

Investigating family social capital and child health: a case study of South Africa

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THESIS ABSTRACT

The link between family social capital and child health has not been well investigated in developing countries. This study assessed socioeconomic inequalities in child health and in family social capital in South Africa. It also assessed the relationship between family social capital and child health. Four waves of the National Income Dynamics Study panel data were used to investigate the relationship between family social capital and child health. Socioeconomic inequalities were assessed using the concentration index. To assess the relationship between family social capital and child health, regressions models were fitted using a selected set of explanatory variables, including an index of family social capital. Child health in this study was operationalized to include: stunting, wasting, and parent-reported health of a child. Results showed that children from the poorest families bear the largest burden of stunting, wasting, and ill health. Similarly, children from poorer households possessed more family social capital when compared to children from more affluent families. Although family social capital was expected to improve child health, the study findings suggest that in South Africa, the socioeconomic status of a family has a greater effect on child health than family social capital.

DEDICATION

For the Wazaarwas: Charlotte, Patricia, Rosette, Andrew, Richard, Ronald, Albert, Charity, Daphne, Lena and Derrick. And to my angels: Mom & Dad.

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PART A: RESEARCH PROTOCOL

1.1 Background

Increasingly, the broader society is concerned that social affiliation and closeness of neighborhoods and families as a form of social capital is steadily diminishing (Runyan et al., 1998, Putnam, 1995). In 1988, the concept of family social capital was introduced in the seminal work of James Coleman (Coleman, 1988b). Social capital can be defined as the features of social relations for example norms of reciprocity, mutual aid and interpersonal skills — which enable collective action for mutual benefit (Coleman, 1990). A growing body of research recounts of the critical role played by social capital in the smooth functioning of community life ranging from micro to macro phenomena such as: promotion of successful youth development (Parcel and Menaghan, 1993), prevention of crime and juvenile delinquency (Sampson et al., 1997), promotion of schooling and education (Coleman, 1988b) and enhancement of economic development (Fukayama, 1995).

Given these explicit benefits “claimed” for social capital, it is not farfetched that health researchers turned to the notion of social capital to investigate disparities in health outcomes spanning various communities (Kawachi, 1999). As a result, the role of social environment on health has been studied since the mid-1970s. There is sufficient evidence which suggests that social capital does not only have a direct positive effect on health status but also acts as an effect modifier of physical and psychosocial stress on the physical and mental health of an individual (Broadhead et al., 1983). Furthermore, social epidemiology discourse attests to health benefits accruing from social affiliation (House et al., 1988). It has been well documented that individuals who are socially isolated are at a higher risk of premature mortality and poor mental health while the reverse is true for individuals who are more socially integrated (Berkman, 1995).

James Coleman postulated that benefits accruing from social capital in communities as well as within families have a pivotal bearing on the wellbeing and development of children (Coleman, 1988b). Central to the wellbeing of children is the quality of family life and particularly the parent-child relationship has a profound bearing on the physical, psychological, social, and economic wellbeing of children (Sanders, 1999). As such, a compelling case has been made that – poor health outcomes, increased risk

of death at an older age, economic and social problems are rooted and hinged on suboptimal family support or relations (Sanders, 1999, Demakakos et al., 2016).

1.2 Justification for the study

The relationship between social capital and health outcomes has received considerable attention in developed countries (Kawachi et al., 1997, Fujiwara and Kawachi, 2008, Beaudoin, 2009, Giordano and Lindstrom, 2010, Mohnen et al., 2011, Han et al., 2012). Despite the crucial importance of family social capital as a determinant of health (Demakakos et al., 2016), the link between family social capital (as a form of social capital) and the health of children has not been well investigated. There is a paucity of research focusing on the relationship between family social capital and the health of children in the developing countries (De Silva and Harpham, 2007, Morrow, 1999b, Harpham et al., 2006, Desai, 1992, Reyes et al., 2004) moreover, none of these studies is conducted in South Africa or the sub Saharan African region.

In South Africa, considerable effort has been put into documenting the disintegration of social capital especially among black communities as a result of colonialism and apartheid (Mamphela, 1991, HSRC, 2004b). Post 1994 when South Africa gained independence, social capital and the importance of social cohesiveness were the cornerstone of the country's policy documents (Burns, 2009). Although some studies have examined the relationship between social capital and health outcomes in South Africa (Campbell et al., 2002, Tomita and Burns, 2012, Cramm and Nieboer, 2011, Gilbert and Soskolne, 2003, Pronyk et al., 2008, Lau and Ataguba, 2015), none of them has focused on how the social capital generated in a family affects the health of children. Furthermore, there is no study known to the author that has assessed the socioeconomic status inequalities in the distribution of family social capital in South Africa.

1.3 Study Objectives

- 1) To assess for socioeconomic status (SES) inequalities in child health in South Africa.
- 2) To assess for SES inequalities in family social capital in South Africa.
- 3) To investigate the relationship between *family social capital* and *child health* in South Africa.

1.4 Literature review

This section presents a review of literature on child development, indicators of child development, the role of SES on child health and family social capital, family social capital as a form of social capital, child wellbeing in the context of a family and lastly a conceptual framework that will guide this study.

1.4.1 Child health and development in the context of a family

A child's development consists of many interdependent domains such as: cognitive ability, social-emotional development and sensory-motor – the development of both sensory and motor pathways or functions (Grantham-McGregor et al., 2007). The first 5 years of a child's life are extremely crucial as vital developments happen across all the domains during this phase. In fact, it has been unequivocally concluded that brain development and unfolding of human behavior is premised on a child's early life experiences that are in turn dictated by a highly interactive and inseparable combination of genetics and the influence of the environment (Shonkoff and Phillips, 2000, Grantham-McGregor et al., 2007). One of the active ingredients for the environment is parents and regular caregivers of children. The development of children thrives when a dependable and close relationship exists between parents/caregivers and the children (Shonkoff and Phillips, 2000). Notably, the absence of such relationships disrupts the development of children and this can have long lasting and severe negative consequences (Shonkoff and Phillips, 2000). Furthermore, the importance of parenting and consistent caregiving on the science of early child development is incontrovertible (Shonkoff and Phillips, 2000). Notably, all aspects of child/human development spanning from brain development to a child's ability to empathize are directly affected by the environment and experiences that children encounter in a cumulative manner starting from the prenatal period through early childhood years (Shonkoff and Phillips, 2000). The family is an active ingredient that forms the environment for child development and especially, the interfamilial process of parent-child relations. Mounting evidence from epidemiological studies shows that family-based risk factors for instance: the breakdown of marriage, poor parenting, and family conflicts influence the development and wellbeing of children (Sanders, 1999). In addition, unresponsive and inconsistent parenting has been identified as an effect modifier for poor development in children (Cooper et al., 1999, Murray and Cooper, 1997). In

developing countries, empirical evidence suggests that more than 200 million under 5 children do not fulfill their developmental potential (Grantham-McGregor et al., 2007). In some countries (e.g. the UK), powerful rhetoric has been developed about the negative consequences of family breakdown on the wellbeing and development of children (Shonkoff and Phillips, 2000).

1.4.2 Indicators of child growth and development

The two commonly used indices to assess physical growth/development in children are: wasting (weight-for-height) and stunting (height-for-age). Wasting is indicative of a deficiency in tissue and fat mass in comparison to the expected amount in a child of similar height (WHO, 1986b). Wasting is usually a result of “acute” malnutrition meaning that it can be developed very rapidly but also restored rather rapidly if the environment or living conditions are favorable (Ashworth, 1969). Stunting on the other hand is synonymous with linear growth failure among children (Grantham-McGregor et al., 2007). It is indicative of slow skeletal growth. Stunting results from long-term “chronic” exposure of children to a combination of the following factors: (i) poor nutrition, (ii) infectious diseases and (iii) poor child environments composed of the family structure, maternal support, neighborhood safety, among others (Walker et al., 2007, Semba et al., 2008). While wasting is an important indicator to describe the current health status of a child, stunting is particularly important when describing overall social deprivation. The World Health Organization has advised that it is generally desirable to report on both indices so as to provide a description of the nature of the problem as well as the extremity or magnitude of the problem (WHO, 1986b). Wasting is not always accompanied by stunting and the two indicators are not associated geographically or even ecologically. Countries with similar prevalence for stunting can have marked differences in wasting prevalence (WHO, 1986b). Studies have shown that a third of all children in developing countries experience linear growth or stunting (UNICEF., 2005) while 55 million children globally are wasted (Black et al., 2008).

1.4.3 Family social capital

The concept of family social capital was systematically introduced and developed by Coleman (1988, 1990). He postulates that social capital within the family refers to the

relationship between parents, children and any other members of the extended family that reside with a family unit (Coleman, 1988b). Coleman argues that family social capital is highly dependent on the physical presence of adults in the family and the attention they give to children. He described the absence of such physical presence as a structural deficiency in family social capital and he further notes that the most immanent element of structural deficiency is the single-parented family (Coleman, 1988b). To estimate the impact of social capital on the formation of human capital, Coleman constructed a 5 variable index which served as a proxy for family social capital: (i) presence of both parents in a household (ii) presence of 1 versus 4 siblings and this was premised on the argument that fewer children receive a deeper concentration of parental attention (iii) number of school changes since 5th grade – this was based on the hypothesis that each move disrupts social capital (iv) attendance of religious services on a regular basis and (v) a mother's expectations for her child's educational attainment — this variable was reflective of family norms. Over the ensuing decades, a handful of other scholars have investigated the impact of family social capital on child wellbeing and in these subsequent studies (Harpham et al., 2006, De Silva and Harpham, 2007, Runyan et al., 1998, Sanders, 1999), family social capital has been defined variably to include: maternal caregiver social capital, social networks, as well as organizational and community involvement (Morrow, 1999b).

1.4.4 SES, child health and family social capital

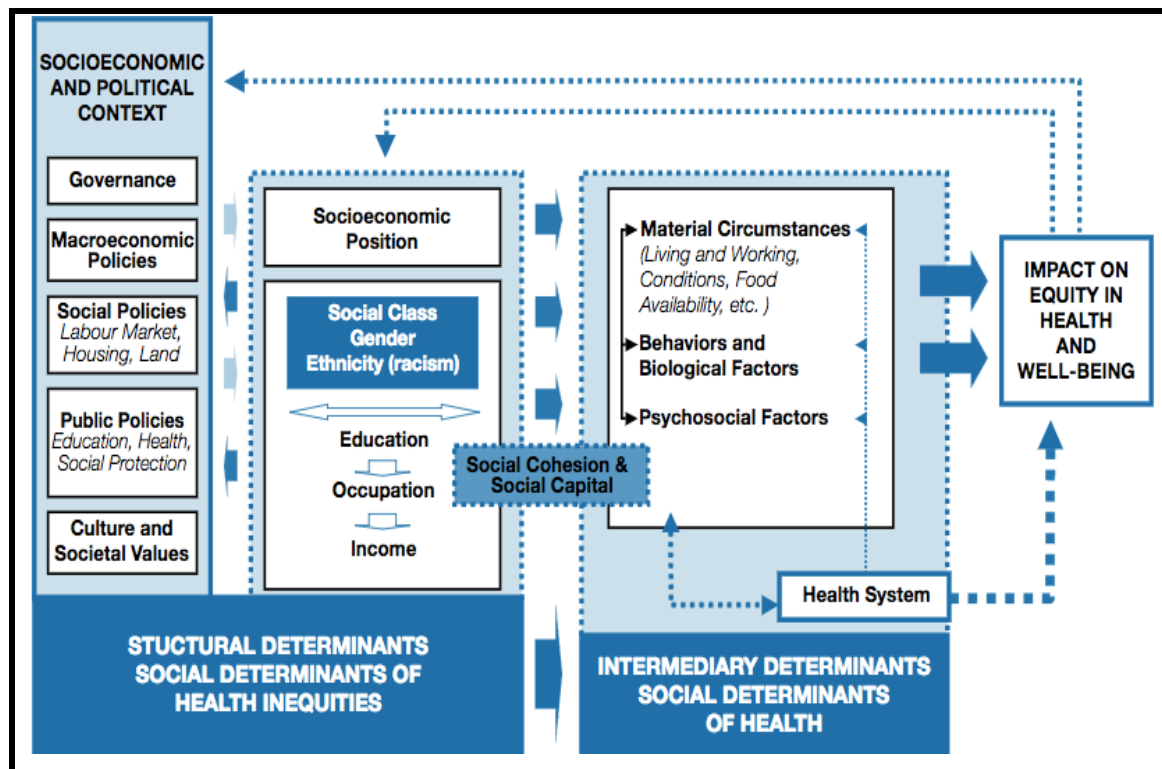
Studies show that SES is associated with health outcomes in children (Bradley and Corwyn, 2002). As such, differences in economic and social status contribute to inequalities in the development and wellbeing of children (Engle et al., 2011). Poverty has been found to be associated with poor sanitation, insufficient food and compromised hygiene all of which increase the rate of infections and stunting in children (Grantham-McGregor et al., 2007). Furthermore, poverty is associated with increased maternal stress, lower maternal education, depression and little stimulation for children in a home setting (Baker-Henningham et al., 2003, Bradley and Corwyn, 2002, Paxson and Schady, 2007). Ultimately, such economic stress and little education detrimentally affect the social capital generated in a family (Grantham-McGregor et al., 2007). Additionally, a body of research has theorized and found that low-income parents are more likely to be less nurturing in their reaction towards their children's

behavior and are more likely to be more punitive as compared with their counterparts in the middle class (Goodson et al., 2000). An upsurge in empirical evidence also suggests that there are considerable developmental deficits in poor children as compared with affluent children (Grantham-McGregor et al., 2007). In the South African context, there is a pro-rich distribution of health and health outcomes (Ataguba et al., 2011). Arguably, these disparities are not unexpected given the country's colonial and apartheid history.

1.4.5 Conceptual framework for this study

The WHO commission on Social Determinants of health and inequalities in health has developed a conceptual framework which includes social capital (for which family social capital is a subset) as one of the determinants that cuts across both the structural and intermediary social determinants of health. Figure 1 illustrates that social, economic and political mechanisms give rise to socioeconomic positions which in turn shape specific determinants of health status.

Figure 1: Commission on Social Determinants of Health (CSDH) Conceptual framework



Source: WHO 2010

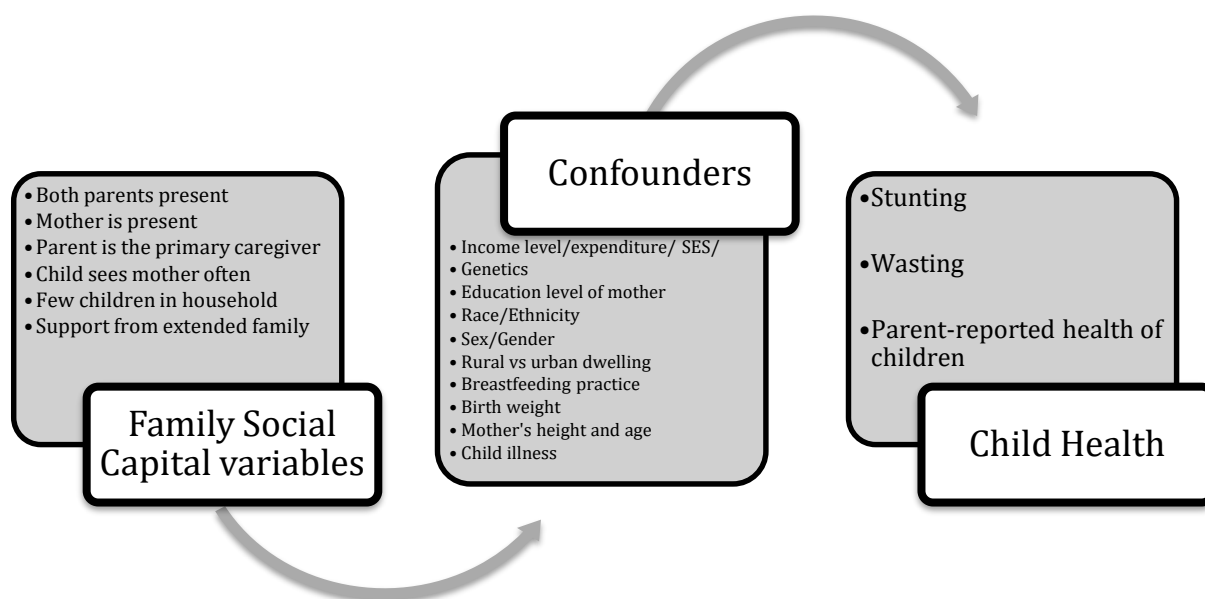
http://www.who.int/sdhconference/resources/ConceptualframeworkforactiononSDH_eng.pdf

This broader CSDH conceptual framework is used to situate and contextualize the conceptual framework used for this study, shown in Figure 2 and described in turn, which focuses on the role of family social capital on child health.

Optimal family social capital is composed of: presence of both parents in a household, if the parent is the primary caregiver for the child, good parent-child relationships, regular attendance of religious activities, mother stays at home most of the time (or not employed), support from the extended family, safe neighborhood, and fewer children in the household (Coleman, 1988b). This study's hypothesis is that children who receive bigger proportions of family social capital are less likely to be stunted, wasted or self-report as ill or unhealthy compared to the children who have a smaller dosage of family social capital. Based on previous research, a priori confounders to this relationship (child health and family social capital) include (a) child level factors: the age of the child, gender, genetics, the presence of a serious illness, breastfeeding practices and birth weight. (b) Household level factors: socioeconomic status (SES) or the income level of a household, education level of a mother, mother's age, mother's height, medical aid, and if the household receives a child social grant. (c) Community level variables are if the household is in an urban vs. rural setting as well as the regional or provincial dwelling of a household. While it would have been perfect to include all the identified variables in the present study's analysis, the study is constrained to only include variables elicited by the National Income Dynamics Study (NIDS) survey.

Figure 2 shows the conceptual framework that will guide this study and the readily available variables. After adjusting for the identified confounders shown in Figure 1, this study hypothesizes that the resultant child health will to a great extent, be attributable to the family social capital that the child receives. This study is cognizant of the fact that there are other external factors and contexts that influence the development and health of children e.g. schools, hospitals, social networks, peer groups, and parent's work environment (Bronfenbrenner, 1986). However, this thesis has a specific emphasis and focus on how the family affects the health and development of children.

Figure 2: Conceptual framework illustrating how family social capital affects the development of children



2.0 Methods

This section presents the proposed methods for this study including the source of data, study design, study population, measurement of variables of interest and the methodological plan to achieve each study objective.

2.1 Source of data

This study will use the National Income Dynamics Study (NIDS) data. The NIDS survey collected nationally representative panel data to facilitate the description and explanation of several socioeconomic indicators e.g. education, labor, health and wellbeing, income, etc. (Leibbrandt et al., 2009). Wave 1 of the survey was conducted in 2008, wave 2 between 2010-2011 and Wave 3 between April and December of 2012 (de Villiers et al., 2013) and Wave 4 in 2014. The survey used a stratified two-stage cluster sample design, in the first stage 400 primary sampling units (PSUs) were selected from a master sample of 3,000 PSUs and in the second stage, a random sample of 400 PSUs were selected from each stratum in the 53 district councils in the country (Leibbrandt et al., 2009).

A combination of household, adult and child questionnaires was used for all the four waves of the NIDS survey. Household questionnaires were administered to a knowledgeable member of the household, adult questionnaires were administered to every individual over 15 years of age in the household, while child questionnaires were administered to the mother or care giver of the child (below 15 years of age). Full details relating to the NIDS survey have been described elsewhere (de Villiers et al., 2013). This thesis will mainly use the data elicited by the child questionnaire. Some data will come from the adult and household questionnaires. Data from all the 4 waves of the survey will be used for this study. All the NIDS questionnaires and datasets can be accessed at a data repository (<http://www.datafirst.uct.ac.za/dataportal/index.php/catalog/central0>) hosted by the University of Cape Town.

2.2 Study population

This study is nationally representative and will focus on households in all the 9 provinces of South Africa. For the research question at hand, the study is only interested in the child population and the NIDS survey defined a child as anyone below 15 years of age. This analysis however has a special interest in the early childhood phase so the study will only include children between 6 months and 5 years of age. The decision to include children who are over 6 months is based on the fact that 6 months is the recommended average age at which children are weaned off exclusive breastfeeding. As such, a child is more likely to be exposed to the environment as well as the family-related factors that affect his/her growth and health after 6 months (Reyes et al., 2004). Both female and male children will be included as well as children of all races. In instances where more than one child in the household is eligible for the study, all the eligible children in the household will be included in the study.

2.3 Study design

This study proposes to firstly assess for SES inequalities in child health and in family social capital in South Africa. This objective of the study will be achieved by using the Concentration Index (CI) to estimate SES inequalities. Secondly, the study sets out to investigate the association between family social capital (exposure) and child health (operationalized as: stunting, wasting and parent-reported illness of the child). This

objective of the study will be answered using longitudinal study design. Logistic regression models will be fitted to predict child health in waves 2, 3 and 4 using two-year lagged covariates from the preceding waves. For instance, a cohort of children will be followed up between Wave 1 and Wave 2. A model will be fitted to predict child health in 2010 (Wave 2) using lagged covariates including family social capital from 2008 (Wave 1).

2.4 Measurements

2.4.1 Outcomes of interest: stunting, wasting and parent reported health among children

In this study, child health has been operationalized to encompass three indicators: stunting, wasting, and parent-reported illness of a child. To assess for stunting and wasting, it has been widely accepted that anthropometry is the most pragmatic tool to evaluate for deficiency in growth among children (WHO, 1986b). This study will use anthropometric measures reported in section G of the child questionnaire. The trajectory of stunting is such that its prevalence increases over time up to 24 or 36 months and then levels off (Martorell et al., 1995). This is because children can only double their height in the first year; as such significant degree of stunting takes a longer period to be established (WHO, 1986b). Stunting will be defined as a height-for-age Z score of less than the conventional cut off point of -2SD below the median height-for-age (de Onis et al., 2004). This study will use the WHO child growth standard (WHO, 2006). For instance, the height-for-age Z score of the i^{th} child will be given as:

$$Z - Score = \frac{Hi - Hr}{SD \text{ of the reference population}} \quad (1)$$

Where Hi is the height of the child “ i ”, Hr is the median height for the preference population while SD is the standard deviation of height in the reference population. Question G4.3 in the child questionnaire will be used to obtain information on the child’s height while the age of the child will be got from question D5 that asks, “*What was the child’s date of birth*”.

Wasting is most prevalent between 12 and 24 months of age. This is because diarrhea diseases and deficiencies in diet are most common this period (WHO, 1986b). Wasting will be defined as a weight-for-height Z score of less than -2SD below the median weight-for-height. Similar to the stunting analysis, for the reference population, this study will use the WHO and the NCHS child growth standards. Information on the child's weight will be obtained from question G5.3 in the child questionnaire.

The decision to consider Parent-reported illness was guided by two principle virtues of relying on the health status of an individual that is self-reported. Firstly, self-reported illness has been found to be a valid predictor for morbidity and mortality (Idler et al., 2000, Idler and Benyamini, 1997) and secondly, it is multidimensional and implicitly embeds aspects of coping, functionality and wellbeing (Simon et al., 2005). In the NIDS survey question D12 asked, “*Overall, how is this child's health at this point in time? Would you say that this child's health is excellent, very good, good, fair or poor?*” This question elicited for a binary response of either YES or NO.

