

Application of exploratory factor analysis to address the challenge of measuring SC in a rural communal setting in South Africa

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Abstract

Social capital (SC) is an umbrella concept combining attributes of multiple latent factors that are not directly observable, making it difficult to measure and express as a single variable. Despite its multidimensional nature, the bulk of empirical studies continue to construct and use unidimensional indicators of SC, generating notable disparities in results derived from the use of these alternative measures. This study employed exploratory factor analysis to search for and construct composite measures capturing the multidimensional facets of structural and cognitive social capital (SC) in a rural communal setting in Africa. Our factor analysis revealed eleven factors describing a diversity of SC components, with clear evidence of multiple features of cognitive SC at the household level. On the other hand, evidence of presence of structural SC was limited, which is a general finding of household level analysis of determinants of SC. Not adequately accounting for elements of informal social networks, is an important weakness of our study, and we accordingly strongly recommend that SC research in developing countries should include, as indicators of structural SC, measures of informal social networks.

KEYWORDS Management of commons; social capital; informal institutions; social networks; South Africa

1. Introduction

There is widespread evidence in the literature that social capital (SC) plays a critical role in facilitation of decision making and management of the common affairs of various groups of people around the world (Adler, 2002; Pretty, 2003; Ostrom and Ahn, 2009). The influence of SC is particularly important in communal settings where formal institutions are lacking, such as those dominating rural regions of developing countries (Meinzen-Dick et al., 2004; Bodin

and Corna, 2008; Ishihara and Pascual, 2009; Nkhata et al., 2009; Minato et al., 2010). Although progress has been made in conceptualizing and analytically defining what constitutes SC, how to measure SC and what indicators adequately capture its constituents remains a major challenge for empirical research (Adler, 2002; Ostrom and Ahn, 2009). As a result, the empirical literature uses numerous indicators of SC under diverse contexts and for various analytical purposes (Krishna and Shrader, 2000). The search for improved composite measures and indicators that fully capture the meaning of and influences of SC is far from complete though.

Despite widespread agreement on the multidimensionality of SC, many empirical studies continue to construct and use unidimensional indicators of SC. There are notable disparities between results derived from studies employing multidimensional indicators and those obtained from unidimensional indicators (Mitchell and Bossert, 2007). Of the methodological frameworks available to researchers, the Social Capital Assessment Tool (SOCAT) developed by the World Bank in the early 2000s is among the most comprehensive and conceptually consistent, in so far as it captures multiple dimensions of social capital and gives practical steps for conducting social capital in different geographic and cultural settings (Krishna and Shrader, 2000).

This study employs the SOCAT to capture attributes of SC in an African rural communal setting. Exploratory factor analysis is then used to search for and construct composite measures of structural and cognitive SC influencing choices of members of a community project in South Africa. Such community-based models of nature conservation and socioeconomic development have become increasingly important and promoted by the government in rural parts of the country (Cundill et al., 2013). Our knowledge of the underlying SC elements that may catalyse or hinder cooperation among members of these communities towards their common cause is currently weak. The main purpose of our study is therefore to contribute to gaining deeper understanding of key constituents of SC necessary for improved design and successful implementation of such projects. Choice of the case study community and area was dictated by availability of relevant data from a larger study investigating the role of SC in facilitating collective action among participants of the Umgano project, which is owned by the Mabandla community in KwaZulu-Natal province of South Africa (Blore, 2015).

The paper is organized in five sections. The next section presents brief survey of the relevant literature and section three describes the methods of the study. Section four presents and discusses results of the empirical analysis and section five concludes the study.

2. Review of relevant literature

Because many of its attributes are not directly observable to researchers, empirical studies rely on proxy indicators of SC. Examples include membership in particular organizations and indicators of trust, solidarity and reciprocity. The literature suggests that the choice of which indicators to use depends on whether the investigation concerns aspects related to structural (e.g., institutions and networks) or cognitive (e.g., norms and values) attributes of SC. Structural SC comes from the structure and institutional composition – including the “roles, rules, precedents and procedures” (Uphoff, 2000) – of social networks. On the other hand, cognitive SC emanates from less tangible sources (such as norms, attitudes, beliefs and values) that build trust and reciprocity between people (Krishna and Shrader, 2000; Uphoff, 2000).

