighbourhood deprivation which included income and material, employment, education, and the living environment. While Modie-Moroka (2009) demonstrated that neighbourhood deprivation was positively associated with decreased physical health, a significant association between self-rated health and was not found in the other two studies.

Social capital indicators: A number of studies used only group membership or associational activities as a social capital indicator (Campbell et al., 2002; Gregson et al., 2004; von Maltitz, 2005; Ronconi et al., 2012; Sujarwoto and Tampubolon, 2013). Others only included the cognitive dimension of social capital in their studies (Cramm and Nieboer, 2011; Lamarca et al., 2013). Further, social support was also conceived as social capital (Lamarca et al., 2013). Only the remaining seven studies addressed both cognitive and structural dimensions of social capital. Of these seven, only one further made the distinction between bonding and bridging (Borges et al., 2010), and another that included both formal and informal types of social capital (Hurtado et al., 2011).

Individual-level social capital, contextual-level social capital or both: The majority of studies considered social capital as an individual-level variable only (nine out of fifteen), one had household-level social capital, five included individual- and contextual-level social capital variables. No reviewed studies have considered social capital solely as a meso- or macro-level variable.

The relationship between social capital and self-rated health found in the reviewed studies, similar to those of developed countries, has been inconsistent. Among those that considered individual-level social capital:⁵³

⁵³ Gilbert and Soskolne (2003) was not included on this list as the concept “social capital” was not explicitly considered in relation to self-rated health. Ronconi et al. (2012) was not included because it was unclear what the direction of association social capital has on the health indicator.

- [Rose \(2000\)](#) found that both cognitive aspects (generalised trust and sense of being able to control one's life) and structural aspects (market networks and informal networks) of social capital are associated with better self-rated health;
- [Campbell et al. \(2002\)](#) found that group memberships had differential associations with HIV status;
- [Gregson et al. \(2004\)](#), similar to [Campbell et al. \(2002\)](#), found that group memberships had differential associations with HIV status;
- [Borges et al. \(2010\)](#) found that only one item of behavioural/structural social capital (out of four) was associated with higher odds of poor self-rated health;
- [Modie-Moroka \(2009\)](#) found that the Social Capital Index, comprised of items from both structural and cognitive aspects of social capital, was positively related to increased physical health scores;
- [Cramm and Nieboer \(2011\)](#) found that higher social capital scores (comprised of three items of cognitive social capital), was associated with increased odds of good health;
- [Hurtado et al. \(2011\)](#) found that only interpersonal trust (and not reciprocity) was associated with decreased odds of poor self-rated health, while different associational memberships differed in the relationship to self-rated health (similar to [Gregson et al. \(2004\)](#) and [Campbell et al. \(2002\)](#)).

The only study that considered household-level social capital was [Pronyk et al. \(2008\)](#) which assessed the relationship of household-level social capital to HIV prevalence and incidence. It also stated that logistic regression was used. One could interpret HIV incidence to be a binary variable: 1 = change from HIV negative at baseline to HIV positive at exit, 0 = no change between baseline and exit, and logistic regression can be used. However, HIV prevalence is a continuous outcome which should not be modelled by a logistic regression. It is then unclear how the prevalence-related odds ratio can be interpreted. Regarding HIV incidence, however, neither cognitive nor structural social capital was significantly associated among males, whereas among females, higher levels of structural social capital was associated with higher odds of HIV incidence.

Among those that considered social capital at both an individual and contextual level:

- Looking only at the longitudinal evidence, [von Maltitz \(2005\)](#) found that only individual membership of "other groups" in 1998 was significantly associated with higher probability of good self-rated health in 2004 but no significant associations were found between household- or community-level social capital and self-rated health;
- [Yip et al. \(2007\)](#) found that only individual (communist) party membership was associated with self-rated health (membership is linked to lower odds of poor self-rated health) but not

other groups, and similarly for individual index of cognitive social capital. No village-level social capital was found to be significantly associated with self-rated health, however;

- [Sujarwoto and Tampubolon \(2013\)](#) found that an increase in a mother's and her community's (structural) social capital score is associated with an increase in height and weight of the child;
- [Chola and Alaba \(2013\)](#) did not find any significant association between individual-level trust and civic participation with self-rated health, but that higher levels of neighbourhood social capital were positively associated with good self-rated health. However, when the analysis was stratified by province, the directionality of association with self-rated health differed for both individual trust and neighbourhood social capital, depending on the province.

2.4 Synthesising findings from both developed and developing countries

Multilevel analysis is more common among developed countries than developing countries. There were also more nationally representative samples examined among the developed countries compared to the developing countries. However, developed countries did not consider potential differential effects of group membership on health as developing countries did. Further, longitudinal study designs were limited in both settings. Also, no study used all the different dimensions of social capital detailed in the theoretical review: structural/cognitive, bonding/bridging/linking, and formal/informal. This is the main gap in the literature that has been reviewed. Using only select components of social capital could also explain the inconsistent findings in the association between social capital and health in both developed and developing countries' settings. This could be due to a combination of three reasons. First, is the reliance on secondary data sources where the primary objective was not to collect data on social capital, which limits the potential dimensions of social capital that can be explored. Note that some surveys have subsections that focus on social capital i.e. NIDS which [Chola and Alaba \(2013\)](#) used (and also this thesis), but it is not comprehensive, probably because it is part of a larger survey and the questions that could be asked are limited. This is linked to the second reason: because of the limited data available (particularly from secondary data sources), some studies included what should be considered as intermediate variables between social capital and health i.e. neighbourhood safety ([Chola and Alaba, 2013](#); [Lamarca et al., 2013](#)). It could signify the need for more comprehensive data on social capital to be collected. Another explanation for the inconsistency between could be the fact that the interpretation of social capital varies from context to context.