2.4.2 Exposure variable: measuring family social capital

As aforementioned, family social capital is a concept that has been variably constructed across different studies (Morrow, 1999b). The definition of family social capital in this study will draw heavily from Coleman's construct of family social capital (1988) and Runyan et al. (1998) definition of a family social capital index. It is important to note that this analysis is inherently constrained to only include variables that were elicited in the NIDS survey. Seven indicators of family social capital will be identified and assessed as either present or absent for each child. The seven indicators of family social capital will include: (i) presence of both parents in a household, (ii) presence of a mother in the household, (iii) how often a child sees the mother, (iv) how often a child sees the father, (v) parent of the child is the primary caregiver, (vi) support from extended family, and (vii) the number of children in the family. Using Multiple Correspondence Analysis (MCA) these seven indicators were used to create a family social capital index. The details of the seven indicators are described in turn:

- (i) *Parents of the child living together*

“E9. Does this child's mother live in this household?”

This is a categorical variable with five responses: (i) Yes, (ii) No – deceased, (iii) No – Absent, (iv) Don't know and (v) Refused. This variable will be redefined and made binary with 1= Yes/Present and 0= other.

“E23. Does this child's father live in this household?”

This is a categorical variable with five responses: (i) Yes, (ii) No – deceased, (iii) No – Absent, (IV) Don't know and (V) Refused. This variable will be redefined and made binary with 1= Yes/Present and 0= other.

(ii) *Presence of mother in the household*

“E9. Does this child's mother live in this household?”

This is a categorical variable with five responses: (i) Yes, (ii) No – deceased, (iii) No – Absent, (iv) Don't know and (v) Refused. This variable will be redefined and made binary with 1= Yes/Present and 0= other.

(iii) *How often a child sees the mother*

“E10. How often does the child's mother see the child?”

This is a categorical variable with the following responses: (1) Everyday, (2) several times a week, (3) several times a month, (4) several times a year and (5) never. This variable will be redefined and made binary with 1= Every day and several times a week while 0= several times a month, several times a year and never.

(iv) *How often a child sees the father*

“E24. How often does the child's father see the child?”

This is a categorical variable with the following responses: Everyday (1), several times a week (2), several times a month (3), several times a year (4) and never (5). This variable will be redefined and made binary with 1= Every day and several times a week while 0= several times a month, several times a year and never.

(v) *Parent of the child is the primary caregiver*

“E2. What is the relationship of the person who is currently responsible for this child?”

This is a categorical variable with 20 possible responses. This variable will be redefined made binary with 1= Biological/adoptive/foster/step parent of the child and 0= other.

(vi) *Support from extended family*

“E3. Who else helps to care for this child?”

This is a categorical variable with 20 possible responses. This variable will be redefined and categorized as: 1= Children who get support from their extended families e.g. uncles, aunts, grandparents, cousins, in-laws and adoptive/step parents and 0= children who don't receive any extra care and support from extended family.

(vii) *Number of children in the family*

“C1.5. How many biological children are now living with you?”

This is a discrete variable asked in the adult questionnaire. This variable will be redefined and categorized as this: 1= Not more than 2 children and 0= 2 children and more.

Using Multiple Correspondence Analysis (MCA), the responses to each of the seven indicators will be combined to construct a family social capital index for each child. The choice of MCA over Principal Components Analysis (PCA) and Factor Analysis (FA) was guided by the fact that MCA is the more appropriate methodology when dealing with categorical variables while PCA is more ideal for continuous variables (Greenacre and Blasius, 2006, Booyesen, 2008). All the variables used in the family social capital index were categorical in nature. Further, MCA makes fewer assumptions regarding the distribution of the indicator variables and imposes fewer constraints on the data. PCA requires linearity as it assumes equal distances between the categories (Greenacre and Blasius, 2006).

2.5 Methodological plan to achieve each study objective

Objectives 1 and 2: SES inequalities in child health and in family social capital

To assess for SES inequalities in child health and in family social capital, the concentration index (CI_H) will be used. The choice of this analytic method is backed by the fact that for a bivariate analysis considering a measure of SES/income, CI is consistent with sequencing units across socioeconomic clusters. Additionally, CI fulfills the basic requirements of a health inequality index; it is sensitive to changes in the population across SES strata, it is reflective of the entire population's experience across SES groups, and it takes into consideration the social economic dimension

(Wagstaff et al., 1991, Kakwani et al., 1997). Concentration Curve plots the cumulative proportion of children ranked by the SES of their household against the cumulative proportion of child health indicators or family social capital. Empirically, (CI_H) will be estimated as; two times the covariance between a child's SES relative ranking and health variable divided by the mean value of the health variable as illustrated in equation 2 (Kakwani et al., 1997).

$$CI = 2 \text{cov}(x_i, R_i) / \mu \quad (2)$$

Where: x_i is the child health indicator score or the family social capital score for the i^{th} child. μ is the mean level of child health or family social capital while R_i is the SES relative rank of the i^{th} child.

Theoretically, the CI lies between -1 and +1; with -1 representing an extreme pro-poor distribution (the chosen health outcomes are concentrated among the most disadvantaged) while a CI of +1 represents an extreme pro-rich distribution (the chosen health outcomes are concentrated among the least disadvantaged) (Kakwani et al., 1997). CI will be estimated using the ADePT software developed by the World Bank. This study will use household per capita expenditure as a proxy for SES.

Objective 3: Association between child health and family social capital

To answer this objective, logistic regression analysis will be done to assess for the impact of family social capital (exposure variable) on each of the three child health indicators. Qualitative response logit models will be specified for each regression analysis. This implies that the outcome variable in all 3 models will be binary in nature with 0 representing a stunted/wasted/ill child and 1 representing a not stunted/not wasted/ not ill child. The advantage with the logistic model is that it uses maximum likelihood estimation technique and therefore circumvents the possibility of violating the ordinary least squares assumptions (Jones, 2006b). Equation 3 shows the model specification for the regression analysis.

$$\ln \left[\frac{\pi(x)}{1-\pi(x)} \right] = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_i X_i \quad (3)$$

Where: $\pi(x)$ is the probability that the outcome variable $Y_i = 1$, α is the constant and β_i the coefficient of the independent variable X_i .

From a review of theoretical and empirical studies, individual, household and community level covariates were identified for consideration in each of the multi regression analyses. Table 1 lists these independent variables and how they will be defined in this analysis.

Table 1: List of independent variables for the multi-regression analysis

Variable	Type of variable	Coding
<i>Child level variables</i>		
Sex	Binary	0= Female, 1= Male
Race	Categorical	0=Other, 1=Black
Age	Continuous	Measured in months
Birth Weight	Continuous	Measured in Kgs
Serious illness	Categorical	0=No, 1=HIV/AIDS, TB, Diabetes and cancers
<i>Household level variables</i>		
Mother's level of education	Categorical	0=Below Tertiary, 1=Tertiary and above
Per capita household expenditure	Binary	0=Poorest and second poorest, 1=Middle, rich and richest
Mother's height		Measured in meters
Mother's age		Measured in years
<i>Community level variables</i>		
Province	Categorical	Western cape=0, Eastern cape=1, Northern cape=2, Free state =3, Kwazulu Natal=4, Northwest=5, Gauteng=6, Mpumalanga=7, Limpopo=8
Dwelling	Binary	0=Rural, 1=Urban

3.0 Analysis Plan

All the data will be cleaned, managed, and analyzed using Stata (Stata Corp, Texas). The level of significance will be set at 5%. Descriptive statistics will be provided for all the variables included in the models. Bivariate analyses will be conducted to identify key variables for model building after which the multivariate analysis will be performed.

4.0 Ethics

The National Income Dynamics Study (NIDS) survey obtained all the appropriate ethics approvals and therefore this thesis will not pose any risks to the survey study subjects. Nonetheless, ethical approval will be obtained from the Human Research

Ethics Committee at University of Cape Town. Additionally, permission will be sought from DataFirst at University of Cape Town, which houses the NIDS datasets.

5.0 Stakeholders, reporting and implementation

Study findings will be disseminated through peer reviewed publications. At least one journal article will be published in an appropriate journal and a policy brief of the key findings will be written. Additionally, the study findings will be shared with SALDRU, the proprietor of the data.

6.0 Logistics

6.1 Timeline

It is envisaged that the study will take a total of 24 weeks (6 months). Table 2 shows a breakdown of the tasks and timelines.

Table 2: Timeline for proposed activities

Task	Duration
Concept Note	1 Week
Plan for study objectives	1 Week
Research protocol	3 weeks
Data cleaning for wave 1, 2 and 3	3 weeks
Draft 1 of literature review	7 weeks
Final draft of literature review	1 week
Analysis of data	3 weeks
Draft 1 of journal manuscript	2 weeks
Policy brief	1 week
Final drafts of manuscript and policy brief	2 weeks

6.2 Budget

The NIDS data set is freely available for academic research purposes; therefore, the author will not incur any direct costs. All other software (statistical and referencing) used for this study will be provided by University of Cape Town or freely available in the public domain.

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PART B: LITERATURE REVIEW

1.0 Theoretical Review

This section presents a description of the theory of social capital including family social capital, and how it influences the health of children. The first two sections (1.1&1.2) briefly review the principal authors associated with social capital, and how the concept developed over time. This is followed by a review of the notions of social capital in the family context (family social capital). The review then turns to the links between family social capital and child health and lastly the relationship between socioeconomic status (SES) and (a) child health, and (b) family social capital.

1.1 Theories of social capital

In sociological theory, the notion that social capital affects the wellbeing of populations is not a new one. As is the case with several other sociological concepts, the heuristic value and original meaning of social capital has varied greatly and this is also evidenced in its diverse application. The concept of social capital embodies the idea that social integration or group participation has the potential to positively impact the wellbeing of individuals as well as the broader community. For instance, Durkheim (1952) in his seminal work “*suicide*” investigated the social causes of suicide in the 19th century. He theorized that egoistic suicide results from not being “...integrated at all points to keep all its members under its control” p. 373 (Durkheim, 1952). Durkheim emphasized that social integration is an antidote to self-destruction and anomie.

Social capital is characterized as a form of capital that can be traced back to classical times. The term capital originates from Marx’s (1933 [1849]) “Wage-Labour and Capital” where he defined capital as any input in the production process. Marx (1933 [1849]) postulated that the bourgeoisie exploited the working class to accumulate capital through the production and creation of surplus. Neoclassical economists took it a step further by distinguishing between the different types of capital namely: physical, financial and human capital. Physical capital refers to inputs for the production process e.g. machines and land while an example of financial capital is the money required to set up a business venture. Human capital on the other hand is accumulated when individuals invest in

improving their own capabilities e.g. advancement in education or training (Varian, 2006). The similarity between social capital and other types of capital is that, as with other forms of capital, an investment in social capital is expected to yield some form of utility or payoff (Lin and Hsung, 2001). While financial capital is in an individual's bank account and human capital relates to one's abilities, social capital is in the structure of individuals' relationships (Portes, 1998).

The novelty of social capital and its heuristic or explanatory power came from two sources; firstly, the notion focuses on the desirable consequences of sociability without delving much into the less desirable features of the concept¹. Secondly, it places the desirable consequences of sociability into a framework of the broader discourse of capital thereby presenting an option of a nonmonetary form of capital that has the power and influence likened to the size of one's bank account (Portes, 1998). As such, social capital caught the attention of policy makers who are primarily interested in fixing social problems using non-economic and less costly remedies.

1.2 Definitions and developments of social capital

One of the first times the term social capital was used in contemporary times was by the economist Glen Loury (1977). As Loury critiqued neoclassical theories of inequalities brought about by race, he ran into the idea of social capital. His argument was that orthodox theories of economics were rather individualistic and focused on individual human capital:

“The merit notion that, in a free society, each individual will rise to the level justified by his or her competence conflicts with the observation that no one travels that road entirely alone. The social context within which individual maturation occurs strongly conditions what otherwise equally competent individuals can achieve. [...] It might thus be useful to employ a concept of “social capital” to represent the consequences of social position

¹ Social capital has been associated with some negative consequences and criticisms and these are discussed later in section 1.6.

in facilitating acquisition of the standard human capital statistics” p.176 (Loury, 1977).

Loury however, did not go further to develop the concept of social capital, he seemed to have merely met the idea in the broader context of his polemical argument against the orthodox economists.

The first analysis of social capital in contemporary times was by Bourdieu [1989]. His initial discussion of the concept appeared in a brief ‘*Provincial Notes*’ in the *Actes de la Recherche en Sciences Sociales* in 1980. This article however did not garner much attention in the English-speaking world as it was published in French. Moreover, the first English translation also didn’t get sufficient attention and this is believed to have resulted from the fact that the article was concealed in the pages of a book on sociology of education (Bourdieu, 1986). The non-visibility of Bourdieu’s analysis has been described as ‘lamentable’ by Portes [1996] because he believed that, “*Bourdieu’s analysis is arguably the most theoretically refined among those that introduced the term in contemporary sociological discourse.*” p.45 (Portes, 1998). Bourdieu defined social capital as:

“The aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relations of mutual acquaintance or recognition – or in other words, to membership in a group – which provides each of its members with the backing of the collectively owned capital.” (p.248: 1980)

Coleman’s analysis on the role of social capital in the creation of human capital is the second seminal source of definition and development of social capital in contemporary times. Coleman defined social capital in terms of its functions as:

“[...] A variety of different entities with two elements in common: they all consist of some aspect of social structures and they facilitate certain action of actors – whether persons or corporate actors – within the structure” p.S98 (Coleman, 1988a).

Subsequent theoretical analyses defined social capital in more nuanced ways in various disciplines; some of these definitions are presented in Table 1. Despite the variation in definitions, consensus on social capital in the existing body of literature is that: social capital is the utility or payoff that an actor gets from social relations or social structures e.g. family, school, trade unions, etc. It is also important to highlight that despite the beneficial consequences of social capital; the concept can be associated with some harmful consequences as well. An illustration of harmful social capital is where criminal activity such as a drug cartel is associated with strong networks (Fine, 1999). The harmful outcomes of social capital have been summarized by Portes (1996) as:

“Exclusion of outsiders, excess claims on group members, restrictions on individual freedoms and downward leveling norms.” (p.15)

Social capital can be broadly categorized as: (i) Social capital generated in a family setting and this thesis refers to this form of social capital as *family social capital* (ii) social capital from the wider community and this includes: social capital from schools, neighborhoods, informal and formal networks like trade unions, and organizations. The focus of the present study is to better understand how aspects of *family social capital* impact the health of children. As such, the remaining sections of this theoretical review are restricted to the discussion of family social capital.

Author(s)	Year	Discipline	Definition
Putman	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, norm and social trust that facilitate coordination and cooperation for mutual benefit” p.2 (Putnam, 1995).
Portes	1998	Sociology	“Social capital is the ability to secure benefits through membership in networks and other social structures” p.8 (Portes, 1998).
Glaeser et al.	1999	Economics	“an individual’s social capital is that individual’s social characteristic – including charisma, status, and access to networks – that enable that person to extract private returns from interactions with others” p.3 (Glaeser et al., 1999).
Fukuyama	2000	Political Economics	“Social capital is an instantiated informal norm that promotes cooperation between two or more individuals” p.3 (Fukuyama, 2000).
Burt	2001	Sociology	“... 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 reforms” p.32 (Burt, 2001).
Grootaert and van Bastelaer	2002	Economics	“Institutions, relationships, attitudes and values that govern interaction among people and contribute to economic and global development” p.4 (Grootaert and van Bastelaer, 2002).
Lin and Hsung	2001	Sociology	“Investment in social relations by individuals through which they gain access to embedded resources to enhance expected returns of instrumental or excessive actions” p.17 (Lin and Hsung, 2001).
Lau and Ataguba	2015	Health Economics	“Social capital refers to resources rooted in social relations to enable actions and interactions of individuals or groups” p.3 (Lau, 2014a).

Table 3: Definitions of social capital

1.3 Family social capital

The concept of family social capital was systematically introduced and developed by Coleman in his work “*social capital in the creation of human capital*” (1988, 1990). Coleman was a theorist of sociology who played a pivotal role in guiding policy making in the USA. Most of his theorizing followed from his early work in 1961 titled, “*The adolescent society: the social life of the teenager and its impact on education*”.

In his work “*social capital in the creation of human capital*” Coleman argued that a family’s capital could be viewed along three dimensions: financial capital, human capital and social capital. Where; financial capital can be measured by a family’s income or wealth, human capital can be measured by the parent’s level of education and this is central in creating a cognitive environment that aids a child’s learning (Coleman, 1988a). Social capital in the family on the other hand is different from these two types of capital and Coleman defined social capital in a family as:

“The relationship between children and parents (and, when families include other members) relationships with them as well.” (1988: S110).

Coleman theorized that family social capital is highly dependent on the physical presence of adults in the family and the attention they give to children. He postulated that as a way to pass on their human capital -- parents should choose to invest time, interaction and training in their children (Coleman, 1988a). To illustrate this, Coleman used one of the examples below:

“John Stuart Mill, at an age before most children attend school, was taught Latin and Greek by his father James Mill, and later in childhood would discuss critically with his father and with Jeremy Bentham drafts of his father's manuscripts. John Stuart Mill probably had no extraordinary genetic endowments, and his father's learning was no more extensive than that of some other men of the time. The central difference was the time and effort spent by the father with the child on intellectual matters” (1988: S110).

He described the absence of such physical presence of parents as a structural deficiency in family social capital. Coleman theorized that structural deficiencies in

family social capital are mainly as a result of: (i) single-parented families and (ii) if one or both parents have jobs that require them to leave the home for extended periods. Although Coleman advocates for the physical presence of both parents, he cautions that over and above the physical presence of parents -- a strong relationship should exist between the parents and children. In other words, he viewed strong bonds between parents and children as the conduit through which interdependencies ensued. Amato (2005) who believes that “*regardless of the family structure, the quality of parenting is one of the best predictors of children’s emotional and social well-being*” p.83 further supports this view.

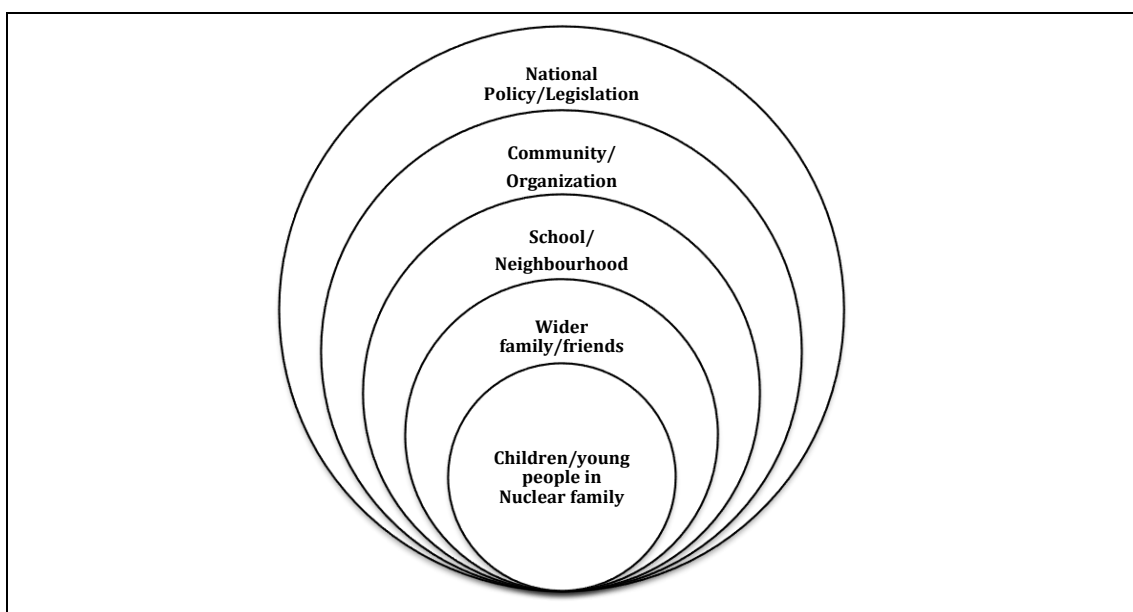
1.4 Developments in family social capital theories

Coleman’s theoretical writings on family social capital remain the most extensive and analytic on the matter up to date. There are no other dominant theoretical underpinnings apparent in the literature that attempt to develop the theory of family social capital (Pinkerton and Dolan, 2007). Subsequent researchers on the notion of family social capital largely agree with Coleman’s conceptualization of social capital with minor variations and nuances on what indicators to consider when measuring and predicting family social capital and this is further discussed in *section 2.1.3*. One recurrent theme in the theoretical underpinnings of these subsequent researchers has been the need to recognize the role played by the neighborhood or sociological characteristics of communities where families reside (Marrow, 2004, Gorman-Smith et al., 2000, Dufur et al., 2008).

Family social capital could be thought of as a dual track with (i) intra-familial social capital that results from interactions within families and (ii) inter-familial social capital that results from mezzo-level interactions between families and the community (Ferguson, 2006). Gorman-Smith et al. theorized that it might be plausible that the type of neighborhood in which a family resides potentially carries different risks or protective effects on the family which in turn influences the development and behavior of children (Gorman-Smith et al., 2000). Marrow (2004) supports this notion by postulating that although health practices and behaviors might appear as a private matter superficially, in reality, health behaviors take place in social arenas. For children -- these arenas are constrained by their everyday contexts such as schools, family, peer groups, and the wider neighborhood or society . Furthermore, Dufur et al.

(2008) argue that for children, there are theoretical reasons that motivate for a distinction between the social capital created in a home and that created at school. He postulates that while social capital created in homes exerts heavy influences on the development of a child, as the child grows, relationships with people outside of the family become increasingly important (Dufur et al., 2008). Admittedly, children spend half of their waking lives at school where they create ties that accrue a substantial amount of social capital. As such, a lack of consideration of variations in the wider community or social institutions might be an over simplistic or otherwise inaccurate way to view the impact of family on the development and wellbeing of children (Gorman-Smith et al., 2000). Therefore, if theoretically, the ultimate goal of family social capital is to ensure that young people's needs are met and their rights achieved, there is a need for a set of social supporters across a range of contexts. These social supporters can be thought of as a nested model where: children in a home are dependent on the immediate/nuclear family for support, the family is dependent on the extended family which in turn relies on a larger network of neighbors, friends and the wider community, who in turn rely on much wider organizational networks and lastly these rely on national policy and legislation (Pinkerton and Dolan, 2007). Figure 1 shows an illustration of such a nested model².

Figure 3: A cupped model of family support



Source: Pinkerton and Dolan (2007)

² Such a cupped model has been used in Ireland to distil an explicit definition for family support.

1.5 Family support as a theory of change

Family support policies have received more attention more in developed countries and specific countries that have incorporated family support into their policy rhetoric include: The United Kingdom, Ireland and some states in the USA (Pinkerton and Dolan, 2007). Furthermore, the United Nations Convention on the rights of the child gave special recognition to the importance of family life in Article 18 and the preamble.