Adherents to the structural conceptualization of SC are interested in the importance of networks. The primary method of analysis in this approach is social network analysis (SNA); a quantitative tool developed by sociologists to study the structure of social networks and quantify the *connectedness* of people within a community (e.g., Burt, 2000). A key contribution of structural perspectives of SC has been the differentiation of ‘bonding’, ‘bridging’, and ‘linking’ varieties of structural SC. Bonding SC, sometimes referred to as internal ties, is used to refer to the cohesiveness of a particular group which is often indicated by the density of social ties (Adler and Kwon, 2002; Adger, 2003; Bodin and Crona, 2008). Bonding SC is thought to facilitate cooperative action because community cohesiveness increases the dissemination of information, sharing of norms and beliefs, and reduces the difficulty of monitoring and enforcing each other’s behaviour (Adler and Kwon, 2002; Adger, 2003; Ostrom and Ahn, 2009). Cohesive communities however, have the potential to exclude outsiders which can result in persistence of inequality (Pretty and Smith, 2004; Ishihara and Pascual, 2009). On the other hand, bridging and linking SC, which can be thought of as external ties, refer to relational connections between groups (horizontal connections) and between groups and external agencies (vertical connections) respectively (Pretty and Smith, 2004). Bridging and linking ties are also thought to be useful for leveraging important financial and informational resources which can improve the effectiveness of collective action (Adler and

Kwon, 2002; Pretty and Smith, 2004). This is revealed by the Bodin and Crona (2008) study of a rural fishing community in Kenya, which found that, despite evidence of strong bonding and bridging SC, lack of links to external agencies was one of the reasons why cooperation towards reducing overexploitation of the fishery had failed to emerge.

Researchers interested in the cognitive manifestations of SC rely on an assortment of methods, qualitative and quantitative, to identify and measure the normative aspects of SC. For example, Minato et al. (2010) use a qualitative approach to identify the role of social norms associated with landholder management of natural vegetation in Australia. Baral (2012) uses primarily quantitative analyses (multiple regression models) to identify the factors contributing to trust between local organizations and administering agencies in the context of community-based forest management in Nepal. However, consequent to the increasing consensus on the multidimensional nature of SC, most experts agree that empirical work should include measures of both structural and cognitive social capital and use a combination of quantitative and qualitative approaches (Grootaert and van Bastelaer, 2002). Table 1 summarizes the elements and indicators of structural and cognitive social capital identified in the literature to play important roles in SC manifestations and influence (Claridge, 2017). Household level structural SC factors tested in the literature include networking attributes such as membership and extent of participation in decision making in organizations, and perceptions of the level of cooperation among community members. Indicators of cognitive SC measured include perceptions on various forms of trust and bonding among community members.

In addition to the multiple dimensions comprising social capital, emergent features are also identified as important in the literature. Krishna (2004) highlights the importance of leaders in mobilizing SC for collective action. Similarly, Menizen-Dick (2009) argues that SC provides the basis for collective action, but typically needs to be activated for collective action to emerge. Exploring the role of key individuals relates to the idea of bridging and linking capital, whereby the relationships of agents with external parties may help to leverage financial and informational support. In addition, the context of any particular case study is especially important for defining indicators of SC that are locally relevant (Krishna, 2004). Krishna and Shrader (2000) emphasize that SNA, used alone, is an inadequate indicator because of the context specific nature of SC. To illustrate this point, Krishna and Shrader (2000) use the example of organised religion that, “supports humanity and peace in one context [but] becomes a forum for armed militancy in another”. For this reason, the SOCAT is designed with

instruments that are multidimensional (i.e. they look at both the network and normative manifestations of SC using multiple methodologies) and flexible to application in different contexts. A novel feature of the SOCAT is that it retains a degree of rigour in analysis as it allows the researcher to identify and measure locally relevant SC indicators (Krishna and Shrader, 2000; Grootaert and van Bastelaer, 2002). The World Bank has also extensively field tested and externally validated the SOCAT. This study has accordingly chosen to use the SOCAT as it includes both structural and cognitive measures and enables the assessment of SC at the household, community, and organisational level (Krishna and Shrader, 2000; McCarthy et al., 2004).

Table 1: Dimensions, elements, and indicators (factors) of social capital at different levels of analysis

Dimensions of social capital	Elements & levels	Indicators (factors)^a
<i>Structural</i>		
Capture the <i>structure and strength</i> of social relations	<u>Informal networks</u>	Indicators of type and strength of relations (nature & level of acquaintance & interactions, bonding, bridging & linking ties, etc.)
	Family within & beyond household	
	Friends & intimates	
	Neighbours	
	<u>Formal networks</u>	Indicators of extent (number, size), diversity (types), & density (membership, level of support, interactions & participation in activities, expenditure of time or money, etc.)
	Civic groups and associations (cultural, religious, ethnic, political, sport & leisure, work, municipal, state, NGOs, etc.)	
<i>Cognitive</i>		
Capture the <i>quality</i> of social relations	<u>Norms of trust</u>	Degree of confidence & tolerance, feeling of safety & honesty, shared norms & culture, common goals, degree of dependence & support, indices of democratic governance & transparency, etc.
	Personal social trust	
		Institutional-civic trust
	<u>Norms of reciprocity</u>	Degree of cooperation, sanctions, direct/indirect & immediate/delayed reciprocal reactions, etc.