This thesis, as mentioned previously, is unable to use all the distinctions of social capital due to data constraints; only the structural/cognitive divide will be used. However, different types of groups will be considered separately as evidence from developing countries have shown that different groups have differential impact on self-rated health. Moreover, this study will contribute to the gap in longitudinal evidence in developing countries by making use of two waves of a panel study which is nationally representative. Lastly, social capital will be conceptualised at an individual and

contextual level to contribute further evidence to decipher which level of social capital impacts, if at all, on self-rated health in a developing country setting.

3 References

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Part C

Journal article

Investigating the relationship between self-rated health and social capital in South Africa – A multilevel analysis using two waves of panel data

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1 Abstract

Much research has examined the relationship between social capital and self-rated health in developed countries. Few studies, however, have investigated this important relationship in developing countries. This study examined this research gap using data from the National Income Dynamics Study (NIDS), the first nationally representative panel study in South Africa. Information regarding social capital - norms of reciprocity, association activity, trust and group membership - was assessed in NIDS. Self-rated health was collected at Wave 1 in 2008, and Wave 2 in 2010 - 2011. The final sample consisted of 8866 respondents. Mixed effects models were fitted to predict self-rated health in Wave 2, using lagged covariates (from Wave 1). The results indicated that individual personalised trust, individual community service group membership and neighbourhood personalised trust were beneficial to self-rated health. Reciprocity, associational activity and other types of group memberships were not found to be significantly associated with self-rated health. Results indicate that both individual- and contextual-level social capital are associated with self-rated health. Policy makers in South Africa may want to consider social capital, in addition to other well-known social determinants of health, when implementing policies to improve the health of its population.

2 Background

There has been a prominent increase in research investigating the role that social capital plays in health outcomes. Much of the research has focused on developed countries (Fujiwara and Kawachi, 2008b; Beaudoin, 2009; Giordano and Lindström, 2010; Mohnen et al., 2011; Giordano et al., 2012; Han, 2013). Given that both social capital and health have demonstrated to play important roles in development (Woolcock and Narayan, 2000), it may be valuable to study their relationship in the context of a developing country. In public health research, the most cited definitions of social capital are from the works of Bourdieu, Coleman and Putnam (Ferlandier, 2007). Briefly, Bourdieu (1986) considers social capital as resources such as money, status, and information - actual or potential - that are linked to a network. Coleman (1990) conceptualises social capital according to its function to facilitate certain actions that would have otherwise been impossible. Putnam (1995) refers to social capital as “features of social organization such as networks, norms and social trust that facilitate coordination and cooperation for mutual benefit.” (p. 2)

South Africa’s history with colonialism and apartheid has contributed to the social disintegration and destruction of social capital of the country, particularly, within black communities (Ramphele, 1991; HSRC, 2004). Since the end of apartheid and the transition to democracy in 1994, South Africa’s policies have focused on the importance of social capital and the beneficial role it plays towards a cohesive society and the well-being of its people (Burns, 2009). Further, results from systematic reviews indicate that the relationship between social capital and health is more consistent in contexts where there is more income inequality (Islam et al., 2006). The World Bank’s most recent estimate of South Africa’s Gini coefficient of income inequality stands at 63.1 - one of the highest in the world (World Bank, 2013). Therefore, in addition to other well-known social determinants of health, it may be worthwhile to examine the relationship between social capital and health in South Africa.

However, there has been a paucity of research investigating the multifaceted relationship between social capital and various health outcomes in South Africa. The few studies that have been carried out did not have nationally representative samples (Campbell et al., 2002; Gilbert and Soskolne, 2003; Pronyk et al., 2008; Cramm and Nieboer, 2011). Two studies used the same panel study - National Income Dynamics Study (NIDS) - as this one (Tomita and Burns, 2012; Chola and Alaba, 2013). However, both were cross-sectional studies. This study uses two waves of NIDS data to examine the prospective relationship between social capital and self-rated health, while controlling for socioeconomic variables.

Given the data available in the NIDS dataset, social capital in this study lends itself best to Uphoff (1999)’s dimensions of social capital: structural and cognitive social capital. The structural dimension is directly observable and refers to forms of social organisation and networks that contribute to cooperation; the cognitive dimension are mental processes that promote social cooperation such as trust (Uphoff, 1999). These dimensions can also be applied to Putnam’s definition of social capital, which was the intended conceptualisation of NIDS (Burns, 2009). In this study, the cognitive component of social capital comprises of personalised trust, generalised trust, reciprocity and associational

activity; and group membership forms the structural domain. This study hypothesises that even after controlling for other social determinants of health (i.e. educational attainment, employment status and household income), social capital will be uniquely associated with self-rated health among South African respondents.