As a theory of change in terms of policy, organizational contexts and practice, family support has been rooted in the theory of social capital (Pinkerton and Dolan, 2007). Social capital got from nuclear and extended families as well as friends can be thought of as an “informal” source of family support and this has been seen to create a core “helping system” for the individual or family (Canavan and Dolan, 2000). When this informal support is perceived as weak or non-existent then the family or individual should ideally resort to “formal” sources of support that are provided by a professional e.g. a counselor or a psychologist (Pinkerton and Dolan, 2007). It is important to highlight that these two types of support should not be counterpoised against each other as an “either/or” choice but rather be viewed as complementary and supplementary to each other. The critical question thus is -- which type of support best suits the needs of a family and how best to manage the mix?

Four specific kinds and qualities of support that are available to and within families have been identified and include the following (Cutrona, 2000):

- *Concrete support*: This type of support relates to practical acts of assistance between people for instance childmind a sister’s young baby as they go off to the market or on a trip. This type of support has often been underestimated or totally missed by professionals.
- *Emotional support*: This type of support relates to acts of empathy e.g. the comfort that a child requires when they are bereaved by the sudden death of a parent.
- *Advice support*: This type of support relates to advice given to family members and the reassurance that goes with it.
- *Esteem support*: This type of support relates to how a family member rates and informs another of their personal worth e.g. the way in which parents assert their

continued love for their child preparing for an examination irrespective of the results.

While it is worth noting the types of support summarized above, it is also important to highlight that there might be variations in the quality of support and this is due to the following factors:

- *Reciprocity*: This refers to the extent to which help or support is exchanged equally between people and neither party feels beholden to the other (Eckenrode and Hamilton, 2000).
- *Closeness*: This refers to the extent to which support can be exchanged and assumed between family members or friends (Cutrona and Cole, 2000, Riordan, 2000).
- *Durability*: This refers to the contact rates and the duration that people are known to each other. Ideally, dependable people are those that have known each other for extended periods, are in close proximity to offer help and typically are not intrusive in nature (Tracy and Biegel, 1994).

Although family support has garnered sufficient attention as a major strategic intervention (Katz and Pinkerton, 2003), it is still relatively in its infancy stages of development (Canavan, 2006, Featherstone, 2004, Pinkerton and Dolan, 2007). Additionally, family support as a theory of change is varied in its diversity, and application and has suffered a case of under-conceptualization (Canavan et al., 2006). Due to these challenges, Pinkerton one of the leading proponents of family support as a theory of change has lamented that family support needs to move on from “*being one of those warm and fuzzy terms which by being all inclusive ends up meaning nothing*” p.11 (Canavan et al., 2006).

1.6 Criticisms of social capital and family social capital theories

Family social capital is hinged and rooted in the theory of social capital and therefore it is important to review some of the criticisms for social capital before presenting the critiques for family social capital.

The notion of social capital has been debated for decades with different arguments from both the proponents and opponents of social capital. Firstly, some argue that

social capital is an ill-defined concept that includes a wide range of variables from how parents relate with their children, to people's perceptions on where they live, to individuals' connections and networks in society and how much these are used to their benefit, and even to what level of trust individuals have for their politicians. Woolcock (1998) criticizes this "all-encompassing" nature of social capital as he notes that:

"It now assumes a wide variety of meanings and has been cited in a rapidly increasing number of social, political and economic studies. [...] These indiscriminate applications of social and 'other' capitals are part of what Baron and Hannan (1994:1122-4) despairingly refer to as the recent emergence of a 'plethora of capital'. Sociologists, they lament, 'have begun referring to virtually every feature of life as a form of capital'" P.155 (Woolcock, 1998).

Secondly, Fine (1999) has criticized the idea of social capital as being totally chaotic as it draws its meaning from very abstract studies. He further observes that social capital scholars treat the concept along two dual notions of "social" and "capital" and ultimately combine the two. He notes that this creates ambiguity on where to draw the line between where capital ends and where social begins. Indeed, such incoherencies have paradoxically resulted into various research studies where the conceptualization of social capital has varied. Furthermore, Szreter and Woolcock (2004) noted that researchers of social capital have conflicting ideological and political inclinations and as a result, there have been various definitions and operationalization of the concept of social capital. For instance: (a) should social capital be treated as a private good or a public good or both (b) whether social capital is a group-level construct or an individual-level attribute or both (c) there are also divergent views on whether social capital is class selective and therefore entitled to the dominating class or if it is publically available to all social structures. As such, the apparent difference in the conceptualization of social capital has been one of the major critiques of the concept. Fine (1999) further noted that the concept has been freely floating from one meaning to another and at times with little attention paid to the conceptual depth or rigor of the notion. Such inconsistencies incapacitate the ability to make comparisons across studies.

By the same token, Portes (1998) argued for the need to make a distinction between the various sources and consequences of social capital. He argued that it is imperative to keep in mind the differing forms and functions of social capital as a source of (a) social capital (b) family support and (c) support from extra familial networks. This distinction is required to avoid confusion and can also allow for a study of interrelationships. On the other hand, Serageldin and Grootaert (1999) advanced that differences in the conceptualization and definition of social capital are unnecessary and artificial because different types of social capital can co-exist and in fact reinforce each other.

Elsewhere, economists have voiced their skepticism regarding social capital (Arrow, 1999). Their main concerns surround the vagueness of the concept and how such vagueness does not permit for the precision and clarity required by the field and standards of economics (Durlauf, 2002). The other reason for their skepticism results from the nature of the training in Economics, which asserts that individual's actions should be investigated to understand social phenomena as opposed to contextual factors. Furthermore, Anderson and Mellor (2010) argue that social capital is often times measured using data solicited by surveys, which are inherently less reliable given the subjective nature of the interpretation of attitudes from individuals.

With regards to critiques of *family social capital*, Morrow (1999b) made a couple of critiques on Coleman's conceptualization of family social capital. Firstly, she observes that Coleman did not base his argument in social and economic history. This could have potentially biased his study findings as the economically disadvantaged demographic group will naturally have low aspirations and might be prone to dropping out of school and turning to crime. Secondly, she notes that Coleman ignored the role played by gender except for the one instance where he noted the negative consequences that ensue from women's employment. This raises concerns about the little credit given to women in creating or sustaining social networks and ultimately social capital for their families. Thirdly, Morrow warns of the misunderstanding that surrounds international circulation of ideas and the plausibility of transposing Coleman's arguments from the USA to other contexts. This critique is premised on the differences in culture, economics, politics and community effects.

Fourthly, Coleman's theory is largely focused on the effect of "family structure" as opposed to "community" effects. The theory is premised on a model of nuclear family norms and ignores the wider kin relations, external labor markets and other social factors. Furthermore, Coleman has been criticized for downplaying the agency of children to appear as passive burdens on their parent's time (Morrow, 1999b). Fifthly, Marrow dismissed Coleman's proposition that more children in a household is an indicator of low social capital because this might ignore some crucial nuances such as the support that siblings get from interacting with one another and supporting each other.

Lastly, family social capital has been criticized as being un-dynamic and vague, individualistic and as a catch all that largely describes rather than explains the effects of inequality (Morrow, 1999b, Pinkerton and Dolan, 2007).

1.7 Family social capital and child health: *what are the links?*

The hypothesis that early environmental influences play a critical role in the early development of a child is widely accepted and supported by empirical evidence. The first 5 years of a child's life are thought to be extremely crucial as vital developments happen across all the domains during this phase (Grantham-McGregor et al., 2007). In fact, it has been unequivocally concluded that brain development and unfolding of human behavior is premised on a child's early life experiences (Shonkoff and Phillips, 2000). Furthermore, the role of early life and childhood exposures have been linked to cardiovascular diseases, metabolic complications and premature death in adulthood (Barker et al., 2002, Carroll et al., 2013, Brown et al., 2009, Kelly-Irving et al., 2013, Repetti et al., 2002, Miller et al., 2011).

The child's early life experiences are dictated by a highly interactive and inseparable combination of genetics and the influence of the environment. Wadsworth (1996), a medical sociologist, paints a good picture of this intricate combination as "*from mother in the form of prenatal development, from both parents in the form of genetic endowment and postnatal care, and from the social and physical environment in all its aspects in the early years*" p.160 (Wadsworth, 1996). As such, concepts such as social capital and family social capital provide an intermediary stage that links the narrow purview of micro individual level factors to an overly broad purview of

macro-social factors that combined shape the trajectory of health outcomes for children. Marrow (1999) postulated that focus should not be geared towards the nature of health behaviors, but rather the contexts in which they take place, in other words where, when and with whom are the factors that have important bearing on children's health outcomes (Morrow, 1999b). The family environment is one such context.

It has been well established that the family is an active ingredient that forms part of the physical environment for child health and development (Sanders, 1999). Insufficiencies in family social capital such as suboptimal maternal care have been implicated in stress reactivity, elevated anxiety and lower memory function in children (Grantham-McGregor et al., 2007). Additionally, poor physical and emotional parenting has been found to be associated with unfavorable outcomes in children such as: obesity (Sleddens et al., 2011), low academic achievements, maladaptation, aggression, (Chan and Koo, 2011, Kawabata et al., 2011) and adult psychopathology (Weich et al., 2009). Lastly, the structure of a family and style of parenting directly influence the critical period from birth to adolescence, which in fact determines the most sensitive time of cognitive, socio-emotional and behavioral development in children (Ribar, 2004).

1.7.1 Theoretical model to assess effects of family social capital on child health

Gary Becker's (1965) household production model or time allocation model is the theoretical workhorse used by most economists to assess children's material, physical, cognitive and emotional wellbeing (Grossman, 2016, Heckman, 2015, Ribar, 2004). Becker's model is premised on the following three essential features as applied to children's outcomes:

- In a household, the decision makers value several outcomes including the wellbeing of children,
- To enjoy and produce these outcomes, members of the household are required to purchase goods and services and also contribute their time as a crucial input,
- Members of the household are constrained by the several uses of their time, and
- Household members are constrained in their non-labor income, wages as well as current prices of goods and services.

The model borrows from economic theories of business by recognizing that parents can substitute and combine the purchase of goods and services with the dedication of their time to generate children's wellbeing (Ribar, 2004). In other words, as a firm has a production function and makes a choice on the amount of inputs required to produce final goods, households similarly have a production function and they decide on the levels of goods, services and time to produce outputs. An illustration of this is if parents want to develop the pre-reading skills of their child, they will have to purchase some books and other materials but also invest a substantial amount of time in providing home instructions. Alternatively, they could send the child to a pre-school thereby incurring higher expenditures but spending less of their own time. It is important to highlight that in this model, the parent's level of income and educational attainment highly constrain the level of investment that parents make into the social capital of their children.

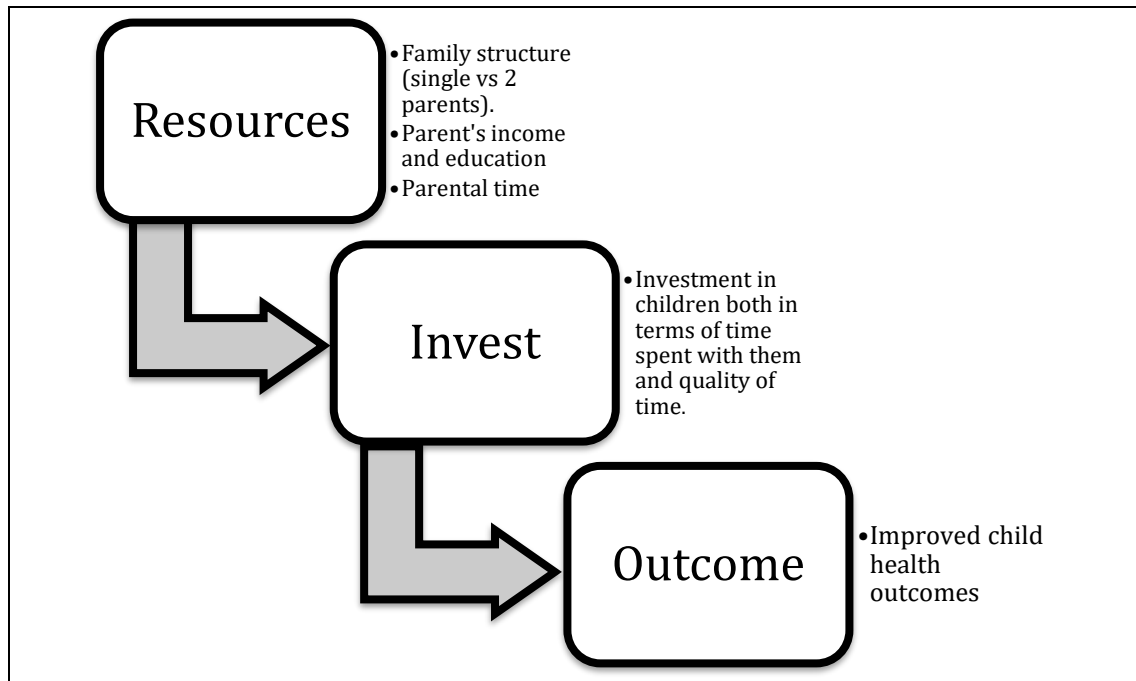
The household production model has been described as a "neat accommodation" for various sociological perspectives. For instance active socialization, monitoring of children and social control can be taken as different production processes in which parents invest their time, goods and services to provide development outcomes (Ribar, 2004). With such a model, it is straightforward to illustrate how different family structures impact on children's wellbeing. For instance, researchers can compare the context of a child who is raised by both parents to a child that is raised by a single parent and has no support or contact with the other parent. From a purely economics perspective, the difference in the two contexts is the amount of resources available. The two-parent household is more likely to have more finances and time as compared with the single-parent household to allocate between producing child wellbeing and other competing activities such as employment. Thus the advantages³ of time and money are likely to increase the odds for better health outcomes for the child (Ribar, 2004).

Leibowitz (1997, 2003) builds on Becker's model by adding that investments in children are dependent on the quality and time parents spend with their children. In

³ The advantages stem from the resources brought in by any additional adult and does not distinguish between the adults being in any form of relationship say marriage or cohabiting. This reasoning also implies that a single parent with sufficient resources can produce the same wellbeing outcomes as two parents.

Leibowitz's framework, a child's wellbeing is determined by the family's income level and investment in goods and time for children. In summary, the household production theory posits that child outcomes are a direct function of parent's investment in their children. Figure 2 illustrates how such a household production theory can be used to guide the present study.

Figure 4: Household production model



1.8 Socioeconomic status (SES), child health, and family social capital

Over the past decades, research has shown the impact of economic and social factors on the welfare and health of individuals. Differences in economic and social status have been found to contribute to inequalities in the development and wellbeing of children (Engle et al., 2011). Regardless of how SES is measured, say by level of income, employment, housing, and level of education, those in the lower SES categorization tend to suffer worse health outcomes (Whitehead, 1988). Furthermore, empirical evidence suggests that an individual's position in social and economic hierarchy does not only affect one's income level but also their health (Marmot and Feeney, 1997).

Until the early 1990s, modeling of the casual pathway between SES and health was done at an individual level, for instance between one's income and their health status (Hawe and Shiell, 2000). Wilkinson (1992) however, challenged this view when he

observed that national mortality rates were less closely related to absolute income and more closely related to the national distribution of income. This ecological design of studies, however, attracted criticism as Gravelle (1998) mathematically showed that the correlation between health and income could in fact be an artifact of the impact that an individual's absolute income has on his health status. In this absolute/relative income hypothesis, Kaplan et al. (1996) nominated social capital as a mediator in the correlation found. Kawachi et al. (1997) echoed similar sentiments when they showed strong associations between social trust, group participation and income inequality. In their study, they concluded that income inequality increases mortality rates and this is a result of disinvestment in social capital. Jack and Jordan (1999a) also postulate that social capital can be eroded and ultimately destroyed as a result of inequalities, exclusions and divisions that act as barriers to cooperative interactions.

Narrowing it down to family social capital, an extensive body of research has theorized and found that low-income parents are more likely to be less nurturing in their reaction towards their children's behavior and are more likely to be more punitive as compared with their counterparts in the middle class (Goodson et al., 2000). Furthermore, the low-income mothers are more likely to give their children commands without any explanations, more likely to make decisions on behalf of their children without consulting their wishes, more likely to show less affection, and not be very responsive to the socio-emotional requirements of the child (Goodson et al., 2000). These findings can be explained by the good parent theory, which postulates that low income in a household reduces the parent's ability to be "good" parents. This is believed to be because economic hardship adversely affects the parent's relationships, behaviors and emotions that in turn compromises parenting skills. Clarke-Stewart (1983) however criticized this school of thought as he observed that when race, ethnicity, religion, and family structure are put into consideration, SES is not a good indicator of parental or child behavior. He further argues that there are greater variations within one level of SES than between different levels of SES (Clarke-Stewart, 1983).

On the contrary, it has been theorized that higher income parents, especially those who privilege work and self-interest over family are less likely to produce sufficient family social capital for their children. This theory is reiterated by Putnam (1995) as

he noted that technological transformation of leisure activities (usually afforded by the affluent class) such as television viewing “privatizes” or “individualizes” use of leisure time and therefore results into social decapitalization.

2.0 Methodological Review

This section presents a review of methodologies that could inform the design of the current study to answer its objectives. The first section (2.1) reviews the statistical and empirical methods that are commonly used to assess the impact of family social capital on child wellbeing and health. The objective of this review is to briefly introduce the various methods while highlighting situations under which they produce biased or inconsistent results. The second section (2.2) presents a review of methods to measure and assess for SES related inequalities.

2.1 Methods to assess the role of family social capital on child health

Broadly the methodologies used to measure family social capital or social capital can be categorized as either qualitative or quantitative⁴. An overview of each of the methods is presented below.

Qualitative methods

Qualitative research methods encompass a series of methods such as; key informant interviews, ethnography, and focused group discussions. The principle virtue of qualitative methods is that they situate study objectives neatly in their contexts by eliciting detailed accounts from their study subjects either through conversation, analysis of documents such as pictures, letters, or merely through observation (Kuper et al., 2008).

In the social capital literature, qualitative methods have not been widely used as most researchers have favored quantitative methods instead e.g. see Whitley (2010). However, Whitley (2010) has suggested that qualitative methods have the potential to meaningfully contribute to the debate around what social capital signifies in various contexts, what forms of social capital should be measured and how they should be measured. Lau (2014a) also echoed similar sentiments through her observation that in the South African context, qualitative studies on social capital could go a long way in assessing the mediatory role of SES and geographic location on health outcomes. In South Africa, some of the evidence generated by qualitative study methods includes

⁴ In this thesis, quantitative methods are reviewed more extensively than qualitative methods because the current study proposes to use quantitative methods. This does not undermine any qualitative methods or evidence.

the work by Luice Cluver to systemically develop a parenting program for low-income families.

Quantitative methods

Quantitative research methods are the most commonly employed methods when assessing the role of family social capital on health outcomes. The main quantitative methods that have been identified are: cross-sectional methods and longitudinal or panel data methods (Ribar, 2004). Some researchers use economic experiments modeled through game theory (Anderson and Mellor, 2010). Economists often conceptualize social capital as cooperative norms and trust – these can be produced via repeated interactions among people. The two common experiments used to measure cooperation and trust is: public good experiments (Isaac et al., 1984) and trust experiments (Berg et al., 1995). Most of the quantitative studies on social capital use data collected through surveys and this warrants a brief review of the use of surveys as a method to elicit social capital data. Below is a summary of the use of data from surveys and in turn is a description of the statistical methods used for the two main quantitative methods (cross section and longitudinal). Analytic methods are also briefly discussed.

Surveys

Most early studies assessing the role of social capital on various outcomes used data elicited by social surveys for instance the world values survey, the General Social Survey (USA) as well as household surveys for specific countries e.g. (Lau and Ataguba, 2015) used the NIDS survey in South Africa. It is important to note, however, that the primary intent of such surveys is not to measure social capital and this has been a great source of criticism for the use of data from surveys. Harpham et al. (2002) caution that it is problematic if researchers rely on proxies of social capital to conduct analyses most especially if the proxy is also a predictor of the outcome under assessment.

To side step this challenge of using secondary data, some scholars of social capital collect primary data through surveys set out to specifically measure the impact of social capital. For such studies, specific tools have been developed and these include: two tools developed by the World Bank (i) the Integrated Questionnaire for Measurement of Social Capital (SQ-IQ) and this tool was specifically developed for

developing countries (Grootaert et al., 2004), (ii) the Social Capital Assessment Tool (SOCAT) for developed countries (Grootaert and van Bastelaer, 2002), (iii) the Adopted Social Capital Assessment Tool (ASCAT) developed by Harpham et al. (2002), this tool was adapted from SOCAT, and (iv) and the Social Capital Community Benchmark Survey (SCCBS) that was developed by Saguaro Seminar (2002) and administered in the USA (Saguaro, 2002).

Cross-sectional methods

Cross-sectional studies, also known as prevalence studies describe the health of the population by measuring disease and exposure at a single point in time. As a result, the temporal sequence⁵ of what came before the other is impossible to work out (Grimes and Schulz, 2002). Consider a data set with observations for N individuals, with markers on; health status, marital status, income, race, among others. Taking Y_i to be a continuous variable that represents health of the i th person ($i=1,N$), let M_i be the binary variable that represents a child's family social capital and X_i a vector of other variables for observed characteristics such as the child's age and race.

$$Y_i = \alpha M_i + B'X_i + \varepsilon_i \quad (1)$$

where ε_i represents the unobserved characteristics, and the coefficients to be estimated are represented by α and B. Using Ordinary Least Squares (OLS) regression, α captures the difference in the average health of children with family social capital and those without family social capital holding all other observable characteristics constant (Jones, 2006a). It is important to note however that the estimated coefficient is unbiased only if two assumptions are met: (i) that the model is specified correctly and (ii) that there is no correlation between the error term ε_i and the explanatory variables (Ribar, 2004, Jones, 2006a).

Although both assumptions are important, researchers are more fretful with the second assumption of violating independence (Jones, 2006a). This assumption is best controlled for in an experimental setting where investigators randomly give treatment to a group of subjects and withhold it from another group (Ribar, 2004). However, the

⁵ Except for long-standing exposures like blood type or sex that unquestionably precede the outcome.

second assumption can be valid even with observational data if the process of assigning family social capital is as random as flipping a coin.

The second assumption of independence can also be violated due to (a) reverse causality and (b) the omission of relevant variables in cross sectional studies (Ribar, 2004). To illustrate a case of *reverse causality* -- assume that family social capital is an endogenous outcome that depends on both observed and unobservable characteristics and so does the outcome variable of interest – the health of children. This would imply that family social capital is related to the determinants of health including the error term. The problem of *omitted variable* arises when one or more determinants of child health are left out which are also determinants of family social capital. The omitted variable automatically becomes part of the error term in estimating the equation for child health. Because these characteristics also affect family social capital, the result is a correlation with the error term. Researchers are able to circumvent the challenge of violating the two assumptions through the following ways: adding variables, through the use of instrumental variables, matching techniques to form comparison groups, modeling the selection process and using non-parametric bounds, among others (Ribar, 2004).

Longitudinal / panel methods

This method deals with data that contain observations for individuals at different points on a time scale, t ($t = 1, T$) (Jones, 2006a). The same notation as in equation 1 above is kept with an addition of time periods in parentheses.

$$Y_i(t) = \alpha M_i(t) + B'X_i(t) + \varepsilon_i(t) \quad (2)$$

As is the case with cross-section method, the OLS estimate of α shows the difference in average health of a child with family social capital and one without family social capital while holding all other observed factors constant. All the cross-section estimators discussed above can be obtained using longitudinal data, however, the added advantage is that the repeated observations at different points in time allow for a before and after comparison of outcomes i.e. temporality (Ribar, 2004).