Source: Compiled by authors

^aSome of these are indicators of outcomes (e.g. trust) and not determinants of social capital

3. Materials and methods of the study

3.1 Study area and data collection

The Mabandla community, which falls within the jurisdiction of the Mabandla Traditional Council (MTC) and has a population of approximately 22 000 people (Leisher *et al.*, 2011), was chosen for conducting our study. The community is settled within a rural area of the

uMzimkhulu local municipality, which is characterised by poor infrastructure, high dependency on social grants for income, and high unemployment (Leisher *et al.*, 2011; Umsonti, 2013). Majority of the members of the Mabandla community participate in a self-driven community development project: The Umgano Project (UP) is comprised of a number of community-owned ventures, including a commercial timber plantation, sawmill, commercial livestock project, biodiversity conservation area and an ecotourism business. The various businesses running under the Umgano umbrella are operated with the help of a non-profit organisation and the biodiversity conservation area is managed in collaboration with the provincial conservation agency, Ezemvelo KwaZulu-Natal Wildlife (Leisher *et al.*, 2011).

This study relied on a pre-coded structured questionnaire, which was based upon the household survey in the SOCAT (Krishna and Shrader, 2000). Before administering the household survey, questionnaires were pre-tested for face validity, as well as for training of local enumerators on administering the household survey. The household survey was administered to a random sample of 360 households in the Mabandla community. A fully randomized sampling frame was constructed from a list of all Umgano Project beneficiary households, from which 30 households were randomly selected per each of the twelve villages comprising the Mabandla Traditional Area (MTA). The sample size per village (i.e. sampling fraction) was specified at 30 because, in the case of the smallest village, the maximum number of beneficiary households was 30. The decision to select equal sample sizes per village was made to facilitate comparison across villages if necessary (Newing, 2011). All surveys were carried out in the first language of the Mabandla people, *isiZulu*. Surveys were administered to heads of households, or alternatively, the next most senior adult present in the household.

3.2 Empirical analysis procedures

The study employed two procedures to analyse the collected data, namely, descriptive statistics and exploratory factor analysis. Descriptive statistical metrics were derived for each of the indicators included in the survey, primarily to get an overview of the nature of households' perceptions about various elements of SC. Exploratory factor analysis was used to extract latent dimensions of SC in this case study.

Exploratory factor analysis is a data reduction statistical procedure which is frequently applied to SC studies to manage the multiple related indicators of SC used in research instruments (Narayan and Cassidy, 2001; Grootaert and van Bastelaer, 2002). Exploratory factor analysis

is particularly useful for SC research because it is able to uncover the latent structure of SC by examining dimensions of shared variance amongst the measured variables. In addition, exploratory factor analysis assumes no *a priori* hypotheses about the particular factor structure (Costello and Osborne, 2005). This study used exploratory factor analysis to extract the key dimensions of household-level SC from data collected in the household survey.

Most of the standard routines for performing factor analysis assume univariate or multivariate normality; assumptions which are violated by the use of the discrete variables obtained in the household survey (Narayan and Cassidy, 2001; UCLA Statistical Consulting Group, 2015). To overcome this problem, a matrix of polychoric and polyserial correlations was first constructed, in place of the usual correlation matrix used in factor analysis (Kolenikov and Angeles, 2004; UCLA Statistical Consulting Group, 2015).

Factors were extracted using the principal factors method and orthogonal varimax rotation was used with Kaiser Normalization. Multiple criteria (namely: the ‘scree test’, the Kaiser Criterion, and cumulative variance explained) were used to decide on the number of factors to retain. Post-estimation, the Kaiser-Meyer-Olkin (KMO) statistic and a likelihood ratio test of independence for the underlying correlation matrix were both assessed to ensure the appropriateness of the data for running factor analysis. As is standard practice in exploratory factor analysis, rotated factors were interpreted and given names that best describe the factor according to the variables with highest factor loadings (Costello and Osborne, 2005)¹. A threshold of 0.40 was used as a minimum threshold for whether an item loads onto a factor. Finally, factor scores were estimated which can be used for any subsequent analyses of correlations or causality.

A number of variables underwent modification before they were used in the overall factor analysis². For instance, in the case of membership indicators, if the respondent was not

¹ It is important to note that exploratory factor analysis is a complex procedure with few absolute guidelines and many options. Furthermore, study design, data properties, and the questions to be answered all have a bearing on which procedures will yield the maximum benefit (Costello and Osborne, 2005). As such, the particular methods of factor extraction and interpretation used in this study were chosen based on a combination of copious iterations and fine-tuning of variables (until a reasonably ‘clean’ and interpretable factor structure was obtained), as well as the recommendations of experts in the field. In particular, the paper written by Costello and Osborne (2005) and the examples provided on the UCLA Statistical Consulting Group’s website (2015) were extremely helpful in navigating the confusing information available regarding exploratory factor analysis.

² Detailed presentation of the contents of the SOCAT instrument adapted for this study is found in Blore (2015) and information on variables measured are presented in Table 2.

involved in any organisations or social groups, then subsequent items regarding organisational characteristics were recorded as missing. Including variables with a wide array of missing observations was problematic for factor analysis, particularly in the calculation of eigenvalues from the polychoric correlation matrix. Therefore, for the purposes of the factor analysis, it was necessary to exclude these variables or combine them with the precondition. For instance, the organisational characteristics variables were recoded such that a zero would indicate that the household was not involved in any organisations (e.g., the item concerning the effectiveness of organisation decision-making was recoded to: 0= not involved in any organisation; 1= not effective at all, 2= somewhat effective, 3= very effective).

