Journal of Education and Learning; Vol. 2, No. 4; 2013
ISSN 1927-5250 E-ISSN 1927-5269
Published by Canadian Center of Science and Education

Analysis of Social Cohesion in Health Data by Factor Analysis Method: The Ghanaian Perspective

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Received: August 21, 2013 Accepted: September 23, 2013 Online Published: November 18, 2013

doi:10.5539/jel.v2n4p177 URL: http://dx.doi.org/10.5539/jel.v2n4p177

Abstract

We investigated the study of the overall social cohesion of Ghanaians. In this study, we considered the paramount interest of the involvement of Ghanaians in their communities, their views of other people and institutions, and their level of interest in both local and national politics. The factor analysis method was employed for analysis using R software. The incontrovertible evidence from the results showed the factors that were measured to enhance and promote social cohesion among Ghanaians were community, political, neighborliness, socio-cultural, confidence and security. Our results perfectly fit our expectation in terms of knowledge in our socio-political arena.

Keywords: social cohesion, community, health data, factor analysis method, Ghana

1. Introduction

The term social cohesion has been increasingly invoked amongst policy-makers, both nationally and internationally, since the late 1980s. Its frequent usage reflects widespread and diverse concerns about the effects of social change on the social fabric – not least those that may arise from the increasing inequality and social diversity that accompanies globalization. With the 2008 financial crisis and subsequent global recession comes mounting unemployment, and such concerns are now necessarily intensified. At the same time the concept of social cohesion has seen a revival in social theory (Chan, To & Chan, 2006; Green, Preston & Janmaat, 2006; Osberg, 2003).

Other revered researchers have established positive (Marschall & Stolle 2004), or insignificant (Aizlewood & Pendakur 2005; Leigh 2006; Soroka, Johnston & Banting, 2007; Sturgis & Allum 2001) diversity effects on absolute trust, much more lot of studies have established notably important inverse association between diversity and measures of social cohesion (Becares, Stafford, Laurence, & Nazroo, 2011; Fieldhouse & Cutts 2010; Letki 2008; Pennant 2005; Putnam 2007), albeit that the magnitude of the underlying effects has been trivial in some cases, particularly in comparison to measures of socio-economic disadvantage (Letki, 2008; Sturgis, Brunton-Smith, Read, & Allum, 2011; Taylor, Twigg, & Mohan, 2010). And, although, the magnitude of the relationship appears to vary across ethnic groups, the basic patterns of negative association between diversity and social capital is broadly consistent across North America and the European contexts in which it has been examined (Fieldhouse & Cutts, 2010; Lancee & Dronkers, 2011).

Paul, Marie & Monique (2010) argued that the existence of the multifaceted constructs of social cohesion suggested by theory has been corroborated by empirical analysis of the EVS data (i.e., Social cohesion consists of components of formal and substantial relationships and political and social-cultural domains). Cassiers & Kesteloot (2012) addressed the increasing social-spatial inequalities in European cities and their impact on the possibilities for fostering social cohesion. Hickman, Crowley & Mai (2008) observed in their book that social

cohesion is achieved through people (new arrivals as well as the long-term settled) being able to resolve the conflicts and tensions within their day-to-day lives in ways that they find positive and viable. Andrews (2011) suggested that mainline Protestant communities enhance social cohesion in rural England, while Evangelical communities do not. Meanwhile, rural dwellers are significantly less likely than residents of urban areas to report their health as being fair or poor and to report common mental disorders, independent of their social-demographic characteristics (Riva, Curtis, Gauvin & Fagg, 2009).

A useful model of social capital recognizes two components, structural and cognitive (Harpham, Grant & Thomas, 2002). The cognitive component, labeled 'social cohesion', is conceptualized as a collective community level characteristic measured by the levels of trust, norms of reciprocity and the formation of strong social bonds within the local social structure (Kawachi & Berkman, 2000; Subramanian, Lochner & Kawachi, 2003; Stafford, Bartley, Sacker & Marmot, 2003). There is some evidence to suggest that this concept of community-level social cohesion is useful in investigating the determinants of general health status (Stafford, Bartley, Sacker & Marmot, 2003; Subramanian, Kim & Kawachi, 2002).