To address the potential bias that ensues from potentially omitting key variables, *fixed effects* models can be used in longitudinal data analysis (Ribar, 2004). Fixed effects models assume that the unobserved determinants of child health at each point in time

can be decomposed into separate permanent and transitory components. In other words, assume that the error term $\mathcal{E}_i(\mathcal{t})$ in equation 2 can be written as:

$$\mathcal{E}_i(\mathcal{t}) = \mu_i + V_i(\mathcal{t}) \quad (3)$$

where μ_i is the time-invariant factor and $V_i(\mathcal{t})$ the transitory factor. The time-invariant factor could represent background characteristics, attitudes, permanent beliefs, all of which affect the child's health. If these factors are correlated with family social capital or other observed independent variables, then the coefficients in equation (2) will be biased. Such permanent characteristics in the regression model could be accounted for by including separate dummy variables for each observation in the sample (Ribar, 2004). This approach however has two limitations: first it is impractical if the data set is large and second, the estimated coefficients of the dummy variables will be inconsistent unless there are several observations for each person. Instead of using this approach, analysts use the *differencing* approach in obtaining estimates for α and B (Ribar, 2004).

Consider a data set where some people have at least two observations for each person: one observation at time \mathcal{t} and another at time $\mathcal{t} + 1$. Also, assume that for some people, the same observed measures vary over time say marital status, health outcomes, etc. If we difference equation (2) over time we obtain:

$$\Delta Y_i(\mathcal{t} + 1) = \alpha \Delta M_i(\mathcal{t} + 1) + B' \Delta X_i(\mathcal{t} + 1) + \Delta V_i(\mathcal{t} + 1) \quad (4)$$

Differencing therefore eliminates the source of bias by sweeping away the unobserved permanent component μ_i . Longitudinal fixed-effects estimators are easy to implement and are available in statistical software such as Stata and LimDep. The principle disadvantage with this method however is the assumption that bias is only caused by an omitted time-invariant factor. Therefore, biases that result from other error structures are excluded. Biases associated with reverse causality and measurement error are not addressed (Ribar, 2004).

Alternatively, analysts could use *random effects* models in the place for mixed effects. The primary difference between the two approaches is that the random effects approach treats μ_i as independent of all or some of the independent variables whereas the fixed approach permits for correlations with the independent variables (Ribar, 2004). The added advantage with the random effects approach is that it does not sweep out all the time-invariant characteristics so it is possible to include permanent

variables in the regression. Additionally, random effects models can be applied to nonlinear models. The main shortcomings of this method however are: firstly, as is the case with the fixed effects model, this method assumes that the omission of a time-invariant factor is the source of bias in the estimation. Secondly, more stringent assumptions are required with this method for instance the random effects should be independent of other observed variables. Thirdly the random effects model has greater computational requirements, as it takes about 50-100 times longer to run as compared to models without random effects (Ribar, 2004).

Analytic methods: linear and nonlinear models

Researchers can use linear regression models when the dependent variable is continuous, binary, or categorical (Jones, 2006a). However, caution must be exercised when the outcome variable is binary in nature or if it takes on categorical unordered or ordered values (say the Likert scale). The main challenge that ensues when the outcome variable is binary or ordered categorical is that the error terms are heteroskedastic (Jones, 2006a, Ribar, 2004). In other words, there is a variation in the errors across observations and this means that the model could potentially predict values outside of the initial range of variables. Heteroskedasticity results into inaccurate standard errors and therefore inaccurate inferences. To address this problem, maximum likelihood should be estimated and this can be done using nonlinear models (Jones, 2006a).

Nonlinear models

Maximum likelihood logit (or ordered logit) and probit (or ordered probit) are nonlinear models that can be used when the outcome is binary and multinomial logit or probit models when the outcome variable is unordered and categorical in nature. Like other estimators of maximum likelihood, these models require specification of the distribution of the error term. If this distribution is inaccurate, the model estimates might be biased (Jones, 2006a). The logit and probit models are slightly more difficult to estimate than linear regression models but this difficulty is not substantive especially if standard versions of the model are used. However, if statistical controls for selectivity are added it becomes difficult (Ribar, 2004). In fact, some methods such as the differencing discussed above don't work in nonlinear regressions. Nonetheless, researchers can address selectivity in logit and probit models using any

of the following methods: instrumental variables, matching, nonparametric bounds and the use of random effects (Ribar, 2004). Despite the mentioned limitations with the probit and logit models, they are very widely used by analysts.

2.2 Measurement/indicators of family social capital

Over the last three decades, the conceptualization and operationalization of family social capital as an explanatory variable to predict individual and collective wellbeing of children and youth has varied (Ferguson, 2006). Coleman's study provided empirical precedent to subsequent scholars. To estimate the impact of social capital on the formation of human capital, Coleman constructed a 5 variable index which served as a proxy for family social capital: (i) presence of both parents in a household (ii) presence of 1 versus 4 siblings and this was premised on the argument that fewer children receive a deeper concentration of parental attention (iii) number of school changes since 5th grade – this was based on the hypothesis that each move disrupts social capital (iv) attendance of religious services on a regular basis and (v) a mother's expectations for her child's educational attainment — this variable was reflective of family norms (Coleman, 1988a). Coleman's conceptualization of family social capital was guided by the USA context and could be largely applicable to other developed countries. However, in the case of low and middle-income contexts, it is important to appreciate the complexity and cultural differences that dictate the formulation of social capital.

Ensuing scholars investigating the impact of family social capital on child wellbeing largely followed Coleman's initial operationalization of the concept with slight variations and additions. Indicators of family social capital in the literature can be broadly categorized into 6 groups: physical presence of parents, parent-child relationship, parent's interest in the child, role of the extended family, monitoring of the child's activities and role of social networks.

Physical presence of parents: This component of family social capital is operationalized to include the following indicators: two parents versus single parent family structure, presence of a parent figure i.e. biological/foster/step parent versus absence of parents, and one employed parent versus both parents working outside of the household (Coleman, 1988a, Teachman et al., 1996, Teachman et al., 1997,

Sampson et al., 1999, Runyan et al., 1998, Johnson, 1999, Furstenberg and Hughes, 1995).

Parent-child relationship: This is another common measure of family social capital used to assess the quality of relationships within the family. Some of the common indicators for this measure include: number of times parent engages in joint activities with the child per week, number of times a parent verbally encourages a child in a week, number of times a parent helps the child with homework in a week, and the number of children in a household (Coleman, 1988a, Teachman et al., 1996, Teachman et al., 1997, Furstenberg and Hughes, 1995, Runyan et al., 1998).

Parent's interest in the child: The common indicators for this measure of family social capital include: a mother's expectations and aspiration for the child's academics, whether a parent is empathetic towards a child's needs, and the parent's expressed interest and participation in the child's school activities (Runyan et al., 1998, Coleman, 1988a, Furstenberg and Hughes, 1995, Teachman et al., 1996, Teachman et al., 1997).

Role of the extended family: This measure is used to assess the extent to which the extended family contributes to the accumulation of family social capital. The common indicators for this measure are: presence of extended family members residing in the home, frequency of interactions between the child and extended family members present in the home, and how frequent a child visits extended family members who reside outside of the home (Coleman, 1988a, Furstenberg and Hughes, 1995).

Monitoring of the child's activities: The common indicators for this measure of family social capital include: parent's attendance of social meetings, parent's knowledge of the child's friends, and parent's knowledge as well as relationship with the parent's of the child's friends (Furstenberg and Hughes, 1995, Teachman et al., 1996, Teachman et al., 1997).

Role of social networks: The common indicators for this measure include: membership in groups, regular attendance of religious services, taking part in citizenship activities, and the general support got from the community (Coleman, 1988a, Runyan et al., 1998, De Silva and Harpham, 2007).

As aforementioned, most of the researchers largely defined family social capital along Coleman's conceptualization of the notion. While this might be legitimate practice for studies in similar contexts as Coleman's, there is need to extend the debate to what parameters should be included in the conceptualization and definition of family social capital in low and middle-income contexts.

2.3 Measurement of socioeconomic status (SES) related inequalities in child health outcomes and family social capital

Measurement of SES

To measure inequalities, a specific socioeconomic status (SES) variable is required. SES is a multidimensional and complex measure which ranks individuals in a given society relative to one another based on markers such as occupation, level of education, income, family background or dwelling place (Zhang and Wang, 2004). As such it is a difficult process to reduce such a complex construct into a single component. One approach to measure SES is to use "direct" measures like income, consumption or expenditure but each of these is associated with some advantages and shortcomings (see e.g. William and Collins, 1995). The most direct measures of SES are (i) ***Income***: it is the most commonly used approach in developed countries to measure SES and this is partly because of availability of better data, large formal sector and it is highly correlated with other facets of SES such as education and occupation level (Alberts et al., 1997, Zhang and Wang, 2004). (ii) ***Household expenditure***: because of the difficulty in eliciting accurate income data especially in household surveys, household expenditure is commonly used instead (Glewwe, 1991). There are arguments that household expenditure has been considered to be a more accurate representation of a household's resources that impacts the health outcomes of a household's members (Pal, 1999). (iii) ***Consumption***: while consumption can be measured by looking at some expenditure information, consumption and expenditure are two different concepts. For instance, expenditure doesn't include consumption that is not based on a market transaction. Because of the high rate of home production in low and middle-income countries it is critical to make a distinction between consumption and expenditure. There is a long-standing debate about which direct measure of SES is better. For developing countries, a compelling case in preference to ***consumption*** as a measure of SES has been made and this is mainly because; (i) large

proportions of the population in developing countries work in the informal sector, (ii) home production is more common, and (iii) income is mostly received intermittently while consumption can be smoothed over extended periods. These factors make measurement of income more difficult as compared to consumption in developing countries.

The second approach to measuring SES is to construct a “proxy” measure of SES due to the difficult and expensive nature of collecting data for the direct measures (income, expenditure, and consumption). An example of a proxy measure is the asset index. Proxy measures can be constructed through the following primary approaches; (i) principal component and factor analysis, (ii) arbitrary approaches where indices are constructed as the such of indicator or dummy variables, and (iii) through predicting consumption using consumption or asset data from past or parallel surveys.

Measurement of SES related inequalities

Classical linear and logistic regression analyses can be used to determine the association and direction between SES and health outcomes (Zhang and Wang, 2004). These classical approaches however are insufficient, as they do not determine the severity of the existing inequalities. Furthermore, the relationship assessed between the outcome and independent variable is an average and therefore does not account for variability in the impact of the independent variable across the entire distribution (Zeger et al., 1988). To address the shortcoming of these classical approaches, researchers have turned to the use of summary indices to quantitatively evaluate SES related inequalities. From the literature, six such indices have been identified: range, Gini coefficient, pseudo-Gini coefficient, index of dissimilarity (ID), relative index of inequality (RII) and the concentration index (CI). Table 2 presents a brief description for each of these methods.

Table 4: Summary indices to measure SES related inequalities

Index	Description
Range	Typically compares the experiences of the bottom and top SES groups. This comparison can be presented in the form of a range itself or as a ratio. The two biggest defects with this method are: it doesn't take into account the intermediate groups and secondly the difference in size of groups being compared is not taken into consideration.

Gini coefficient (associated with Lorenz curve)	The Gini coefficient ranges from 0 (complete equality) to 1 (all the population's health is concentrated in one person). While this method accounts for the experiences of all people, it doesn't tell us to which extent inequalities in health are related to SES i.e. it doesn't take into account the SES dimension of inequality in health.
Pseudo-Gini coefficient (associated pseudo-Lorenz curve)	This method uses grouped data as opposed to individual data. The groups are by occupational classes (not health) and these groups are ranked by the rate of mortality. Like the Gini coefficient, this method doesn't capture the SES dimension of inequalities as the ranking is by mortality and not SES.
Index of dissimilarity (ID)	This method is mainly focused on how a particular SES group's share of the population health compares with the proportionate share received by that group. This method therefore doesn't show how the differences compare across different SES groups. Similar to the previous two methods, this method is not sensitive to SES dimension to inequalities in health.
Relative index of inequality (Slope index of inequality) RII	This method calculates the mean health status of each SES group and then ranks the classes by their SES as opposed to their health. This method is therefore sensitive to the SES dimension of health inequalities.
Concentration index (Concentration curve) CI	This method plots the cumulative proportion of the population ranked by the SES against the cumulative proportion of a health indicator. As with RII, people are ranked by their SES.

Source: Wagstaff et al. (1991)

Wagstaff et al. (1991) concluded that the relative index of inequality (RII) and the concentration Index (CI) are the most superior of the six and this primarily because they can order units and are consistent, to this end the two indices have been extensively used. The main difference between RII and CI is that RII is sensitive to changes in mean health while standard CI is not. RII is therefore ideal when investigating the absolute difference between groups rather than relative difference. CI however can be generalized to also be sensitive to changes in mean health. As a result, CI is the mostly commonly used index to measure relative inequality involving SES and a health outcome. Moreover, CI fulfills the three basic requirements of a health inequality index (Wagstaff et al., 1991), these are:

- CI is sensitive to changes in the distribution of the population across SES groups.

- CI is reflective of the entire population's experience across the SES groups; as opposed to a comparison between two extreme points say quintile 1 versus quintile 5.
- CI takes an account of the social economic dimension in estimating inequalities in health.

Additionally, results from CI can be presented graphically and are more intuitive to interpret (vanDoorslaer et al., 1997).

The computation of CI is from the Concentration Curve. Empirically, CI will be estimated as; two times the covariance between a child's SES relative ranking and health variable divided by the mean value of the health variable as illustrated in equation (5) (Kakwani et al., 1997).

$$CI = 2 \text{ cov}(x_i, R_i) / \mu \quad (5)$$

Where x_i is the child health indicator score or the family social capital score for the i^{th} child. μ is the mean level of child wellbeing or family social capital and R_i is the SES relative rank of the i^{th} child.

Theoretically, the CI lies between -1 and +1: with negative CI representing a pro-poor distribution (the chosen health outcomes are concentrated among the most disadvantaged) while a positive CI represents a pro-rich distribution (the chosen health outcomes are concentrated among the least disadvantaged). A CI of zero (0) implies an equal distribution of health outcomes between the poor and the rich (Kakwani et al., 1997)

3.0 Empirical Review

This section presents a review of empirical studies on family social capital or social capital and child-related outcomes. The review will assess for the following among selected papers: objective of the study, study design, family social capital or social capital indicators used, outcome variable measured, analytic methods used, and a summary of study findings. It is important to note that this is not a systematic review but rather a scoping review. The primary objective of this review is to identify gaps in the existing body of evidence and to further assist in situating the present study in terms of design and methodology.

Literature search strategy

To retrieve relevant empirical literature, a combination of the following words was used to search key databases: “Family social capital AND child AND (health or wellbeing) AND family support OR social capital”. Given that the majority of social capital literature is traced back to the past two decades, the search timeframe was from 1980 to 2016. Furthermore, the review was limited to studies published in English. The electronic databases searched included: CINAHL, MEDLINE, SocINDEX, pscARTICLES, pscINFO, ERIC, EconLit, and Google scholar.

In addition to this primary search, a secondary search was done using the snowball technique where additional studies were manually sought from the reference lists of the identified papers. Only studies published in English were reviewed.

Inclusion and exclusion criteria

The methodology used to distinguish between which empirical studies to include in this review consisted of a four-step selection criteria described below:

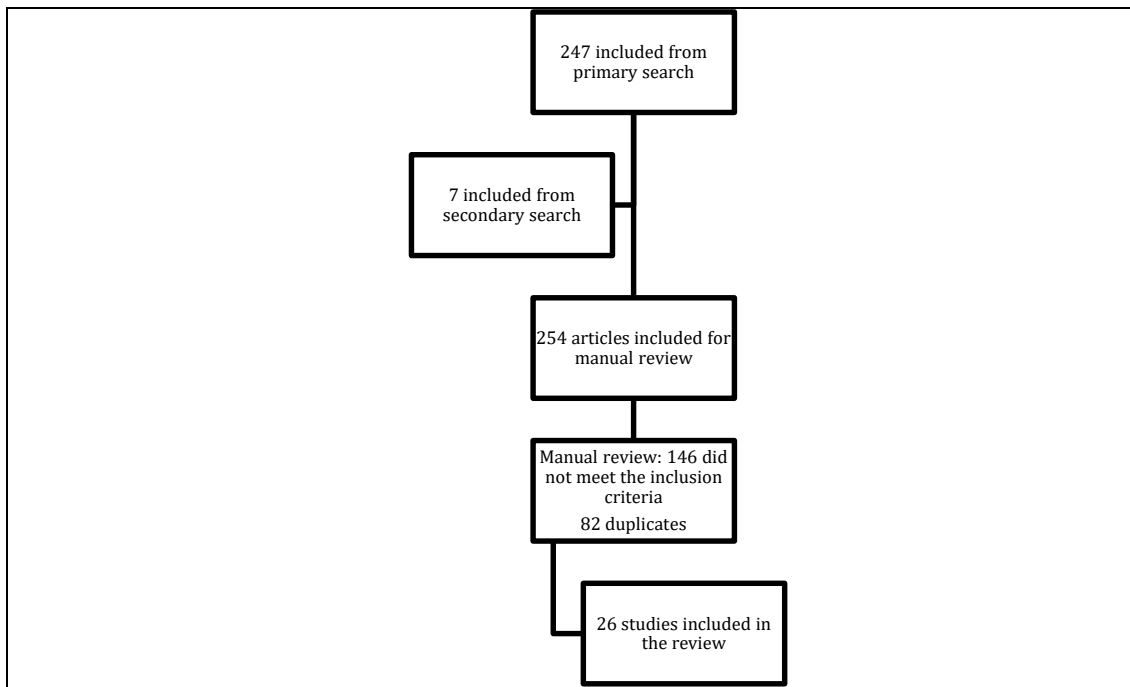
- If the study examined family social capital and/or other forms of social capital and its impact on child health or wellbeing or any other child related outcome⁶ e.g. educational achievement.
- If the study used qualitative, quantitative or mixed research methods to measure family social capital or social capital.
- If the study is directly relevant to the present study’s objectives.

⁶ Coleman’s study investigated the impact of family social capital on child educational outcomes and most of the many subsequent researchers also studies educational outcomes. This guided the decision to extend the search to other non-health child-related outcomes.

- Reviewed studies were required to have focused on children, adolescents or youth.
- If the study is published in the English language.
- If the study lies in the timeframe of 1980 to 2016.

The PRISMA flowchart below summarizes the number of papers identified from the initial search through to the number of studies that were eventually included in the full review.

Figure 5: PRISMA flowchart



The scoping review produced 26 pertinent studies that complied with the current study’s inclusion criteria. The review findings are presented by two broad categorizations; the first *section 3.1* presents a summary of studies reviewed from developing countries and a summary of studies reviewed from developed countries is presented in *section 3.2*. A synthesis and discussion of findings from both developed and developing countries then follows in *section 3.3* and the review closes with a conclusion in *section 3.4*.

3.1 Summary of studies reviewed from developing countries

Nine out of the twenty-six studies reviewed were from developing countries. Two studies were from the African region (Tanzania and Ethiopia), one from Eastern

Europe (Croatia), one from North America (Mexico), one from South America (Brazil) and five from Asia (China, India, Korea and Vietnam).

Study design: Five out of the nine reviewed studies used cross-sectional study design (De Silva and Harpham, 2007, Lau and Li, 2011, Hu et al., 2014, Novak and Kawachi, 2015, Ayllon and Ferreira-Batista, 2015), one study was ecological in nature (Wu et al., 2010), and another was a case-control study (Reyes et al., 2004). As acknowledged by the authors of these studies, reverse causality could not be ruled out with these study designs and therefore conclusions about the cause-effect relationship between family social capital/social capital and child outcomes could not be made. Two studies however used a longitudinal study design (Bofota, 2013, Han and Grogan-Kaylor, 2015), which accounts for reverse causality. It should be noted that these two longitudinal studies used secondary datasets whose primary role was not to measure family social capital or social capital. In fact, the study from Tanzania used data from a survey whose original objective was to measure the impact of deaths and illness resulting from HIV/AIDS on the welfare of children including school achievements, nutrition and SES indicators (Bofota, 2013). Out of the nine reviewed studies, the majority (six out of nine) collected primary data while 3 studies used data from existing data sets where, as aforementioned, the primary objective of the survey was not to measure family social capital.

Sample of studies: Of the nine reviewed studies, only two were nationally representative (Han and Grogan-Kaylor, 2015, Ayllon and Ferreira-Batista, 2015) and the remaining seven were of varying samples sizes but not nationally representative. Three studies sampled under-5 children (De Silva and Harpham, 2007, Reyes et al., 2004, Ayllon and Ferreira-Batista, 2015), three studies sampled primary school children only (Wu et al., 2010, Lau and Li, 2011, Bofota, 2013) and three other studies looked at adolescents only (Hu et al., 2014, Han and Grogan-Kaylor, 2015, Novak and Kawachi, 2015).

Outcome measure: Seven out of the nine reviewed studies measured child health outcomes while two studies evaluated child educational outcomes. Of the seven that measured child health related outcomes, three studied child nutritional status (stunting and wasting) and these are the three studies that sampled under-5 children (De Silva and Harpham, 2007, Reyes et al., 2004, Ayllon and Ferreira-Batista, 2015). Two

studies assessed for mental health and psychological distress among adolescents (Novak and Kawachi, 2015, Hu et al., 2014), one study assessed for health risk behaviors among adolescents (Han and Grogan-Kaylor, 2015) and another study focused on child wellbeing among primary school going children in China (Lau and Li, 2011).

Family social capital or social capital indicators: The indicators of family or social capital varied slightly among the nine reviewed papers. The most frequently used indicators included: family structure i.e. single-parent vs. two-parent households, number of children in the household, parent-child relationships, parental monitoring, parent's involvement with school, trust in the family, trust in the community, group membership, and teacher-child relations. This finding is consistent with what was discussed in the theoretical and methodological review in terms of the conceptualization and operationalization of family social capital. As mentioned earlier, this conceptualization of family social capital was originally conceived in the context of developed countries (the USA). However, no marked differences were taken into account when defining family social capital or social capital in developing countries. All the studies except one combined the indicators of family social capital or social capital into an index or some sort of a composite variable. It appears that family social capital or social capital has a stronger impact when defined as an index as compared to introducing the separate variables individually in the regression analysis (Bofota, 2013, Novak and Kawachi, 2015).