In addition, polychoric correlation matrices cannot be used for categorical variables that are non-ordinal (UCLA Statistical Consulting Group, 2015). Consequently, all such non-ordinal variables were excluded from the factor analysis. These items included the solidarity items, the mutual support items, and other items that indicated which people in the community play important roles in various circumstances (for instance, items concerning who mediates conflict and who acts as leader in times of crisis). However, to include a measure of mutual support, a binary indicator was generated for whether or not the respondent selected the fifth item ('the entire village would act together') in the following scenario: "If there was a problem that affected the entire village, who would work together to deal with the situation?". The latter approach was also used by Pronyk et al. (2008) to formulate an indicator of mutual support.

4. Results and discussions

Sections 4.1–4.3, respectively present summary statistics on attributes of structural and cognitive SC and previous civic engagement indicators measured for the surveyed households. Elements of the structural and cognitive dimensions of SC analysed in the literature are described in more detail in section 2 above. Civic engagement on the other hand, is considered an indicator of outcome rather than a SC factor, such as the structural and cognitive elements that facilitate collective action. Engagement in political processes like voting in elections or making voluntary contributions to charitable causes indicate an act of participation in collective action (outcome) and hence does not fit neatly among structural or cognitive factors. Indicators of the three aspects of SC however, are used in the factor analysis of section 4.4.

4.1 Indicators of Structural SC

The household survey contained several indicators of structural SC, which are summarized in Table 2. First among these indicators were measures of memberships in organisations and features of these organisations (items O1-O4 in Table 2). Although the household survey collected data on all of the household's memberships in organisations, very few households (17.50%) indicated that they were involved in more than one organisation. In fact, for the entire sample, the mean number of organisations per household was just 0.74. For this reason, only the features of each household's top-ranked organisation were considered in the factor analysis in Section 5.3. Of those households participating in one or more organisation (n=227), the vast majority (77%) indicated that religious groups were the most important organisation to the household, followed by finance groups – or 'stokvels', as they are commonly known in the community – (12.33%), then sports groups (4.85%). Just less than half of the sampled households indicated that they are 'very active' participants in their top-ranked organisation (Table 2). In addition, most households (40.56%) indicated that decision-making in top-ranked organisations tends to be carried out entirely by leaders, as opposed to other decision making processes (such as 'democratic leadership' – i.e. where the leader asks the opinions of members of the group before deciding – or entirely democratic processes). However, all of the households participating in organisations felt that these decision-making processes are either effective or very effective (Table 2).

The second indicator of structural SC mentioned in Table 2 is an indicator of perceived mutual support (MS1). MS1 is a binary item indicating whether or not respondents felt that the entire village would work together to deal with a hypothetical crisis situation that affected the entire village, such as a fire that has burnt down many houses in the village. As indicated in Table 2, almost all respondents said that they felt that the entire village would act together. In addition, most households thought that community leaders (39.17%), members of the traditional council (27.78%), and representatives from local government (23.61%) would take initiative and act as leaders in such a situation.

Table 2: Descriptive statistics for indicators of structural SC

Variable	Description	% (n=360)
<u>Household memberships in organisations</u>		
O1	Number of household memberships	
	0	36.94
	1	45.56
	2+	14.17
O2	Degree of participation (top organisation):	
	<i>Not involved in any organisations</i>	36.94
	<i>Not active</i>	0.83
	<i>Somewhat active</i>	6.94
	<i>Very active</i>	48.61
	<i>Leader or group/ organisation</i>	6.67
O3	Organisation decision making (top organisation):	
	<i>Not involved in any organisations</i>	36.94
	<i>Leader decides</i>	40.56
	<i>Democratic leader</i>	12.50
	<i>Group decides</i>	10.00
O4	Effectiveness of decision making (top organisation):	
	<i>Not involved in any organisations</i>	36.94
	<i>Not effective at all</i>	0.00
	<i>Somewhat effective</i>	10.83
	<i>Very effective</i>	52.22
<u>Mutual support</u>		
MS1	Whether or not the respondent agreed that the entire village would act together if there was a problem that affected the entire village:	
	<i>No, the entire village would not act together</i>	3.33
	<i>Yes, the entire village would act together</i>	96.67
D1	Problems as a result of differences between people in the village:	
	<i>Differences do not cause problems</i>	70.00
	<i>Differences cause problems but these problems do not result in violence</i>	9.17
	<i>Differences cause problems and these problems do result in violence</i>	20.83

The final indicator of structural SC offered in Table 2 is an indicator of divisions in the community (D1). The majority of respondent households (70%) felt that differences between people do not cause problems in the community. However, of those that reported problems as a result of differences in the community, the majority (69.44%, n=108) said that these problems lead to violence. In addition, almost all of these households indicated that community leaders and religious leaders are important mediating entities in resolving this conflict.