3 Methods

3.1 Data source

The data used in this study comes from the National Income Dynamics Study (NIDS) conducted biennially by the Southern Africa Labour and Development Research Unit (SALDRU). This is the first nationally representative panel study of households in South Africa. The first wave conducted was in 2008. Full details of NIDS are available elsewhere (Leibbrandt et al., 2009). Briefly, NIDS uses a stratified, two-stage cluster sample design to sample households in the nine provinces of South Africa. First, 400 primary sampling units (PSUs) were chosen from a master sample of 3000 PSUs identified by Statistics South Africa in 2003. Subsequently, the chosen PSUs were randomly sampled within each stratum of 53 district councils, which were also proportional to the master sample’s allocation of PSUs in each stratum. PSUs are derived from Census Enumeration Areas and served as the unit of “neighbourhood” in this study. 7305 households were interviewed at the end of Wave 1, a response rate of 69% (Leibbrandt et al., 2009). Within each household, every member over 15 years old was administered the adult questionnaire. 16,878 individuals were interviewed (Leibbrandt et al., 2009). The overall attrition rate between Wave 1 and Wave 2 was about 22% (Brown et al., 2012). Procedures taken to track respondents from Wave 1 to collect data for Wave 2, and data consistency between the two waves are detailed elsewhere (Brown et al., 2012). This study used data collected by the adult questionnaires in Wave 1 in 2008 and Wave 2 in 2010, and also the household questionnaire from Wave 1. Further, it only included subjects whose responses for the outcome variable of interest, self-rated health, were recorded in both 2008 and 2010 ($n = 12,093$). The final sample size used for analysis was 8866 due to missing data in the predictor variables.

3.2 Outcome variable

The outcome of interest was individual self-rated health at Wave 2 in 2010-2011. Respondents were asked the following: “How would you describe your health at present? Would you say it is excellent, very good, good, fair or poor?” Self-rated health was dichotomised to “ill-health” = 1 (fair or poor) and “good health” = 0 (excellent, very good or good), as has been done in previous studies (Kawachi et al., 1999; Kim et al., 2006; Lamarca et al., 2013). Self-rated health has been well-established as a reliable predictor of mortality in a variety of contexts (Idler and Benyamini, 1997; DeSalvo et al., 2005), including the South African context (Ardington and Gasealahwe, 2012).

3.3 Social capital variables

Individual-level social capital assessed by NIDS included: group participation, personalised trust and generalised trust. Subjects were asked to indicate their membership in various groups. Group membership was then categorised according to the groups' functions: financial (stokvel and burial society), production (farmer's association, informal trader's group, community garden group, sewing group), community service (school committee, water committee, development committee, youth groups, women's association, men's association), political (tribal authority and trade union), and private interest (singing/music group, study group, sports group) (Maluccio et al., 2000; von Maltitz, 2005). Personalised trust was assessed by asking respondents, "Imagine you lost a wallet or purse that contained R200 and it was found by someone who lives close by. Is it very likely or not likely at all to be returned with the money in it?" Generalised trust asked: "Imagine you lost a wallet or purse that contained R200 and it was found by a complete stranger. Is it very likely or not likely at all to be returned with the money in it?" These two items of trust were rated on a 3-point Likert scale: not likely at all, somewhat likely, and very likely. "Not likely" was operationalised as no trust (trust = 0), whereas the latter two as "has trust" (trust = 1). Reciprocity and associational activity was determined at the household-level where the former was assessed by the question "How common is it that neighbours help each other out?", and the latter by "How common is it that neighbours do things together?" Both were rated on a 5-point Likert scale: never happens, rarely happens, not common, fairly common and very common. These categories were dichotomised into "high" (fairly common and very common) and "low." Neighbourhood-level social capital was obtained by aggregating from the individual-level social capital and household-level social capital variables.

3.4 Covariates

Several individual-, household- and neighbourhood-level covariates from Wave 1 were considered (see Table 1). On the individual level: age, sex, race, marital status, education, employment status, self-rated health in Wave 1, urban, obese, smoking and number of household members. Household-level variables include number of household members, and per capita household income quintiles. Lastly, a neighbourhood living environment deprivation index is included as a neighbourhood-level covariate. The index was derived by principal component analysis using the same items from the South African Index of Multiple Deprivation's "Living Environment Deprivation" domain: households without piped water on site/in dwelling/borehole, without flush toilet on site/pit latrine with ventilation pipe; availability of refuse removal at least once a week, without electricity from main/generator; in informal dwelling/shack (Wright and Noble, 2009). The first principal component derived yields an eigenvalue of 2.90 and explains 58% of the total variation.

3.5 Statistical methods

A multilevel analysis was conducted to account for the hierarchical nature of the data such that individuals (level 1) are nested within households (level 2), which are in turn, within neighbourhoods (level 3). Indirect standardisation of the dichotomous outcome of self-rated health by age and sex is applied (O'Donnell et al., 2008). Thereafter, eight mixed-effects linear models were fitted: Model 0 is the null model; Model 1 consists of all covariates without any social capital indicators; Models 2 to 6 builds on Model 1, separately adding on personalised trust, generalised trust, norms of reciprocity, norms of association, and various types of group memberships respectively; lastly, Model 7 is the full model and includes all variables. Mixed-effect models are those that incorporate both fixed effects and random effects. Here, specific neighbourhood effects are specified as random effects given that neighbourhood differences are not due to random error. The software Stata 11.2 (StataCorp, Texas) was used to carry out all analyses.

4 Results

Descriptive statistics for demographic and health characteristics at baseline are presented in Table 1 whereas those related to social capital indicators are presented in Table 2. The sample included for analysis consisted of 8866 subjects. The majority of the sample, 78.67%, reported good health in Wave 1. 82.86% were Black and 37.55% were male. 36.41% indicated they were married or living with their partners. Over 80% of the sample did not complete high school, and just under 80% reported to be unemployed. More than 50% did not live in an urban area and had an average of 5 members per household. About a quarter of the sample were classified as obese (with BMI > 30) and just under a fifth reported to be current smokers in 2008. With regards to social capital indicators, there were low levels of trust: only 23.27% reported having personalised trust, and it was lower at 12.01% for generalised trust. Just over a half of the sample reported being a member of any group, with the largest participation in financial groups. Lastly, norms of reciprocity and association recorded at household levels were a lot higher when compared to either trust indicators.