Family social capital or social capital as a single dimension or multidimensional construct: The operationalization of family social capital or social capital oscillated between a single dimension definition e.g. family-level variables only to multidimensional definitions which included different domains as sources of social capital for instance schools, the community, and peers. Out of the nine studies, two studies defined family or social capital as a single dimension construct: one study defined family social capital using family-level variables only (Ayllon and Ferreira-Batista, 2015) and another study defined social capital as a community-level construct along structural and cognitive social capital indicators (De Silva and Harpham, 2007). It is important to highlight that these two single-dimension studies sampled under-5 children who are exposed to fewer sources of social capital as compared to older

children who accrue some capital from their peers at school, teachers and the wider community. With regards to the studies that operationalized family or social capital as a multidimensional construct: two studies included family-level and neighborhood level variables (Reyes et al., 2004, Bofota, 2013), two studies included family-level and school-level variables (Lau and Li, 2011, Han and Grogan-Kaylor, 2015), two studies included family-level, neighborhood-level and school-level variables (Novak and Kawachi, 2015, Hu et al., 2014), while one study included family-level, school-level, neighborhood-level and peer-level variables (Wu et al., 2010). An interesting finding by Novak et al. (2015) was that when all dimensions of social capital were put into the model simultaneously, social capital had a stronger impact on the odds of psychological distress among children in Croatia compared to when the analysis was restricted to single dimensions. Hu et al. (2014) however concluded that of the three domains of social capital (family, neighborhood and school), family social capital was the most important form in evaluating mental health among children. This finding is somewhat reinforced by Wu et al. (2010) who found that only family and school social capital were associated with an increase in children's educational attainment while peer and community social capital were not directly associated with the outcome.

Summary of findings: Higher levels of family social capital or social capital were found to be associated with; better chronic and acute nutritional status indicators among under-5 children (De Silva and Harpham, 2007, Ayllon and Ferreira-Batista, 2015, Reyes et al., 2004), higher child wellbeing (Lau and Li, 2011), lower mental health risk in children (Hu et al., 2014), lower odds of psychological distress (Novak and Kawachi, 2015) and higher educational achievements (Bofota, 2013, Wu et al., 2010). One unexpected finding was by Reyes et al. (2004) who found a negative relationship between social networks as an indicator of social capital and stunting among children. The authors posit that this finding could perhaps be reflective of the importance of the mother as the primary care giver for the child as opposed to support got from external networks.

The tables below present a summary of the nine reviewed papers from developing countries.

Table 5: Summary of reviewed papers from developing countries

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Reyes et al. 2004	Investigate if family-related factors are associated with young children in Mexico.	Mexico Case-control study design N= 656 6-23 months old children	Family characteristics: nuclear vs. extended family, number of children in the family, mother's use of contraceptives, parental education and age, type and duration of parent's union. Family income. Social networks. Allocation of household resources e.g. time mother spends with child vs. time spent on domestic work. Breastfeeding and health care seeking behavior.	Stunting	Logistic regression	In the urban areas, the risk factors for stunting were; presence of social networks, poor attendance of child wellness programs, breastfeeding longer than 6 months, migration from rural to urban areas, father's unstable job and longer duration of parent's union. In the rural areas, the risk factors for stunting were parent's form of employment and the presence of family networks for childcare. The strongest protective effect against stunting in rural areas is the exclusive care giving by mothers. The unexpected finding of the negative relationship between social networks and stunting in children is perhaps reflective of the importance of the mother being the primary caregiver for the child.

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
De Silva and Harpham 2007	To investigate the associate between maternal social capital and child health.	Peru, Ethiopia, Vietnam and India. Cross-sectional survey N= 7,242 1 year old children	Structural social capital: group membership, citizenship and social support. Cognitive social capital: Trust, social harmony, belonging and sense of fairness.	Nutritional status	Linear regression	An increase in the level of both social support and cognitive social capital result into an improvement in both acute (weight-for-age) and chronic (height-for-age) indicators. On the contrary, maternal group membership and citizenship is not associated with either chronic or acute indicators. This unexpected finding could be as result of the effects of group membership getting subsumed within other indicators of social capital especially trust. More consistent associations were seen for cognitive social capital as compared to structural social capital.

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Qiaobing et al. 2010	To assess the impact of social capital on the academic achievement of Chinese migrant children.	China Ecological study N=772 Primary-school children (4 th to 5 th grade)	Ecological perspective incorporating 4 dimensions of social capital. 1) Family social capital: parent-child relationship and parental monitoring. 2) School social capital: school climate and quality of teacher-student relationship. 3) Community social capital: social cohesion, trust in children and adults, and informal solidarity in the neighborhood. 4) Peer social capital: Quality of peer relationships using the 23-item friendship qualities scale.	Academic achievement of migrant children.	Structural Equation Modeling (SEM)	Higher levels of family social capital were associated with high academic achievement. Higher levels of school social capital were associated with high academic achievement. Community social capital was not directly associated with higher academic achievement, however, it was found to be a mediator for family and school social capital. Peer social capital was unexpectedly found not to be associated with academic achievement. In conclusion, it is important to use an ecological framework when examining the impact of social capital on a given outcome.

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Lau and Li 2011	Examine variations in family and school social capital as a result of differences in SES and also to assess the impact of family and school social capital on child subjective wellbeing.	China Cross-sectional study N= 1,306 2009 Primary-school children	1) Family social capital: Parent and child discuss important issues, Parent-child interpersonal relationships, Child's perceived parent-child relations, and Trust within family members. 2) School social capital: Children's perceived teacher-student relationship, children's trust in teachers, trust & reciprocity with peers, and child's trust with friends and classmates.	Subjective child wellbeing	Hierarchical regression	SES could explain variations in family and school social capital. There was a positive association between positive child subjective wellbeing and children's perceptions of connectedness to their parents, teachers and peers. Girls, only children at home, high parental education, high SES were associated with strong interactions with parents and peers and they also perceived their parent-child and peer relationships to be strong. On the contrary, children who were 2 or more in a household had closer perceived relationships with their teachers and their parents showed close relationship with the schools.

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Bofota 2013	Investigate the relationship between social capital and children's educational achievements.	Tanzania Longitudinal data set from 1991-2004. N= 1,928 7 to 16 years	1) Presence of both parents at home 2) Number of friends to the household and participation in networks. 3) Financial aid / remittances received by the household. 4) Role of the extended family.	Educational outcomes.	Fixed-effects models, 2SLS	Family social capital positively and significantly affects educational achievement among children in Tanzania. Social capital has a stronger impact on educational outcomes as an index and not as the separate individual variables. Study findings did not show a significant difference in the impact of social capital on biological children as compared to foster children.

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Hu et al. 2014	Examine the relationship between social capital and mental health among children left behind by migrant parents.	China Cross-sectional survey N= 1,031 Children 10-18yrs	Social capital was conceptualized as a multidimensional concept with 3 dimensions: family social capital, neighborhood social capital and school social capital.	Mental health for children.	Spearman correlation and logistic regressions.	<p>Senior students who reported to have bad relationships with their parents were at a higher risk for mental problems compared to children who reported caring about their parents (OR=2.048-2.420 p<0.001)</p> <p>Family social capital was associated with decreased risk for mental health problems (OR=0.845 95% CI: 0.801-0.891)</p> <p>Neighborhood social capital was associated with lower risk for mental health (OR=0.867 95% CI: 0.826-0.910)</p> <p>School social capital was associated with lower risk for mental health (OR=0.893 95% CI: 0.863-0.923)</p> <p>Family social capital was found to be the most important form of social capital.</p>

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Yoonsun and Grogan-Kaylor 2015	Investigate the impact of social capital on delayed onset of health risk behaviors.	Korea Longitudinal / panel survey data collected between 2003 and 2007. N= 3,449 Adolescents	Parental monitoring Parent-youth communication Social cohesion indicators	Health risk behaviors	Discrete-time survival analysis using logistic regression.	<p>Higher family-level social capital was found to be associated with delayed onset of drinking, smoking, aggression and breaking of rules. A unit increase in family social capital strongly reduces the odds of first engagement in health risk behaviors (AOR=0.75 95% CI: 0.67-0.83).</p> <p>A unit increase in community-level social capital led to a reduction in the odds for first engagement in health risk behaviors (AOR=0.89 95% CI 0.81-0.98).</p> <p>For successful prevention of early onset of health risk behaviors among adolescents, informal mechanisms of social control provided through the family and the community should be reinforced in successful prevention of early engagement in health risk behaviors.</p>

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Novak et al. 2015	Investigate the impact of family, neighborhood and school social capital on psychological distress among high school students.	Croatia Cross-sectional methods 2013/14 N= 3,427 17-18 year old children (adolescents)	1) Family support: Is family understanding and pays attention to child during high school. 2) Neighborhood support: trust and informal social control. 3) School social capital: teacher-student interpersonal trust and students collaboration in school.	Psychological distress	Logistic regression	High neighborhood trust, high family support in school, high teacher-student interpersonal trust and high student inter-personal trust were all associated with lower odds of psychological distress. When all the social capital dimensions were simultaneously entered in the model, higher social capital in each dimension was associated with lower odds of psychological distress.

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Ferreira-Batista and Ayllon 2015	To investigate the relationship between lone motherhood and stunting among Brazilian children.	Brazil Cross-sectional survey, data collected in 2008/9 N= 190,159 Children <60 months	1) Single parent vs. two-parents present. 2) Number of children in the household.	Stunting	Treatment-effects modeling	Children raised in single-parent households have a height-for-age z score that is 0.31 points lower than children that are raised in two-parent households. An increase in the number of children in the home is associated with lower z scores for height-for-age. This is possibly because food needs to be distributed among more members in larger households.

3.2 Summary of studies reviewed from developed countries

Seventeen out of the twenty-six studies reviewed were from developed countries. The majority of the studies were from North America: eleven from the USA and one study from Canada. In Europe one study was from the UK and another study sampled from the UK and the USA, one from Sweden, one study looked at four countries: Belgium, Canada, UK and Romania. Another study looked at 18 affluent countries.

Study design: Eleven out of the seventeen reviewed studies were cross-sectional in nature (Reynolds et al., 2015, Coleman, 1988a, Runyan et al., 1998, Zolotor and Runyan, 2006, Caughy and O'Campo, 2006, Wen, 2008, Bala-Brusilow, 2010, Lee, 2012, Eriksson et al., 2012, Pförtner et al., 2015) and the remaining seven studies employed longitudinal study design (Furstenberg and Hughes, 1995, Teachman et al., 1996, Carter, 2003, Parcel et al., 2012, Dufur et al., 2008, Rethon et al., 2012, Freistadt and Strohschein, 2012). The bulk of the reviewed studies (thirteen) used secondary data from existing surveys. As was the case with studies from developing countries, the studies that used secondary data in this cohort utilized surveys whose primary goal was not to measure family social capital. Out of the seventeen reviewed studies, only four studies collected primary data that directly measured family or social capital.

Sample of studies: Of the seventeen reviewed studies, eight studies were nationally representative and the remaining nine were of varying samples sizes but not nationally representative. Two studies sampled preschool children (Runyan et al., 1998, Caughy and O'Campo, 2006), five studies sampled primary school children (Coleman, 1988a, Teachman et al., 1996, Parcel et al., 2012, Dufur et al., 2008, Bala-Brusilow, 2010), five studies looked at adolescent children only (Furstenberg and Hughes, 1995, Rethon et al., 2012, Lee, 2012, Eriksson et al., 2012, Pförtner et al., 2015) and the remaining five studies sampled a wide range of ages for instance 2 to 17 year old children in Iowa (Reynolds et al., 2015), 6 to 17 year old children in 18 affluent countries (Wen, 2008), and Freistadt and Strohschein (2012) sampled from newborn to 11 year old children in Canada.

Outcome measure: Twelve out of the seventeen reviewed studies measured child health outcomes; of the twelve that measured child health related outcomes, six

studied child development and behavioral problems (Furstenberg and Hughes, 1995, Runyan et al., 1998, Parcel et al., 2012, Dufur et al., 2008, Pfortner et al., 2015). One study assessed for mental health (Rothon et al., 2012), another study focused on child thriving (Carter, 2003), another looked at self-reported health among children (Wen, 2008), one study focused on childhood obesity (Bala-Brusilow, 2010) and another study focused on child complaints and wellbeing (Eriksson et al., 2012). The remaining five studies assessed for other child-related outcomes; three studies evaluated child educational outcomes (Coleman, 1988a, Teachman et al., 1996, Lee, 2012), one study assessed for family functioning (Freistadt and Strohschein, 2012) and another for parenting behavior and in-home violence (Zolotor and Runyan, 2006).

Family social capital or social capital indicators: Generally, the indicators of family or social capital have been fairly similar across the reviewed studies. The most frequently used indicators included: family structure i.e. single-parent vs. two-parent households, number of siblings in the household, parent-child relationships, parental monitoring, parent's involvement with school, eating family meals together, trust in the family, trust in the community, group membership, community cohesion, teacher-child relations, parental education, and parental workload. Unlike in the case of developing countries, the majority of the studies (thirteen) did not combine the indicators of family social capital or social capital into an index or some sort of a composite variable. The remaining four studies created a family or social capital index and of these four, only one reported the index had stronger impact when defined as an index when compared to introducing the separate variables individually (Eriksson et al., 2012).

Family social capital or social capital as a single dimension or multidimensional construct: Out of the seventeen studies, only four studies defined family or social capital as a single dimension construct and these four studies defined family social capital using family-level variables only. With regards to the studies that operationalized family or social capital as a multidimensional construct: six studies included family-level and neighborhood level variables, two studies included family-level and school-level variables, one study included family-level, neighborhood-level and school-level variables, while one study included family-level, and family policy-level variables. The remaining three studies in addition to family-level variables, they

further included school-level, neighborhood-level and peer-level or personal level variables. An interesting finding by Ericksson et al. (2012) was that the three dimensions of social capital (family, school and neighborhood social capital) had a cumulative effect on child health and wellbeing in Sweden. This finding might imply that social support from all three domains might in fact be additive in nature (Ericksson et al., 2012). On the other hand, Dufur et al. (2008) found that the effects of family social capital and school social capital can be measured separately and argued that the context or dimension in which social capital resides shows a more nuanced picture of how that specific domain of social capital affects the health outcomes of children. Furstenberg and Hughes (1995) echoed similar sentiments when they found that different dimensions of social capital seem to be linked to specific outcomes and therefore different dimensions should be examined individually in relation to how they might be associated with successful outcomes in young people. Both studies by Dufur et al. (2008) and Erickson et al. (2012) however, reached consensus that family social capital is the most important dimension of social capital for children as the family is their most proximate social unit. Pförtner et al. (2015) also found that family social capital was the strongest protective dimension of social capital (as compared to peer and school social capital) against smoking among adolescents. These findings are consistent with two studies from developing countries (Hu et al., 2014, Wu et al., 2010).

Summary of findings: Higher levels of family social capital or social capital were found to be associated with; higher self-reported oral health (Reynolds et al., 2015), higher child wellbeing (Ericksson et al., 2012), lower mental health risk in children (Rothon et al., 2012), higher odds of improvement in developmental and behavioral outcomes (Runyan et al., 1998, Furstenberg and Hughes, 1995, Caughy and O'Campo, 2006, Dufur et al., 2008), higher educational achievements (Coleman, 1988a, Teachman et al., 1996), higher childhood thriving (Carter, 2003), and lower likelihood for childhood obesity (Bala-Brusilow, 2010). Additionally, an increase in family social capital was found to be associated with improved family functioning, decreased odds of domestic violence, neglectful parenting and psychologically harsh parenting (Zolotor and Runyan, 2006). A couple of counterintuitive findings were reported; first, Pförtner et al. (2015) found that friend-related social capital and school participation increased the odds of smoking among adolescents. This finding seems to

imply that social capital can act as both a protective and a risk factor for smoking among adolescents. Secondly, Freistadt and Strohschein (2012) reported that single-mother households received less neighborhood support as compared with two-parent households. The authors argue that this finding is perhaps because single parents do not have a lot of time to divert to neighborhood activities as much as two-parents families do purely because of the presence of an additional adult. In turn, the neighborhood reciprocates to those who actively engage in network activities leaving out the single parents. Thirdly, Dufur et al. (2008) found that home environment was not a good fit for the best family social capital model. The authors argue that this is perhaps because as children age, there is a shift in their sources of social capital from family social capital to school social capital. Lastly, Carter (2003) found mixed results where parental involvement in some neighborhoods had a positive association with cognitive development of pre-scholars while in other neighborhoods such a positive association is non-existent. The author suggests that a larger sample size is required to investigate this discrepancy further.

The tables below present a summary of the seventeen reviewed papers from developed countries.

Table 6: Summary of reviewed papers from developed countries

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Coleman 1988	Assess the relationship between social capital and the rate of dropping out of high school.	USA Cross-sectional survey, data collected in 1969 N= 4,000	1) Presence of both parents 2) Number of siblings 3) Regular attendance of church 4) Mother's expectations for their children 5) Parent-child relationship	School dropout rate	Logistic regression	Two parent households, high frequency of parent-child interactions, high maternal expectations for the child, fewer children in the household, and higher regular church attendance, acted as a buffer against dropping out of school.

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Furstenberg and Hughes 1995	To investigate the relationship between family & community social capital and youth's developmental outcomes.	USA Data from a longitudinal study – data collection began in mid-1960s N= 252	Family social capital: family cohesion, see grandparents and siblings weekly, father in the home, support to and from the mother, parents help with homework, parent's educational expectations for child, mother encourages child, mother's participation in school meetings, and number of child's friends known by the mother. Community social capital: Family involvement in social institutions and relationships with other families.	Youth's developmental outcomes	Logistic regression	Broadly, social capital plays an important part in helping the youth to navigate their way out of disadvantage. However, social capital is multidimensional and each dimension seems to be differently linked to specific outcomes. In conclusion therefore, future research should examine how the different dimensions (even within family social capital or within community social capital) might be associated with success in several arenas of early adulthood.

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Techman et al. 1996	Assess the impact of various forms of social capital on the odds of early dropping out of school.	USA Data from a longitudinal survey 1988-1992 N= 16,014 8 th graders	Family structure i.e. living with one or both parents, attendance of a catholic school, parent's knowledge of the parents to their child's friend, number of times school is changed, parent-child interaction, parent-school interaction, and parental income.	Likelihood of dropping out of school.	Weighted and unweighted OLS regressions.	<p>Children living with a divorced father, mother or with stepparents were associated with lower social capital. On the contrary, children who lived with both biological parents, and attended catholic school tended to have higher social capital.</p> <p>Children from stepparent families have significantly higher odds of dropping out of school when compared to children from families of two natural parents.</p> <p>Children from wealthier families (parents with higher resources) are less likely to drop out of school.</p>

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Runyan et al. 1998	Assess the extent to which social capital is associated with developmental and behavioral outcomes among high-risk pre-school children.	USA Cross-sectional case-control study N=667 2-5 year old children.	Two parents vs. no parent-figure in a home Social support of the maternal caregiver Number of children in the household Support from the neighborhood Church attendance	Developmental and behavioral outcomes	Logistic regression	The social capital index was strongly associated with the wellbeing of children more so than the single indicators or variables. In conclusion, as early as pre-school, social capital may have an impact on the wellbeing of children. Just as children benefit from their parent's financial and human capital, they also benefit from the parent's social capital. Moreover, it appears that social capital is more crucial for families with less educational and financial resources.

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Carter 2003	To investigate the effect of family social capital on childhood thriving.	USA Longitudinal data collected in 1987-88 and in 1992-94. N=9,637 households	1) Strong or close relationships that the child has with parents or other family members. The level of emotional closeness and time spent together determined the strength of the relationship. 2) Verbal interaction between the child and parents. 3) Parent's involvement in child's school activities Parent's affection towards child. 4) Shared family activities. 5) Monitoring of child's behavior.	Childhood thriving	Ordinary Least Squares regression.	Higher family social capital is associated with higher odds of childhood thriving. The structure of a family (single vs. two-parents) has very clear implications for amount of family social capital that parents pass on to their children and therefore family structure indirectly influences childhood thriving. In conclusion, family structure should be treated as a variable that affects the amount of family support and not as a variable that affects wellbeing of children.

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Parcel and Campbell 2006	To assess the impact of family social, financial, and human capital on child behavior outcomes in the US and the UK.	USA and UK Longitudinal study using 1991 (NCDS) and 1994 (NLSY) data sets. N= 3,360+1,595 5-13 year olds.	1) Number of children in family 2) Family structure: single vs. 2-parent families 3) Parental work hours 4) Mother's educational expectations 5) Home environment 6) Grandparent's level of education and occupation.	Child behavior problems (Behavioral Problems Index – BPI)	Regression modeling	Children with divorced mothers are at a higher risk for behavioral problems The effects of family structure were found to be more pervasive in Britain than in the US and this is perhaps as a result of the racial diversity in the US sample size. In conclusion, in both societies, parents are a very important part in promoting child social adjustment.

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Zolotor and Runyan 2006	To examine low social capital as a predictor of harsh physical punishment, neglect parenting, domestic violence and psychologically harsh parenting.	USA Cross-sectional study N= 1,435 2002	1) Presence of 2 adults in a household 2) Regular participation in religious activities 3) Neighborhood characteristics 4) Willingness to take personal action	Self-reported parenting behaviors and in-home violence	Logistic regression	A point increase in the 4-point index of social capital was associated with a 30% decrease in the odds of domestic violence, neglectful parenting and psychologically harsh parenting. The study however found no relationship between harsh physical punishment and social capital.
Caughy and Campo 2006	Investigate the impact of family and neighborhood level factors on cognitive development of children.	USA Cross-sectional survey N= 200 African American children.	Family level: Parental education, parental employment, family structure, family size, parenting behavior, cultural and environmental context at home. Neighborhood level: neighborhood structure, neighborhood social capital and negative social climate.	Cognitive development	Multilevel regression	Over and above the influence of family economic resources and positive parent involvement, neighborhood poverty was found to be associated with poorer problem solving skills. Although the study found indicators of family and neighborhood social capital to be associated with cognitive skills, these factors did not explain the relationship between problem solving and neighborhood poverty.

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Dufur et al. 2008	Investigate the prediction of child behavior problems using social capital at school and at home.	USA Longitudinal study using data collected in 1994 N= 1,833	Family social capital: how many friends of the child the parent knows, how often the parent had knowledge of the child's location, family's frequency of church attendance, how often ties are made with other people in society, and the relationship stats of the parents. School social capital: parents volunteering after school, parents' attendance of advisory sessions at school, parents' involvement in program design, and parents' involvement in policy decisions.	Child behavior problems	Structural Equation Modeling	Social capital accrued at home and social capital got from a school can be measured as individual constructs. Social capital at home is much more influential than social capital from school in predicting children's social adjustment.

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Wen Ming 2008	To assess the relationship between family structure and child wellbeing (ages 6 to 17).	USA Cross-sectional survey data from 1999 N= 20,667 6 to 17 year old children	1) Presence of two biological or adoptive parents vs. living with one biological/adoptive/step parent. 2) Parental education Parental involvement in volunteer work.	Parent-rated health for the child, limiting health conditions and child behavior.	Weighted logit and OLS regression models	Single-parent families have worse child wellbeing indicators as compared with two-parent families and stepfamilies. Family SES has a stronger mediating effect on child wellbeing than social capital. In conclusion, differences in child wellbeing are not entirely accounted for by family SES, parental regular attendance of religious activities, parent-child relations and involvement in extracurricular activities.

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Bala-Brusilow 2010	To investigate the association between obesity and different measures of social capital.	USA Cross-sectional study using survey data collected in 2003 N= 10,018 10&11 year olds.	Personal social capital: school type, gets along with peers, frequency moving homes, and involvement in organized activities outside of school. Family social capital: family size, structure, eat together and parent's knowledge of child's friends. Neighborhood social capital: safety, social support, community type and social capital scale.	Obesity in children	Logistic and OLS multiple regression models.	The following 5 indicators were found to have strong associations with the likelihood of obesity: number of siblings in a family, number of times the family moves, type of school the child attends (either public or private), participating in after-school activities, and lastly parents knowing the friends of their children. The study concluded that in order to get a better understanding of childhood obesity in the US, it is important to better understand the children's social capital at a personal, family and neighborhood level.