4.2 Indicators of Cognitive SC

Table 3 presents the indicators of cognitive SC that were used in the factor analysis, including indicators of trust and cooperation (TC1-TC6); social trust (T1 & T3-T10); specific trust (ST1 & ST2); and conflict and conflict avoidance (CR1-CR6). Table 3 only summarizes the

‘positive’ response categories for the latter variables (i.e. categories indicating high levels of cognitive SC).

Table 3: Summary of the positive response categories regarding cognitive SC

Variable	Description	Positive response categories included in percentage	% (n=360)
<u>Trust and cooperation</u>			
TC1	Village trust ('Do you think that in this village people generally trust one another in matters of lending and borrowing?')	Do trust	83.89
TC2	Change in levels of trust in village	Trust is better	18.06
TC3	Village trust relative to other villages	More trust than other villages	19.72
TC4	People here look out mainly for the welfare of their own families and they are not much concerned with village welfare	Disagree or strongly disagree	64.72
TC5	People willing to contribute time to community project with no direct benefit	Will contribute time	18.61
TC6	People willing to contribute money to community project with no direct benefit	Will contribute money	39.72
<u>Social Trust</u>			
T1	Most people are basically honest and can be trusted	Agree or strongly agree	76.94
T3	Members of this village are more trustworthy than others	Agree or strongly agree	40.28
T4	People are willing to help me if I have a problem	Agree or strongly agree	92.78
T5	I do not pay attention to the opinions of others in the village	Disagree or strongly disagree	71.39
T6	Most people in this village are willing to help if you need it	Agree or strongly agree	79.72
T7	This village has prospered in the last five years	Agree or strongly agree	47.22
T8	I feel accepted as a member of this village	Agree or strongly agree	95.83
T9	Someone would return a lost pig/goat	Agree or strongly agree	36.39
T10	Someone would return a lost wallet	Agree or strongly agree	5.00
<u>Specific Trust</u>			
ST1	Land ownership option	Prefer the option of jointly owning a larger plot of land	61.67
ST2	Whom would be trusted with belongings	Would trust anyone from the village with their belongings	0.83
<u>Conflict and conflict avoidance</u>			
CR1	Village is generally peaceful	Agree	95.00
CR2	Relative village conflict ('Compared with other villages, is there more or less conflict in this village?')	Less conflict than other villages	30.56
CR3	People contribute time/money to common development goals	Contribute some or a lot of time and/ or money	33.06
CR4	Relative contribution ('Compared with other villages, to what extent do people of this village contribute time and/or money toward common development goals?')	Contribute more than other villages	11.11
CR5	Social harmony ('Are the relationships among people in this village generally harmonious (i.e. friendly) or disagreeable (i.e. people disagree and argue a lot)?')	Harmonious	95.56
CR6	Relative social harmony	More harmonious than other villages	51.11

Households generally felt that there are sufficient levels of social trust amongst people in their villages, but that these levels of trust have neither improved over the last few years nor are they much higher than levels of trust in nearby villages (as illustrated by TC1-TC3 and T1-T10 in Table 3). In addition, almost 65% of households felt that people are just as concerned about overall village welfare as they are about their personal welfare (Table 3). However, households also indicated that contribution to community projects (as an indicator of cooperation) tends to be low, with less than one fifth of households suggesting that people will contribute time to such projects (although about twice as many households suggested that people would be willing to contribute money), as presented by TC5, TC6 and CR3 in Table 3.

To assess trust in more specific circumstances, the household survey asked households whether they would prefer “owning and farming land the size of one soccer field by themselves” or “owning and farming land the size of three soccer fields jointly with another person”. Under the ‘joint’ option, each partner would hypothetically get more land per household but would also require relatively more interpersonal trust and coordination compared to the first option. As shown in Table 2, just less than two thirds of the sample opted for the ‘joint’ option, thus indicating a certain degree of interpersonal trust in the context of owning and managing land. However, respondents indicated substantially less trust in the context of whom they would leave in charge of their property if “they suddenly had to leave the village for a while” – most households chose family (71.11%) and neighbours (26.11%) as their preferred caretaker, and only three people indicated that they would trust anyone in the village for this purpose.

Sampled households seemed to perceive levels of conflict within their villages as relatively low, with approximately 95% stating that their villages is generally peaceful and relationships are generally harmonious (Table 3). Also, the majority of households (51.94%) felt that levels of conflict in their village are the same as other villages, while roughly the same proportion felt that relationships in their village are relatively more harmonious compared to nearby villages (Table 3). However, when there are conflictive circumstances, most households (53.33%) indicated that community leaders are the primary entity that facilitate conflict resolution.

