Published in final edited form as:

Health Place. 2018 March ; 50: 42–51. doi:10.1016/j.healthplace.2017.12.007.

Social Capital and Child Nutrition in India: The Moderating Role of Development

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Abstract

Empirical studies of social capital rarely take into account the socioeconomic context of the region in which it operates, indeed as most of this research has been located in high income countries. It is imperative to investigate how development may influence the impact of social capital, especially in developing countries. This paper examines the relationship between social capital and child nutrition using the India Human Development Survey, 2005–2006. Using a multilevel framework and a sample of 6,770 rural children under the age of five, it finds that household based bridging social capital, expressed as connections with development based organizations, is positively associated with child nutrition. Bonding social capital, expressed as ties with caste and religious based organizations, has the opposite impact. At the village level, contextual measures of social capital are associated with nutritional status of children, but their influence is conditional on local socio-economic resources.

Keywords

social capital; child health; development; multi-level modelling; India

Introduction

There is considerable evidence of a positive relationship between social capital and health (Kawachi et al., 1997; Kawachi, Kennedy and Glass, 1999; Kim, Subramanian and Kawachi, 2008). However, the majority of this research has focused on developed countries where infrastructure is developed, the population is relatively well educated, and health and educational services are accessible and reliable. This paper addresses the paucity of research on developing countries by examining the relationship between social capital and undernutrition among children in India. Malnutrition, especially in early years, leads to cumulative disadvantages over the life course. Poor fetal growth or stunting in the first two years of life leads to irreversible damage, including shorter adult height, lower attained schooling, reduced adult income, and for women, decreased offspring birth weight (Victora

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et al., 2008). Undernutrition is pervasive in India; in 2005, 48% of Indian children were stunted, 43% were underweight, and 20% were wasted (IIPS and Macro International, 2007). More recent estimates suggest that even though the magnitude of the problem has diminished, it remains disturbingly high, with 38.4% of children stunted, 36% underweight, and 21% wasted (IIPS and Macro international, 2017).

India has a rich history of social and political movements and has witnessed consistent growth in the voluntary sector in the last four decades (Sahoo, 2013), spurred by state support, a rising middle class, and global influences such as international aid (Kochanek and Hardgrave, 2007). It is likely that these organizations, whether indigenous or externally funded, generate precious social capital.

Involvement in associations and community organizations is a form of social capital (Coleman, 1995; Putnam, 2000). This paper considers two types of voluntary organizations, development and religious or caste-based, on the basis of the resources they offer to people and communities. It visualizes these as forms of bridging and bonding social capital respectively and examines how they are differentially related to nutritional outcomes of children in India.

A second goal of this paper is to distinguish between the impact of social capital as a public good and as a personal resource. At the community level, social capital can function as a public good – community cohesion and information flow benefit all community members, irrespective of personal ties to social capital (Coleman, 1990; Putnam, 1993, 2000). At the individual level, social capital is a private good - providing personal social networks for social support, social influence, new knowledge, and increased access to scarce resources (Macinko and Starfield, 2001; Portes, 1998).

A third goal is to test if the impact of social capital on child nutrition varies by the level of local development. Studies often report contradictory results between social capital and health outcomes (for health services, see Derosé and Varada, 2009; for outcomes, see De Silva et al., 2005). Even otherwise excellent cross-country studies do not discuss how and why the relationships between social capital and the outcome of interest might differ across regions or countries (an exception is Islam et al., 2006), even though the influence of social capital is theorized to depend on the normative, socio-historical, and economic contexts.

Some argue that if social capital can substitute for or complement other forms of capital, it may be a particularly advantageous resource within a developing country where human and economic capitals are often found wanting (Kunitz, 2004; Woolcock, 1998). Research has consistently highlighted how personal socio-economic factors, such as education or SES, moderate the relationship between social capital and health (Uphoff et al., 2013, Nobles and Frankenberg, 2009; Favara, 2012; Moestue et al., 2007; Story and Carpiano, 2017). Yet little evidence links the development of a community within which social capital operates to its influence (exceptions include Caughy, Campo and Muntaner, 2003). For example, when access to health services is limited, people less educated, and infrastructure weak, social capital may make a significant difference to child health. Conversely, it may have little impact in communities with meager resources; the provision of information and contacts

may be inadequate if basic systems are not in place. To know which assumption is correct, it is necessary to probe the interplay between social capital and the socio-economic institutions within which it is embedded.

Bridging and Bonding Social Capital

Social capital can be obtained from involvement in associations and community organizations. Coleman (1995) and Putnam (2000) say these organizations can facilitate co-operation for mutual benefit irrespective of their specific ends. Operationally, social capital can be measured as the sum of resources available or the value or quality of resources accessed and used (Lin 2005). As noted in the introduction, this paper considers two types of social capital: bonding and bridging.

Bonding social capital refers to trusting and co-operative relations between network members with similar social identities (Putnam, 2000; Szreter and Woolcock, 2004). Social interactions within homogenous groups, such as families and churches, provide information and resources and enforce norms of behavior. However, interactions tend to be inward looking, reinforcing exclusive identities and homogeneous groupings (Putnam, 2000).

Bonding social capital can come at a price. It can undermine individual autonomy (Boissevain, 1974) and has been associated with higher levels of mental stress (Mitchell and LaGory, 2002; Caughy, Campo and Muntaner, 2003). In India, religion and caste remain important, and membership in their respective organizations may generate bonding social capital. Randheria says caste organizations are not a vestige of the past but a 'constitutive feature of modern life' (2006, p. 238). They may reinforce conservative ideas about medicine, discouraging mothers from adopting modern health practices (Vikram, 2012; Vikram, Vanneman and Desai, 2012; Story, 2014).

Certain caste organizations like *caste panchayats* in villages, set norms or adjudicate on personal and public disputes and are motivated by patriarchal and parochial ideologies. For instance, *khap (Jat caste) panchayats* and Hindu groups, such as *Rashtriya Swayamsevak Sangh (RSS)*, strongly oppose inter-caste and inter-religious marriages (Kaur, 2010; Dhar, 2013). These can impose strong restraints on individual freedoms as well as generate downward levelling norms, preventing marginalized groups from gaining opportunities for growth (Portes, 1998).

However, some evidence shows bonding social capital is positively related to improved health care access and utilization (Derose and Varda, 2009), but this may depend on the norms or beliefs of network members (Derose and Varda, 2009; Pescosolido et al., 1998). If ties to religious and caste based groups in India support traditional attitudes regarding the use of modern health services, the positive association observed elsewhere will not appear. For instance, Vikram (2012) finds bonding social capital is negatively associated with contraceptive use in India. Similarly, Story (2014) finds a negative association for two health-seeking behaviors, antenatal care and childhood immunizations.

On a more positive note, bonding social capital, defined on the basis of kinship and religion, can benefit the community by organizing collective action (Grootaert, 2001). Story (2014)

finds ties with religious and caste-based groups are positively associated with professional care during childbirth in India. Arguably, then, even though traditional attitudes about modern health care practices such as antenatal care remain salient for members of religious and caste-based groups in India, support may be provided for certain medical needs.

Bridging capital refers to connections between heterogeneous individuals or groups (Putnam, 2000). This concept suggests *weak ties*, exemplified in relationships with individuals outside one's immediate or local network, are important for the acquisition of new information and opportunities (Granovetter, 1973). Putnam (2000) suggests bridging social capital is the key to mobilizing community resources, as it includes a wider variety of resources and information. It may even increase cohesion at the societal level (Granovetter, 1973; Varshney, 2002).

