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MEASURING SOCIAL COHESION: AN EXPERIMENT USING THE CANADIAN NATIONAL SURVEY OF GIVING, VOLUNTEERING, AND PARTICIPATING

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ABSTRACT. Social cohesion is a concept difficult to define and to measure. As there can be many definitions, so there can be many measurements. The main problem, either in defining or measuring the concept, is its multilevel and multidimensional nature. At one extreme, *country* is the most commonly used level to view social cohesion but measurement at this level is of little use for any interventions. At the other extreme, *community* is the most useful level but it is a social construct for which data are difficult to get, given the administrative boundaries used in social surveys. As an initial attempt to measure social cohesion at a subcountry level, this study focuses on *census metropolitan areas* for which data on several dimensions of social cohesion are available. We use the information gathered by the National Survey on Giving, Volunteering and Participating (NSGVP) on three dimensions of social cohesion: political (voting and volunteering), economic (occupation, income, labour force participation) and social (social interactions, informal volunteering). Using statistical techniques including factor analysis and standardization, we create an overall index of social cohesion for each CMA. We point out use of this measure for further analysis of social dynamics.

KEY WORDS: latent scores, national survey of giving, social cohesion, structural equation modeling, volunteering and participating

> ... social solidarity is completely a moral phenomenon which, taken by itself, does not lend itself to exact observation and indeed to measurement. To proceed to this classification and this comparison, we must substitute for this internal fact which escapes us an external index which symbolizes it and study the former in the light of the latter.
> (Durkheim, 1893 [1965], p. 64)

1. INTRODUCTION

More than a century ago, Durkheim (1893) stated there was neither a clear definition of the concept of social cohesion nor was there a possibility of its direct measurement. A century of advances in empirical observation and

analytical techniques have not overcome the problem. There is still no universally recognized definition of social cohesion, and conceptualizations found in the literature are at times contradictory and difficult to operationalize. For example, a definition by Rosell (1995, p. 78), also adopted by Maxwell (1996), states that social cohesion involves "building shared values and communities of interpretation, reducing disparities in wealth and income, and generally enabling people to have a sense that they are engaged in a common enterprise, facing shared challenges and that they are members of the same community." Stanley (2003, p. 9) criticizes the ambivalence of the expression "shared values" and notes that social cohesion does not mean "social sameness, homogeneity of values or opinions". He offers his own definition of social cohesion as "the sum over a population of individuals' willingness to cooperate with each other without coercion in the complex set of social relations needed by individuals to complete their life courses". While this definition avoids assuming commonality of values, it remains limited by not recognizing social cohesion as a group property that is greater than the sum of individual parts. As Mudrack (1989, p. 38) pointed out, such a "legacy of confusion" arises because cohesiveness as a property of the group is often not measurable, and so researchers largely start with data on individuals.

Although we are not able to define exactly what social cohesion is, we often understand it as "something that glues us together". It is also clear that social cohesion is a multidimensional and multilevel concept. Any attempt at measurement needs to take both these aspects into consideration. This paper tries to measure social cohesion in its multidimensional aspect at the level of census metropolitan area. Taking advantage of past research[1], we discuss the data and methods used in modeling the index of social cohesion, relegating the advanced and complex technical details to the Endnotes and Tables in the Appendix. We then present the results of our analysis, discuss what we have learned through this study, and suggest improvements in measuring the concept.

2. THE MULTIDIMENSIONAL AND MULTILEVEL ASPECTS OF SOCIAL COHESION

The concept of social cohesion has two basic components (Moody and White, 2003). One refers to the psychological identification of members within a collectivity, called *ideational* component. The other refers to the observed relationships among members, called *relational* component. Durkheim identified the theoretical link between these two components by

connecting changes from ''mechanical'' to ''organic'' societies. Present-day research unfortunately separates these two components, depending on the focus of study, leading to a wide variety of definitions and measurements. Studies that restrict the concept to the ideational component inquire about individuals' feelings, such as sense of belonging. In contrast, those that focus on the relational component examine the relationships between members of different groups. To cite a few examples, cohesion has been examined in terms of individual psychological feelings (Bollen and Hoyle, 1990), global structural relationships (Freeman, 1992), and relationships in various possible intermediate groups (McPherson and Smith-Lovin, 1986). All these perspectives touch on different levels at which cohesion can be measured.

Apart from Durkheim's two basic components, we can also find in the literature some specific group properties classified under different dimensions. These also help clarify the concept of social cohesion (see for example, Berger-Schmidt, 2000). The dimensions that seem most amenable to operationalization and measurement are the five discussed by Jenson (1998), subsequently expanded to six by Bernard (1999). In this study, we use the term *domain* to indicate the three major aspects of social cohesion, namely Social Domain, Political Domain and Economic Domain. And, we use the term *dimension* to point to measurable components of each domain, namely Recognition, Belonging, Legitimacy, Participation, Inclusion and Equality, as shown in Figure 1.

The *inclusion*/*exclusion* dimension under the Economic domain points to the market forces. It addresses the questions of who has opportunities to participate or who is marginalized or excluded from participation in the economy. The dimension of *equality*/*inequality* was suggested by Bernard (1999) who argued that equality is an essential dimension of social cohesion that cannot be simply expressed in attenuated forms such as ''equality of opportunity''. As a specific dimension of social cohesion, it rather calls for reducing inequality of conditions. The *legitimacy*/*illegitimacy* dimension under the Political domain refers to how adequately the institutions (such as the government, political parties, and unions) represent the people. *Participation*/*passivity* under the same domain relates to people's involvement in governance or in politics. The *recognition*/*rejection* dimension under the Social domain recognizes the virtue of pluralism, while the dimension *belonging*/*isolation* relates to shared values or sense of being part of a community (Jenson, 1998). While these six dimensions are theoretically interesting and meaningful, the measurement illustrated in this paper focuses on the three broad domains (Economic, Political and Social) for two reasons. First, the survey data that we use do not have all the information