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Rothon et al. 2011	To assess the relationship between family social support, community social capital and mental health and education outcomes of young people	England, UK Longitudinal study 2004 N=15,770 households	1) Parental relations. 2) Have an evening meal with the family. 3) Parental monitoring. 4) Parent's involvement with school, activities outside of the home and sociability.	Mental health and educational outcomes	Logistic regression	<p>Good parental relations, high parental monitoring, high frequency of sharing an evening meal with family were associated with decreased odds of mental health.</p> <p>Good parental relations, high parental monitoring, high frequency of sharing an evening meal with family, high involvement in extracurricular activities and high involvement of parents in school activities were associated with higher odds of higher educational achievement.</p> <p>In conclusion, building social capital could result into an improvement in both mental health and educational achievements in deprived communities. There is also need to focus on the family unit as a provider of support.</p>

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Lee 2012	Investigate the role of family-level resources on children's educational, the mediating pathways and the role played by family policy contexts.	Multi-countries (18 rich countries) Cross-sectional survey 2000	1) Single-parent vs two-parents. 2) Maternal work. 3) Number of siblings. 4) Parent-child interactions. 5) Single family policy indicators. 6) Family policy regimes.	Educational achievement	Random-effect multilevel modeling and fixed-effect multilevel modeling.	<p>Family financial, social and human capital was found to play a significant role in a child's educational attainment.</p> <p>Family social capital such as parent-child relationships mediated relationships with other family-level resources and children's educational achievements.</p> <p>A positive relationship was found between family policy and education achievement. Countries with generous family policies had higher educational performance than countries with weak family policy. Furthermore, family policy was found to mediate the association between family-level resources and a child's educational achievement. For instance, the negative impact of maternal work was mitigated by the generous family polices.</p>

Author (year)	Objective of the study	Country Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Freistadt and Strohschein 2012	Assess for family structure differences in family functioning and the impact of social capital on family functioning	Canada National Longitudinal Survey 1994 N=6,223	1) Family structure 2) Family functioning 3) Social involvement in community organizations 4) Neighborhood cohesion	Family functioning	Ordinary Least Squares Regression	1) Higher levels of family functioning (defined as level of communication, trust, support, and conflict in a family) within stable married two-biological-parent households as compared with single-biological-mother and stable cohabiting two-biological-parents households. 2) Neighborhood cohesion and social involvement was associated with higher family functioning especially among the married and cohabiting households and much less with the single-mother households.

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Eriksson et al. 2012	To assess for the relationship between social capital in school, family, and neighborhood and health complaints wellbeing.	Sweden Cross-sectional survey data collected in 2001/02 N= 3,926 11-15 year old children	1) Family social capital: How easy children found it to talk with their parents, family structure i.e. living with both parents or not. 2) School social capital: Our school is nice to be, I feel safe at school and I feel I belong to this school. 3) Neighborhood social capital: people say hello in the community, safety of neighborhood, trust of people and reciprocity.	Health complaints and wellbeing	Correlations and hierarchical multiple linear regression	Higher levels of family, neighborhood and school social capital were associated with lower health complaints and higher wellbeing. The three dimensions of social capital had a cumulative effect on child health and wellbeing. This implies that the support from all the spheres might be additive.

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Pfortner et al. 2015	To evaluate the impact of social capital at an individual level on adolescent smoking and whether socioeconomic status plays any role.	Belgium, Canada, Romania and England. Cross-sectional survey 2005/06 N=6,511	1) Friend-related social capital. 2) Reciprocity and trust in the family, school and neighborhood. 3) Involvement in school and voluntary organizations.	Health behavior (smoking)	Logistic regression models.	<p>All other forms of social capital were related with a lower likelihood of smoking with the exception of two: friend-related social capital and school participation.</p> <p>Family-related social capital was found to have a stronger association with low smoking among adolescents of lower SES.</p> <p>Vertical trust and reciprocity had a stronger association with smoking among adolescents of higher SES.</p> <p>Conclusion is that social capital may act as both a risk and protective factor for smoking among adolescents. Higher levels of family-related social capital might reduce on socioeconomic inequalities in smoking among adolescents.</p>

Author (year)	Objective of the study	Country/Countries Type of study Year of analysis	Measurement of family social capital/social capital	Outcome measure	Analytic method	Findings
Reynolds, et al. 2015	To investigate the impact of family and neighborhood social capital on the oral health of children.	USA Cross-sectional study 2010 N= 2,386 households	1) Frequency of eating meals together as a family. 2) Regular attendance of religious services. 3) Number of children in family. 4) Family structure (one vs. two-parents family). 5) Neighborhood trust and cohesion.	Oral Health.	Mixed-effects linear regression models	Strong positive association between high parent-reported child oral health and family frequency of eating meals together. Higher neighborhood social capital was found to be significantly and positively associated with high parent-reported child oral health.

3.3 Discussion

The review provides evidence that family social capital and other forms of child-related social capital are an important paradigm through which to better understand child-related outcomes. Moreover, including different dimensions of social capital in this review (family, school, neighborhood and peer) has demonstrated that some domains of social capital are more salient than others in terms of child related outcomes. The choice of study participants particularly appears to dictate which domain(s) of social capital to consider in a study; if the sample is composed of infants or children under 5 years, focusing on family social capital as the main source of capital seems like an accurate decision because children at that age have mainly been exposed to their families as a source of social capital. If the study participants are primary school children, it is crucial to consider school-level social capital, if the study includes adolescents and youth it might be important to look at peer-related and community or neighborhood-level social capital in addition to family social capital. Multiple studies from this review, however, reported that family as opposed to school and neighborhood social capital is the most important form of social capital in predicting child wellbeing (Dufur et al., 2008, Hu et al., 2014, Novak and Kawachi, 2015, Eriksson et al., 2012). This is perhaps because the family is the most proximate social unit for children. Coleman (1988) concluded that taken together, family social capital should be considered a resource as crucial as financial and human capital.

This structured review has revealed three trends that deserve to be highlighted. *Firstly*, the consistent finding across multiple studies from both the developing and developed countries is that higher social capital regardless of the form or dimension is more likely to improve a child's health or general wellbeing. This consistent finding could be a result of two factors: (i) children might be tapping into existing stocks of human and financial capital of their parents or (ii) it could be that they are tapping into their family's existing stocks from the community and social networks. This evidence highlights the need to view the family as one of the primary providers of social support for children.

Secondly, a plethora of the reviewed studies suggest that families with high family social capital have the following common characteristics; a family structure with presence of two-parents (biological or adoptive), strong parent-child relations, parents

monitor and are involved in the child's activities, and having fewer children in household. With regards to the debate around biological vs. adopted children, one study found that there was no significant difference in the impact of family social capital on biological vs. adopted children (Bofota, 2013).

Thirdly, the review exposed that SES is a key-mediating factor that strongly influences child-related outcomes. Two studies found that children from higher SES families had lower odds of dropping out of school (Teachman et al., 1996) and lower odds of improvement in developmental and behavioral outcomes (Runyan et al., 1998). This finding is further reinforced by Wen (2008) who found that family SES (household income and mother's occupation) in fact has a stronger mediating effect on child wellbeing than social capital does. Relatedly, Runyan et al. (1998) concluded that social capital, as a resource might be more crucial or beneficial to families that have less financial and educational resources.

The reviewed studies had several similarities in study design and analytic methods employed and most of the studies operated in the theoretical framework by Coleman (1988) discussed in the previous section. Furthermore, the bulk of the studies took necessary steps to strengthen their internal validity; most of the studies had large sample sizes, most of them included control groups, some used random sampling methods while others got data from various sources. That being said, the following limitations and gaps have been identified in the reviewed studies.

Methodological limitations in the reviewed studies and gaps in the literature

Firstly, from the reviewed studies, it is evident that there is discord among researchers on what indicators comprise social capital and how it should be operationalized. Researchers appear to be split into two broad categories: those who define social capital as a relational construct and those who view it to be a benefits-driven construct. Over three quarters of the reviewed studies defined social capital along the lines of involvement and relationships within families as well as between families and the community (neighborhood, school, and church). This group of researchers view social capital as merely a "means" to some sort of child-related end. In contrast, less than a quarter of the reviewed studies operationalized social capital as the direct benefits that the construct provides to families. This group of researchers view social capital as an "end" in and of itself. This duality in the operationalization of the

construct makes it difficult to make comparisons among studies as essentially two distinct concepts are being measured. Similarly, the reviewed studies have used a plethora of indicators and there is no consensus on which specific indicators to include in the definition of family social capital. There also seems to be no conclusive position on whether to include the various indicators of social capital individually or to create an index or composite variable of family social capital.

Secondly, all of the studies reviewed were entirely observational. Furthermore, slightly over 60% of the reviewed studies used cross-sectional study design that does not account for reverse causality and spurious correlation brought about by omitting key variables. The remaining 30% that used longitudinal study design, which accounts for reverse causality, but used data from surveys that did not primarily set out to measure social capital. Moreover, variables from such surveys might predict social capital, for instance the presence of two-parents in a household, but such variables on their own are not indicative of interconnectedness and social ties between individuals.

Thirdly, slightly over half of the reviewed studies are from developed countries and among the few studies from developing countries only two are from Africa. The two studies from Africa are both from the East African region and both studies did not have nationally representative samples. Although developing countries are already underrepresented in this area of research, Southern Africa is further marginalized without a single study from the region. One of the major gaps identified by this review therefore is that the association between family social capital and child health has not been investigated well enough in developing countries and not at all in Southern Africa.

Lastly, despite this review confirming our *a priori* expectations that social capital is indeed positively associated with child-related outcomes, there is an empirical gap in better understanding how this family social capital translates into a protective factor and how social capital can be mobilized in communities but most importantly in families. Additionally, despite the clear importance of family social capital, there is a need to try and further uncover the causal pathways through which social capital in one dimension or context may affect capital in another context. These two specific

gaps warrant further scrutiny that the present study scope unfortunately cannot contribute to.

3.4 Conclusion

In conclusion, the empirical precedents discussed above expose that using a social capital theoretical framework is beneficial when investigating the relationship between family social capital and child-related outcomes. The present study is unable to fill all the gaps in the evidence but will go a long way in establishing an association between family social capital and child health in South Africa. Additionally, the study will narrow the gap in longitudinal evidence in developing countries by utilizing four waves of a nationally representative dataset.

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PART C: JOURNAL MAUSCRIPT

Proposed Journal: Journal of Family Issues⁷

⁷ Author's instructions are presented in Annex 1.

Investigating family social capital and child health: a case study of South Africa

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Abstract

The link between family social support (FSC) and child health has not been well investigated in developing countries. This study assessed socioeconomic inequalities in child health and in FSC in South Africa. It also assessed the relationship between FSC and child health. Four waves of the National Income Dynamics Study panel data were used. Socioeconomic inequalities were assessed using the concentration index. To assess the relationship between FSC and child health, regressions models were fitted using a selected set of explanatory variables, including an index of FSC. Child health was operationalized to include: stunting, wasting, and parent-reported illness of a child. Results showed that children from the poorest families bear the largest burden of malnutrition, ill health and had more FSC. Although FSC was expected to improve child health, the study findings suggest that in South Africa, the socioeconomic status of a family has a greater effect on child health.

Investigating family social capital and child health: a case study of South Africa

1.0 Background

Increasingly, public health and health promotion specialists have become aware that the quality of family life is vital to children's wellbeing (Morrow, 1999a). This is because primarily, the family provides the very first social context for infants and children. Moreover, the family is a major determinant of what resources a child has access to; one such resource is social capital (Dufur et al., 2008, Hu et al., 2014, Novak and Kawachi, 2015). The concept of social capital in the family context was introduced in the seminal work of Coleman where he defined family social capital as the relations between parents and children as well as other family members that reside in a home (Coleman, 1988a). To estimate the impact of social capital on the formation of human capital, Coleman constructed a 5 variable index which served as a proxy for family social capital: (i) presence of both parents in a household (ii) presence of 1 versus 4 siblings and this was premised on the argument that fewer children receive a deeper concentration of parental attention (iii) number of school changes since 5th grade – this was based on the hypothesis that each move disrupts social capital (iv) attendance of religious services on a regular basis and (v) a mother's expectations for her child's educational attainment — this variable was reflective of family norms. Over the ensuing decades, family social capital has been defined variably to include: maternal caregiver social capital, social networks, as well as organizational and community involvement (Morrow, 1999a). A convergence of empirical evidence suggests that family social capital has a bearing on children's health. For instance, family social capital has been implicated in lower odds of psychological distress among children (Novak and Kawachi, 2015), lower mental health risks (Hu et al., 2014, Rethon et al., 2012), and higher odds of developmental and behavioral

outcomes (De Silva and Harpham, 2007, Ayllon and Ferreira-Batista, 2015, Reyes et al., 2004).

Despite the acclaimed benefits of family social capital, there have been concerns in the broader society that closeness in families and social affiliation has been steadily diminishing over the past decades (Runyan et al., 1998, Putnam, 2000). Moreover, in the South African context, social disintegration and dilution of social capital, particularly among black communities, can be traced back to apartheid and colonial era (HSRC, 2004a, Ramphela, 1991). Worse still, the country has grappled with intense income or socioeconomic inequality and empirical precedent has shown that income inequality is associated with disinvestment in social capital (Kawachi et al., 1997, Jack and Jordan, 1999b). Post 1994 when the country transitioned into a democracy, the role of social capital and the importance of social cohesiveness became a cornerstone of the country's policy rhetoric (Burns, 2009). Social capital research on child related outcomes, however, has largely focused on the importance of multilevel social capital from various domains such as the community, neighborhood, schools, families and peers (Ferguson, 2006). There is a paucity of evidence on the impact of social capital singularly generated in a family setting on child health. A search of electronic databases provided only 4 peer reviewed studies that investigated the role of family social capital on child health. Three of these studies are from developed countries (Coleman, 1988a, Carter, 2003, Teachman et al., 1996) while the one study from developing countries was conducted in Southern America (Ayllon and Ferreira-Batista, 2015). Furthermore, very little is known about the relationship between family social capital and nutritional status of children in developing countries. The only studies that attempted to investigate this relationship operationalized social capital as a broader community-level construct and not as a

family-level construct (Reyes et al., 2004, Harpham et al., 2006, De Silva and Harpham, 2007). This glaring gap in the evidence is quite surprising because the importance of the family and consistent caregiving on the science of early child development is incontrovertible (Shonkoff and Phillips, 2000). Moreover, early life and childhood exposures have been linked to cardiovascular diseases, metabolic complications and premature death in adulthood (Barker et al., 2002, Carroll et al., 2013, Brown et al., 2009, Kelly-Irving et al., 2013, Repetti et al., 2002, Miller et al., 2011).

The purpose of this study therefore is to assess the relationship between family social capital and child health in South Africa. Furthermore, this study will assess socioeconomic related inequalities in child health as well as in family social capital. This study hypothesises that after controlling for other determinants of child health, (a) family social capital will be positively associated with child health, (b) children from families of lower socioeconomic status (SES) will have worse child health outcomes as compared to children from higher SES families and (c) families in lower SES will have less family social capital as compared to affluent families.

2.0 Methods

2.1 Data source

This study used the National Income Dynamics Study (NIDS) data. The NIDS survey collected nationally representative panel data to facilitate the description and explanation of several socioeconomic indicators e.g. education, labor, health and wellbeing, income, etc. (Leibbrandt et al., 2009). Wave 1 of the survey was conducted in 2008, wave 2 between 2010-2011 and Wave 3 between April and December of 2012 and wave 4 in 2014 (de Villiers et al., 2013). The survey used a stratified two-

stage cluster sample design; in the first stage 400 primary sampling units (PSUs) were selected from a master sample of 3,000 PSUs and in the second stage, a random sample of 400 PSUs were selected from each stratum in the 53 district councils in the country (Leibbrandt et al., 2009). At the end of the first wave, 7,305 households and 16,878 individuals were interviewed. The present study used data collected by the child questionnaire (section E specifically asked family support questions) and other variables were obtained from the household and adult questionnaires for all the four waves of the NIDS study. It would have been ideal to longitudinally follow up one cohort of children over the four waves of the NIDS study. However, due to attrition, missing data, the short-term nature of some of child health indicators especially wasting and parent reported health, and lastly, the varying nature of the exposure variable (family social capital) it was not feasible to follow up one cohort of children over the 6-year period of the 4 NIDS waves. Instead, for this analysis the 4 waves of the NIDS dataset were split into three cohorts of children and each cohort was longitudinally followed up for two years. Cohort 1 included children who were followed from 2008 to 2010, cohort 2 comprised children followed from 2010 and 2012 and the third cohort of children was followed from 2012 to 2014.

Study participants

The present study focused on the early childhood phase; as such, the analysis included children between 6 months and 5 years of age at baseline. The decision to include children who were over 6 months was supported by the fact that 6 months is the average age at which children are weaned off exclusive breastfeeding. Therefore, a child gets more exposure to the environment that affects his/her health after 6 months (Reyes et al., 2004). The 5-years upper limit was guided by the study's specific interest on the impact of social capital generated in a family context on child health.

Apart from those that attend crèches quite early, children usually start going to school after 5 years and accrue different forms of social capital from their schools, peers, and neighborhoods. Both female and male children were included as well as children of all races. All eligible children in one household were included in the study. To account for overestimation of the relationship between child health and family social capital especially in households where there was more than one eligible child, clustering was done on the household variable in the regression analysis.

2.2 Measurement of outcome variable: child health

Child health in this study was operationalized to include three indicators: stunting, wasting and parent-reported health of a child. Stunting is an indicator of chronic deficiencies in the skeletal growth of children, wasting is a result of acute malnutrition and is indicative of deficiencies in tissue and fat (WHO, 1986a). Parent reported health on the other hand is not only a predictor of mortality and morbidity (Idler et al., 2000, Idler and Benyamini, 1997) but it is also multidimensional and encompasses aspects of coping, functionality and wellbeing (Simon et al., 2005).

To measure stunting and wasting, anthropometric measures of children were used. Stunting was defined as a height-for-age Z score of less than the conventional cut off point of $-2SD$ below the median height-for-age (de Onis et al., 2004). The present study used the WHO child growth standard (WHO, 2006) as the population reference.

The height-for-age Z score of the i^{th} child was given as:

$$Z\ Score = \frac{H_i - H_r}{SD} \quad (1)$$

Where H_i is the height of the child “ i ”, H_r is the median height for the reference population while SD is the standard deviation of height in the reference population.

Wasting was defined as a weight-for-height Z score of less than -2SD below the median weight-for-height. Similar to the stunting analysis, the reference population used was the WHO child growth standard. The weight-for-height Z score of the i^{th} child was given as:

$$Z\ Score = \frac{w_i - w_r}{SD} \quad (2)$$

Where w_i is the weight of the child “i”, w_r and SD represent the median and the standard deviation weight for the reference population respectively.

Parent-reported health for the child was measured using data elicited by the question “Overall, how is this child’s health at this point in time? Would you say that this child’s health is excellent, very good, good, fair or poor?” As previous studies have done for self-reported health (Kawachi et al., 1999, Lamarca et al., 2013, Lau, 2014b), parent-reported health in this study was dichotomized as either “*ill-health*” = (fair or poor) or “*good-health*” = (excellent, very good or good).

2.3 Measurement of exposure variable: family social capital

Family social capital is a nebulous concept that has been variably constructed across different studies. This study lends itself to the definition and conceptualization of family social capital by Coleman (1988a). It is important to note that this study was inherently constrained to only include variables that were elicited by the NIDS survey. Seven indicators or proxies of family social capital were identified and assessed as either present or absent for each child. The seven indicators were: (a) presence of both parents in a household (b) presence of a mother in the household (c) how often a child sees the mother (d) how often a child sees the father (e) parent of the child is the primary caregiver, (f) support from extended family and (g) the number of children in the family. According to Coleman’s definition of family social

capital, these seven indicators are theoretically pertinent in constructing a family social capital indicator. Using Multiple Correspondence Analysis (MCA) these seven indicators were used to create a family social capital index. The choice of MCA over Principal Components Analysis (PCA) and Factor Analysis (FA) was guided by the fact that MCA is the more appropriate methodology when dealing with categorical variables while PCA is more ideal for continuous variables (Greenacre and Blasius, 2006, Booysen, 2008). All the variables used in the family social capital index were categorical in nature. Further, MCA makes fewer assumptions regarding the distribution of the indicator variables and imposes fewer constraints on the data. PCA requires linearity as it assumes equal distances between the categories (Greenacre and Blasius, 2006). The calculation of the family social capital index followed a 4-stage process (Asselin, 2002): firstly, an indicator matrix was constructed showing the presence/absence of each family social capital category for every child. Secondly, the profiles of the children relative to the categories of family social capital were calculated. Thirdly, MCA was applied to the indicator matrix to generate weights. Fourthly, the MCA generated weights were applied to the profile matrix. A child's MCA index was therefore estimated by adding up all that child's weighted responses as shown in equation 3.

$$MCA_i = C_{i1}W_1 + C_{i2}W_2 + \dots + C_{ij}W_j \quad (3)$$

Where MCA_i is the i^{th} child's composite family social capital indicator score, C_{ij} is the response of the i^{th} child to the category j and W_j is the MCA weight for the first dimension applied to category j .

Tests for correlation were performed to ensure that variables with a negative relationship are excluded from the composite variable. Given the varying nature of family social capital over a given period of time (for instance the frequency of parents

seeing their children, the number of siblings, etc.), an average composite family social capital index for each child (the average of MCA_i) over the follow up period was used in the regression analysis.

2.4 Covariates

The study considered covariates at the individual (child), household, and neighborhood levels (see *Table 7*). Individual-level covariates included: age, race, birth weight, gender, and if the child had any serious illness (HIV/AIDS, TB, diabetes and cancers). At the household-level, the analysis adjusted for four variables: per capita household expenditure, the education of a mother, mother's height (for stunting) and mother's age. Two neighborhood-level covariates were adjusted for: location (urban or rural) and provincial location (i.e. the 9 South African provinces).

2.5 Measurement of SES related inequalities

Inequalities in child health and family social capital were measured using the concentration index (CI). CI fulfills the basic requirements of a health inequality index; it is sensitive to changes in the population across SES strata, it is reflective of the entire population's experience across SES groups, and it takes into consideration the social economic dimension (Wagstaff et al., 1991). The concentration index was computed from the concentration curve, which plots the cumulative proportion of children ranked by the SES of their household against the cumulative proportion of child health indicators or family social capital. CI was estimated as; two times the covariance between a child's SES relative ranking and health (or family social capital) variable divided by the mean value of the health (or family social capital) variable as illustrated in Equation 4 (Kakwani et al., 1997).

$$CI = 2 \text{cov}(x_i, R_i) / \mu \quad (4)$$

where x_i is the i^{th} child's health indicator or family social capital score, μ is the mean level of child health or family social capital while R_i is the SES relative rank of the i^{th} child. The estimation in Equation 4 produces unstandardized CI results, which do not account for age and sex variations. Age-sex variations were accounted for through an indirect standardization process where the influence of all standardizing variables was subtracted from the unstandardized CI (van Doorslaer et al., 2004). Standardization therefore allows for measurement of inequality in child health and family social capital that is systemically associated with SES.