Involvement in voluntary associations in a community often utilize connections between heterogeneous individuals or groups and entail the sharing of information and resources; thus, such involvement can be considered bridging social capital (Coleman, 1995; Putnam, 2000). Development organizations, such as non-governmental organizations, cooperatives, saving groups, or self-help groups, are good examples. Their agenda of development, poverty alleviation, and economic empowerment, among others, may engage participants in more secular and modern ideas and attract a diverse, broad-based membership.

Bridging social capital may be an important determinant of child nutrition by influencing several of its underlying determinants (UNICEF, 1998). For example, it can: increase food security by influencing educational attainment, standard of living, and uptake of nutritional programs; improve resources for care of mother and children by impacting health knowledge and beliefs, nutritional status, autonomy and well-being of the mother, among others; improve health services and the local environment, such as water supply and sanitation.

Evidence links membership in community based organizations to improved economic outcomes (e.g. Grootaert, Oh, and Swamy, 2002). Such membership helps women attain greater economic independence, as well as access to information, leading to more autonomous and informed household decision-making (Holvoet, 2005; Lyngdoh, and Pati, 2013). Bridging social capital can facilitate the adoption of healthy norms and behavior within a community more generally, including support for institutionalized care (Manandhar et al., 2004) and increased use of formal health services such as immunization and modern contraception (Barber et al., 2002, Vikram et al., 2012; Vikram, 2012; Story, 2014), although establishing causality is difficult (Mouw, 2006). Recent work also highlights the positive role of bridging organizations in preventing child underweight in India (Story and Carpiano, 2017).

Community and Individual Level Social Capital

Coleman (1990) and Putnam (1993, 2000) define social capital as an aggregate concept, a characteristic of communities rather than individuals that facilitates action beneficial to entire communities. This definition prompts an investigation of the influence of social capital at the contextual level. Research shows that resources produced through social capital diffuse not only to those who possess it but also to people living in regions with a high level

of social capital (Putnam, Pharr and Dalton, 2000). Generalized trust, norms, mutual relations, and information exchange have positive externalities for the entire community, not just those members connected to sources of social capital (Coleman, 1990).

Neighborhood organizations can aid in the development of the solidarity and trust that is instrumental in the formation of collective efficacy, willingness to intervene on behalf of the common good (Sampson, Raudenbush, and Earls, 1997). They may enable formal, collectively organized activity to address neighborhood issues (Putnam, 2001; Saegert, Winkel, and Swartz, 2002; Carpiano, 2006). For instance, they may oversee government welfare programs, approaching government offices to demand more services or to rectify problems. They may facilitate trust between service providers and marginalized communities, protecting the latter from discrimination and improving overall utilization of services (Derose and Varda, 2009).

According to Carpiano (2006), community participation is instrumental for health in several ways. Organizations can work towards improving the quality of life in the community, whether bringing resources into the community via bridging ties or improving cohesion via bonding ties (Saegert, Winkel and Swartz, 2002). A high degree of community participation may foster a psychological sense of community and community empowerment from which all residents benefit, allowing communities to bond to solve collective problems (Kawachi, 2004).

At the individual level, social capital is seen as a private good, an individual resource whereby individuals benefit directly from their own social affiliations and network strategies (Burt, 1992; Lin, 1999). In this school of thought, social capital is viewed as a property of individuals who use it to gain scarce resources not as a structural property of communities (Portes, 1998). Both evidence and theory direct researchers towards the explicit modeling of community and individual social capital.

Social Capital and Child Health in Developing Countries

Many studies find a weak link between maternal participation in community organizations and child nutrition (Harpham et al., 2006; Harpham, De Silva, and Tuan, 2006; De Silva and Harpham, 2007; for an exception, see Sujarwoto and Tampubolon, 2013). However, the results for social capital defined as trust, social harmony, perceived fairness, and sense of belonging are associated with better anthropometric indicators across countries (De Silva and Harpham, 2007). Some studies find social capital relevant for certain groups (Nobles and Frankenberg, 2009; Favara, 2012). Nobles and Frankenberg (2009) note a positive association between maternal participation in voluntary organizations and child health only for mothers with low education. Kana'Taupuni et al. (2005) find mothers' social networks are associated with child health, especially among economically marginalized families.

However, the above studies do not distinguish between bridging and bonding social capital. Recent work using the India Human Development Survey (2004–05) finds bridging and bonding social capital impact childhood health in different ways in India (Vikram et al., 2012; Story, 2014; Story and Carpiano, 2017). Since the two kinds of social capital can

behave in opposite ways, combining them in a single measure may lead to erroneous conclusions, hence the decision here to test them separately.

Does Development Moderate the Impact of Social Capital?

In a context of structural deficiencies, social capital may provide valuable resources not readily available to all people. These resources can potentially improve health outcomes at existing levels of socio-economic status and service delivery by making more information available about health, local services, and their access. Social capital may also act as a buffer in contexts of extreme deprivation by facilitating the provision of goods not available from institutional sources (Campbell et al., 1999).

Bridging social capital, such as that provided by non-governmental organizations, may offer information, resources, and even services such as immunization. Access may be especially important in underdeveloped areas. It is possible, however, that bridging social capital will have no impact in communities with meager resources. For instance, if a community has no or little access to safe water, pharmacies, or health services, readily available information on diarrhea and its treatment may do little to impact its prevention or treatment. Perhaps only developed communities can tap into the benefits of bridging capital by utilizing the existing infrastructure in a fruitful way. Yet the opposite is equally possible: villages with a high education, strong infrastructure, and health amenities may not need the social capital of organizations. The resources offered are already readily available, making bridging social capital less relevant.

Bonding social capital provides solidarity and support, a strong within-group identity, and a vehicle for exchange of information and resources. In deprived regions, provision of support and cohesion may facilitate community action towards better quality of life and increased generalized trust. Bonding social capital can provide social support and resources to needy community members on a day-to-day basis (Stack, 1974), especially in disadvantaged areas. That said, bonding social capital is associated with higher levels of mental distress in deprived communities of Alabama (Mitchell and LaGory, 2002), and higher behavioral and mental health problems among African-American children in impoverished neighborhoods in Maryland (Caughy et al., 2003).

Religious and caste-based groups of the type found in India may maintain existing social divisions, thus inhibiting collaboration and exchange among diverse groups, increasing mistrust, and advantaging one group over another. In developed villages, such bonding social capital can be particularly harmful, persuading group members to adhere to traditional norms when health resources are otherwise available. In disadvantaged villages, such groups may not add significantly to the overall deprivation.

Research Hypotheses

H1: Bridging social capital expressed as household connections with development-oriented community based organizations will be associated with lower odds of undernutrition among children.

H2: Bonding social capital expressed as household connections with religious and caste-based organizations will be associated with higher odds of undernutrition among children.

H3: The presence of development-oriented bridging social capital in villages will be associated with lower odds of undernutrition among children.

H4: The presence of religious and caste-based bonding social capital in villages will be associated with higher odds of undernutrition among children.

The presence of these organizations in villages are hypothesized to have an impact at the contextual level, extending to all residents of the village, irrespective of personal ties to it.

H5: The impact of bridging and bonding social capital at both the household and village level will be moderated by socio-economic development of the village.

Data and Methods

Data—The India Human Development Survey (IHDS) is a nationally representative face-to-face survey of 41,554 households in 1503 villages and 971 urban blocks across all Indian states and most union territories (Desai et al., 2008). The survey questionnaires were translated into 13 Indian languages and administered by local interviewers between September 2004 and August 2005 under the supervision of the National Council of Applied Economic Research, New Delhi.