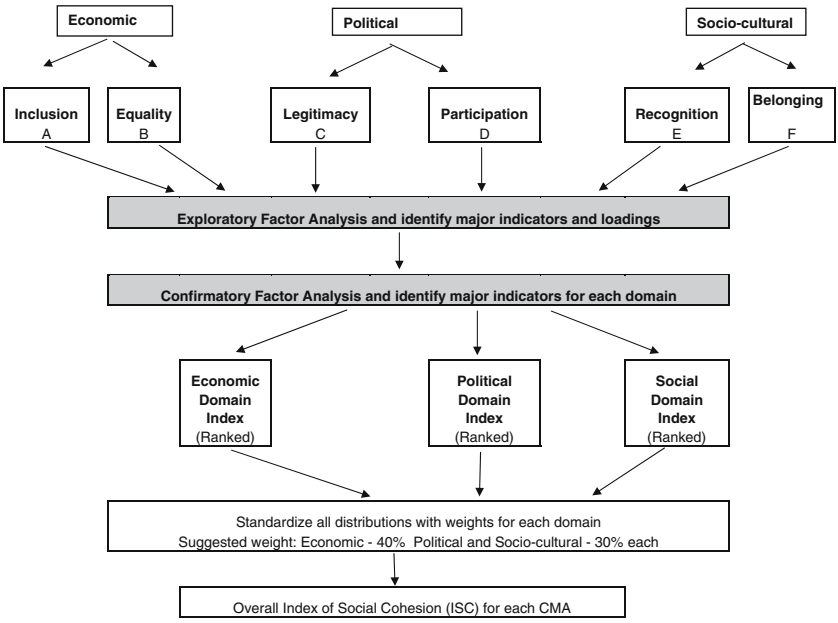


Fig. 1. Methodology used for construction and analysis of indicators of social cohesion.

needed as indicators of these six dimensions. Second, these six dimensions are themselves interrelated, which can lead to problems in statistical discriminant analysis.

Having mentioned the relevant multidimensional aspects of social cohesion, let us now turn to its multilevel aspect. Measures of cohesion for the nation as a whole may be interesting and useful especially for cross-national comparisons; in fact, many studies do that either in studying social cohesion or related ideas like social capital. Putnam's (1995) ''social capital'', for example, is measured for the whole country [but see Portes' (1998) criticism of the measures used for social capital]. Similarly, the indicators suggested by Thomas (1999) are calculated for the country as a whole, using different time points. However, it would seem suitable to measure cohesion at the ''community'' level, as communities are where people live, share, and engage in day-to-day activities. But ''community'' or ''neighbourhood'' is another social construct that is difficult to identify based on geographic maps. Thus, people in the same geographic area may have different ''communities'' or ''neighbourhoods'' that are meaningful to them; or neighbourhoods and communities can span over, and slice across, two or three geographic areas. The literature also debates whether space and geographic closeness are essential features of ''communities''.

One way of capturing "communities" in a meaningful way is to consider the smallest possible geographic areas. Surveys do not usually measure such small geographic areas. Using the census enumeration areas (EA) is one possibility, although it has no intrinsic meaning besides that of units that are convenient for enumerators. There are about 44,000 enumeration areas in Canada. Our initial work at this level soon ran into the problem of small numbers in many EAs, not only with the survey data but also with the census data. The next higher geographic level is census tracts (CTs). There are about 4400 CTs in Canada, and missing data could be handled through imputation methods. However, the problem with the survey data still exists. [See Myles et al. (2000) for an example of using CTs as "neighbourhoods".] The Census Metropolitan Areas (CMA) is a feasible unit of analysis as each has administrative and other features of a "community" distinct from all others. The CMAs however may not represent the "true community" of the residents, especially since the CMA sizes can vary greatly. Yet, we show in this paper a measurement of social cohesion for this level mainly because the data needed as indicators of its domains are available from a survey. We hope future surveys will be able to provide the needed data at a more meaningful level.

3. DATA AND METHODS

In computing the indicators of social cohesion, we set the following criteria for the data: (a) timeliness; (b) measures should be statistically robust; and (c) indicators should directly or indirectly measure a major aspect of cohesion. While we have sought data from various sources, the data collected through the National Survey of Giving, Volunteering, and Participating (NSGVP) seem to be a good starting point to measure social cohesion.

The NSGVP, conducted in 2000, collected information from 14,724 respondents residing in Canada excepting those from the Territories and residents of institutions. This study focuses on the CMAs since these are identifiable units with sufficient number of cases. The survey covered 64 CMAs with a total of 8374 respondents. However, to meet the criterion that the data should allow the computation of statistically robust estimates, we limit our analysis to CMAs with 30 or more respondents. This reduces our sample to 8093 respondents from 49 CMAs that make up our units of analysis (see Table I for details).

As for the third criterion, the main aim of the NSGVP was to gather information on giving, volunteering, and civic participation, which are all

TABLE I

Number of respondents by census metropolitan areas, by province – 2000 national survey of giving, volunteering, and participating

Newfoundland		*Quebec*		*Manitoba*		*British Columbia*	
St. John's	153	Chicoutimi-Jonq	141	Winnipeg	573	Vancouver	371
Corner Brk-Deer Lk	46	Québec	172	Brandon	48	Victoria	153
Total CMA	199	Montréal	413	Total CMA	621	Kelowna	50
Non-CMA	394	Hull	126	Non-CMA	554	Kamloops	21
Total Province	593	Trois-Rivières	128	Total Province	1175	Matsqui	67
		Sept-Iles	35			Chilliwack-Hope	30
		Baie-Comeau	46			Nanaimo	16
Prince Edward Island		Rimouski	11			Prince George	32
Charlottetown	116	Sherbrooke	161	*Saskatchewan*		Dawson Creek	6
Summerside	69	Ryn Nrnda/ValDOr	45	Regina	265	Total CMA	746
Total CMA	185	Total CMA	1278	Saskatoon	278	Non-CMA	394
Non-CMA	252	Non-CMA	1090	Moose Jaw	55	Total Province	1140
Total Province	437	Total Province	2368	Prince Albert	73		
				Total CMA	671	Total respondents in:	
		Ontario		Non-CMA	680	Canada	14724
Nova Scotia		Ottawa	267	Total Province	1351	Non-CMA	6350
Halifax	257	Sudbury	261			CMA	8374
Sydney-SdnyMines	88	Toronto	687			CMAs with < 30 resp.	281
New Glasgow	25	Hamilton	219			CMAs with 30+ resp.	8093
Truro	16	St. Cath-Niagara	220	*Alberta*			
Total CMA	386	London	253	Calgary	306		
Non-CMA	670	Windsor	165	Edmonton	287		
Total Province	1056	Kitchnr-Waterloo	251	Lethbridge	35		
		Thunder Bay	221	Medicine Hat	29		
		Oshawa	249	Red Deer	35		
		Cornwall	18	Grande Prairie	15		