There have been many attempts to conceptualize and measure social cohesion. Different definitions and approaches have yielded different types of indicators and empirical results. However, most of these attempts will only partially cover the complex, multilevel and multidimensional nature of the concept. Since the measurement of social cohesion describes the nature of a certain group or society, the indicators of social cohesion generated have great potential to be used in comparative research. So to identify question items relating to the concept of cognitive social cohesion we used factor analysis with principal components analysis followed by a varimax rotation to identify a set of underlying common factors. To this end, this article seeks to examine the correlation among community, social and political issues relative to individual's response to a variety of health questions.

2. Method

To achieve the stated objectives of the study, a survey data on Global Ageing and Adult Health in Ghana was employed. The survey was conducted in Ghana by SAGE under the initiative of the World Health Organization (WHO) in the year 2007. The survey which involved a total of 6000 households employed both stratified and systematic random sampling techniques. That is, the entire country was first stratified by regions and the respondents who were eighteen (18) years and above in each household were randomly interviewed using a systematic approach.

The data set contains information on self-reported health status, demographic and socioeconomic characteristics as well as social cohesion. The variables considered in the study include attending public meeting, meeting community leader (meet leader), organizational meeting (club), work with neighbors (neighborhood), invite friends home (friends), visit friends (in other homes), socialize with other (coworkers), religious services, attending social meetings (how often go out?), satisfy with going out (want to get out more?), reasons for not getting out (why not?), general trust, have someone to trust, neighbors, coworkers, strangers, safe at home, safe on the street, a victim, interest, voted, say in government, and express yourself freely.

2.1 Model Specification

The primary variable of interest was the overall social cohesion of Ghanaians. It is interdependent in nature with three factors namely; Community, Social and Political aspects of the individual's life.

The factor analysis method was therefore the appropriate model for the analysis. The paramount interest of the involvement of Ghanaians in their communities, their views on other people and institutions and their level of interest in both local and national politics were considered.

Table 1. Descriptive statistics

	Mean	Std. Deviation	Analysis N
q6001: public meeting	1.62	1.014	585
q6002: meet leader	2.00	1.266	585
q6003: club	1.94	1.243	585
q6004: neighborhood	1.67	1.181	585
q6005: friends	3.38	1.431	585
q6006: in another home	2.61	1.430	585

q6007: coworkers	1.94	1.409	585
q6008: religious services	3.02	1.404	585
q6009: how often go out?	2.57	1.303	585
q6010: want to get out more?	1.18	1.119	585
q6011: why not?	2.21	2.288	585
q6012: general trust	1.48	.781	585
q6013: have someone to trust	1.37	.977	585
q6014: neighbors	2.81	1.193	585
q6015: coworkers	3.04	1.226	585
q6016: strangers	3.66	1.229	585
q6017: safe at home	1.94	.970	585
q6018: safe on street	2.43	1.308	585
q6019: victim	1.99	.541	585
q6020: interest	2.83	1.290	585
q6021: voted	1.28	.920	585
q6022: say in govt	3.63	1.395	585
q6023: express yourself freely	2.67	1.316	585

Table 2. Correlation matrix

	q6001	q6002	q6003	q6004	q6005	q6006	q6007	q6008	q6009	q6010	q6011	q6012
q6001	1.000	**.648**	**.566**	**.686**	.227	**.406**	**.548**	**.384**	**.414**	**.389**	.280	.199
q6002	**.648**	1.000	**.522**	**.568**	.313	**.345**	**.404**	**.358**	**.414**	**.330**	.140	.156
q6003	**.566**	**.522**	1.000	**.588**	.249	**.418**	**.461**	**.431**	**.445**	**.362**	.199	.192
q6004	**.686**	**.568**	**.588**	1.000	.224	**.385**	**.566**	**.370**	**.355**	**.336**	.234	.168
q6005	.227	.313	.249	.224	1.000	**.509**	.287	.284	.307	.195	.233	.041
q6006	**.406**	**.345**	**.418**	**.385**	.509	1.000	**.565**	**.475**	**.432**	.276	**.409**	.122
q6007	**.548**	**.404**	**.461**	**.566**	.287	**.565**	1.000	**.370**	.326	.289	**.344**	.143
q6008	**.384**	**.358**	**.431**	**.370**	.284	**.475**	**.370**	1.000	**.449**	.241	.312	.098
q6009	**.414**	**.414**	**.445**	**.355**	.307	**.432**	.326	**.449**	1.000	.275	.142	.140
q6010	**.389**	**.330**	**.362**	**.336**	.195	.276	.289	.241	.275	1.000	**.359**	.297
q6011	.280	.140	.199	.234	.233	**.409**	**.344**	.312	.142	**.359**	1.000	.094
q6012	.199	.156	.192	.168	.041	.122	.143	.098	.140	.297	.094	1.000
q6013	.195	.143	.139	.175	.068	.120	.150	.095	.166	**.345**	.060	**.433**
q6014	.088	.040	.100	.051	-.089	.043	.076	.062	.091	.108	.071	**.407**
q6015	.137	.005	.117	.077	.044	.189	.132	.147	.003	.127	.264	.323
q6016	.049	-.073	.031	.013	.095	.147	.060	.089	.039	.151	.310	.262
q6017	.238	.087	.227	.223	.058	.158	.188	.143	.111	.224	.066	**.339**
q6018	.110	.037	.142	.107	.000	-.019	.022	.050	.021	.155	-.022	.168
q6019	**.362**	.262	.269	.298	.208	.230	.262	.208	.228	**.338**	.200	**.500**
q6020	.033	.030	.081	.014	.112	.007	-.096	.053	.112	.162	-.085	.163
q6021	**.344**	.198	.228	.318	.119	.196	.205	.133	.167	**.337**	.163	.322
q6022	-.010	-.027	-.012	-.042	.094	-.019	-.087	.035	-.048	.118	.037	.133
q6023	.165	.144	.137	.121	.081	.027	.051	.089	.044	.162	-.004	.210