The IHDS household questionnaire asked a knowledgeable informant, typically the male head of the household, about the socioeconomic condition of the household, its level of social capital as measured by association memberships, and education histories of all household members. An interview with an ever-married woman, aged 15–49 years, asked about her health, medical care utilization, and her children's health. IHDS has complete data on anthropometry for 10,508 children under the age of five. As this analysis models contextual factors which are available for rural areas only, the sample is reduced to 6,770 rural children under the age of five. This yields a sample of 6,436 children for underweight, 6,135 for wasting, and 5,347 for stunting in 1345 villages¹.

The IHDS developed separate questionnaires to measure village characteristics through interviews with key informants, such as village officials and elders; 1,454 completed questionnaires (out of 1,503 villages surveyed) provide information on local development, such as roads and electricity, and public services, such as schools and medical centers. It also has information on community based organizations. Such detailed community level data are unique and allow community level social capital to be modelled hierarchically together with household-level social capital.

¹In assigning the *z*-scores using WHO growth curves, checks are made on the plausibility of the scores. For *height-for-age z*-scores, 15.6% of the values fall below -6 SD, a level considered implausible. The implausible values are lower for other measures: 1.8% for *weight-for-age* and 2.59% for *weight-for-height z*-scores. Hence, the total sample for stunting is smaller than for underweight and wasting.

In this study, the Indian Primary Census Abstract (PCA) data are merged with the IHDS village survey. The PCA provides census data on male and female literacy at the village level (Registrar General, 2001). These data were taken four years before the IHDS data, but as measures remain stable across censuses, the lag makes little difference for the analysis. To make the sample representative of the Indian population, sampling weights at the household level are included in the analysis.

Dependent Variable—Underweight is viewed as a comprehensive indicator of malnutrition, capturing stunting (an indicator of long-term nutritional deprivation) and wasting (short-term nutritional deprivation). Both stunted and wasted children are likely to fall in the ‘underweight’ category, making this a ‘summary’ indicator of child malnutrition (Deaton and Dreze, 2009). Many adverse health consequences are associated with underweight (Nandy et al., 2005; Fishman et al., 2004). An underweight child has a ‘weight-for-age’ z score that is at least 2 standard deviations below the median for WHO Child Growth Standards.

Stunting reflects chronic undernutrition during the most critical periods of growth and development in early life and may be exacerbated by recurrent or chronic illness (Gross et al., 2000). A stunted child has ‘height-for-age’ z score that is at least 2 standard deviations below the median for WHO Child Growth Standards

Wasting is usually taken to be an indicator of short-term nutritional status, as it reflects acute undernutrition caused by severe disease, such as diarrhea, or by starvation (UNICEF, 2007). A wasted child has a ‘weight-for-height’ z score that is at least 2 standard deviations below the median of the WHO Child Growth Standards.

Independent Variables—IHDS households were asked nine questions about their family members’ participation in social organizations: ‘Does anybody in the household belong to a 1) women’s group; 2) youth club, sports group, or reading room; 3) trade union, business or professional group; 4) self-help group; 5) credit or savings group; 6) religious or social group or festival society; 7) caste association; 8) development group or NGO; 9) agricultural, milk, or other co-operative?’ This study uses the information to construct two continuous variables indicating the number of associational memberships in development organizations and in religious or caste-based groups for each household. There were minimal missing values (<0.2%) and these were excluded from the analysis. The two separate membership variables permit the direction of their impacts to be tested.

Cronbach’s alpha suggests both indexes have reasonable estimates of reliability. The religious or caste group index has a reliability of .592; the development membership index reliability is .586. These indicators have been used in earlier research (Vikram, 2012; Vikram et al., 2012). The variables are standardized to have a mean of 0 and standard deviation of 1.

From the data on the kinds of associations present in a village, two continuous variables are developed at the community level; one indicates the number of development organizations in the village and the other indicates the number of religious or caste-based groups. These

variables are also standardized. The reliability of the village level religious or caste group index is .60; the development membership index reliability is .69. This information is valuable; most studies examining social capital as a community level variable aggregate individual attitudes, or memberships; they do not use community level measures that do not necessarily rely on individuals (Harpham et al., 2002).

Village Socio-Economic Status—Economic status of the neighborhood impacts children's health beyond household socio-economic status (Montgomery and Hewett, 2005). Additionally, local socio-economic development may moderate the impact of social capital on child nutrition. To develop a comprehensive indicator for local development, the study employs a variety of measures from both the Primary Census Abstract (PCA) and IHDS village-level data.

Village Infrastructure Index: An index is created to indicate the level of infrastructure of the village by counting its infrastructure facilities: electricity, paved road, grocery, bus stop, landline and mobile access to telephone, post office, police station, bazaar, and bank. The index reliability is 0.7619.

Literacy of Men and Women in the Village: The village-level data provided by the Indian Primary Census Abstract (PCA) measure literacy rates for all females and males, six years and older.

Integrated Child Development Scheme (ICDS) Centers: The Government of India has implemented the Integrated Child Development Scheme (ICDS) to provide nutritional supplementation to young children, pregnant and lactating women, along with other services, such as immunization, growth monitoring and preschool education. The village questionnaire asked if ICDS centers within villages provide these services. These are combined in an additive index (0–5), with a reliability coefficient of 0.854.

Local Health Facilities: An additive scale is developed to capture local health facilities accessible to village residents. These include government sub-centers, primary health centers, community health centers, government maternity centers, private clinics, and hospitals. The reliability coefficient is 0.5122.

The above scales are combined into an index to represent overall development of the villages. Village infrastructure index and male and female literacy are converted into quintile measures to scale all the variables to be similar. ICDS and medical facilities range from 0–5. The reliability of this measure is 0.668.

Controls

Child Characteristics: In India, girls are subjected to neglect and discrimination (Das Gupta and Bhat 1997). Mishra, Roy, and Retherford (2004) find a significant bias against girls in feeding and nutritional status in later-born girls. Children with two or more surviving same sex siblings have worse nutritional status, especially when they are later-born girls. This analysis uses two variables to indicate the number of boys and girls born before the child of interest – the youngest child born within the last five years at the time of the survey.

A variable is included to indicate the child's age in months as a control and its squared term to test for non-linearity of this relationship.

Maternal Characteristics: Maternal education is a critical determinant of child health (Frost et al., 2005). This variable is coded in four categories: illiterate (reference category), primary education from grades one to five, upper primary and secondary education (grades six to 12), and any college education (13 or more years of schooling).

Mother's age needs to be controlled for, as early motherhood is associated with increased likelihood of low birth-weight infants, child morbidity and mortality (Save the Children, 2012). Women's employment was originally included but was not a significant predictor of undernutrition and was removed. Mother's height is included to control for genetic endowment of the child. Mean imputation is carried out for missing cases (3%); these are marked using a dichotomous variable.

Household Characteristics: Child undernutrition in India has a strong socio-economic gradient (Subramanyam et al., 2010). The study includes controls for household income (logged) and standard of living. The latter reflects the long-term economic status of the household as measured by possession of 30 housing amenities and household goods. Paternal education is coded identically to maternal education. An additional category is created to capture missing information on paternal education; fathers with missing information are likely migrant workers away from home. Mean imputation is carried out for missing cases (4%).