TABLE I
Continued

New Brunswick		Kingston	45	Fort McMurray	21
St. John	151	Peterborough	11	Total CMA	728
Bathurst	29	Guelph	89	Non-CMA	461
Chatham-Newcast	23	Brantford	56	Total Province	1189
Moncton	138	Sarnia-Clrwater	42		
Fredericton	57	Sault Ste. Marie	25		
Edmunston	15	North Bay	68		
Total CMA	413	Total CMA	3147		
Non-CMA	482	Non-CMA	1373		
Total Province	895	Total Province	4520		

indicators of a specific dimension of social cohesion, namely participation under the Political domain. Nonetheless, there were also questions related to the other dimensions such as on voting behaviour (*legitimacy*)[2], labour force participation and income (*inclusion and equality*), and socialization and ethnicity (*belonging and recognition*). Information from these questions provides the following variables measured either as proportions or measures of heterogeneity[3], estimated from weighted data:

Variables	Description	Domain-Dimension
Voted – Fed	Proportion of people voting in the last federal election	Political-Legitimacy
Voted – Pro	Proportion of people voting in the last provincial election	
Voted – Mun	Proportion of people voting in the last municipal election	
Volunteer	Proportion volunteering	Political- Participation
Civic Part	Proportion participating in organizations	
Full-time	Proportion in full-time job	Economic – Inclusion
Tenured	Proportion with job tenure	
Pincgt20T	Proportion with personal income greater than $20,000	Economic – Equality
Wkly–Fam	Proportion socializing weekly with family and relatives	Social – Belonging
Wkly–Fri	Proportion socializing weekly with friends	
Wkly–Spt	Proportion joining weekly in sports and recreation with friends	
Ethnic Het	Heterogeneity measure of major ethnic groups	Social – Recognition

We also examined many other measures (such as proportions employed, union membership, giving donations, length of stay in community, and age heterogeneity). But initial exploratory factor analyses helped us to narrow the list to the above measures that had high loadings on the factors (see details below).

As for method, we follow the schema presented in Figure 1. This method actually extends the methods used for computing the *Indices of Deprivation 2000* in England (Department of the Environment, Transport and the Regions, 2000). Our idea is to create an overall index of social cohesion for each CMA. This overall index, however, needs to be calculated from the three domain indices, which in turn are to be calculated from the relevant dimension indices. The procedure therefore seeks to calculate dimension indices from the set of theoretically relevant indicators available from the

survey data. It is here the Factor Analysis, both exploratory and confirmatory, becomes useful, and a brief description of this technique is given below.

Factor Analysis is a statistical technique used to identify a rather small number of unobserved "factors" or "latent variables" that represent relationships among many interrelated metric variables or indicators. In our case, for example, we have a few indicators such as those listed above that collectively represent an underlying latent (unobserved or unobservable) characteristic or concept such as *legitimacy* or *equality* or *belonging*. Similarly, the concept of social cohesion itself is a latent concept that collectively represents the three domains of interest. Factor analysis finds the weights or loadings that show the relationships between the indicators and the latent construct, with larger loadings implying closer relationships. One can use the technique therefore either to explore the data for any latent constructs underlying the observed indicators (called exploratory factor analysis) or to confirm the existence of theoretically established latent constructs through the available indicators (called confirmatory factor analysis, elaborated further into what is known as structural equation model or SEM). We are using both the exploratory and confirmatory approaches here since we need first to select useful indicators of the six underlying dimensions as well as to confirm the theoretical relationships shown in Figure 1.

From the set of indicators available from the survey, the exploratory factor analysis helps us to select more useful indicators of the six dimensions, and thus to eliminate the redundant ones. As mentioned above, indicators such as union membership, donations, length of stay in community have all been proposed in the literature as good indicators of social cohesion. But these were not identified as good indicators in the exploratory factor analysis and consequently were dropped from further consideration. The confirmatory factor analysis or the structural equation model has an added advantage besides confirming the relationships. It also finds the error (co)variances between the selected indicators and the underlying constructs – a feature provided by statistical techniques but rarely clarified in theoretical reflections. This specific feature can help us reformulate and refine our theoretical relationships between the constructs.

The relationships and error (co)variances identified by the structural equation model can then be used to estimate the latent scores for each domain. Unlike the factor scores produced by factor analysis, these latent scores (produced by structural equation modeling) are not orthogonal since the model suggests some relationships between the domains. These latent

scores are already in a standardized form and therefore will have a mean of zero and standard deviation of 1. Some scores will be positive and others negative. Negative scores stand for the least cohesive and positive scores the most cohesive. In this study, the latent scores for the three domains Social, Political and Economic range from −2.58 to 1.91, from −3.82 to 1.69, and from −2.44 to 1.92 respectively (see Appendix Table B).

The latent scores however can have different measures of skewness and kurtosis for each domain. The skewness measures for the Social, Political and Economic domains are −0.893, −1.058 and −0.329, and their kurtosis measures are 0.482, 2.956, and −0.137 respectively. It is necessary, therefore, to convert them all into one and the same metric, having the same statistical measures such as mean, standard deviation, skewness and kurtosis (in other words, they all have a common distribution). The use of a common distribution for all the three domains safeguards against many pitfalls. One such pitfall, for example, is: while combining the domain scores, a high score in one domain can be fully cancelled out by a low score in another domain simply because of the differences in their distributions.

One can transform either the latent scores themselves or their ranks into a common distribution. We have used the latter procedure and an exponential transformation as follows:

(a) Domain ranks (R) range from 1 to 49, 1 standing for the most cohesive (corresponding to the highest positive latent score) and 49 the least cohesive under that domain. [Note that "least cohesive" does not mean absence of cohesion.] These ranks can be rescaled to the range of (0, 1) by computing $\mathrm{NR} = \mathrm{R}/49$.