The results for the three-level mixed-effects linear regression models of poor health in 2010 on predictors from 2008 are presented in Table 3. Compared to the null model, Model 1 indicates reported ill-health in Wave 1 is a significant predictor of ill-health in Wave 2 ($p \leq 0.01$). Being Black (compared to White) is significantly associated with ill-health ($p \leq 0.05$), but this did not apply to any of the other race groups when compared to the reference group. Belonging to household income quintiles 1 to 4 (compared to the 5th quintile) are positively associated with poor health (all $p \leq 0.05$). On the other hand, being married, completed primary school or more, being employed, and increase in household size, are negatively associated with poor health ($p \leq 0.01$ for all, except married/living with partner where $p \leq 0.05$). All these associations were similar in Model 2 when individual- and neighbourhood-level personalised trust were added except for being Black, which

was no longer significantly related to poor health. Both individual-level and neighbourhood-level personalised trust were negatively associated with poor health (both $p < 0.01$). In Model 3, all associations from Model 1 were retained, and only individual-level generalised trust was found to be significantly negatively associated with poor health ($p \leq 0.01$), but not at the neighbourhood-level ($p > 0.10$). Models 4 and 5 showed that neither norms of reciprocity nor association were significantly associated with poor health on any level (all $p > 0.10$); associations with other covariates were the same as in Model 1. In Model 6, only individual membership in community service groups was associated negatively with poor health ($p \leq 0.01$); significant associations with all the other types of group memberships were not detected. In Model 7, which includes the full set of variables, the social capital indicators that remained statistically significant were individual personalised trust ($p \leq 0.01$), community service group membership ($p \leq 0.01$), neighbourhood personalised trust ($p \leq 0.01$) and neighbourhood generalised trust ($p \leq 0.05$).

5 Discussion

This study examined the association between individual-, household- and contextual-level (proxied by neighbourhoods) social capital indicators and self-rated health, while controlling for relevant covariates on all three levels. In particular, the predictor variables used were from the first wave of NIDS in 2008, whereas the outcome of interest, self-rated health, was from the second wave of NIDS in 2010.

The full model's results suggest that individual personalised trust, contextual personalised trust, and membership in a community service group were associated negatively with poor health. That is, both structural and cognitive components of social capital are associated with self-rated health. Contrary to Model 3, where individual generalised trust was significantly associated with poor health but not contextual generalised trust, contextual generalised trust emerged to be a significant predictor in the full model, but not individual generalised trust. Covariates that remained consistently statistically significant predictors of self-rated health were: educational attainment, employment, household income and household size. The first three are well-established social determinants of health, while the last could be a proxy for social support. The associations between all four of these variables and self-rated health are similar to what some studies have found (Han, 2013; Chola and Alaba, 2013). While potential health confounders such as smoking and obesity were controlled for, they were not found to be significantly associated with self-rated health. This study also considered contextual-level deprivation. Similar to some studies (Chola and Alaba, 2013; Han, 2013), this was not found to be significantly associated with self-rated health. Others, however, have found contextual-level deprivation to be significantly associated with self-rated health (Kavanagh et al., 2006; Poortinga, 2012). The discrepancy could be due to the difference of contexts considered i.e. districts in a city vs Census Enumeration Areas, and/or the varying factors that were included in the indices.

It is difficult to make comparisons of association in regard to social capital with other studies - even in

the instance where the same dataset was used - as social capital has been conceptualised differently. For example, in [Chola and Alaba's](#) study, civic participation was a dichotomous variable considered only on the individual level which indicated any group membership, or no membership. In this study however, the 18 group memberships were classified according to functions as previous work has shown that different groups may impact on health in varying ways ([Campbell et al., 2002](#); [Pronyk et al., 2008](#)). Indeed, in [Chola and Alaba's](#) cross-sectional analysis, they found no association between individual-level civic participation and self-rated health. In this study, however, individual-level group membership in community service groups was associated inversely with poor self-rated health. No other group memberships were found to be significant in the full model (Model 7). It may be relevant to note that [Campbell et al. \(2002\)](#) found that members of stokvels (a financial group) were more likely to have HIV, but members of sports groups were less likely to have HIV. This suggests that group participation impact differently on health; this may be understood from a social network perspective on social capital which points out that different networks contain different resources that are beneficial to health, depending on the health outcome ([van der Gaag and Webber, 2010](#)). Regardless of the health outcome considered, contextual-level group membership/civic participation was not examined in the studies that were based in South Africa ([Campbell et al., 2002](#); [Pronyk et al., 2008](#); [Tomita and Burns, 2012](#); [Chola and Alaba, 2013](#)). In this study, it was found that contextual-level group membership did not appear to be associated with self-rated health (see Model 7).

In addition, contextual-level social capital in [Chola and Alaba's](#) study was defined by a summative index of four items asked at the household level. Two of the four items were conceived of as reciprocity and associational activity at the household level in this study, and then aggregated to the neighbourhood level. The other two items - perceived aggression of neighbours and perceived safety of neighbourhood - were not conceived of as social capital by this author but rather intermediate variables of social capital ([Harpham et al., 2002](#)).