India is deeply stratified by caste and religion. Children in scheduled castes and scheduled tribes are more likely to be undernourished, experience higher mortality, and have lower access to health care than children in higher castes (IIPS and Macro International, 2007). Caste is controlled in five broad categories: Brahmins, other advanced castes, other backward classes, scheduled castes, and scheduled tribes. Religion is divided into Hindus, Muslims, and other religions.

Statistical Methods—Multilevel analysis is carried out to assess the role of contextual and household social capital on children's nutritional status. At the first (household) level, child nutritional status is modeled as a function of household social capital, child characteristics, and other household-level controls. These controls are centered at the grand mean to gain intercepts that estimate the adjusted grand mean. While child characteristics might be considered as nested within households, only the youngest child born within the last five years is selected per household; hence, there is no need to include an extra level of analysis. At the second (village) level, the effects of contextual social capital on the adjusted nutritional status of the child are estimated while controlling for village-level socio-economic development.

Methodologically, the goals of the study are achieved using three models. The first includes social capital indicators at the community and household level, along with all household level controls and socio-economic development of the village at level two. The second model includes interaction terms between social capital variables at the village level and

development of the village to assess whether the impact of contextual village social capital is moderated by local development. The third model includes cross-level interactions that assess if the impact of household social capital is moderated by village development.

Results

Both types of social capital are significant predictors of child nutrition. First, households connected with bridging organizations are less likely to have underweight and wasted children, lowering the odds of the former by 11% and the latter by 13%. This supports the hypothesis that development-oriented bridging ties provide households with resources beneficial for children's nutritional outcomes (H1). Second, households with ties to bonding organizations are more likely to have underweight and wasted children. These results are consistent with the hypothesis on the negative influence of bonding social capital on health (H2). Results are consistent across all models.

The second model includes interaction terms between contextual social capital at the village level and development of the village to determine whether the impact of contextual social capital is moderated by local development. This is indeed the case, so H5 is supported. Before the addition of interaction variables between social capital and local development, contextual social capital is not found to be a significant predictor of undernutrition emphasizing that support for H3 and H4 is contingent on local development. For underweight, the presence of religious or caste-based organizations in villages is harmful only in more developed villages. This result is also observed for stunting ($p < 0.01$). Lastly, the presence of bridging community based organizations is positively associated with wasting in developed villages. This result is explained in greater detail in the discussion.

In the third model, cross-level interactions are added between household level social capital variables and village development. The presence of bridging social capital is helpful in reducing stunting ($p < 0.1$), and this effect is conditional on local development. After the introduction of cross-level interactions, development organizations at the village level and even household based connections with development organizations work to lower the odds of stunting. Cross-level interaction between bridging ties and village development is also significant and indicates that those households connected to bridging organizations are *more* likely to experience higher levels of stunting. There are no significant cross-level interactions observed for wasting and underweight.

Discussion

This study finds that household connections to development-oriented bridging organizations improve child nutrition. These connections transcend traditional boundaries of interaction, spreading information and norms across diverse groups and increasing social cohesion (Varshney, 2002). The findings are supported by other studies on bridging social capital and child nutrition (Nobles and Frankenberg, 2009; Story and Carpiano, 2017).

In contrast, households with ties to bonding social capital in form of religious or caste-based organizations are more likely to have undernourished children, possibly because such associations strengthen Indian patriarchal norms restricting maternal autonomy, a known

contributor to child malnutrition (Shroff et al., 2011). They may also reinforce counter-productive religious beliefs on childcare and feeding practices. For example, prelacteal feeding of honey and purified butter is considered beneficial for children in many rural parts of India and is recommended in certain religious texts (Laroia and Sharma, 2006).

Ties with families, ethnic, religious and caste groups are associated with higher fertility and lower use of contraceptive services in developing countries (Caldwell and Caldwell, 1987; Paek, Lee, Salmon et al., 2008; Vikram, 2012), which may exacerbate maternal undernutrition and intrauterine growth restriction (Black et al., 2008).

At the contextual level, the results suggest a dependency between socio-economic development and social capital. The presence of development-oriented organizations reduces the prevalence of stunting but only in villages with access to other socio-economic and institutional resources. With adequate infrastructure, bridging social capital may facilitate the use of existing infrastructure, increase health knowledge, empower and serve marginalized groups to improve the nutritional status of children.

Similarly, the presence of bonding organizations has an influence only in villages that are advantaged. In developed villages, strong ties between specific religious and caste groups might lead to the exclusion of others in the village, with a negative impact perceptible at the village level. The presence of these organizations may indicate cleavages on the basis of caste or religion within a community, which may foster mistrust and prejudice, thereby affecting health negatively (Abascal and Baldassarri, 2015, Wang et al., 2017, Stuber Meyer and Link, 2008.). In less developed villages, the deprivation in social and institutional resources does not enable either bridging or bonding organizations to have an impact at the village level.

At the same time, the lack of significance of cross-level interactions indicates that personal ties to these organizations provide tangible resources that are either helpful or harmful for households. These personal exchanges are not contingent on local development. Kawachi (1999) argues that mechanisms linking social capital with health may vary at the level of aggregation at which social capital is conceptualized and measured. This is substantiated by the present study, as the role of social capital in influencing health at the village level is conditional on local development but not at the household level.

Some results emerging from the analysis do not fit the original hypotheses. The cross-level interactions for stunting show that household with bridging ties are *more* likely to have stunted children in developed regions. It is possible that disadvantaged households seek the help of bridging organizations to improve health of weak children. Secondly, the presence of bridging organization in developed villages seem to be positively associated with wasting. It was expected that developed villages would be able to utilize the resources offered by bridging organizations and lower the prevalence of wasting; this occurs for stunting but not wasting, possibly because of the specific outcome being analyzed. First, wasting is an indicator of short-term nutritional status (UNICEF, 2007), making it different from the other indicators in the study which represent longer-term nutritional status. Second, the prevalence of wasting is higher for certain groups, such as tribals, which is observed even in this study.

Development organizations could be located in tribal areas with higher prevalence of wasting².

Conclusion

A considerable amount of research on social capital has focused on the different types of social capital and how they impact health. However, less attention has been paid to how social capital interacts with community resources. This paper draws on three important distinctions, bridging vs. bonding social capital, positive vs. negative effects of social capital, and household based vs. community based social capital. It operationalizes bridging and bonding social capital to the Indian context, at the household and village level, examining how they interact with local development to influence child nutrition in India.

Taking advantage of the regional diversity inherent in India, it highlights how local development moderates the impact of social capital on health. At the household level, personal ties remain important in influencing nutritional status of children across all villages. However, at the village level, social capital's interplay with the larger development context is crucial to its impact. Thus, a comprehensive study of social capital should assess its relationship with the outcome of interest, in conjunction with the broader structural forces that might influence the function of social capital.

Limitations

There are several limitations of the study. It is hard to assess causality here, as endogeneity is inherent in social capital research. Endogeneity can occur because of unobserved factors correlated with social capital and child underweight. Well-connected households and villages may be different in systematic ways from more isolated households and villages, with concomitant effects on child health.

Since the data are cross sectional, reverse causation must be considered, i.e. the possibility that worse child health leads to lower participation of families in local organizations. Nor can the problem of self-selection be dismissed, as participation in organizations is largely voluntary. Those people associated with development organizations may also be more likely to access modern health care and follow scientific norms around feeding and, hence, experience better health.