(b) To transform these values into a common (exponential) distribution, we used the following procedure. For example for the Economic Domain:

$$\mathrm{Ecotr} = -20 * \ln[(1 - \mathrm{NR}) * (1 - \exp(100/20)]$$

The value 20 stands for the mean of the exponential distribution. Trial and error will suggest the best value that gives a good exponential shape. These transformed values – call them exponentials of ranks – range from 0 (strictly $0.41 = 1/49$) to 100, zero standing for most cohesive and 100 least cohesive. This transformation results in a proper distribution that is common to all domains, with a mean of 20.43, a standard deviation of 20.38, a skewness of 1.853 and a kurtosis of 0.34. The skewness and kurtosis measures are such that they *reduce* any "cancellation effect" that will occur when high scores in one domain are combined with low scores in another.

TABLE II

Results of factor analysis: final model

Panel A: KMO and Bartlett's Test						
Kaiser–Meyer–Olkin Measure of Sampling Adequacy			0.57			
Bartlett's Test of Sphericity		Approx. Chi-Square	287.188			
		Df	66			
		Sig.	0			
Panel B: Factor extraction						
Total variance explained						
Component	Initial eigenvalues			Rotation sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.821	31.838	31.838	2.853	23.773	23.773
2	1.983	16.527	48.365	2.665	22.21	45.983
3	1.65	13.752	62.117	1.847	15.394	61.377
4	1.337	11.142	73.259	1.426	11.882	73.259
5	0.944	7.867	81.126			
6	0.562	4.681	85.808			
Extraction Method: Principal Component Analysis.						
Panel C: Factor loadings						
Rotated Component Matrix						
	Component					
	1	2	3	4		
Voted in last federal election	−0.153	0.910	−0.207	−0.096		
Voted in last provincial election	−0.199	0.898	−0.159	0.118		
Voted in last municipal election	−0.035	0.845	0.086	0.156		
Civic participation	0.706	−0.099	0.098	−0.219		
Volunteer	0.766	0.138	0.173	−0.257		
Personal income > 20,000	0.014	0.089	0.838	−0.342		
Full time	0.003	−0.090	0.686	0.482		

TABLE II
Continued

Tenured job	−0.062	0.202	−0.035	0.763
Ethnc heterogeneity	0.198	−0.333	0.714	0.097
Weekly socializing with family and relatives	0.733	−0.117	0.147	0.489
Weekly socializing with friends	0.747	−0.233	0.07	0.291
Weekly sports and recreation with friends	0.751	−0.228	−0.142	0.008

(c) Finally, the exponentials of ranks for each domain are combined to give an overall index of social cohesion. There is a practical problem at this stage in terms of weights to use to combine the domain scores. If one were to use weights of 40% for the Economic, and 30% each for the Social and Political Domains, the resultant scores are as given in Table III and Appendix Table B. The Economic domain is assigned a greater weight as discussions on social cohesion or inclusion/exclusion predominantly focus on the economic aspect, with less attention to the social aspect. Obviously assigning different weights would produce different results. For the moment we leave the weights as above, although the LISREL model used in this study suggests otherwise. Given the set of indicators for the three domains used in this study, the social domain comes out as more important than the other two, as revealed by the standardized estimates of the LISREL model, which assigns weights of 46% for the Social, 19% for the Economic and 35% for the Political Domains. Such weights, however, may reflect the importance and relevance of the indicators used in the structural equation model. We need to do more research with more powerful indicators, but for now we have decided to stay with the weights of $40+30+30$ as mentioned above. Given the arbitrary nature of these weights, we will focus on the domain scores that differentiate the CMAs rather than the overall score.

All the above procedures assure that the overall index of social cohesion for each CMA would be *a weighted, exponentially distributed and ranked score, independent of population size*. A specific usefulness of these measures of cohesion is that they can be used either as dependent or independent variables in other studies.

4. RESULTS

4.1. *Exploratory Factor Analysis*

As seen in Table II, four factors were drawn from the selected indicators. These factors explain 73% of the relationships between these indicators. The four factors classify the indicators into the theoretical domains (Social, Political, and Economic) but the classification does not neatly follow the theoretically driven six dimensions discussed earlier. Factor 1, for example, includes civic participation, volunteering and socializing variables, which combines the political dimension of *participation* and the social dimension of *belonging*. This might suggest that while we distinguish formal involvement in organizations from informal socializing with family and friends, there