Additionally, the computation procedure in Equation 4 does not permit for making statistical inferences (Kakwani et al., 1997) to assess the statistical significance of the CI. To address this challenge, standard error for the CI was calculated using a simple regression procedure as shown in Equation 5

$$2\sigma_R^2 \left(\frac{x_i}{\mu} \right) = \beta_0 + \beta_1 R_i + \mu \quad (5)$$

where β_1 is the CI and inference is conducted on the corresponding standard error.

Theoretically, the CI lies between -1 and +1: with negative CI representing a pro-poor distribution (the child health outcomes are concentrated among the most disadvantaged) while a positive CI represents a pro-rich distribution (the child health outcomes are concentrated among the least disadvantaged). A CI of zero (0) implies an equal distribution of health outcomes between the poor and the rich (Kakwani et al., 1997).

Lastly, a normalization process was done because all the child health indicators were binary in nature therefore the CI was not bound between -1 and 1, as it ought to be but rather it lay between $\mu-1$ and $1-\mu$, where μ is the mean of the variable of interest. As

such, normalization ensures that the quantified CI is lies between -1 and 1 by multiplying the CI by $(1/1-\mu)$ (Wagstaff, 2005).

2.6 Data analysis

Data management and cleaning was done in Stata 13. To answer objectives 1 & 2 of the study (measuring SES inequalities in child health and in family social capital), ADePT software, which was developed by the World Bank, was used. To answer objective 3 (investigate the relationship between family social capital and child health), logistic regression analysis was done. As aforementioned, three cohorts of children were longitudinally followed up for two years. A model was fitted for each child health indicator (stunting, wasting and parent-reported health) and this was done for each of the three cohorts. All the analyses for objective 3 were done in Stata 13 (StataCorp, Texas). Clustering and stratification were accounted for in all the estimations both in the ADePT and the regression analysis. To ensure data quality, three stages of data cleaning and checking was performed. Two people supervised and the data cleaning and coding process to ensure data quality. Outlying data points were dropped and cases of missing data were handled appropriately. For instance, in some cases, missing data only meant a “negative” response and not “unavailability” of data.

3.0 Results

3.1 Descriptive statistics

Descriptive statistics for demographic, child health and family social capital characteristics for the three cohorts of children are presented in *Table 7*. For cohort 1, the sample for analysis consisted of 2,187 children; cohort 2 included 2,280 children while cohort 3 included 2,742 children. In cohort 1, the majority of the children were: black (82%), male (52%), resided in a rural area (61%), and had mothers with below

tertiary level of education (91%). About 21% of the children were stunted, 4% were wasted and 2% reported ill health by their parents. For family social capital parameters: only 28% of the children had both parents present in the home, 78% received support from extended family, 72% had a parent as a primary caregiver, 50% of the children saw their father frequently, 84% saw their mother frequently, and 41% of the children were two or less siblings in a household. Very similar patterns are observed in cohorts 2 and 3 (see *Table 7*). The prevalence for stunting however reduces dramatically from 20.55% in cohort 2 to 13.15% in cohort 3. Similarly, the prevalence of wasting drops from 4.59% in cohort 2 to 1.96% in cohort 3. Another variable that varies in the three cohorts is nominal per capita household expenditure that increases from R1, 268 in 2008 to R1, 380 in 2010 and to R1, 722 in 2012. The number of mothers with a tertiary and above level of education also increased from 9% in cohort 1 to 11% in cohort 2 and 14% in cohort 3.

3.2 Results for study objective 1: SES inequalities in child health

Results for SES inequalities in stunting, wasting and parent-reported health for the child are presented in *Figure 6*, *Figure 7*, and *Figure 8* respectively. *Table 8* presents the unstandardized and standardized CI results for all the child health indicators.

Stunting

The unstandardized concentration index for stunting was -0.157 (95% CFI, -0.08, -0.23) and the indirectly standardized concentration index was -0.155 (95% CFI, -0.07, -0.23). Both the unstandardized and standardized results were statistically significant at the 95% CFI. The negative CI for stunting implies that children in the lowest SES group bear a bigger burden of stunting as compared to children in higher SES strata.

Wasting

The unstandardized concentration index for wasting was -0.094 (95% CFI, -0.24, 0.06) and the indirectly standardized concentration index was -0.102 (95% CFI, -0.25, 0.04). The negative CI for wasting implies that children in the lowest SES group bear a greater burden of wasting as compared to children in higher SES strata. However, both the unstandardized and standardized CIs are not statistically significant at the 95% CFI.

Parent reported health for children

The unstandardized concentration index for parent reported health of children was -0.105 (95% CFI, -0.42, 0.21) and the indirectly standardized concentration index was -0.106 (95% CFI, -0.42, 0.21). Both the unstandardized and standardized concentration indices were not statistically significant at the 95% CFI. The negative concentration indices (unstandardized and standardized) imply that children in lower SES group bear a greater burden of parent reported ill health as compared to children in higher SES strata.

3.3 Results for study aim 2: SES inequalities in family social capital

Figure 9 and *Table 8* present the results for SES inequalities in family social capital. The unstandardized concentration index for family social capital was -0.106 (95% CFI, -0.06, -0.15) and the indirectly standardized concentration index was -0.112 (95% CFI, -0.06, -0.16). Both the unstandardized and standardized CIs were statistically significant at the 95% CFI. The negative concentration indices (unstandardized and standardized) imply that family social capital was more concentrated among children of lower SES strata as compared to children in higher SES strata.

3.4 Results for study aim 3: family social capital & child health

The results for three logistic regression models for stunting, wasting and parent-reported health for children are presented in *Table 9*, *Table 10* and *Table 11* respectively.

Stunting

The Model for cohort 1 indicates that no relationship was observed between family social capital and stunting among children as the odds ratio (1.17, $p>0.05$) was not different from 1. A unit increase in the birth weight of a child (OR 0.86 $p>0.05$), child's age (OR 0.86 $p<0.05$), and the mother's height (OR 0.94 $p<0.05$) are associated with lower likelihood of stunting among children. The remaining associations were not statistically significant for instance: male children were 0.9 times less likely to be stunted compared to female children (OR 0.92 $p>0.05$), children in urban areas were 0.6 times less likely to be stunted as compared to children in the rural areas (OR 0.64 $p>0.05$) and black children were 2 times more likely to be stunted (OR 2.05 $p>0.05$) compared to Asian and white children. Similar patterns were observed in cohort 2 with the exception of family social capital where a negative association was found, however, these results were not statistically significant (OR 0.99, $p>0.05$). Additionally, children whose mothers had tertiary level and above education were 0.45 times less likely to be stunted compared to children whose mothers have less than tertiary level education (OR 0.45 $p>0.05$). For cohort 3 as was the case in cohort 1, family social capital was found not to have an association with stunting among children as the Odds Ratio (1.24 $p>0.05$) was not very different from 1. All the other associations were similar to those observed in cohort 1 and 2.

Wasting

Results for cohort 1 showed that children with more family social capital were 0.7 times less likely to be wasted as compared with children with less family social capital (OR 0.712 $p>0.05$). The statistically significant predictor of wasting in cohort 1 was the race of a child ($p<0.05$) where black children were more likely to be wasted compared to white and Asian children. On the other hand, the birth weight of a child and per capita expenditure were negatively associated with wasting but this finding was not statically significant. Further, the age of the child, mother's education and mother's age were positively associated with wasting among children, but none of these associations were statistically significant. Results for cohort 2 indicated a negative association between family social capital and wasting (OR 1.48 $p>0.05$). All the other associations were similar to those presented in cohort 1. For cohort 3 similar associations as those presented in cohort 1 were found and a statistically significant negative association was found between wasting and per capita expenditure ($p<0.05$).

Parent reported health

Results for cohort 1 indicated that there is no association between family social capital and parent-reported health as the Odds Ratio (1.19 $p>0.05$) was not different from 1, however this finding was not statistically significant. The significant predictor of parent-reported health of children was the birth weight of a child ($p<0.05$). The remaining associations were not found to be statistically significant for instance, parents to male, black and urban dwelling children were found to report higher levels of illness among their children. On the other hand, age (OR 0.98 $P>0.05$), birth weight (OR 0.34 $p<0.05$) and per capita expenditure (OR 0.99 $p>0.05$) had a negative association with parent-reported health among children. Results for cohort 2 that a unit increase in family social capital reduces the likelihood of parent-reported health

for their children (OR 0.98 $p>0.05$), however this finding was not statistically significant. All the other associations presented in cohort 1 were retained except for two: male children were less likely to be reported as poor compared to female children (OR 0.59 $p>0.05$) and a positive association was found between birth weight and the likelihood of parents reporting children as having poor health (OR 1.09 $p>0.05$). Results for cohort 3 found very similar associations as those reported in cohort 1 and also found that the dwelling place (urban vs. rural) of children was found to be a statically significant predictor of parent-reported health of children.

4.0 Discussion

This study had three objectives; firstly, to assess SES inequalities in child health, secondly to assess SES inequalities in family social capital and thirdly to examine the association between family social capital and child health in South Africa.

In a national sample of 7,249 children, an assessment of SES inequalities in child health showed that both stunting and wasting were concentrated more among children of lower SES as compared with children from a higher SES. Similarly, children in families from lower SES were bearing a greater burden of ill health as compared to children in higher SES strata. Overall, SES related inequalities were strongest in stunting with a concentration index of -0.16. This is also graphically depicted by the stunting concentration curve in *Figure 6*, which is farthest from the 45-degree line of equality. This finding is in line with the World Health Organization's recommendation that stunting is a more reliable measure of overall social economic deprivation as well as one of the key parameters to monitor equity in the distribution of health (WHO, 1986a). When compared with other studies, it is noted that our findings conform to patterns observed in developing countries where the rate of

decline in protein-energy malnutrition is slow (de Onis et al., 2000, Zere and McIntyre, 2003); with stunting being the biggest problem in malnutrition followed by underweight and wasting (de Onis et al., 1993). A study that made an attempt to estimate inequalities in under-five malnutrition in South Africa found similar findings as the present study. Zere and McIntyre (2003) found that under-five children from the poorest families bear the largest burden of malnutrition. Given the consistent pattern of inequalities in under-five malnutrition, the likelihood to perpetuate the existing high levels of income inequality in the South Africa is elevated. This is because it is well established that systematic inequalities in under-five malnutrition have grave implications for the lifetime earnings of the affected children (Behrman and Hodinott, 2000, Grantham-McGregor et al., 2007).

An assessment of SES inequalities in family social capital found a pro-poor distribution implying that families from lower SES possessed more family social capital when compared to more affluent families. Although Putnam (2000) suggests that social capital is insufficient in disadvantaged communities due to the vicious cycle of low mutual trust resulting into lower levels of social cohesion, other studies have revealed that social capital is in abundance among the marginalized and impoverished communities and moreover, this social capital is primarily manifested in intra-familial social support networks (Krishna and Uphoff, 1999, Díaz et al., 2000, Fernández-Kelly, 1994).

The last objective of this study was to assess the association between family social capital and child health and the results suggest that, contrary to our hypothesis, family social capital was found to be largely negatively associated with child health. However, these results were not statistically significant. The data suggest that stunting

is strongly predicted by the age of a child and the gender (males were significantly more likely to be stunted as compared to females) and this finding is consistent with another study among under-5 children in South Africa (Zere and McIntyre, 2003) and other studies in developing countries (Semba et al., 2008). The stunting results also corroborate earlier evidence that a mother's height and the birth weight of a child are determinants of stunting among children (Ricci and Becker, 1996, Chopra, 2003).

When compared with previous research, a study found that in rural Mexico the presence of extended families and extensive social networks were associated with stunting among children (Reyes et al., 2004). The authors note that the plausible explanation for this unexpected finding was that family networks and the extended family set up might infringe on the exclusive provision of child-care by a mother. Similarly, another study found that increased maternal social capital elevated the risk of stunting among 8-year-old Vietnamese children (Harpham et al., 2006). The same study however, found that among 1 year olds, high maternal social capital was associated with better child health outcomes. In South Africa, empirical precedent suggests that the negative impact of household economic shocks on stunting can be buffered by living in a community with high social capital (Carter and Maluccio, 2003). The Plausible explanation for the difference between the findings of Carter and Maluccio (2003) and the present study is the differences in definition of social capital; the previous study considered community-level social capital while the present study considered the social capital generated in a family setting.

Another plausible explanation for the unexpected negative relationship between family social capital and child health (although not statistically significant) can be explained by the fact that family social capital is concentrated more among the poor

families as shown by the SES related inequalities in family social capital estimated by the present study. In other words, the findings suggest that poverty might have a stronger effect on child health than family social capital does. This finding is reinforced by Putnam's (2000) observation that second only to poverty; social capital has the highest impact on child development. This hypothesis is also in line with what Cattell (2001) found in poor areas of London, where she observed that the social support from homogenous networks made up of poor people is often not effective. Furthermore, other empirical studies have suggested that social capital in impoverished communities is abundant but tends to be fragmented and therefore ineffective in improving collective wellbeing (Portes and Landolt, 1996, Krishna and Uphoff, 1999, Pantoja, 1999).

The policy implication of these findings is that, there is a need to conduct further research with more refined measurement of family social capital, as the results in this study were counter-intuitive. On the other hand, given that family social capital concentrated more among the socioeconomically disadvantaged families, the government can leverage this existing family social capital to provide family support interventions tailored to improve child health. Furthermore, there is a need to intervene up-stream through interventions that improve their socioeconomic status of these families as the data suggest that poverty might have a stronger effect on child health than family social capital does. Previous studies indicate that an increase in the income of the socioeconomically deprived parts of the demographic can curb child malnutrition (Sahn, 1994, WorldBank, 1981). As such, the implementation of income-generating interventions that encourages the full realization of the acclaimed benefits of family social capital is recommended.

This study was not without limitations. Firstly, social capital is variably defined and the best constellation criteria to measure family social capital are yet to be determined. Moreover, this study used the NIDS data that were not collected primarily to assess family social capital. So, this study extracted the readily available family support variables from the NIDS dataset that were theoretically pertinent to construct a family social capital index. However, these variables on their own might not be indicative of interconnectedness and social ties between individuals in a family. Secondly, the study only focused on social capital generated in a family setting. As such, the importance of public policy and other community wide contextual factors that impact social capital were not accounted for. Fourthly, the high attrition rate and the varying nature of the exposure variable did not permit for a longer follow-up period of one cohort of children across the 4 waves of the NIDS dataset. Lastly, the analysis did not control for the impact of school for some of the children that could have been attending some form of pre-school or crèche.

The limitations notwithstanding, this study had strengths. Firstly, the study used 4 waves of nationally representative panel data and a longitudinal study design was employed. The exposure variable (family social capital) was accumulated and measured two years prior to assessing the outcome variable (child health) across the three cohorts of the children thus partially accounting for reverse causation. Secondly, this study assessed the impact of social capital generated in a family setting only on child health and this distinction is important as Dufur et al. (2008) argue that for children, there are theoretical reasons that motivate for a distinction between the social capital created in a home and that created in other contexts such as schools. Lastly, to the best of our knowledge, this is the first study to assess the association between family social capital and child health in South Africa.

5.0 Conclusion

The determinants of child health are complex and include constitutional parameters (i.e. height of a mother, birth weight), proximal parameters (i.e. presence of illness, dietary intake) and other underlying factors (i.e. SES, family social capital, education of a mother, dwelling place). Although family social capital would be expected to improve child health, the study findings suggest that in South Africa, the socioeconomic status of a family has a greater effect on child health than family social capital. Therefore, interventions that will improve both family social capital and the social economic status of families are encouraged.

6.0 References

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7.0 Tables

Table 7: Descriptive Statistics of the Study Population

Variable	Cohort 1 2010 (N=2,187)	Cohort 2 2012 (N=2,280)	Cohort 3 2014 (N=2,742)
Stunted (%):			
No	79	79	87
Yes	21	21	13
Wasted (%):			
No	96	95	98
Yes	4	5	2
Parent-Reported Health (%):			
Good Health	98	98	98
Poor Health	2	2	2
Both Parents Present (%):			
No	72	74	77
Yes	28	26	23
Patent is the Caregiver (%):			
No	28	25	21
Yes	72	75	79
Children in household (%):			
More than two children	59	60	57
Not more than two children	41	40	43
Father sees child often (%):			
No	50	49	53
Yes	50	51	47
Mother sees child often (%):			
No	16	12	13
Yes	84	88	87
Extended family (%):			
No	22	48	46
Yes	78	52	54
Parent's Relations (%):			
Not together	64	65	67
Together	36	35	33
Gender (%):			
Male	52	51	49
Female	48	49	51
Race (%):			
African	82	83	85
Coloured/Asian	16	15	14
White	2.7	2.2	1.1
Age of child (Mean in months)			
	33	35	35
Birth Weight (Mean in kgs)			
	3	3	3
Child has a serious illness (%):			
No	99	99.6	99
Yes	1	0.4	1
Mother's height (Mean in cms)			
	158	159	160
Mother's age (Mean)			
	29	29	28
Per Capita Expenditure (Rand)			
	1,268	1,380	1,722
Mother's Education (%):			
Below tertiary	91	89	86
Tertiary and above	9	11	14
Location (%):			
Rural	61	59	56
Urban	39	41	44

Table 8: Unstandardized and Standardized CI results for Stunting, Wasting, Parent-reported health and FSC

Variable	Unstandardized CI	Confidence Interval	Standardized CI	Confidence Interval
Stunting	-0.157	-0.08 -0.23	-0.155	-0.07 -0.23
Wasting	-0.094	-0.24 0.06	-0.102	-0.25 0.04
Parent-reported Health	-0.105	-0.42 0.21	-0.106	-0.42 0.21
Family Social Capital	-0.106	-0.06 -0.15	-0.112	-0.06 -0.16

Table 9: Association between family social capital and stunting

	Cohort 1 ^a N=540		Cohort 2 ^b N=1,298		Cohort 3 ^c N=1,567	
	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P
Family social capital	1.17 (0.64-2.15)	0.61	0.99 (0.77-1.26)	0.93	1.24 (0.95-1.61)	0.12
Age(months)	0.99 (0.98-1.01)	0.38	0.98 (0.92-1.00)	<0.00	0.97 (0.96-0.98)	<0.00
Gender (Male)	0.92 (0.59-1.41)	0.69	1.36 (1.02-1.80)	0.03	1.42 (1.03-1.95)	0.03
Race/Ethnicity:						
Black/African	2.05 (0.66-6.34)	0.27	0.63 (0.31-1.31)	0.22	0.54 (0.28-1.07)	0.08
Coloured/Asian/White	Reference		Reference		Reference	
Birth Weight (kgs)	0.81 (0.58-1.13)	0.21	0.84 (0.69-1.03)	0.09	0.52 (0.38-0.69)	<0.00
Per capita Expenditure	0.99 (0.99-0.99)	0.02	0.99 (0.99-1.00)	0.24	0.99 (0.99-1.00)	0.14
Mothers Education	2.08 (0.92-4.69)	0.07	0.45 (0.22-0.90)	0.02	0.69 (0.41-1.16)	0.17
Location (urban)	0.64 (0.34-1.21)	0.17	0.97 (0.64-1.45)	0.86	1.31 (0.86-1.99)	0.20
Serious illness	Omitted	-	1.39 (0.21-0.98)	0.73	2.22 (0.64-7.75)	0.21
Mother's Height	0.94 (0.91-0.97)	<0.00	0.96 (0.94-0.98)	<0.00	0.93 (0.90-0.96)	<0.00
Mother's Age	0.98 (0.96-1.02)	0.36	1.01 (0.99-1.03)	0.56	1.01 (0.98-1.03)	0.51

^aCohort 1: Association between family social capital and stunting among children followed up between 2008&2010 adjusting for individual, household and community level variables. (prob>chi2 = 0.06).

^bCohort 2: Association between family social capital and stunting among children followed up between 2010&2012 adjusting for individual, household and community level variables. (prob>chi2 = 0.0000).

^cCohort 3: Association between family social capital and stunting among children followed up between 2012&2014 adjusting for individual, household and community level variables. (prob>chi2 = 0.0000)

Table 10: Association between family social capital and wasting

	Cohort 1 ^a N=227		Cohort 2 ^b N=583		Cohort 3 ^c N=539	
	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P
Family social capital	0.76 (0.23-2.56)	0.66	1.48 (.079-2.76)	0.22	0.94 (0.27-3.33)	0.93
Age(months)	1.02 (0.93-1.12)	0.66	0.98 (0.95-1.04)	0.78	0.96 (0.88-1.05)	0.39
Gender (Male)	0.83 (0.19-3.52)	0.80	0.94 (0.47-1.87)	0.88	0.83 (0.23-3.00)	0.77
Race/Ethnicity:						
Black/African	53.6 (1.54-1859)	0.03	3.58 (1.74-7.39)	<0.00	1.22 (0.15-10.26)	0.85
Coloured/Asian/White	Reference		Reference		Reference	
Birth Weight (kgs)	0.81 (0.30-2.16)	0.66	0.61 (0.30-1.24)	0.18	0.28 (0.07-1.16)	0.08
Per capita Expenditure	0.99 (0.99-1.00)	0.11	0.99 (0.99-1.00)	0.73	1.00 (1.00-1.00)	0.00
Mothers Education	1.45 (0.21-9.99)	0.71	2.07 (0.66-6.46)	0.21	2.29 (0.62-8.44)	0.22
Location (urban)	1.22 (0.27-5.62)	0.79	0.72 (0.35-1.48)	0.37	0.56 (0.10-3.06)	0.51
Mother's Age	1.05 (0.99-1.13)	0.24	1.02 (0.96-1.07)	0.18	1.08 (0.99-1.18)	0.09

^aCohort 1: Association between family social capital and wasting among children followed up between 2008&2010 adjusting for individual, household and community level variables. (prob>chi2 = 0.0025).

^bCohort 2: Association between family social capital and wasting among children followed up between 2010&2012 adjusting for individual, household and community level variables. (prob>chi2 = 0.0391).

^cCohort 3: Association between family social capital and wasting among children followed up between 2012&2014 adjusting for individual, household and community level variables. (prob>chi2 = 0.0000).

Table 11: Association between family social capital and parent-reported health

	Cohort 1 ^a N=949		Cohort 2 ^b N=1,560		Cohort 3 ^c N=1,536	
	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P
Family social capital	1.19 (0.76-1.86)	0.46	0.98 (0.71-1.37)	0.93	1.48 (0.95-2.29)	0.08
Age(months)	0.98 (0.95-1.01)	0.21	0.99 (0.97-1.00)	0.29	1.01 (0.99-1.03)	0.58
Gender (Male)	1.63 (0.76-3.49)	0.21	0.59 (0.29-1.24)	0.17	1.06 (0.55-2.04)	0.86
Race/Ethnicity:						
Black/African	2.88 (0.33-25.3)	0.34	1.19 (0.18-8.03)	0.85	0.49 (0.08-3.16)	0.46
Coloured/Asian/White	Reference		Reference		Reference	
Birth Weight (kgs)	0.34 (0.16-0.69)	<0.00	1.09 (0.76-1.56)	0.64	0.71 (0.39-1.31)	0.27
Per capita Expenditure	0.99 (0.99-1.00)	0.08	0.99 (0.99-1.00)	0.39	0.99 (0.99-1.00)	0.33
Location (urban)	1.36 (0.48-3.85)	0.57	2.54 (0.95-6.79)	0.06	2.57 (1.08-6.12)	0.03

^aCohort 1: Association between family social capital and parent reported health among children followed up between 2008&2010 adjusting for individual, household and community level variables. (prob>chi2 = 0.0000).