It appears that the conceptualised personalised trust and generalised trust, as it has been conceptualised in this study, have different associations with self-rated health. Therefore, personalised and generalised trust could be an imperfect proxy for bonding and bridging types of social capital. Interestingly, social trust in [Chola and Alaba's](#) study considered only generalised trust. In another study which looked at mental health (assessed by the 10-item Center for Epidemiologic Studies for Depression Scale) and social capital also using data from NIDS Wave 1, only personalised trust was regarded as social trust ([Tomita and Burns, 2012](#)). In this study, both items of trust were considered and found that lower individual-level personalised trust was more significantly associated with poorer self-rated health. Similarly, [Tomita and Burns \(2012\)](#) found that lower levels of individual personalised trust were associated with higher depression scores; and [Fujiwara and Kawachi \(2008b\)](#) found that personalised trust is associated with better self-rated health. [Chola and Alaba \(2013\)](#) did not find any association with individual generalised trust and self-rated health, similar to this study. Other studies, however, have found that it was associated with better self-rated health ([Kim et al., 2006](#); [Hurtado et al., 2011](#); [Giordano et al., 2012](#)). Additionally, this study aggregated in-

dividual level of trust to the neighbourhood level, and found that higher levels of contextual-level generalised trust was associated with poorer self-rated health in contrast to another study (Kawachi et al., 1999). The conflicting results regarding the association between generalised trust and health suggests that in-depth qualitative research may be required to understand whether generalised trust as conceptualised in this study is comparable to other studies. Moreover, the inquiry may also investigate how generalised trust could affect health in the South African context.

5.1 Strengths and limitations

A major strength of this study is that two waves of nationally representative panel data was used, and in doing so, partly controlling for reverse causation, as social capital accumulated in 2008 necessarily occurred prior to self-rated health in 2010. This study also considered civic participation differently compared to many other studies where only participation and/or intensity of participation mattered, but not the function of the groups. It is plausible that different types of social capital can be derived from different groups; and in turn, depending on the health outcome of interest, one may find varying associations between social capital and health. Further, this study considered both cognitive (trust, reciprocity and associational activity) and structural aspects (group membership) of social capital on both the individual level and contextual level, whereby the contextual-level social capital was obtained by aggregating the individual-/household-level social capital indicators.

However, there are also some limitations to this study. Firstly, as with many studies of social capital and health, a secondary data source was used. This limited the dimensions of social capital that can be considered, namely bonding/bridging/linking social capital. For example, the racial and income composition of the various groups would be one way of assessing these dimensions. Also, the degree of involvement in these groups could not be determined, which could be a function of the amount of social capital one has. Another important variable that could not be considered is whether a person has moved from his/her residence recently. A person new to a neighbourhood is likely to have lower social capital compared to someone who has lived there for longer (Glaeser et al., 2002). This could not be ascertained from the data available and thus could not be controlled for. Similarly, only contextual-level social capital aggregated from individual-level indicators were used, as ecological measures of social capital were not available. An additional issue is that the neighbourhoods defined in this study, which are based on Census Enumeration Areas, may not be the same spatial areas as those in which the social capital indicators considered have an effect. Residual confounding may still persist, despite best efforts to control for many known confounders given the available data. Common method bias may have been introduced as both the outcome, self-rated health, and “exposure” of interest social capital, are self-reported. Lastly, as self-rated health was indirectly standardised, one can only interpret the direction of association between social capital, other covariates, and self-rated health, but not the magnitude of association.

6 Conclusion

Using two waves of nationally representative longitudinal data, this study has shown that both individual- and contextual-level social capital are significantly associated with self-rated health. It further adds to the current evidence that structural and cognitive social capital contributes independently to self-rated health from a developing country's perspective. While lower levels of individual-level personalised trust are associated with poorer self-rated health, unsurprisingly, socioeconomic conditions such as educational attainment, employment status and household income are important predictors of self-rated health. Evidence from this study suggests that policy makers may want to consider policies that impact socioeconomic conditions as well as social capital. With regards to social capital policies, one may also need to consider the type of health outcome in order to foster the appropriate types of social capital that are beneficial to health. For example, there is strong evidence to indicate that people who participate in community service groups, and those who are in neighbourhoods with higher levels of membership in such groups, report better self-rated health. Government may wish to consider establishing a fund for individuals or organisations that are involved in community service groups to support and expand their activities.

7 References

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8 Tables and figures

Table 1: Demographic and health statistics in 2008, n = 8866¹

Variable	Category	n (%)
<i>Individual-level variables</i>		
Gender	Male	3329 (37.55)
	Female	5537 (62.45)
Age	15-21	2017 (22.75)
	22-35	2306 (26.01)
	36-59	3359 (37.89)
	60+	1184 (13.35)
Self-rated health in Wave 1	Ill health	1891 (21.33)
	Good health	6975 (78.67)
Race	White	276 (3.11)
	Black	7346 (82.86)
	Coloured	1145 (12.91)
	Indian/Asian	99 (1.11)
Marital status	Married/Living with partner	3228 (36.41)
	Widow/Divorced/Separated/Never married	5638 (63.69)
Education	No schooling to some primary school	2748 (30.99)
	Completed primary school and some high school	4436 (50.03)
	Completed high school or more	1682 (18.97)
Employment status	Employed	1965 (22.16)
	Unemployed	6901 (77.84)
Urban/rural classification	Urban formal/Urban informal	3919 (44.20)
	Rural formal/Former tribal area	4947 (55.80)
Obese	Yes	2230 (25.15)
	No	6636 (74.85)
Smoker	Yes	1642 (18.52)
	No	7224 (81.48)
Household size [Mean(SD)]	(continuous)	5.28 (3.18)
<i>Household-level variables</i>		
Per capita household income quintiles	5th quintile	1021 (11.52)
	1st quintile	1762 (19.87)
	2nd quintile	2123 (23.95)
	3rd quintile	2046 (23.08)
	4th quintile	1914 (21.59)
<i>Neighbourhood-level variables</i>		
Living environment deprivation index [Mean(SD)]	(continuous)	0.34 (1.68)

¹ Reference categories used for multilevel models for each variable are listed first and bolded. Gender and age are shown only for reference.