TABLE III
CMA overall rank and rank by major domains

Rank by Domains			Overall Rank
Social	Political	Economic	
1 Lethbridge	1 Ryn Nrnda/ValDOr	1 Toronto	1 Hamilton
2 Kelowna	2 Trois-Rivières	2 Kitchnr-Waterloo	2 St. Cath-Niagara
3 Red Deer	3 Summerside	3 Windsor	3 Red Deer
4 St. Cath-Niagara	4 Québec	4 Vancouver	4 Sudbury
5 Summerside	5 Sydney-SdnyMines	5 Matsqui	5 Charlottetown
6 Guelph	6 Sherbrooke	6 Edmonton	6 Fredericton
7 Prince George	7 Kelowna	7 Ottawa	7 St. John
8 Charlottetown	8 Prince Albert	8 London	8 Moose Jaw
9 Sydney-Sdny Mines	9 St. John's	9 Hamilton	9 Edmonton
10 St. John	10 Baie-Comeau	10 Chilliwack-Hope	10 Victoria
11 Brandon	11 Montréal	11 Oshawa	11 Winnipeg
12 North Bay	12 Moncton	12 Fredericton	12 Sept-Iles
13 Saskatoon	13 Charlottetown	13 Red Deer	13 Thunder Bay
14 Calgary	14 Brandon	14 St. Cath-Niagara	14 Kelowna
15 Edmonton	15 St. John	15 Kingston	15 Brantford
16 Hamilton	16 Brantford	16 Montréal	16 London
17 Kingston	17 Victoria	17 Sudbury	17 Kitchnr-Waterloo
18 Moose Jaw	18 Chicoutimi-Jonq	18 Calgary	18 Guelph
19 Sudbury	19 Thunder Bay	19 Hull	19 Kingston
20 Sept-Iles	20 Hull	20 Winnipeg	20 Ottawa
21 Kitchnr-Waterloo	21 Fredericton	21 Sarnia-Clrwater	21 Calgary
22 Victoria	22 Sudbury	22 Moose Jaw	22 Chilliwack-Hope
23 Thunder Bay	23 Winnipeg	23 Brantford	23 Regina
24 Regina	24 North Bay	24 Sept-Iles	24 Summerside
25 Moncton	25 Sept-Iles	25 Guelph	25 Windsor
26 Winnipeg	26 Moose Jaw	26 Victoria	26 Prince Albert
27 Fredericton	27 Chilliwack-Hope	27 Thunder Bay	27 Brandon
28 Vancouver	28 Ottawa	28 Sherbrooke	28 Halifax
29 Halifax	29 Hamilton	29 Charlottetown	29 Montréal
30 Prince Albert	30 Halifax	30 Regina	30 Oshawa
31 Matsqui	31 Regina	31 Halifax	31 St. John's
32 London	32 St. Cath-Niagara	32 St. John	32 Moncton
33 Brantford	33 London	33 Corner Brk-Deer Lk	33 Matsqui
34 CornerBrk-Deer Lk	34 Red Deer	34 Lethbridge	34 Toronto
35 Oshawa	35 Sarnia-Clrwater	35 Saskatoon	35 Sherbrooke
36 Toronto	36 Windsor	36 St. John's	36 Sarnia-Clrwater
37 St. John's	37 Guelph	37 Prince Albert	37 Vancouver
38 Ottawa	38 Edmonton	38 Chicoutimi-Jonq	38 Lethbridge
39 Windsor	39 Kingston	39 Kelowna	39 Chicoutimi-Jonq
40 Chicoutimi-Jonq	40 Oshawa	40 Baie-Comeau	40 Hull
41 Chilliwack-Hope	41 Kitchnr-Waterloo	41 Moncton	41 Saskatoon
42 Sarnia-Clrwater	42 Calgary	42 Brandon	42 North Bay

TABLE III
Continued

Rank by Domains			Overall Rank
Social	Political	Economic	
43 Ryn Nrnda/ValDOr	43 Toronto	43 Summerside	43 Ryn Nrnda/ValDOr
44 Sherbrooke	44 Matsqui	44 Ryn Nrnda/ ValDOr	44 Sydney-SdnyMines
45 Montréal	45 Lethbridge	45 Québec	45 Baie-Comeau
46 Trois-Rivières	46 Saskatoon	46 Prince George	46 CornerBrk-DeerLk
47 Hull	47 Vancouver	47 North Bay	47 Québec
48 Baie-Comeau	48 CornerBrk-Deer Lk	48 Sydney-SdnyMines	48 Prince George
49 Québec	49 Prince George	49 Trois-Rivières	49 Trois-Rivières

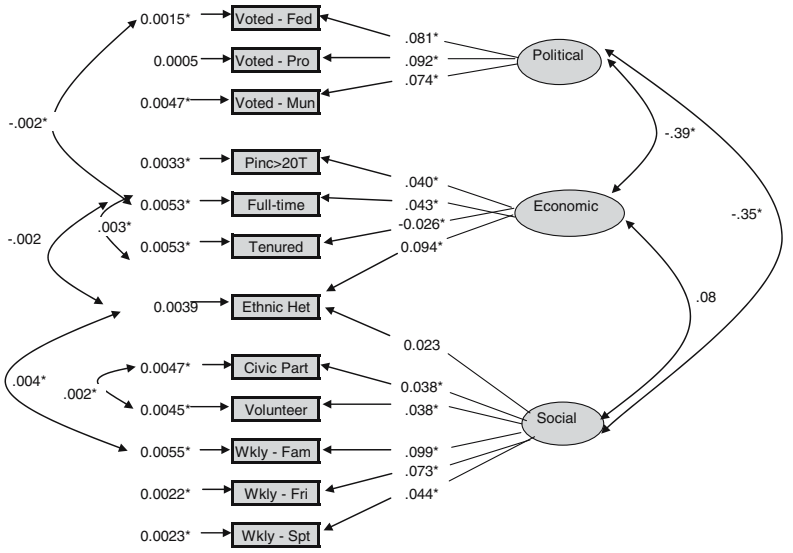
could be an underlying (unobserved) phenomenon common to both dimensions, which is captured by this factor. For practical purposes, we can call this factor Social Domain.

Factor 2 mainly consists of voting variables, which represent the political dimension of legitimacy, according to which the democratic exercise of the right to vote leads to institutions representative of the people. We take this factor to represent the Political Domain in the subsequent steps of the analysis.

We initially considered the variable Full-time Job as an indicator of the economic dimension of *inclusion*, Proportion Tenured and Personal Income greater than $20,000 as indicators of *equality*, and Ethnic Heterogeneity as an indicator of the social dimension of *recognition* (see section 3 on Data and Methods). But as shown in Table II, Factor 3 has high loadings on Full-time Job, Personal Income and Ethnic Heterogeneity while Proportion Tenured falls separately under Factor 4. Both factors 3 and 4 clearly capture an economic domain although which factor represents the dimension of *equality* and which one represents *inclusion* is difficult to tell. In addition, the fit between Ethnic Heterogeneity and the other economic indicators (which is confirmed in further analysis below) is unexpected. This tells us an important point for theoretical development. While we think of *recognition* (or the related concept of tolerance for pluralism) as a social domain, its outcome is mainly to be seen in the economic domain.

4.2. *Structural Equation Model*

Confirmatory factor analysis (using structural equation modeling) assured the usefulness of the indicators selected through the exploratory procedure.