^bCohort 2: Association between family social capital and parent reported health among children followed up between 2010&2012 adjusting for individual, household and community level variables. (prob>chi2 = 0.0112).

^cCohort 3: Association between family social capital and parent reported health among children followed up between 2012&2014 adjusting for individual, household and community level variables. (prob>chi2 = 0.0557).

8.0 Figures

Figure 6: Concentration Curve of SES inequalities in stunting among South African children (2012)

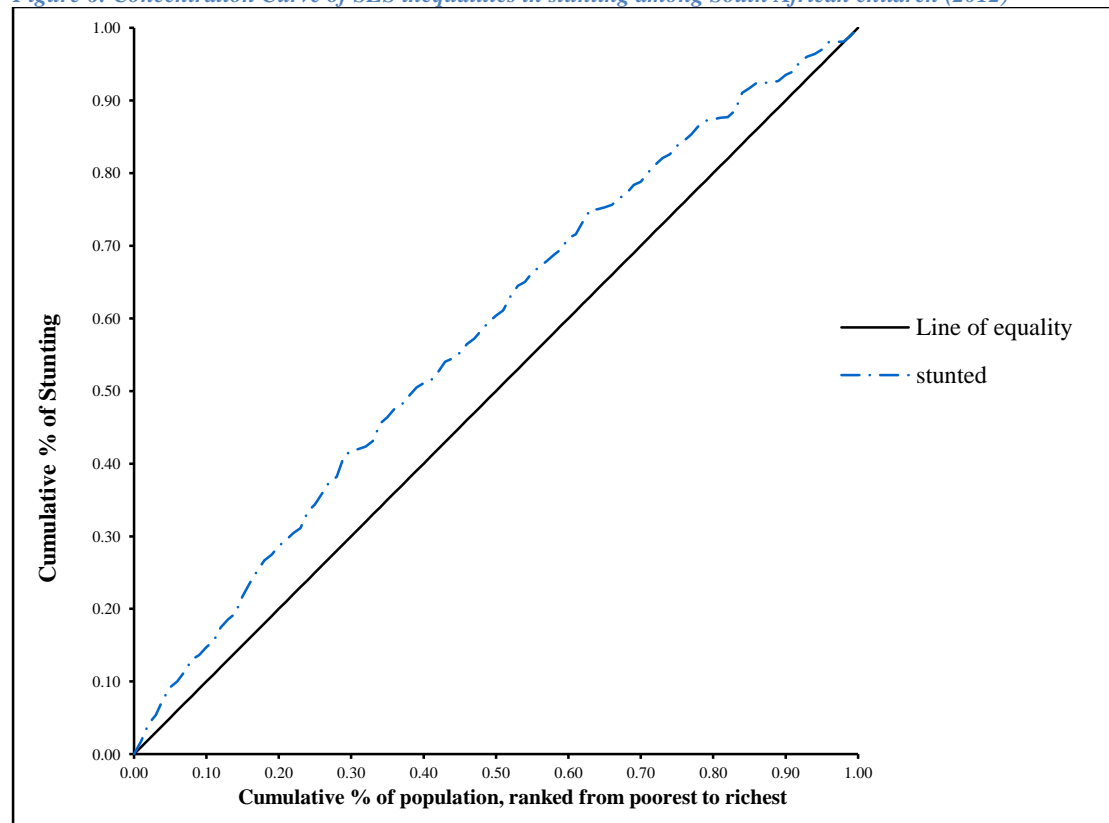


Figure 7: Concentration Curve of SES inequalities in wasting among South African children in 2012

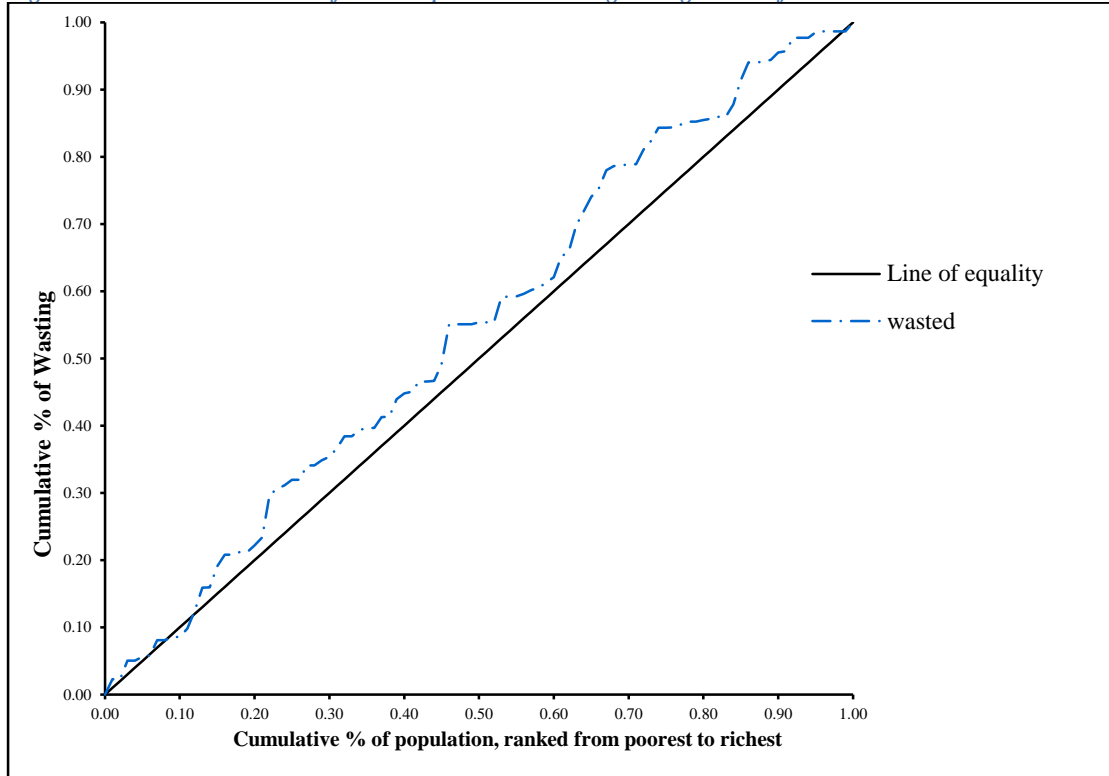


Figure 8: Concentration Curve of SES inequalities in parent-reported ill health among South African children in 2012

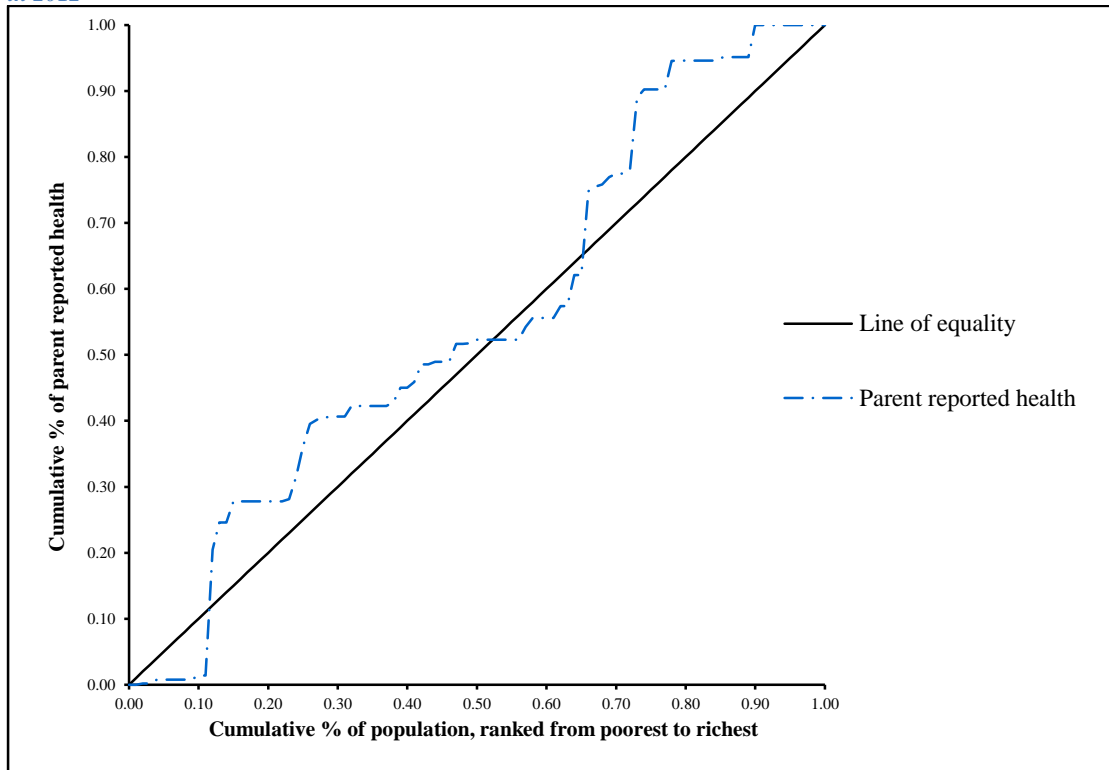
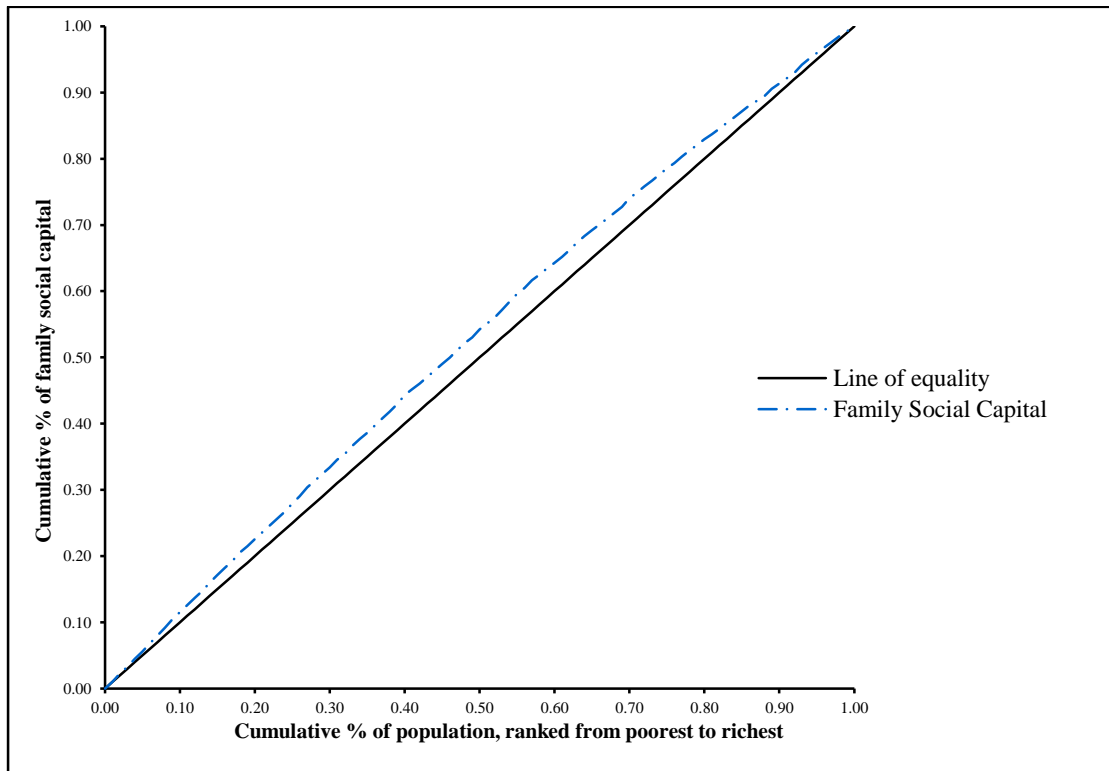


Figure 9: Concentration Curve of SES inequalities in family social capital among South African children in 2012



PART D: POLICY BRIEF

FAMILY SOCIAL CAPITAL AND CHILD HEALTH A CASE STUDY OF SOUTH AFRICA



The quality of family life and particularly the parent-child relationship remains central to the health of children. This relationship has a strong impact on all the spheres of a child's development: the physical, psychological, social, and economic. A child's health thrives when a dependable and close relationship exists between parents / caregivers and the child. This study investigated the relationship between family social capital and child health outcomes. Additionally, the study assessed for socioeconomic status (SES) related disparities in child health. In other words, the study investigated if: (a) children from poorer households had worse off health outcomes compared to children from richer households and (b) if children from poorer households had more family social capital compared to children from richer households.

**“The most fundamental form of social capital is the family”
R.D Putnam 1995**

What is family social capital?

Coleman (1988) defined family social capital as the relationship between children and parents (or extended family). He noted that family social capital is highly dependent on the physical presence of parents/caregivers in the family and the attention they give to children.

Link between family social capital and child health

It has been well established that the family is an active ingredient that forms part of the physical environment for child health and development. Previous studies have shown where family social capital is insufficient, stress levels in the family increase, there is an increase in anxiety, and children in such families have lower memory function. Additionally, low family social capital increases the likelihood of unfavorable outcomes in children such as: obesity, low academic achievements, maladaptation, aggression, and adult psychopathology.

ABOUT THIS STUDY

Four waves of National Income Dynamics Study panel data were analyzed to examine the relationship between family social capital and child health, using Coleman's definition of family social capital by Coleman. Seven indicators or proxies of family social capital were identified and assessed as either present or absent for each child (see Box 2). These seven indicators were then used to construct a family social capital index. Regressions models were fitted using a selected set of explanatory variables, including the composite index of family social capital. To assess for SES inequalities in child health and in family social capital, the concentration index

method was used. In this study, child health was operationalized to include three child health indicators: stunting, wasting, and parent-reported health of a child.

Box 1: KEY FINDINGS

- Children from poorer households experienced more stunting, wasting and ill health than children from richer households.
- Out of 3-child health indicators, stunting was the most common consequence of malnutrition among children from poorer households.
- Poorer families had more family social capital than richer families.
- Family social capital doesn't have a significant effect on child health (however results were not statistically significant).
- The findings suggest that poverty has a stronger effect on child health than family social capital in South Africa.

POLICY RECOMMENDATIONS

- 1) Further research where the measurement of family social capital is better refined is highly recommended to better understand the relationship between family social capital and child health.
- 2) Communities should be made aware of the importance and potential benefits of family social capital in relation to child health.
- 3) While strengthening family social capital has the potential to improve child health, poverty reduction strategies are needed. The study findings suggested that poverty has a stronger impact on child health. This means that efforts to leverage and exploit the low-hanging fruit of family social capital to improve child health especially in the socioeconomically disadvantaged families might be futile if the SES of these families is not improved.
- 4) Interventions to improve the nutrition status of children should be intensified and targeted at children from less wealthy families. Children from families of lower SES experienced more stunting and wasted compared to children from richer families. Therefore, the government should prioritize poorer families when designing and implementing child health interventions in South Africa.



CONCLUSION

Although family social capital was expected to improve child health, the study findings suggest that in South Africa, the socioeconomic status of a family has a greater effect on child health than family social capital. While the poor bear a greater burden of child malnutrition, they also have more deposits of family social capital. Existing resource of family social capital is a potential leverage among the socioeconomically disadvantaged to design and implement child health interventions.



NOTE: All the images used in this policy brief were sourced from Google images.

Box 2: Construction of a family social capital index

Seven indicators or proxies of family social capital were identified and assessed as either present or absent for each child.

- The presence of both parents in a household
- The presence of a mother in the household
- How often a child sees the mother
- How often a child sees the father
- Parent of the child is the primary caregiver
- Support from extended family
- The number of children in the family

These indicators were assigned a value and summed up to form a family social capital index for each child.

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This policy brief is based on an MPH (Health Economics) mini-dissertation by Christabell Abewe submitted to University of Cape Town (UCT) at the Health Economics Unit, Faculty of Health Sciences. The dissertation was supervised by Dr. John E. Ataguba (Health Economics Unit, UCT) and Nicola Foster (Health Economics Unit, UCT).

Appendices

Appendix 1: Guide for authors: Journal of family issues

Journal of family issues manuscript preparation requirements

Manuscripts must be submitted electronically at <http://mc.manuscriptcentral.com/jfi>. The corresponding author must create an online account in order to submit a manuscript. Submitted papers should be in Word and must not exceed 30 double-spaced typewritten pages in total (text, references, tables, figures, appendices).

Manuscript Preparation

Manuscripts should be prepared using the *APA Style Guide* (Sixth Edition). All pages must be typed, double-spaced (including references, footnotes, and endnotes). Text must be in 12-point Times Roman. Block quotes may be single-spaced. Must include margins of 1 inch on all the four sides and number all pages sequentially. The manuscript should include four major sections (in this order): Title Page, Abstract, Main Body, and References. Sections in a manuscript may include the following (in this order): (1) Title page, (2) Abstract, (3) Keywords, (4) Text, (5) Notes, (6) References, (7) Tables, (8) Figures, and (9) Appendices.

1. Title page. Please include the following:

- Full article title
- Acknowledgments and credits
- Each author's complete name and institutional affiliation(s)
- Grant numbers and/or funding information
- Corresponding author (name, address, phone/fax, e-mail)

2. Abstract. Print the abstract (150 words or less) on a separate page headed by the full article title. Omit author(s)'s names.

3. Text. Begin article text on a new page headed by the full article title.

a. Headings and subheadings. Subheadings should indicate the organization of the content of the manuscript. Generally, three heading levels are sufficient to organize text. Level 1 heading should be Centered, Boldface, Upper & Lowercase, Level 2 heading should be Flush Left, Boldface, Upper & Lowercase, Level 3 heading should be Indented, boldface, lowercase paragraph heading that ends with a period, Level 4 heading should be Indented, boldface, italicized, lowercase paragraph heading that ends with a period, and Level 5 heading should be Indented, italicized, lowercase paragraph heading that ends with a period.

b. Citations. For each text citation there must be a corresponding citation in the reference list and for each reference list citation there must be a corresponding text citation. Each corresponding citation must have identical spelling and year. Each text citation must include at least two pieces of information, author(s) and year of publication. Following are some examples of text citations:

(i) Unknown Author: To cite worksthatdo not have an author, cite the source by its title in the signal phrase or use the first word or two in the parentheses. Eg. The findings are based on the study was done of students learning to format research papers ("Using XXX," 2001)

(ii) Authors with the Same Last Name: use first initials with the last names to prevent confusion. Eg.(L. Hughes, 2001; P. Hughes, 1998)

(iii) Two or More Works by the Same Author in the Same Year: For two sources by the same author in the same year, use lower-case letters (a, b, c) with the year to order the entries in the reference list. The lower-case letters should follow the year in the in-text citation.Eg.Research by Freud (1981a) illustrated that...

(iv) Personal Communication: For letters, e-mails, interviews,and other person-to-person communication, citation should include the communicator's name, the fact that it was personal communication, and the date of the communication. Do not include personal communication in the reference list.Eg.(E. Clark, personal communication, January 4, 2009).

(v) Unknown Author and Unknown Date: For citations with no author or date, use the title in the signal phrase or the first word or two of the title in the parentheses and use the abbreviation "n.d." (for "no date").Eg. The study conducted by of students and research division discovered that students succeeded with tutoring ("Tutoring and APA," n.d.).

5. Notes. If explanatory notes are required for your manuscript, insert a number formatted in superscript following almost any punctuation mark. Footnote numbers should not follow dashes (—), and if they appear in a sentence in parentheses, the footnote number should be inserted within the parentheses. The Footnotes should be added at the bottom of the page after the references. The word "Footnotes" should be centered at the top of the page.

6. References. Basic rules for the reference list:

- The reference list should be arranged in alphabetical order according to the authors' last names.
- If there is more than one work by the same author, order them according to their publication date – oldest to newest (therefore a 2008 publication would appear before a 2009 publication).
- When listing multiple authors of a source use "&" instead of "and".
- Capitalize only the first word of the title and of the subtitle, if there are one, and any proper names – i. e. only those words that are normally capitalized.
- Italicize the title of the book, the title of the journal/serial and the title of the web document.
- Manuscripts submitted to XXX [journal acronym] should strictly follow the XXX manual (xth edition) [style manual title with ed].
- Every citation in text must have the detailed reference in the Reference section.
- Every reference listed in the Reference section must be cited in text.
- Do not use "et al." in the Reference list at the end; names of all authors of a publication should be listed there.

Here are a few examples of commonly found references. For more examples please check *APA*(6th Ed).

Books:

Book with place of publication--Airey, D. (2010). *Logo design love: A guide to creating iconic brand identities*. Berkeley, CA: New Riders.

Book with editors & edition-- Collins, C., & Jackson, S. (Eds.). (2007). *Sport in Aotearoa/New Zealand society*. South Melbourne, Australia: Thomson.

Book with author & publisher are the same--MidCentral District Health Board. (2008). District annual plan 2008/09. Palmerston North, New Zealand: Author.

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Periodicals:

Journal article with more than one author (print)--Gabbett, T., Jenkins, D., & Abernethy, B. (2010). Physical collisions and injury during professional rugby league skills training. *Journal of Science and Medicine in Sport*, 13(6), 578-583.

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Act (statute / legislation)--Copyright Act 1994. (2011, October 7). Retrieved from <http://www.legislation.govt.nz>

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Non-English reference book, title translated in English

Real Academia Espanola. (2001). *Diccionario de la lenguaespanola* [Dictionary of the Spanish Language] (22nded.). Madrid, Spain: Author

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8. Figures. They should be numbered consecutively in the order in which they appear in the text and must include figure captions. Figures will appear in the published article in the order in which they are numbered initially. The figure resolution should be 300dpi at the time of submission.

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Appendix 2: Human Research Ethics Committee Approval



UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
Human Research Ethics Committee



Room E53-46 Old Main Building
Groote Schuur Hospital
Observatory 7925
Telephone [021] 406 6492
Email: sumayah.ariefdien@uct.ac.za

Website: www.health.uct.ac.za/fhs/research/humanethics/forms

13 July 2016

HREC REF: 511/2016

Dr J Ataguba
Health Economics Unit
School of Public Health & Family Medicine
FHS

Dear Dr Ataguba

PROJECT TITLE: INVESTIGATING FAMILY SUPPORT AND CHILD HEALTH: A CASE STUDY OF SOUTH AFRICA (Masters-candidate-C Abewe)

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee (HREC) 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 until the 30 July 2017.

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/fhs/research/humanethics/forms)

Please quote the HREC REF in all your correspondence.

We acknowledge that the student, Christabell Abewe will also be involved in this study.

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

Please note that for all studies approved by the HREC, the principal investigator **must** obtain appropriate institutional approval before the research may occur.

Yours sincerely

Signed

PROFESSOR M BLOCKMAN
CHAIRPERSON, FHS HUMAN RESEARCH ETHICS COMMITTEE

Federal Wide Assurance Number: FWA00001637.
Institutional Review Board (IRB) number: IRB00001938

HREC 511/2016

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Date: 16th March 2017