4.3 Indicators of Previous Civic Engagement

Civic engagement elements are also indicators of SC, but do not fit neatly into the ‘structural’ and ‘cognitive’ SC constructs. Rather they are a proxy for *both* constructs (Grootaert and van Bastelaer, 2002). Table 3 summarizes the responses to the various civic engagement indicators (E1-E5). In addition, the ‘civic engagement score’ in Table 4 depicts the additive score across twelve binary items (CE1-CE12) asking the respondent whether he/she had personally participated in a number of civic activities during the previous three years. Civic engagement scores near twelve indicate that the respondent had participated in nearly all of the civic activities, whereas scores near zero indicate that the respondent had participated in few/none of the civic activities.

Table 4: Descriptive statistics for indicators of previous civic engagement

Variable	Description	% (n=360)	Mean	SD	Range
E1	Frequency of petition for village development in the previous year:				
	<i>Never</i>	59.17			
	<i>Once</i>	10.56			
	<i>A few times</i>	28.33			
E2	Frequency of coming together to address a common issue in the previous year:				
	<i>Never</i>	38.33			
	<i>Once</i>	13.61			
	<i>A few times</i>	44.44			
E3	Decision making over development projects:				
	<i>Community leaders would decide</i>	14.17			
E4	Spirit of participation:				
	<i>Very low</i>	2.22			
	<i>Low</i>	9.17			
	<i>Average</i>	63.89			
	<i>High</i>	15.28			
E5	Perception of one's own influence in making the village a better place to live:				
	<i>None</i>	1.11			
	<i>Little</i>	21.94			
	<i>Some</i>	53.89			
Civic engagement score (/12)	Additive score across the 12 binary items (CE1 - CE12) indicating whether the respondent had participated in a number of civic activities during the previous three years		4.59	2.10	1-11

Sampled households indicated that they had participated in some civic engagement activities, although very few (<5%) indicated that they participate in such activities regularly (as indicated by E1 and E2 in Table 3). Similarly, the civic engagement score indicates that, on average, households participated in just over a third of politically-oriented civic engagement and volunteering activities included in the CE1-CE12 items. In addition, most households (~64%) felt that the spirit of participation in their village is 'average' (Table 4). However, about three quarters of sampled households felt that they have some or a lot of influence in making their village a better place to live. Also, when asked who would be called on to make decisions related to a development project in their village, the vast majority (~86%) said that the entire community would be called on to decide (Table 4).

4.4 Exploratory factor analysis results

Exploratory factor analysis was used as a means to uncover the underlying dimensions of SC in the Mabandla community. As discussed earlier, some modifications were made to simplify the overall factor analysis and improve the interpretation of the results. Eleven factors were retained; all had eigenvalues above unity and cumulatively explained 75.62% of the overall variance of the variables used in the factor analysis procedure. The rotated factor loadings of all eleven factors are presented in Table 5. Each of the factors will be described briefly here, and some attempt will be made to explain the possible commonality underpinning each of the factors. However, in most cases and unless otherwise stated, the explanation of factors is purely conjecture and should be considered a preliminary attempt at understanding extremely complex social phenomena.

The first factor was interpreted to indicate aspects of the politically active in the community, as all of the politically-oriented civic engagement items (items CE2 to CE8 and E1) loaded highly on the first factor – most notably the highest loading items, 'took part in an election campaign' (CE5), 'made personal contact with an influential person' (CE3). 'People willing to contribute time to community project with no direct benefit' (TC5) also loaded on the first factor which is consistent with politically-oriented collective activities. Interestingly, however, the CE1 item (i.e. whether or not the respondent had 'voted in the national elections') loaded negatively on the political engagement factor –although the loading was relatively small compared to the other loadings on the factor.

Table 5: Rotated factor loadings using principal factors method of extraction and varimax rotation with Kaiser Normalization

Variable code	Description	Factor 1 (Politically active)	Factor 2 (Self-serving)	Factor 3 (Group functioning)	Factor 4 (Social harmony)	Factor 5 (Neighbourliness)	Factor 6 (Perceived influence)	Factor 7 (Heterogeneity)	Factor 8 (Problem reporting)	Factor 9 (Honesty)	Factor 10 (Social cohesion)	Factor 11 (Spirit of participation)	Uniqueness
O1	Number of household memberships			0.87									0.15
O2	Degree of participation			0.84									0.16
O3	Organisation decision making			0.92									0.11
O4	Effectiveness of decision making			0.87									0.04
MS1	Mutual support										0.69		0.14
D1	Differences cause problems and lead to violence							0.68					0.34
TC1	Village trust												0.26
TC2	Change in village trust		-0.53										0.43
TC3	Relative village trust					0.66							0.37
TC4	People here look out mainly for the welfare of their own families and they are not much concerned with village welfare		0.71										0.19
TC5	People willing to contribute time to community project with no direct benefit	0.54											0.23
TC6	People willing to contribute money to community project with no direct benefit		0.73										0.16
T1	Most people are basically honest and can be trusted				0.69								0.36
T3	Members of this village are more trustworthy than others										0.42		0.51
T4	People are willing to help me if I have a problem					0.71							0.27
T5	I pay attention to the opinions of others in the village										0.75		0.31
T6	Most people in this village are willing to help if you need it					0.64							0.31
T7	This village has prospered in the last five years		-0.42										0.47
T8	I feel accepted as a member of this village							0.59					0.27
T9	Someone would return a lost pig/goat									0.73			0.37
T10	Someone would return a lost wallet									0.81			0.21
ST1	Land ownership option		0.59										0.29
ST2	Whom would be trusted with belongings						0.55						0.44
CR1	Village is generally peaceful				0.87								0.09
CR2	Relatively more conflict in this village than others		0.63										0.30
CR3	People contribute time/money to common development goals		0.57										0.22