LISREL ML Estimates - Measurement Equations

VOTED_FED = 0.081*Politica, Errorvar.= 0.0015 ,R2 = 0.81
VOTED_PR0 = 0.092*Politica, Errorvar.= 0.00048 ,R2 = 0.95
VOTED_MUN = 0.074*Politica, Errorvar.= 0.0047 ,R2 = 0.54
PINC>20 = 0.040*Economic, Errorvar.= 0.0033 ,R2= 0.32
FULLTIME = 0.043*Economic, Errorvar.= 0.0053 ,R2 = 0.26
TENURED = - 0.026*Economic, Errorvar.= 0.0053 ,R2 = 0.11
CIVIC PART = 0.038*Social, Errorvar.= 0.0047 ,R2= 0.24
VOLUNTEER = 0.038*Social, Errorvar.= 0.0045 ,R2 = 0.25
WKLY_FAM = 0.099*Social, Errorvar.= 0.0055 , R2 = 0.64
WKLY_FRI = 0.073*Social, Errorvar.= 0.0022 ,R2 = 0.71
WKLY_SPT = 0.044*Social, Errorvar.= 0.0023 ,R2 = 0.45
ETHNIC HET = 0.023*Social + 0.094*Economic, Errorvar.= 0.0039 ,R2

Fig. 2. LISREL model of indicators of social cohesion.

The results from the LISREL path diagram are summarized in Figure 2. The LISREL model on which the diagram is based has a good fit, judging from the goodness of fit parameters[4] for the model.

Figure 2 shows that the three indicators of voting behaviour capture very well the Political domain, with voting in provincial elections standing out very clearly with reliability (R^2) value of 0.95. The Social domain is captured moderately well by the socializing variables (with R^2 values around 65–70%) but there is much to be wished with the other indicators like civic participation and volunteering which have large error variances. The indicators of the Economic domain are also somewhat weak (with R^2 values hovering around 25–30%). In general, however, the LISREL model shows that all these indicators are good, and most of them have significant effects on their respective domains. However, they are not sufficient in the sense that most of their error variances are also significant, thus calling for more powerful indicators than what we have here.

Other findings through the exploratory factor analysis are confirmed by the LISREL model (Figure 2). Thus, Ethnic heterogeneity is shown to be related to both Social and Economic domains with an R^2 value of 71%, although the path coefficient connecting it to the Social domain is not significant at 5% level. The model also reveals what cannot be seen in traditional factor analyses; that is, there are significant error covariances between different indicators, for example, between Civic Participation and Volunteering, and between Full-time Job and Tenured Job. These covariances make a lot of sense. The LISREL model points to possible improvement in the model by adding covariances between certain indicators (through the so-called modification indices). For example, it points out a significant covariance between Full-time Job and Voting in Federal elections, though why this is so is not clear *a priori*. Similarly, LISREL points to a possible (although nonsignificant) covariance between Ethnic heterogeneity and Full-time Job. These points, subtle as they are, need further reflection in theorizing the relationships between the various dimensions of social cohesion.

4.3. *The Domain Scores and Ranks*

The LISREL model allows estimate of latent scores for the three domains of social cohesion. As pointed out in the previous section, these scores are turned into ranks, ranks into exponentials of ranks, and finally into an overall index of cohesion[5], which are all provided in Appendix Table B. Combining the three domain scores (indices) into an overall index of cohesion for each CMA was done by averaging the domain scores with weights of 30% for the Social and Political domains and 40% for the Economic domain. It needs stressing here that the domains' exponentiated *scores* are proper distributions and therefore they matter more than the ranks and should be used for further analysis. The ranks of these scores may be helpful for interpretation and comparison of CMAs, but they should not be used for further analysis of the determinants and consequences of social cohesion.

Table III presents the ranks of CMAs under each domain and the overall ranks. The first rank in the Social domain (meaning the most "cohesive" in that domain) is held by Lethbridge, followed by Kelowna and Red Deer, all fairly small CMAs. Of the top ten CMAs in the Social domain, four are from the Atlantic region (Summerside, Charlottetown, Sydney-Sydney Mines, and St John) with none from Quebec. In contrast, the first and second rank in the Political domain are both in Quebec (Rouyn-Noranda/ValDOr and Trois Rivières) with three more in the top ten (Quebec,

Sherbrooke, and Baie-Comeau) but none from Ontario. However, Ontario CMAs dominate the Economic domain with Toronto in the first rank and with five others in the top ten (Kitchener-Waterloo, Windsor, Ottawa, London, and Hamilton). British Columbia is well represented as well with three CMAs in the top ten (Vancouver, Matsqui, and Chillliwack-Hope).

The lowest ranked CMAs within each domain include a predominance of cities from Quebec in the social domain, while those lowest on the political domain tend to be from the West plus Toronto. While the top ranked cities on the economic domain tend to be the larger cities that are west of Quebec, those ranked lowest tend to be smaller cities, or from Quebec, but not Montreal. Thus, the domain ranks are strikingly clustered in the provinces, which brings to the fore the significant differences that exist in the provinces, economically, socially and politically.

As for the overall rank, in general, we normally expect those CMAs that rank high in all *three* dimensions to have higher overall ranking. That, however, is a rare phenomenon in our data set. And, the method followed in this study has specifically taken account of possible cancellation effects that will arise in the case of a CMA that has a high rank in one domain but a low rank in another. Consider, for example, Toronto which holds the first rank in the Economic domain but only the 43rd rank in the Political domain and the 36th rank in the Social domain. The technique of using a common distribution for all domains (with the same skewness and kurtosis measures) reduces this anomalous effect as much as possible. It also indirectly produces the result that the CMAs which have "average" ranks in all domains move up in the overall index, depending also on the weights associated with each domain. As shown in the last column of Table III, the CMAs that rank high overall do not necessarily rank high in all three domains and the largest cities tend not to be among the top or bottom ranked cities. For example, Hamilton, the highest ranked CMA overall, holds the 16th in the Social, the 29th in the Political, and the 9th in the Economic domain. Most CMAs holding the top ten ranks overall have moderately high ranks in at least two domains. This can be taken to mean that to be at the high-end in overall ranking of cohesion, CMAs must have better than average ranking on at least 2 dimensions.[6]

The above ranks are all based on relevant data available from the NSGVP and derived from models that we have used. Needless to say, the ranks will be different with different sets of data and with different statistical models of cohesion. We think, however, there is no better statistical model than one that adopts the latent construct approach. There is also a need to collect more meaningful and refined indicators of those latent constructs.