Table 2: Descriptive statistics of social capital indicators in Wave 1

Variable	n (%)
<i>Individual-level indicators</i>	
Personalised trust	2063 (23.27)
Generalised trust	1065 (12.01)
Group Membership	
Financial group	2085 (23.52)
Production group	155 (1.75)
Private interest group	1051 (11.85)
Community service group	733 (8.27)
Political group	614 (6.93)
<i>Household-level indicators</i>	
Norms of reciprocity	5850 (65.98)
Norms of association	5399 (60.90)
<i>Neighbourhood-level indicators</i>	
	Mean (SD)
% Neighbourhood personalised trust	0.24 (0.20)
% Neighbourhood generalised trust	0.12 (0.13)
% Neighbourhood reciprocity	0.66 (0.20)
% Neighbourhood associational activity	0.61 (0.22)
% with financial group membership	0.24 (0.16)
% with production group membership	0.02 (0.03)
% with community service group membership	0.08 (0.09)
% with private interest group membership	0.11 (0.09)
% with political group membership	0.07 (0.10)

Table 3: Results for three-level mixed-effects linear regression models of poor health in 2010 on predictors from 2008, n = 8868²

Variable	Co-efficient (standard error)							
	Model 0	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
<i>Individual-level variables</i>								
Self-rated health in Wave 1	-	0.133 (0.009)***	0.132 (0.009)***	0.134 (0.009)***	0.133 (0.009)***	0.134 (0.009)***	0.133 (0.009)***	0.132 (0.009)***
Race: Black	-	0.048 (0.025)**	0.028 (0.025)	0.049 (0.025)**	0.050 (0.025)**	0.050 (0.025)**	0.061 (0.026)**	0.029 (0.027)
Coloured	-	0.028 (0.026)	-0.002 (0.027)	0.027 (0.026)	0.029 (0.026)	0.029 (0.026)	0.032 (0.027)	-0.002 (0.027)
Indian/Asian	-	0.049 (0.047)	0.030 (0.046)	0.047 (0.047)	0.049 (0.047)	0.049 (0.047)	0.047 (0.047)	0.027 (0.046)
Married/living with partner	-	-0.01 (0.007)**	-0.014 (0.007)*	-0.015 (0.007)**	-0.015 (0.007)**	-0.015 (0.007)**	-0.013 (0.008)*	-0.012 (0.008)
Education: Completed primary and some high school	-	-0.04 (0.008)***	-0.040 (0.008)***	-0.041 (0.008)***	-0.041 (0.008)***	-0.041 (0.008)***	-0.040 (0.008)***	-0.037 (0.008)***
Completed high school or more	-	-0.059 (0.011)***	-0.056 (0.011)***	-0.058 (0.011)***	-0.059 (0.011)***	-0.059 (0.011)***	-0.057 (0.011)***	-0.053 (0.011)***
Employed	-	-0.027 (0.009)***	-0.028 (0.009)***	-0.028 (0.009)***	-0.028 (0.009)***	-0.027 (0.009)***	-0.029 (0.010)***	-0.029 (0.010)***
Urban	-	0.024 (0.016)	0.023 (0.015)	0.024 (0.016)	0.022 (0.016)	0.023 (0.016)	0.021 (0.016)	0.020 (0.016)
Obese	-	-0.002 (0.008)	-0.003 (0.008)	-0.002 (0.008)	-0.002 (0.008)	-0.002 (0.008)	-0.002 (0.008)	-0.002 (0.008)
Smoker	-	0.017 (0.009)*	0.016 (0.009)*	0.017 (0.009)*	0.017 (0.009)*	0.017 (0.009)*	0.015 (0.009)*	0.014 (0.009)
Personalised trust	-	-	-0.037 (0.009)***	-	-	-	-	-0.031 (0.010)***
Generalised trust	-	-	-	-0.030 (0.011)***	-	-	-	-0.016 (0.012)
Group Membership	-	-	-	-	-	-	-	-
Financial group	-	-	-	-	-	-	-0.002 (0.009)	-0.002 (0.009)
Production group	-	-	-	-	-	-	-0.036 (0.026)	-0.037 (0.026)
Private interest group	-	-	-	-	-	-	-0.005 (0.011)	-0.005 (0.011)
Community service group	-	-	-	-	-	-	-0.039 (0.013)***	-0.038 (0.013)***
Political group	-	-	-	-	-	-	0.004 (0.016)	0.003 (0.016)
<i>Household-level variables</i>								

² Reference category for race is “White,” education is “No School to some primary school.”