Variable code	Description	Factor 1 (Politically active)	Factor 2 (Self-serving)	Factor 3 (Group functioning)	Factor 4 (Social harmony)	Factor 5 (Neighbourliness)	Factor 6 (Perceived influence)	Factor 7 (Heterogeneity)	Factor 8 (Problem reporting)	Factor 9 (Honesty)	Factor 10 (Social cohesion)	Factor 11 (Spirit of participation)	Uniqueness
CR4	People in this village contribute relatively more time/money		0.75										0.28
CR5	Social harmony				0.73								0.06
CR6	Relative social harmony						0.47						0.38
E1	Frequency of petition for village development	0.79											0.13
E2	Frequency of coming together to address a common issue		0.71										0.20
E3	Decision making over development projects											0.59	0.31
E4	Spirit of participation											0.70	0.26
E5	Perception of one's own influence in making the village a better place to live						0.80						0.25
CE1	Voted in the elections	-0.48						0.64					0.03
CE2	Actively participated in an association	0.66											0.27
CE3	Made personal contact with an influential person	0.81											0.27
CE4	Made the media interested in a problem	0.66											0.32
CE5	Actively participated in an election campaign	0.83											0.22
CE6	Taken part in a protest march or demonstration	0.73											0.21
CE7	Contacted your elected representative	0.67											0.27
CE8	Taken part in a disruption of government meetings/ offices	0.76											0.17
CE9	Talked with other people in your area about a problem								0.86				0.16
CE10	Notified the court or police about a problem								0.72				0.16
CE11	Made a monetary or in-kind donation		-0.65										0.13
CE12	Volunteered for a charitable organization		-0.74										0.15

Items loading on the second factor predominantly have negative connotations in terms of collective action. For instance, the item indicating that people in the village are ‘mostly concerned with their own welfare rather than the welfare of the village in general’ (TC4) loaded highly on Factor 2 and is the key reason that the factor has been named ‘self-serving’. Similarly, indicators suggesting that village trust has improved and is relatively better than other villages (TC2, T7, CR2 to CR4) all loaded highly and negatively on the self-serving factor, and both aspects of volunteerism (CE11 and CE12) also loaded negatively on the factor. The remaining items loading on the self-serving factor were, however, less obviously related. In particular, item TC6 (‘people are willing to contribute money to community projects with no direct benefit’) loaded highly and positively on the self-serving factor. In all of the various attempts at factor analysing the data (using different methods of extraction methods and rotation techniques), the TC6 item consistently loaded highly and positively on the same factor as TC4. A potential explanation is that, to the extent that contributing money is a substitute for contributing time to common projects, TC6 indicates a less ‘sincere’ form of contribution. Furthermore, the contribution of money is consistent with self-interested behaviour; particularly if there are strong social norms governing community participation in mutually beneficial projects. A similar argument can be made for the loading of ST1 (the item depicting the respondent’s choice between owning a smaller plot of land by themselves, or owning a relatively larger piece of land jointly with another person from the village) and E2 (indicating the frequency of collective action in addressing common problems during the last year) on the self-serving factor. That is, higher scores for ST1 and E2 are consistent with self-interested behaviour (i.e. in ST1 the self-interested individual gets more land and in E2 the self-interested individual is more likely to have his/her concerns addressed by choosing the collective approach).

All of the items pertaining to features of group/ organisation functioning (O1 to O4) loaded very highly onto a single underlying factor, Factor 3 (the ‘group functioning’ factor). The ‘social harmony’ factor (Factor 4) was also straightforward to interpret; all items loading highly (T1, CR1, and CR5) pertained to the overall levels of general trust, peacefulness and social harmony of the village. The fifth factor was named ‘neighbourliness’ because two of the loading items indicated the helpfulness of people in the village, as indicators of trust (T4 and T6), and the third item suggested that the underlying factor also contributes to improved village trust compared to other villages (TC3). The sixth factor took its name ‘perceived influence’ from the highest loading item (E5) regarding the ‘perception of own influence in making

village a better place to live'. Other items loading on Factor 6 – although they did not load anywhere nearly as highly as the E5 item – were also consistent with the 'perceived influence' concept; including an indicator of specific trust (in the context of leaving one's belongings in the care of anyone in the village- item ST2) and relatively higher social harmony compared to other villages (item CR6).