5. DISCUSSION

As the title of this paper implies, our main aim was to try out a measure of social cohesion that considers the multidimensional aspect of the concept. This was done using only one source of data, the Canadian National Survey of Giving, Volunteering, and Participating conducted in 2000. We think the experiment succeeds to an extent, so we can make a tentative substantive interpretation of the results.

A look at the separate results of each of the three domains – economic, social, and political – brings out some of the commonly known impressions about the different regions of the country. Many cities in the province of Ontario, particularly Toronto, have a strong economy, as do the other two big metropolitan areas of Vancouver and Montreal in the provinces of British Columbia and Quebec respectively. They all have high ranking in the economic domain. The CMAs in the Atlantic Provinces, on the other hand, are generally seen as places where communities are closely knit. This is revealed in their prominence in the social domain, but their economy is not as good as in Ontario, Alberta, or British Columbia. And, the long-standing issue of separation of Quebec from Canada may have politicized its residents more than in other parts of Canada. It is no surprise, then, that many cities in Quebec rank high in the political domain.

The multidimensionality of the concept of social cohesion calls for a measure that combines all three domains together. The regional differences in Canada are certainly reflected in the domain scores of the CMAs from each region. And, the end-result of the overall ranking is such that CMAs with the highest ranks are generally small CMAs that hold a moderate to high rank in at least two domains. What this means is that high level of cohesion requires a balancing of the three domains. This could be seen as similar to a point made by Bernard (1999). That is, in a democracy, a distortion of social order occurs when one or two elements of social cohesion, namely liberty, equality, and solidarity, are neglected.

The overall measure also shows the highest ranking CMAs are well scattered in different parts of Canada – Hamilton, St. Catherines-Niagara, and Sudbury in Ontario; Red Deer, Moose Jaw, Edmonton, and Victoria in the West; and Charlottetown, Fredericton, St. John in the Atlantic Provinces. This makes it clear that no one region can claim to be more conducive to social cohesion than any other.

An examination of domain scores reveals another interesting point: No CMAs rank high in all three domains. This suggests that CMAs differ in their base on which social cohesion is (and can be) built. When weak in one

domain, they compensate by being strong in another. Thus, in the CMAs that rank high in the social dimension like those in the Atlantic region, people may need to band together to make up for their economic disadvantage. Conversely, in economically strong CMAs such as big metropolitan areas of Toronto or Vancouver, people may not have a compelling need for strong social ties or political involvement. This "compensation effect" results in CMAs not greatly polarized, which would have been the case had some CMAs ranked very high in all three domains and others very low in all three domains. The resulting balance among the CMAs possibly contributes to the cohesion of the country as a whole.

While these substantive discussions of the results are reasonable, the social cohesion measure used here has a number of limitations, the most conspicuous one being lack of information on the *ideational* aspect, an important component of social cohesion as discussed in an earlier section. A few of these limitations are discussed in the concluding section.

6. CONCLUSIONS

Making use of data from a major Canadian social survey and a social cohesion paradigm developed by Canadian researchers, this study shows the validity of some of the important aspects of the paradigm as well as the utility of the procedures and models. Both the exploratory and confirmatory factor analyses highlighted the multidimensionality of social cohesion that encompasses the economic, social, and political domains. However, clear distinctions between the associated six dimensions proved to be difficult to validate. In the political domain, for example, volunteering and association membership indicative of political *participation* did not statistically fit in with voting behaviour. Rather, they fitted in better with the socializing variables taken to represent the socio-cultural dimension of *belonging*. Similarly, while ethnic heterogeneity is generally assumed to be related to the social domain, it is positively and more strongly related to the economic domain.

The results point to the need for more refined conceptualization of the complex relationships among the various dimensions of social cohesion. The confirmatory factor analysis provides a good start as it presents, for example, interrelationships between domains and dimensions (see curved arrows in Figure 2). The analysis also shows the need for better indicators of the dimensions. Particularly missing in our analysis are *ideational* (as opposed to *relational*) indicators. In Stanley's (2003) definition (quoted in the introductory section), the "willingness to cooperate", for example, calls for an ideational indicator. Certainly, indicators of economic dimensions

require ''hard'' data such as the indicators that we have used (income, employment), but economic *inclusion* connotes certain attitudes as well (for example, attitudes towards immigrants as co-workers). And, the socio-cultural dimension of *recognition* (or related concept of *tolerance*) is more attitudinal than behavioural. Thus, it is possible that a strong sense of belonging, measured here by frequencies of socializing with family and friends, may be accompanied by low tolerance for diversity, which however can be measured only by attitudinal variables.

Even if surveys like NSGVP collect ideational variables in future surveys, we would still need to combine data from different sources in order to provide a holistic picture of social cohesion. However, data linkage assumes that we have found the level that best corresponds to our concept of 'communities' or 'neighbourhoods'. This study has considered the level of CMAs, which is not ideal but justifiable given the limitations of social surveys, not to speak of problems of anonymity and confidentiality. After all, CMAs are entities, each characterized with distinct economic, political, and social features. But concentrating on CMAs leaves out the rest of the country – the nonCMAs and, in this study, very small CMAs. Also, CMAs vary greatly in size, and size is correlated with dimensions of social cohesion. It is imperative that we define a level of aggregation that is not too disparate in size, more inclusive, and yet would not pose an excessive problem either in data collection or in preserving the confidentiality requirement.

The usefulness of a study such as this lies not so much on the ranking but on the latent scores generated by the model. The latent scores can be used to examine the impact of social cohesion on other outcomes such as population health or the well-being of children and youth. It would also be possible to examine the effect of many other processes like market penetration, aging and family change on social cohesion.