Variable	Co-efficient (standard error)							
	Model 0	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Household size	-	-0.004 (0.001)***	-0.004 (0.001)***	-0.004 (0.001)***	-0.004 (0.001)***	-0.004 (0.001)**	-0.003 (0.001)***	-0.004 (0.001)***
1st quintile (Ref: 5th quintile)	-	0.040 (0.017)**	0.038 (0.017)**	0.039 (0.017)**	0.040 (0.017)**	0.040 (0.019)**	0.035 (0.017)**	0.029 (0.017)*
2nd quintile	-	0.040 (0.016)**	0.034 (0.016)**	0.039 (0.016)**	0.040 (0.016)**	0.040 (0.016)**	0.035 (0.017)**	0.030 (0.017)*
3rd quintile	-	0.053 (0.015)***	0.049 (0.015)***	0.053 (0.015)***	0.053 (0.015)***	0.053 (0.015)***	0.050 (0.016)***	0.046 (0.016)***
4th quintile	-	0.030 (0.014)**	0.026 (0.014)*	0.029 (0.014)**	0.030 (0.014)**	0.030 (0.015)**	0.027 (0.015)*	0.023 (0.015)
Norms of reciprocity	-	-	-	-	0.004 (0.008)	-	-	0.011 (0.011)
Norms of association	-	-	-	-	-	-0.001 (0.008)	-	-0.006 (0.011)
<i>Neighbourhood-level variables</i>								
Living environment deprivation index	-	-0.001 (0.005)	-0.002 (0.005)	-0.001 (0.005)	-0.001 (0.005)	-0.001 (0.005)	-0.002 (0.005)	-0.002 (0.005)
% Neighbourhood personalised trust (High)	-	-	-0.073 (0.026)***	-	-	-	-	-0.105 (0.030)***
% Neighbourhood generalised trust (High)	-	-	-	0.007 (0.038)	-	-	-	0.113 (0.044)**
% Neighbourhood reciprocity (High)	-	-	-	-	-0.029 (0.026)	-	-	-0.064 (0.097)
% Neighbourhood associational activity (High)	-	-	-	-	-	-0.003 (0.025)	-	0.042 (0.038)
% Financial group membership	-	-	-	-	-	-	-0.073 (0.033)**	-0.065 (0.033)*
% Production group membership	-	-	-	-	-	-	-0.040 (0.151)	-0.041 (0.150)
% Community service group membership	-	-	-	-	-	-	0.041 (0.068)	0.064 (0.067)
% Private interest group membership	-	-	-	-	-	-	0.023 (0.064)	0.018 (0.063)
% Political group membership	-	-	-	-	-	-	-0.023 (0.052)	-0.011 (0.051)
Var (neighbourhood)	0.004201	0.003794	0.003437	0.003804	0.003805	0.003817	0.003791	0.003429
Var (household)	0.009569	0.008509	0.008276	0.008422	0.008851	0.008521	0.008511	0.008305
Var (residual)	0.089897	0.086940	0.086935	0.086946	0.086938	0.086940	0.086837	0.086801

*p ≤ 0.10, **p ≤ 0.05, ***p ≤ 0.01

Part D

Policy brief

Social Capital and Health

A South African perspective



Education, household income and employment status have been shown to impact on health outcomes across a variety of contexts. Increasingly, *social capital* has emerged as another important social determinant of health. This study adds to the current body of evidence, by examining the association of self-rated health and social capital in the South African context.

WHAT IS SOCIAL CAPITAL?

The idea that social relations affect health is not new: during the late 19th century, the French sociologist, Emile Durkheim, suggested that social disintegration is correlated with higher rates of suicide. In short, social capital refers to resources rooted in social relations to enable actions and interactions of individuals and groups. We can think of social capital as *resources* such as money, status, and information - actual or potential - that are linked to a social network (Bourdieu, 1986). We can also think of social capital as *features* of social networks and norms that facilitate coordination and cooperation for mutual benefit (Putnam, 1995). Lastly, we can also think of social

capital in terms of how it *functions* to enable people to take actions that would have otherwise been impossible without certain social relations (Coleman, 1988).

HOW DOES SOCIAL CAPITAL AFFECT HEALTH?

There are two approaches to social capital in public health research: the social cohesion school, and the network theory school. In the former, social capital tends to be treated as a characteristic of a group. A group can be an organisation, a community, or a province. Social capital is typically thought of as *social trust*, *norms of reciprocity*, *civic participation* and *the extent of exercising of sanctions*. On the other hand, the network

Key points

- The results reveal that certain aspects of social capital do impact on health.
- Being a part of community service groups is beneficial to self-rated health.
- People with higher levels of personalised trust also reported better self-rated health.
- Other social determinants of health such as educational attainment, employment status and household income were also important predictors of self-rated health.
- This study confirms results from similar studies in other countries, and previous studies that have been conducted in South Africa.
- Policy makers may want to consider social capital as part of policies that address social determinants of health.

theory school usually thinks of social capital as *social support, information channels, social credentials and potential resources available to an individual through his/her networks*.

On an individual level, social capital can influence health through social support, social influence, social engagement, person-to-person contact (that can restrict or promote exposure to infectious diseases) and access to material resources. On a contextual level, social capital may impact health through collective efficacy, informal social control, norms of reciprocity, and information channels that diffuses health knowledge within social networks. The combination of these mechanisms can have an effect on health outcomes by affecting health-related behaviours, access to services and amenities, and psychosocial processes.