In contrast to the preceding factors, Factor 7 was less easy to interpret. The item with the highest loading on the seventh factor was D1, which captured the extent to which divisions in the community cause problems and whether or not these problems result in violence (with the modified response codes as follows: 0= divisions do not cause problems; 1= divisions cause problems, but these problems do not result in violence; 2= divisions cause problems and these problems often result in violence). Interestingly, item T8 (which indicates a sense of belonging in the village) also loaded quite highly on Factor 7. While the relationship is not obvious, a sense of belonging is certainly not mutually exclusive with experiencing problems and violence as the result of differences between social groups. For instance, the commonality between items D1 and T8 could potentially stem from the complex interaction between heterogeneous groups in a village. Consider, for instance, a village with a relatively large number of distinctive social groups³, each of which offers its members a sense of closeness and belonging, but also tends to divide people based on their differences and creates conflict as a result. Consequently, the seventh factor was tentatively named 'heterogeneity', with the name referring to the plausible common factor rather than direct indicators of heterogeneity in the community.

Factor 8 was interpreted to capture aspects of discussing and reporting problems, both through formal channels (such as courts or the police, as indicated by CE9) or informal channels (such as discussions of problems amongst friends, as indicated by CE10); hence the eighth factor was named the 'problem reporting' factor. Two items indicating the honesty and trustworthiness of people in the village (items T9 and T10) loaded very highly (>0.7) on the 'honesty' factor (Factor 9). Items that loaded on the tenth factor (the 'social cohesion' factor) all pertain to the interrelated concepts of reputation (item T5), trustworthiness (item T3), and mutual support (item MS1). Finally, the items loading on the 'spirit of participation' factor (Factor 10) clearly

³ Although membership in formal organisations and social groups was measured in the household survey, this thought experiment refers to social groups more generally, including more informal groups such as groups of friends and family.

shared the characteristic of participation in major decisions and activities around village development as indicated by the high loadings of items E4 and E3.

5. Conclusions and limitations

Our results provide evidence of multiple distinct components of SC at the household level in the Mbandla community. In particular, factor analysis revealed eleven factors describing a diversity of SC components, which included dimensions of both structural and cognitive social capital. However, evidence of household level structural SC was limited, as of the eleven factors extracted, only one factor (the ‘group functioning’ factor) reflected a clear structural SC dimension. While it appears that this is the general finding of the literature on determinants of SC at household compared to community levels (Claridge, 2018), the limited evidence of structural SC in our case study may be attributed to two reasons. Firstly, descriptive statistics revealed that household-level structural SC is meagre, as indicated by memberships in organisations. However, the mean number of memberships (0.74, i.e. number of organization) per household in this case study are comparable to results found in other developing countries. For example, Mitchell and Bossert (2007) found that the average number of organisational memberships per household ranged from 0.57 in rural areas to 0.89 in urban areas in Nicaragua, and Narayan and Cassidy (2001) found that the average number of memberships per individual was 0.5 in a Ugandan case study.

Secondly, the limited evidence of structural SC in this study is also possibly due to the failure to quantitatively capture *informal* social networks in the factor analysis. Memberships in informal social groups were measured by Mitchell and Bossert (2007), and the resultant factor analysis showed that memberships in informal social groups loaded on a distinctly different factor to memberships in formal organisations; suggesting that memberships in informal networks potentially capture important aspects of structural SC in developing countries. The non-ordinal nature of other indicators of structural SC used in this study meant that possible measures of informal social networks and support were excluded from the factor analysis for the most part. However, some attempt was made to include simplified indicators of mutual support (via item MS1) and divisions in the community (via D1) in the factor analysis. Therefore, in addition to the ‘group functioning’ factor, the ‘heterogeneity’ and ‘social cohesion’ factors (which included the MS1 and D1 items respectively) can also be interpreted as representing structural SC to some extent.

On the other hand, the household survey results showed clear evidence of multiple features of cognitive SC at the household level. Again, this is consistent with findings of earlier studies suggesting stronger influences of cognitive than structural attributes of SC at the household level (Claridge, 2018). Furthermore, unidimensional factors of cognitive SC were not apparent, such as a single trust factor for instance. These results confirm findings of other studies, which suggest that constructs of SC indices that capture the complex interactions between its many underlying structural and cognitive determinants offer higher statistical explanatory powers than single attributes' indicators (Vyncke et al., 2012). The importance of accounting for the complex nature of the constituents of SC is also established by the disparity between multidimensional results, such as those found here and in some other studies (Onyx and Bullen, 2000; Mitchell and Bossert, 2007), versus the unidimensional results of cognitive SC found elsewhere (Narayan and Cassidy, 2001). According to Mitchell and Bossert (2007: 61), this disparity “highlight[s] the contextual nature of SC dimensions, suggesting that phenomena that may be unidimensional in one society may not be so in another.”

One important weakness of our study however, is not accounting for elements of informal social networks. We accordingly strongly recommend that SC research in developing countries should include, as indicators of structural SC, measures of informal social networks.

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