Even though IHDS has information about different types of community based organizations, there is little information on the specific role of these organizations in the village, their functioning and agenda, who they service, or how they work. Caste organizations are not monolithic, especially in a diverse society like India. Some may be empowering; for example, *Dalit* organizations combat caste discrimination and untouchability and seek to improve educational and employment opportunities. Originally a grassroots movement, the *Dalit* movement is increasingly being subsumed within the NGO movement (Jaoul, 2017),

²For instance, the northeastern Indian states are dominated by scheduled tribes but are also rich in development organizations and this could be driving this result.

functioning as a form of linking or bridging social capital. More information is needed about these organizations to classify them more accurately.

Future Directions

Even though this paper discusses possible pathways through which social capital might influence the nutritional status of children, it does little to empirically test those pathways. The next logical step is to test such pathways as increased health knowledge, improved food security, higher use of government programs and health services using the newly available longitudinal data (Desai and Vanneman, 2015).

Several researchers talk about generalized trust, increased solidarity, and support generated by social capital (e.g., Varshney, 2002; Kawachi, 1999; Putnam, 2001; Carpiano, 2006). This study has not used any measures of trust or cohesiveness within the community, primarily because of the difficulty of assessing whether trust or support leads to the development and successful functioning of these organizations or vice-versa. IHDS does not have specific measures for generalized trust (Vanneman, Desai, and Noon, 2006) but other indicators of cohesion such as whether people get along with each other and bond together to solve problems are available. Future work will assess if these measures explain how social organizations influence and/or are influenced by cohesion within a community.

Lastly, while the current study focused on social capital at the village level, others have studied the relationship between social capital and health at the national level (e.g. Poortinga, 2006) and state level (e.g., Kawachi, Kennedy, & Glass, 1999). Future research should assess other levels through which social capital can impact health outcomes in India.

References

- Abascal M, Baldassarri D. Love thy neighbor? Ethnoracial diversity and trust reexamined. *American Journal of Sociology*. 2015; 121(3):722–782.
- Barber JS, Pearce LD, Chaudhury I, Gurung S. Voluntary associations and fertility limitation. *Social Forces*. 2002; 80(4):1369–1401.
- Boissevain, J. Friends of friends: networks, manipulators and coalitions. Oxford: Blackwell; 1974.
- Black RE, Allen LH, Bhutta ZA, Caulfield LE, De Onis M, Ezzati M, Rivera J. Maternal and child undernutrition: global and regional exposures and health consequences. *The Lancet*. 2008; 371(9608):243–260.
- Burt, RS. Structural Holes: The Social Structure of Competition. Cambridge, Massachusetts, and London: Harvard University Press; 1992.
- Campbell, C., Wood, R., Kelly, M. Social capital and health. London: Health Education Authority; 1999.
- Caldwell JC, Caldwell P. The cultural context of high fertility in sub-Saharan Africa. *Population and development review*. 1987:409–437.
- Carpiano RM. Toward a neighborhood resource-based theory of social capital for health: Can Bourdieu and sociology help? *Social science & medicine*. 2006; 62(1):165–175. [PubMed: 15992978]
- Caughy MOB, O'Campo PJ, Muntaner C. When being alone might be better: neighborhood poverty, social capital, and child mental health. *Social Science and Medicine*. 2003; 57(2):227–237. [PubMed: 12765704]
- Coleman, JS. Foundations of social theory. Cambridge, MA: Belknap Press; 1990.
- Coleman, JS. Grundlagen der sozialtheorie. Band 1: Handlungen und Handlungssysteme. München: Oldenbourg; 1995. [as cited by Häuberer 2011]

- Desai, S., Dubey, A., Joshi, B., Sen, M., Shariff, A., Vanneman, R. India Human Development Survey (IHDS) [Computer file]. ICPSR22626-v1; Ann Arbor, MI: Inter-university Consortium for Political and Social Research. [distributor]; 2008-07-30; New Delhi: University of Maryland and National Council of Applied Economic Research; 2008. [producers], 2007.
- Desai, S., Vanneman, R. CPSR36151-v2. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor]; 2015. India Human Development Survey-II (IHDS-II), 2011–12; p. 07-31.
- Das Gupta M, Mari Bhat PN. Fertility decline and increased manifestation of sex bias in India. *Population Studies*. 1997; 51(3):307–315.
- De Silva MJ, Harpham T. Maternal social capital and child nutritional status in four developing countries. *Health and Place*. 2007; 13(2):341–355. [PubMed: 16621665]
- De Silva MJ, McKenzie K, Harpham T, Huttly SR. Social capital and mental illness: a systematic review. *Journal of Epidemiology and Community Health*. 2005; 59(8):619–627. [PubMed: 16020636]
- Deaton A, Drèze J. Food and nutrition in India: facts and interpretations. *Economic and Political Weekly*. 2009; 44(7):42–65.
- Deroose KP, Varda DM. Social capital and health care access: a systematic review. *Medical Care Research and Review*. 2009; 66(3):272–306. [PubMed: 19174538]
- Dhar RL. Intercaste marriage: a study from the Indian context. *Marriage and Family Review*. 2013; 49(1):1–25.
- Favara, M. World Bank Policy Research Working Paper no. 6264. Washington DC: World Bank; 2012. 'United we stand divided we fall': maternal social participation and children's nutritional status in Peru.
- Fishman, S., Caulfield, L., de Onis, M., Blössner, M., Hyder, A., Mullany, L., et al. Childhood and maternal underweight. In: Ezzati, M., Lopez, A., Rodgers, A., Murray, C., editors. *Comparative quantification of health risks: global and regional burden of disease attributable to selected major risk factors*. Geneva: World Health Organization; 2004. p. 39-162.
- Frost MB, Froste R, Haas DW. Maternal education and child nutritional status in Bolivia: finding the links. *Social Science and Medicine*. 2005; 60(2):395–407. [PubMed: 15522494]
- Granovetter M. The strength of weak ties. *American Journal of Sociology*. 1973; 78:1360–1380.
- Grootaert, C. Local Level Institutions Working Paper Series, Working Paper No. 10. Washington DC: World Bank; 2001. Does social capital help the poor? A synthesis of findings from the local level institutions studies in Bolivia, Burkina Faso and Indonesia.
- Grootaert C, Oh GT, Swamy A. Social capital, household welfare and poverty in Burkina Faso. *Journal of African Economies*. 2002; 11(1):4–38.
- Gross R, Schoeneberger H, Pfeifer H, Preuss HJ. The four dimensions of food and nutrition security: definitions and concepts. *SCN News*. 2000; 20:20–25.
- Harpham T, de Silva MJ, Tuan T. Maternal social capital and child health in Vietnam. *Journal of Epidemiology and Community Health*. 2006; 60(10):865–871. [PubMed: 16973533]
- Harpham T, de Silva MJ, Jones N, Garlick C. Maternal social capital and child wellbeing in comparative perspective: Young Lives Working Paper 31. 2006
- Harpham T, Grant E, Thomas E. Measuring social capital within health surveys: key issues. *Health Policy and Planning*. 2002; 17:106–111. [PubMed: 11861592]
- International Institute for Population Sciences (IIPS) and Macro International. *National Family Health Survey (NFHS-3), 2005–06: India*. Vol. 1. Mumbai: IIPS; 2007.
- International Institute for Population Sciences (IIPS) and Macro International. [Accessed 12 November 2017] *National Family Health Survey 4 (NFHS-4)*. 2017. Available at: <http://rchiips.org/NFHS/pdf/NFHS4/India.pdf>
- Islam MK, Merlo J, Kawachi I, Lindström M, Gerdtham UG. Social capital and health: does egalitarianism matter? A literature review. *International Journal for Equity in Health*. 2006; 5(1):3. [PubMed: 16597324]
- Jaoul N. Politics against the grain: the Dalit movement of Uttar Pradesh in the throes of NGOization. *Critical Sociology*. 2017 doi.org/10.1177/0896920516688756.