The size of the factor loadings (correlation coefficients between the variables and the factors they represent) will help in the interpretation. As a general rule, variables with large loadings indicate that they are representative of the factor, while small loadings suggest they are not. The rule of thumb suggests that factor loadings greater than ±0.33 are considered to meet the nominal level of practical significance. The reason being that when ±0.33 is squared, it represents the amount of the variables total variance accounted for by the factor. The factor loading of 0.33 denotes that approximately 10% of the variable's total variance is accounted for by the factor.

Examining the Correlation Matrix (see Table 2) revealed fairly high correlations among q6001, q6002, q6003, q6004, q6006, q6007, q6008, q6010, q6009, q6011 and q6012 (community involvement variables) were greater than 0.33.

Table 3. Correlation matrix continuous

	q6013	q6014	q6015	q6016	q6017	q6018	q6019	q6020	q6021	q6022	q6023
q6001	.195	.088	.137	.049	.238	.110	**.362**	.033	**.344**	-.010	.165
q6002	.143	.040	.005	-.073	.087	.037	.262	.030	.198	-.027	.144
q6003	.139	.100	.117	.031	.227	.142	.269	.081	.228	-.012	.137
q6004	.175	.051	.077	.013	.223	.107	.298	.014	.318	-.042	.121
q6005	.068	-.089	.044	.095	.058	.000	.208	.112	.119	.094	.081
q6006	.120	.043	.189	.147	.158	-.019	.230	.007	.196	-.019	.027
q6007	.150	.076	.132	.060	.188	.022	.262	-.096	.205	-.087	.051
q6008	.095	.062	.147	.089	.143	.050	.208	.053	.133	.035	.089
q6009	.166	.091	.003	.039	.111	.021	.228	.112	.167	-.048	.044
q6010	**.345**	.108	.127	.151	.224	.155	**.338**	.162	**.337**	.118	.162
q6011	.060	.071	.264	.310	.066	-.022	.200	-.085	.163	.037	-.004
q6012	**.433**	**.407**	.323	.262	**.339**	.168	**.500**	.163	.322	.133	.210
q6013	1.000	.190	.131	.111	.216	.194	**.376**	.160	.300	.091	.131
q6014	.190	1.000	**.645**	**.440**	.303	.315	.213	.203	.177	.097	.076
q6015	.131	**.645**	1.000	**.575**	.227	.279	.256	.117	.208	.216	.156
q6016	.111	**.440**	**.575**	1.000	.112	.140	.234	.064	.183	.255	.006
q6017	.216	.303	.227	.112	1.000	**.551**	.323	.262	.321	.077	.229
q6018	.194	.315	.279	.140	**.551**	1.000	.201	.300	.269	.224	.230
q6019	**.376**	.213	.256	.234	.323	.201	1.000	.197	**.419**	.217	.224
q6020	.160	.203	.117	.064	.262	.300	.197	1.000	**.541**	**.489**	**.549**
q6021	.300	.177	.208	.183	.321	.269	**.419**	**.541**	1.000	**.396**	**.521**
q6022	.091	.097	.216	.255	.077	.224	.217	**.489**	**.396**	1.000	**.528**
q6023	.131	.076	.156	.006	.229	.230	.224	**.549**	**.521**	**.528**	1.000