In South Africa, there have been a few studies that examined social capital and health. Campbell et al. (2002) investigated the possible associations between civic participation (in stokvels, churches, political parties, sports clubs, burial societies, youth groups, residents associations and women's groups) and HIV-related sexual health. One of the findings of this study was that those who were members of sports club were less likely to be HIV positive. Another study by Pronyk and colleagues (2008) found that a global indicator - one that encompassed all types of participation - of civic participation was not associated with HIV prevalence among males, but higher levels of civic participation among females was associated with higher HIV

prevalence. However, this same study found that higher levels of cognitive social capital - which combined perceived levels of reciprocity and community support, perceived solidarity in response to a crisis, and participation in collective action - were associated with lower levels of HIV prevalence. A more recent study by Tomita and Burns (2012) looked at the association between personalised trust and depression. They found that a medium level of trust compared to high level of trust, is associated with a higher depression score. Lastly, Chola and Alaba (2013) examined the relationship between individual generalised trust and self-rated health and did not find any significant association with the two. Individual civic participation was also not associated with self-rated health.

ABOUT THIS STUDY

It is critical to note that the indicators of trust used in the last two studies mentioned did not explicitly distinguish between personalized trust and generalized trust. Both used the terminology "social trust." This study, however, makes use of that distinction to facilitate comparison. Furthermore, this study divides civic participation into different group functions, rather than putting all types of group membership into one general category of group membership. This facilitates comparison between studies that have found certain types of group membership beneficial to health (i.e. Campbell et al. 2002). In addition, self-rated health was used as the health outcome of interest as it has been demonstrated to be a strong

Some definitions

Generalised trust.

norms of trust between strangers

Personalised trust.

norms of trust between people you know

Structural social capital

forms of social organisation and networks that contribute to cooperation; a directly observable type of social capital i.e. volunteering organisations.

Cognitive social capital

mental processes that promote social cooperation i.e. trust. This social capital dimension usually needs to be elicited verbally from research subjects.

predictor of mortality, internationally and in the South African context (Ardington and Gasealahwe, 2012).

This study used two waves of nationally representative data from the National Income Dynamics Study for analysis.

Regarding civic participation, 17 types of group memberships were categorised in the following manner:

- **Financial** (stokvel, burial society)
- **Production** (farmer's society, informal trader's group, community garden group, sewing group)
- **Community service** (school committee, water committee,

development committee, youth group, women's association, men's association)

- **Political** (tribal authority, trade union); and
- **Private interest** (singing/music group, study group, sports group)

FINDINGS

This study found that higher levels of personalised trust were associated with lower levels of poor self-rated health. Individual generalised trust was not associated with self-rated health. When trust was examined on the

neighbourhood level, it was found that higher levels of generalised trust was associated with higher chances of poor self-rated health. Personalised trust remained beneficial to self-rated health at the neighbourhood level.

It was found that only membership of community service groups was beneficial to self-rated health. All significant associations mentioned had taken into account other variables such as age, sex, household income, race, education, and neighbourhood environment deprivation.

Policy recommendations

Considering South Africa's history of apartheid which has destroyed the social fabric of communities, it is worthwhile to keep social capital in mind when implementing any social policy.

Based on the results of this research, health policy makers may wish to consider social capital when considering public health interventions. There is strong evidence to indicate that people who participate in community service groups, and those who are in neighbourhoods with higher levels of membership in such groups, report better self-rated health. Government may wish to consider establishing a fund for individuals or organisations that are involved in community service groups to support and expand their activities.

However, caution needs to be exercised in interpreting other results. For example, it is clear that different types of social capital have different impacts on health, depending on what health outcome is considered. Further, policy makers should be cognisant that there is no standardised terminology used in social capital research – for

example, social trust in one study may be different to social trust in another study.

Without further research to better understand what is meant by "trust", and what people in the communities consider to be a "community" or "neighbourhood", it is difficult to translate the findings about trust into clear policies. In this vein, government may wish to commission an in-depth study to further investigate what social capital means in the South African context.



Lastly, social capital should be considered in conjunction with other social determinants of health. The results of this study, confirmed once again, that socioeconomic status such as education, employment status, and household income, were also important predictors of self-rated health. Policy makers should still focus on improving these factors in order to make positive impacts on the health of South Africans.

Support and funding

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Part E

Appendices

Appendix 1: Social Science & Medicine - Guide for authors



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AUTHOR ENQUIRIES

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Appendix 2: Human Research Ethics Committee approval



03 September 2013

HREC REF: 511/2013

Ms Y K Lau
c/o Dr J Ataguba
Public Health and Family Medicine
Falmouth Building

Dear Ms Lau

PROJECT TITLE: INVESTIGATING THE RELATIONSHIP BETWEEN SOCIAL CAPITAL AND SELF-RATED HEALTH IN SOUTH AFRICA

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee for review.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

Approval is granted for one year till the 30th September 2014

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.

(Forms can be found on our website: www.health.uct.ac.za/research/humanethics/forms)

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please quote the HREC. REF in all your correspondence.

Yours sincerely

Signature removed

PROFESSOR M BLOCKMAN
CHAIRPERSON, FHS HUMAN ETHICS

Federal Wide Assurance Number: FWA00001637.

Institutional Review Board (IRB) number: IRB00001938

This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Convention on Harmonisation Good Clinical Practice (ICH GCP) and Declaration of Helsinki guidelines.

The Human Research Ethics Committee granting this approval is in compliance with the ICH Harmonised Tripartite Guidelines E6: Note for Guidance on Good Clinical Practice (CPMP/ICH/135/95) and FDA Code Federal Regulation Part 50, 56 and 312.

Appendix 3: Plagiarism declaration

Plagiarism Declaration

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- 3) This dissertation is my own work. I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as his/her own work.

Signature:

Signature removed

Name: Yan Kwan Lau

Student number: LXXYAN005

2 December 2013