- Kana'iaupuni SM, Donato KM, Thompson-Colon T, Stainback M. Counting on kin: social networks, social support, and child health status. *Social Forces*. 2005; 83(3):1137–1164.
- Kaur R. Khap Panchayats, sex ratio and female agency. *Economic and Political Weekly*. 2010; 45(23): 14–16.
- Kawachi I. Social capital and community effects on population and individual health. *Annals of the New York Academy of Sciences*. 1999; 896(1):120–130. [PubMed: 10681893]
- Kawachi I. Commentary: Reconciling the three accounts of social capital. *International Journal of Epidemiology*. 2004; 33(4):682–690. [PubMed: 15282222]
- Kawachi I, Kennedy BP, Glass R. Social capital and self-rated health: a contextual analysis. *American Journal of Public Health*. 1999; 89(8):1187–1193. [PubMed: 10432904]
- Kawachi I, Kennedy BP, Lochner K, Prothrow-Stith D. Social capital, income inequality, and mortality. *American Journal of Public Health*. 1997; 87(9):491–1498.
- Kim, D., Subramanian, SV., Kawachi, I. Social capital and physical health: a systematic review of the literature. In: Kawachi, I. Subramanian, SV., Kim, D., editors. *Social Capital and Health*. New York: Springer; 2008. p. 139-190.
- Kochanek, SA., Hardgrave, RL. *India: government and politics in a developing nation*. Boston: Cengage Learning; 2007.
- Kunitz SJ. Social capital and health. *British Medical Bulletin*. 2004; 69(1):61–73. [PubMed: 15226197]
- Lyngdoh BF, Pati AP. Impact of microfinance on women empowerment in the matrilineal tribal society of India: an analysis using propensity score matching and difference-in-difference. *International Journal of Rural Management*. 2013; 9(1):45–69.
- Laroia N, Sharma D. The religious and cultural bases for breastfeeding practices among the Hindus. *Breastfeeding Medicine*. 2006; 1(2):94–98. [PubMed: 17661569]
- Lin N. Social networks and status attainment. *Annual Review of Sociology*. 1999; 25:467–487.
- Lin, N. Social capital. In: Beckert, J., Zagiroski, M., editors. *Encyclopedia of economic sociology*. New York: Routledge Ltd.; 2005. p. 604-612.
- Macinko J, Starfield B. The utility of social capital in research on health determinants. *Milbank Quarterly*. 2001; 79(3):387–427. [PubMed: 11565162]
- Manandhar DS, Osrin D, Shrestha BP, de L Costello AM. Effect of a participatory intervention with women's groups on birth outcomes in Nepal: cluster-randomised controlled trial. *The Lancet*. 2004; 364(9438):970–979.
- Mishra VK, Roy TK, Retherford RD. Sex differentials in childhood feeding, health care, and nutritional status in India. *Population and Development Review*. 2004; 30(2):269–295.
- Mitchell CU, LaGory M. Social capital and mental distress in an impoverished community. *City and Community*. 2002; 1(2):199–222.
- Montgomery MR, Hewett PC. Urban poverty and health in developing countries: household and neighborhood effects. *Demography*. 2005; 42(3):397–425. [PubMed: 16235606]
- Mouw T. Estimating the causal effect of social capital: a review of recent research. *Annual Review of Sociology*. 2006; 32:79–102.
- Nandy S, Irving M, Gordon D, Subramanian SV, Smith GD. Poverty, child undernutrition and morbidity: new evidence from India. *Bulletin of the World Health Organization*. 2005; 83(3):210–216. [PubMed: 15798845]
- Nobles J, Frankenberg E. Mothers' community participation and child health. *Journal of Health and Social Behavior*. 2009; 50(1):16–30. [PubMed: 19413132]
- Paek HJ, Lee B, Salmon CT, Witte K. The contextual effects of gender norms, communication, and social capital on family planning behaviors in Uganda: a multilevel approach. *Health Education & Behavior*. 2008; 35(4):461–477. [PubMed: 17513691]
- Pescosolido BA, Wright ER, Alegria M, Vera M. Social networks and patterns of use among the poor with mental health problems in Puerto Rico. *Medical Care*. 1998; 36(7):1057–1072. [PubMed: 9674623]
- Portes A. Social capital: its origins and applications in modern sociology. *Annual Review of Sociology*. 1998; 24:1–24.

- Poortinga W. Social capital: An individual or collective resource for health? *Social Science & Medicine*. 2006; 62:292–302. [PubMed: 16024152]
- Putnam, RD. *Bowling alone: civic disengagement in America*. New York: Simon and Schuster; 2000.
- Putnam RD. The prosperous community. *The American Prospect*. 1993; 4(13):35–42.
- Putnam, RD., Pharr, S., Dalton, RJ. What's troubling the trilateral democracies?. In: Pharr, S., Putnam, RD., editors. *Disaffected democracies: What's troubling the trilateral countries*. Princeton, NJ: Princeton University Press; 2000. p. 3–27.
- Randeria, S. Entangled histories: civil society, caste solidarities and legal pluralism in post-colonial India. In: Keene, J., editor. *Civil society: Berlin perspectives*. Oxford: Berghahn; 2006. p. 213–142.
- Sampson RJ, Raudenbush SW, Earls F. Neighborhoods and violent crime: A multilevel study of collective efficacy. *Science*. 1997; 277(5328):918–924. [PubMed: 9252316]
- Stuber J, Meyer I, Link B. Stigma, prejudice, discrimination and health. *Social science & medicine* (1982). 2008; 67(3):351. [PubMed: 18440687]
- Save the Children. [Last accessed 3 November 2017] Nutrition in the first 1,000 days. State of the world's mothers 2012. 2012. Available at: <http://www.savethechildren.org/atf/cf/%7B9def2ebe-10ae-432c-9bd0-df91d2eba74a%7D/STATE-OF-THE-WORLDS-MOTHERS-REPORT-2012-FINAL.PDF>
- Saegert S, Winkel G, Swartz C. Social capital and crime in New York City's low-income housing. *Housing Policy Debate*. 2002; 13:189–223.
- Sahoo, S. *Civil society and democratization in India: institutions, ideologies and interests*. New York: Routledge; 2013.
- Stack, CB. *All our kin: strategies for survival in a black community*. New York: Harper and Row; 1974.
- Story WT. Social capital and the utilization of maternal and child health services in India: a multilevel analysis. *Health and Place*. 2014; 28:73–84. [PubMed: 24769216]
- Story WT, Carpiano RM. Household social capital and socioeconomic inequalities in child undernutrition in rural India. *Social Science and Medicine*. 2017; 181:112–121. [PubMed: 28390226]
- Shroff MR, Griffiths PL, Suchindran C, Nagalla B, Vazir S, Bentley ME. Does maternal autonomy influence feeding practices and infant growth in rural India? *Social Science & Medicine*. 2011; 73(3):447–455. [PubMed: 21742425]
- Subramanyam MA, Kawachi I, Berkman LF, Subramanian SV. Socioeconomic inequalities in childhood undernutrition in India: analyzing trends between 1992 and 2005. *PLoS One*. 2010; 5(6):e11392. [PubMed: 20617192]
- Sujarwoto S, Tampubolon G. Mother's social capital and child health in Indonesia. *Social Science and Medicine*. 2013; 91:1–9. [PubMed: 23849232]
- Szreter S, Woolcock M. Health by association? Social capital, social theory and the political economy of public health. *International Journal of Epidemiology*. 2004; 33:650–667. [PubMed: 15282219]
- Vanneman, R., Desai, S., Noon, J. [Last accessed 2 December 2017] Social capital in India: networks, organizations, and confidence. Annual Meeting of the American Sociological Association. Montreal. 2006. Available at: <http://www.vanneman.umd.edu/papers/vannemannd06.pdf>
- Varshney, A. *Ethnic conflict and civic life: Hindus and Muslims in India*. New Haven: Yale University Press; 2002.
- Victora CG, Adair L, Fall C, Hallal PC, Martorell R, Richter L, Sachdev HS, Maternal and Child Undernutrition Study Group. Maternal and child undernutrition: consequences for adult health and human capital. *The lancet*. 2008; 371(9609):340–357.
- Vikram, K. [Last accessed 2 December 2016] The role of social and cultural capital on fertility preferences and contraceptive use. Paper presented at the Population Association of America Annual Conference. 2012. Available at: <http://paa2012.princeton.edu/papers/122700>
- Vikram K, Vanneman R, Desai S. Linkages between maternal education and childhood immunization in India. *Social Science and Medicine*. 2012; 75(2):331–339. [PubMed: 22531572]
- UNICEF (United Nations Children's Fund). *The state of the world's children*. New York: UNICEF; 1998.