From Correlation Table Continuous (Table 3) fair high correlation among q6013, q6014, q6015, q6016, q6017, q6018 and q6019 (social involvement indicators), indicated a correlation greater than 0.33. Similarly, q6019, q6020, q6021, q6022 and q6023 (political variables) reported correlation more than 0.33

Table 4. KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.841
Bartlett's Test of Sphericity	Approx. Chi-Square	5454.508
	Df	253
	Sig.	0.000

Bartlett's test (Table 4) was used to test for the adequacy of the correlation matrix,among some variables. The observed correlation matrix of independent variables have a small off-diagonal coefficients. Bartlett's test of sphericity tests the hypothesis that the correlation matrix is an identity matrix, that is, all the diagonal terms are 1 and all off-diagonal terms are 0. If the test value is large and the significance level is small (< 0.05), the hypothesis that the variables are independent can be rejected. In the present analysis, the Bartlett's test of sphericity yielded a value of 5454.508 and an associated level of significance smaller than 0.001. Thus, the hypothesis that the correlation matrix is an identity matrix is rejected.

Table 5. Overall sum of variance explained

	Initial Eigenvalues			Sums of Squared Loadings (Extraction)			Sums of Squared Loadings (Rotation)		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.938	25.816	25.816	5.938	25.816	25.816	3.753	16.318	16.318
2	3.171	13.788	39.604	3.171	13.788	39.604	2.539	11.039	27.357
3	1.960	8.522	48.126	1.960	8.522	48.126	2.312	10.051	37.408
4	1.494	6.495	54.621	1.494	6.495	54.621	2.244	9.757	47.165
5	1.201	5.220	59.841	1.201	5.220	59.841	2.196	9.548	56.713
6	1.011	4.394	64.235	1.011	4.394	64.235	1.730	7.522	64.235
7	.964	4.190	68.425						
8	.786	3.419	71.844						
9	.702	3.054	74.898						
10	.644	2.799	77.696						
11	.602	2.618	80.314						
12	.577	2.508	82.823						
13	.501	2.178	85.001						
14	.452	1.965	86.965						
15	.428	1.861	88.826						
16	.411	1.789	90.615						
17	.373	1.623	92.238						
18	.353	1.534	93.771						
19	.346	1.506	95.277						
20	.315	1.370	96.648						
21	.275	1.195	97.842						
22	.271	1.177	99.019						
23	.226	.981	100.000						

Extraction Method: Principal Component Analysis.

Table 5 presents the number of common factors computed, the eigenvalues associated with these factors, the percentage of total variance accounted for by each factor, and the cumulative percentage of total variance accounted for by the factors. Although twenty-three (23) factors were computed, it is obvious that not all twelve factors will be useful in representing the list of twenty-three variables. In deciding how many factors to extract to represent the data, it is helpful to examine the eigenvalues associated with the factors. Using the criterion of retaining only factors with eigenvalues of 1 or greater, the first Six factors were retained for rotation. These six factors accounted for 25.82%, 13.78%, 8.52%, 6.50%, 5.22% and 4.39% of the total variance, respectively. That is, almost 64.24% of the total variance were attributable to these factors. The remaining seventeen factors together account for approximately 35.76% of the variance. Hence, a model with six factors was adequate to represent the data.

Table 6. Rotated Component of absolute value greater than or equal to 0.5 Matrix

	Component					
	1	2	3	4	5	6
q6001: public meeting	.845					
q6002: meet leader	.742					
q6003: club	.711					
q6004: neighborhood	.841					
q6005: friends				.783		
q6006: in another home				.732		
q6007: coworkers	.653					
q6008: religious services				.568		
q6009: how often go out?				.551		
q6010: want to get out more?					.508	
q6011: why not?						
q6012: general trust					.724	
q6013: have someone to trust					.797	
q6014: neighbors			.660			
q6015: coworkers			.841			
q6016: strangers			.801			
q6017: safe at home						.734
q6018: safe on street						.761
q6019: victim					.637	
q6020: interest		.766				
q6021: voted		.667				
q6022: say in govt		.797				
q6023: express yourself freely		.815				

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

The Rotated Component Matrix presents the factors after varimax rotation. The identification of what these factors represent was necessary to consider what items loaded on each of the factors. The clustering of items for each factor and their wording offer the best clue as to the meaning of that factor. Therefore, five items were loaded on Factor 1 and an inspection of these items clearly shows that, these items reflect a Community involvement (q6001: public meeting, q6002: meet leader, q6003: club, q6004: neighborhood and q6007: co-workers)

Factor 2 contained items that clearly reflect the political participation in elections q6020: interest, q6021: voted, q6022: say in government, and q6023: express freely in government).