- UNICEF (United Nations Children's Fund). Progress for Children: A World Fit for Children Statistical Review. New York: UNICEF; 2007.
- Uphoff EP, Pickett KE, Cabieses B, Small N, Wright J. A systematic review of the relationships between social capital and socioeconomic inequalities in health: a contribution to understanding the psychosocial pathway of health inequalities. *International Journal for Equity in Health*. 2013; 12(1):54. [PubMed: 23870068]
- Wang H, Schlesinger M, Wang H, Hsiao WC. The flip-side of social capital: the distinctive influences of trust and mistrust on health in rural China. *Social Science & Medicine*. 2009; 68(1):133–142. [PubMed: 18986744]
- Woolcock M. Social capital and economic development: toward a theoretical synthesis and policy framework. *Theory and Society*. 1998; 27(2):151–208.

Highlights

- This paper examines the link between social capital and child nutrition in India.
- Household bridging social capital is positively associated with child nutrition.
- Household bonding social capital is negatively associated with child nutrition.
- Local development moderates the influence of contextual social capital.

Table 1

Table of Means and Standard Deviations

<i>Village Level Variables</i>	Mean	Std. Dev.	Min	Max
Development (Bridging) Social Capital	0.00	1.00	−1.33	2.44
Religious and Caste-based (Bonding) Social Capital	−0.01	1.00	−1.04	1.37
Development Index	2.75	0.92	0.6	5
<i>Household/Individual Variables</i>				
Development (Bridging) Social Capital	0.00	1.00	−0.42	8.27
Religious and Caste-based (Bonding) Social Capital	0.00	1.00	−0.51	2.78
Stunting	0.61	0.49	0	1
Wasting	0.16	0.36	0	1
Underweight	0.48	0.5	0	1
Child's sex: Girl	0.47	0.5	0	1
Number of boys born before	0.71	0.92	0	7
Number of girls born before	0.78	1.02	0	8
Child's age in months	25.94	15.85	0	60
Child's age squared	923.51	929.51	0	3600
Caste: Brahmin	0.04	0.19	0	1
Forward	0.18	0.38	0	1
Other backward classes	0.44	0.5	0	1
Scheduled Caste	0.24	0.43	0	1
Scheduled Tribe	0.1	0.3	0	1
Religion: Hindu	0.84	0.37	0	1
Muslim	0.12	0.32	0	1
Other minority religions	0.04	0.18	0	1
Joint family	0.68	0.47	0	1
Logged income	10.13	1.03	6.91	14.09
Household Assets	9.06	4.88	0	27
Maternal education: No Education	0.53	0.5	0	1
Primary	0.16	0.36	0	1
Secondary education	0.26	0.44	0	1
Senior secondary and college	0.06	0.24	0	1
Paternal education: No education	0.24	0.43	0	1
Primary	0.18	0.38	0	1
Secondary education	0.38	0.49	0	1
Senior secondary and college	0.16	0.37	0	1
Missing on father's education	0.04	0.19	0	1
Maternal height	150.22	6.07	101	187
Missing on mother's education	0.03	0.16	0	1

Table 2
Multilevel Logistic Models Analyzing the Relationship between Social Capital and Child Underweight

<i>Village variables</i>	Model 1		Model 2		Model 3	
	OR	SE	OR	SE	OR	SE
Bridging Social Capital	0.960	0.059	0.966	0.060	0.967	0.060
Bonding Social Capital	0.908 ⁺	0.055	0.936	0.053	0.937	0.053
Development Index	0.979	0.052	0.944	0.069	0.946	0.070
Bridging Social Capital [*]						
Development Index			0.996	0.053	0.993	0.054
Bonding Social Capital [*]						
Development Index			1.121 [*]	0.055	1.134 [*]	0.057
<i>Individual/family variables</i>						
Bridging Social Capital	0.899 ^{**}	0.041	0.890 ^{**}	0.041	0.889 ^{**}	0.041
Bonding Social Capital	1.083 ⁺	0.041	1.089 [*]	0.042	1.076 ⁺	0.043
<i>Cross level interactions</i>						
Bridging Social Capital [*]					0.966	0.042
Development Index					0.993	0.034
Bonding Social Capital [*]						
Development Index					0.966	0.042
Household Assets	0.966 ^{**}	0.013	0.967 ^{**}	0.014	0.967 [*]	0.014
Logged Income	0.913 ⁺	0.047	0.912 [*]	0.047	0.911 [*]	0.047
Joint family	1.062	0.089	1.057	0.088	1.056	0.088
Child's sex: Girl	0.912	0.086	0.913	0.086	0.914	0.086
Number of boys born before	1.111 ⁺	0.061	1.109 ⁺	0.061	1.108 ⁺	0.061
Number of girls born before	1.143 ^{**}	0.044	1.146 ^{**}	0.044	1.146 ^{**}	0.044
Child's age	1.009 ^{**}	0.004	1.009 [*]	0.004	1.009 [*]	0.004
Child's age squared	0.999 ^{***}	0.000	0.999 ^{***}	0.000	0.999 ^{***}	0.000
Caste: Brahmin (Ref: Forward)	0.796	0.250	0.816	0.253	0.817	0.254

<i>Village variables</i>	Model 1		Model 2		Model 3	
	OR	SE	OR	SE	OR	SE
Other backward classes	0.933	0.118	0.938	0.117	0.938	0.118
Scheduled Caste	0.995	0.145	1.009	0.144	1.008	0.145
Scheduled Tribe	1.368 ⁺	0.189	1.363 ⁺	0.187	1.365 ⁺	0.187
Religion: Muslim (Ref: Hindu)	0.793	0.147	0.790	0.147	0.790	0.147
Other minority religions	0.676 ⁺	0.206	0.679 ⁺	0.205	0.683 ⁺	0.206
Women's Age	0.979 ⁺	0.011	0.979 [*]	0.011	0.979 [*]	0.011
Maternal education: Primary (Ref: None)	0.610 ^{**}	0.116	0.616 ^{***}	0.116	0.615 ^{***}	0.116
Secondary education	0.769 ⁺	0.138	0.774 ⁺	0.139	0.773	0.138
Senior secondary and college	0.905	0.250	0.890	0.244	0.889	0.244
Paternal education: Primary	0.967	0.131	0.966	0.130	0.963	0.130
Secondary education	0.870	0.119	0.870	0.119	0.869	0.119
Senior secondary and college	0.642 [*]	0.173	0.647 [*]	0.170	0.646 [*]	0.171
Missing on father's education	0.581 [*]	0.216	0.572 ^{**}	0.214	0.573 ^{**}	0.214
Maternal height	0.958 ^{***}	0.007	0.958 ^{***}	0.007	0.958 ^{***}	0.007
Imputation (mother's height)	0.914	0.284	0.907	0.286	0.908	0.284

Source: IHDS 2004–05; n = 6,427;

p<0.001,

**
p<0.01,

*
p<0.05,

⁺
p<0.1

Table 3
Multilevel Logistic Models Analyzing the Relationship between Social Capital and Child Stunting

	Model 1		Model 2		Model 3	
	OR	SE	OR	SE	OR	SE
Village variables						
Bridging Social Capital	0.988	0.059	0.987	0.059	0.983	0.059
Bonding Social Capital	0.973	0.058	1.001	0.053	0.994	0.052
Development Index	0.883 +	0.072	0.871 +	0.072	0.866 *	0.073
Bridging Social Capital *						
Development Index			0.909	0.061	0.896 +	0.063
Bonding Social Capital *						
Development Index			1.116 +	0.063	1.109	0.067
Individual/family variables						
Bridging Social Capital	0.934	0.045	0.930	0.045	0.932 +	0.042
Bonding Social Capital	0.972	0.047	0.981	0.048	0.985	0.046
Cross level interactions						
Bridging Social Capital *					1.093 *	0.039
Development Index						
Bonding Social Capital *						
Development Index					1.001	0.051
Household Assets	0.968 *	0.014	0.968 *	0.014	0.968 *	0.014
Logged Income	0.963	0.055	0.963	0.055	0.964	0.055
Joint family	0.972	0.088	0.971	0.088	0.970	0.089
Child's sex: Girl	0.926	0.092	0.923	0.092	0.920	0.092
Number of boys born before	1.081	0.060	1.081	0.059	1.078	0.059
Number of girls born before	1.152 **	0.051	1.148 **	0.050	1.149 **	0.050
Child's age	1.000	0.004	1.000	0.004	1.000	0.004
Child's age squared	0.999 ***	0.000	0.999 ***	0.000	0.999 ***	0.000
Brahmin (Ref: Forward)	0.904	0.282	0.926	0.276	0.923	0.277

<i>Village variables</i>	Model 1		Model 2		Model 3	
	OR	SE	OR	SE	OR	SE
Other backward classes	0.940	0.127	0.941	0.128	0.947	0.129
Scheduled Caste	0.986	0.150	0.994	0.152	1.007	0.152
Scheduled Tribe	0.776	0.217	0.757	0.217	0.765	0.217
Religion: Muslim(Ref: Hindu)	0.682 *	0.166	0.678 *	0.166	0.676 *	0.167
Other minority religions	1.056	0.225	1.082	0.227	1.068	0.228
Women's Age	0.966 **	0.011	0.966 **	0.011	0.966 **	0.011
Maternal education: Primary (Ref: None)	0.792 +	0.124	0.794 +	0.124	0.798 +	0.124
Secondary education	1.130	0.149	1.128	0.149	1.137	0.150
Senior secondary and college	0.882	0.267	0.885	0.268	0.901	0.270
Paternal education: Primary (Ref: None)	0.941	0.134	0.943	0.135	0.951	0.136
Secondary education	0.855	0.127	0.857	0.128	0.851	0.127
Senior secondary and college	0.699 *	0.181	0.701 *	0.181	0.693 *	0.180
Missing on father's education	0.917	0.234	0.902	0.234	0.902	0.236
Maternal height	0.966 ***	0.008	0.965 ***	0.008	0.965 ***	0.008
Imputation (mother's height)	0.442 **	0.261	0.445 **	0.262	0.450 **	0.266

Source: IHDS 2004–05; n = 5,347;

p<0.001,

**
p<0.01,

*
p<0.05,

+
p<0.1

Table 4
Multilevel Logistic Models Analyzing the Relationship between Social Capital and Child Wasting

<i>Fixed Effect</i>	Model 1		Model 2		Model 3	
<i>Village variables</i>	OR	SE	OR	SE	OR	SE
Bridging Social Capital	1.036	0.071	1.034	0.072	1.036	0.072
Bonding Social Capital	1.030	0.067	1.016	0.067	1.016	0.066
Development Index	0.923	0.088	0.937	0.087	0.932	0.087
Bridging Social Capital *						
Development Index			1.141 +	0.074	1.158 +	0.075
Bonding Social Capital *						
Development Index			0.982	0.078	0.967	0.080
<i>Individual/family variables</i>						
Bridging Social Capital	0.880 *	0.059	0.876 *	0.061	0.868 *	0.062
Bonding Social Capital	1.108 +	0.053	1.105 +	0.053	1.129 *	0.053
<i>Cross level interactions</i>						
Bridging Social Capital *						
Development Index					0.957	0.054
Bonding Social Capital *						
Development Index					1.058	0.059
Household Assets	0.943 ***	0.018	0.942 ***	0.018	0.942 ***	0.018
Logged Income	1.130 *	0.061	1.129	0.061	1.131 *	0.061
Joint family	1.033	0.107	1.028	0.106	1.031	0.106
Child's sex: Girl	1.002	0.125	1.008	0.126	1.010	0.126
Number of boys born before	0.927	0.071	0.927	0.070	0.929	0.070
Number of girls born before	0.929	0.071	0.934	0.070	0.935	0.070
Child's age	1.001	0.005	1.001	0.005	1.001	0.005
Child's age squared	1.000	0.000	1.000	0.000	1.000	0.000
Caste: Brahmin (Ref: Forward)	0.788	0.447	0.785	0.453	0.783	0.455
Other backward classes	0.951	0.149	0.951	0.149	0.949	0.150

<i>Fixed Effect</i>	Model 1		Model 2		Model 3	
	OR	SE	OR	SE	OR	SE
<i>Village variables</i>						
Scheduled Caste	1.042	0.174	1.041	0.176	1.033	0.177
Scheduled Tribe	1.841 *	0.261	1.889 *	0.260	1.870 *	0.260
Religion: Muslim (Ref: Hindu)	0.841	0.199	0.842	0.202	0.840	0.202
Other minority religions	0.885	0.255	0.858	0.256	0.862	0.257
Women's Age	1.010	0.014	1.008	0.014	1.008	0.014
Maternal education: Primary (Ref: None)	1.177	0.169	1.185	0.165	1.181	0.165
Secondary education	1.174	0.210	1.175	0.211	1.173	0.211
Senior sec. and college	1.516	0.290	1.482	0.296	1.474	0.298
Paternal education: Primary(Ref: None)	0.801	0.169	0.796	0.168	0.799	0.168
Secondary education	1.123	0.186	1.118	0.185	1.124	0.184
Senior sec. and college	0.749	0.240	0.747	0.241	0.751	0.242
Missing on father's education	0.377 **	0.301	0.376 **	0.301	0.374 **	0.302
Maternal height	0.988	0.010	0.988	0.010	0.988	0.010
Imputation (mother's height)	1.102	0.407	1.098	0.413	1.091	0.414

Source: IHDS 2004–05; n = 6,135;

*** p<0.001,

** p<0.01,

* p<0.05,

+ p<0.1