Factor 3 contained items three items reflecting neighborliness (q6014: neighbors, q6015: co-workers, q6016: strangers).

Factor 4, contain items reflecting socio-cultural involvement (q6005: friends, q6006: in other homes, q6008: religious services, q6009: how often go out)

Factor 5 consists q6010: want to get out, q6012: general trust, q6013: have Someone to trust and q6019: victim, (personal trust) .

Factor 6 had two variables namely q6017: safety at home, and q6018: safety at street, representing a security.

3. Discussion

This study sought to examine the correlation among community, social and political issues relative to individual's response to a variety of health questions.

First, a study of a variety of health questions tf individual responses, were grouped into contrasting categories which indicate Community, Social and Political aspects of individual life.

The identifiable factors using the criterion of retaining only factors with eigenvalues of 1 or greater, the first six factors were retained for rotation. These factors accounted for 25.82%, 13.78%, 8.52%, 6.50%, 5.22% and 4.39% of the total variance, respectively. That is, almost 64.24% of the total variance are attributable to these six factors. The remaining seventeen factors together accounted for approximately 35.76% of the variance. Thus a model with six factors may be adequate to represent the data

Also, five items loaded on Factor reflect Community involvement (q6001: public meeting, q6002: meet leader, q6003: club, q6004: neighborhood and q6007: co-workers). Factor 2 contained items which clearly reflect political participation in elections (q6020: interest, q6021: voted, q6022: say in governance and q6023: express freely in government). Factor 3 contains three items classified as neighborhood (q6014: neighbors, q6015: co-workers, q6016: stragers). Factor 4, contain items reflecting socio-cultural involvement (q6005: friends, q6006: in other homes, q6008: religious services, q6009: how often go out). Factor 5, was classified as confidential (q6010: want to get out, q6012: general trust, q6013: have Someone to trust and q6019: victim). Factor 6 had two variables representing security (q6017: safety at home, and q6018: safety on the street).

Finally, there was a significant association between Community, Social and Political varies with the individual responses to the health questions.

Groupings such as "political" and "socio-cultural" involvement in this study partly covered earlier groupings by Paul, Marie & Monique (2010) who argued that the existence of the multifaceted constructs of social cohesion suggested by theory has been corroborated by empirical analysis of the EVS data (i.e. Social cohesion consists of components of formal and substantial relationships and political and social-cultural domains), which was consistent with the present study.

In conclusion, the present study did not take to account the effects of protestant and evangelical communities as suggested by Andrews (2011) that mainline Protestant communities enhance social cohesion in rural England, while evangelical communities did not. However, this study revealed that social cohesion is enhanced through six factors such as community, political, neighborliness, socio-cultural, confidence and security. This coincide with a model of social capital that recognizes structural and cognitive components (Harpham, Grant & Thomas, 2002). The cognitive component, labeled 'social cohesion', was conceptualized as a collective community level characteristic measured by the levels of trust, norms of reciprocity and the formation of strong social bonds within the local social structure (Kawachi & Berkman, 2000; Subramanian, Lochner & Kawachi, 2003; Stafford, Bartley, Sacker & Marmot, 2003). There was some evidence to suggest that this concept of community-level social cohesion was useful in investigating the determinants of general health status (Stafford, Bartley, Sacker & Marmot, 2003; Subramanian, Kim & Kawachi, 2002)

Acknowledgment

We are grateful to all respondents and interviewers who made the SAGE survey in Ghana possible. Financial support was provided by the US National Institute on Aging through Interagency Agreements (OGHA 04034785; YA1323-08-CN-0020; Y1-AG-1005-01) with the World Health Organization and a Research Project Grant (R01 AG034479- 64401A1). WHO contributed financial and human resources to SAGE Ghana. The Ministry of Health, Ghana, is supportive of SAGE. The University of Ghana's Department of Community Health contributed

training facilities, data entry support, and storage of materials. The Ghana Statistical Office provided the sampling information for the sampling frame and updates.

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