APPENDIX

TABLE A

Observed measures of variables by CMAs

	Voted Federal Election	Voted Provin Election	Voted Municip Election	Civic Participation	Volunteer	Per. Inc. > $20T	Full-Time	Tenured	Ethnic Heter	Weekly Fam Soc	Weekly Fr Soc	Weekly Sports
Newfoundland												
St. John's	0.845	0.828	0.728	0.459	0.306	0.621	0.831	0.424	0.656	0.587	0.389	0.321
Corner Brk-Deer Lk	0.555	0.609	0.497	0.601	0.261	0.539	0.894	0.461	0.677	0.677	0.333	0.428
Prince Edward Island												
Charlottetown	0.816	0.817	0.692	0.548	0.338	0.572	0.780	0.386	0.715	0.692	0.400	0.332
Summerside	0.806	0.898	0.709	0.483	0.271	0.420	0.782	0.373	0.668	0.750	0.401	0.261
Nova Scotia												
Halifax	0.750	0.710	0.602	0.611	0.324	0.626	0.841	0.320	0.673	0.556	0.457	0.327
Sydney-Sdny Mines	0.911	0.889	0.835	0.505	0.358	0.511	0.886	0.580	0.710	0.762	0.514	0.388
New Brunswick												
St. John	0.790	0.793	0.786	0.444	0.354	0.593	0.806	0.365	0.697	0.695	0.459	0.311
Moncton	0.831	0.824	0.597	0.491	0.327	0.528	0.780	0.481	0.677	0.633	0.382	0.298
Fredericton	0.762	0.789	0.579	0.459	0.375	0.702	0.866	0.416	0.817	0.656	0.453	0.268
Québec												
Chicoutimi-Jonq	0.798	0.727	0.698	0.375	0.218	0.459	0.666	0.426	0.540	0.402	0.191	0.252
Québec	0.855	0.846	0.664	0.473	0.212	0.539	0.770	0.339	0.383	0.238	0.234	0.202
Montréal	0.778	0.819	0.592	0.353	0.154	0.560	0.800	0.370	0.709	0.364	0.236	0.195
Hull	0.736	0.763	0.659	0.484	0.232	0.591	0.823	0.356	0.616	0.327	0.199	0.184
Trois-Rivières	0.849	0.890	0.637	0.391	0.209	0.481	0.668	0.432	0.432	0.295	0.324	0.270

TABLE A

Continued

	Voted Federal Election	Voted Provin Election	Voted Municip Election	Civic Participation	Volunteer	Per. Inc. >$20T	Full-Time	Tenured	Ethnic Heter	Weekly Fam Soc	Weekly Fr Soc	Weekly Sports
Sept-Iles	0.731	0.752	0.473	0.444	0.301	0.411	0.860	0.231	0.823	0.513	0.420	0.313
Baie-Comeau	0.776	0.854	0.703	0.375	0.393	0.592	0.873	0.406	0.634	0.333	0.286	0.321
Sherbrooke	0.843	0.827	0.634	0.353	0.221	0.526	0.753	0.388	0.632	0.351	0.193	0.262
Ryn Nrnda/Val DOr	0.917	0.867	0.552	0.486	0.278	0.512	0.668	0.407	0.451	0.341	0.232	0.230
Manitoba												
Winnipeg	0.712	0.759	0.640	0.548	0.343	0.567	0.798	0.331	0.755	0.585	0.365	0.320
Brandon	0.819	0.784	0.613	0.548	0.337	0.445	0.684	0.359	0.543	0.646	0.260	0.320
Saskatchewan												
Regina	0.729	0.717	0.512	0.655	0.399	0.577	0.832	0.305	0.678	0.572	0.413	0.313
Saskatoon	0.651	0.629	0.456	0.631	0.413	0.525	0.873	0.359	0.721	0.625	0.429	0.429
Moose Jaw	0.747	0.739	0.623	0.655	0.557	0.614	0.837	0.416	0.763	0.640	0.380	0.287
Prince Albert	0.834	0.840	0.722	0.631	0.345	0.499	0.848	0.485	0.701	0.665	0.286	0.310
Ontario												
Ottawa	0.743	0.700	0.590	0.486	0.313	0.633	0.794	0.355	0.808	0.472	0.360	0.274
Sudbury	0.754	0.756	0.673	0.521	0.275	0.622	0.775	0.402	0.766	0.620	0.384	0.306
Toronto	0.657	0.644	0.603	0.433	0.200	0.624	0.845	0.330	0.875	0.538	0.343	0.253
Hamilton	0.738	0.707	0.541	0.520	0.276	0.599	0.827	0.292	0.739	0.605	0.341	0.325
St. Cath-Niagara	0.696	0.718	0.641	0.433	0.276	0.559	0.804	0.374	0.800	0.721	0.413	0.319
London	0.709	0.699	0.619	0.545	0.329	0.607	0.795	0.370	0.791	0.570	0.312	0.302
Windsor	0.698	0.698	0.619	0.434	0.243	0.604	0.895	0.394	0.838	0.598	0.290	0.202
Kitchnr-Waterloo	0.675	0.665	0.562	0.470	0.271	0.645	0.853	0.293	0.833	0.624	0.356	0.270
Thunder Bay	0.783	0.780	0.722	0.544	0.305	0.576	0.804	0.361	0.738	0.587	0.427	0.290

TABLE A
Continued

	Voted Federal Election	Voted Provin Election	Voted Municip Election	Civic Participation	Volunteer	Per. Inc. > $20T	Full-Time	Tenured	Ethnic Heter	Weekly Fam Soc	Weekly Fr Soc	Weekly Sports
Oshawa	0.689	0.677	0.640	0.475	0.281	0.642	0.883	0.367	0.796	0.585	0.398	0.348
Kingston	0.701	0.620	0.602	0.433	0.278	0.615	0.655	0.302	0.666	0.499	0.337	0.352
Guelph	0.632	0.728	0.609	0.433	0.300	0.551	0.806	0.362	0.821	0.667	0.478	0.463
Brantford	0.779	0.782	0.720	0.545	0.194	0.507	0.853	0.215	0.734	0.511	0.352	0.387
Sarnia-Clrwater	0.732	0.735	0.735	0.434	0.224	0.606	1.000	0.549	0.770	0.569	0.292	0.337
North Bay	0.722	0.777	0.719	0.544	0.238	0.533	0.794	0.457	0.556	0.724	0.511	0.342
Alberta												
Calgary	0.704	0.649	0.531	0.622	0.460	0.646	0.835	0.285	0.751	0.560	0.471	0.343
Edmonton	0.691	0.665	0.565	0.558	0.345	0.634	0.794	0.266	0.805	0.553	0.418	0.313
Lethbridge	0.707	0.550	0.536	0.622	0.500	0.584	0.622	0.280	0.638	0.601	0.427	0.506
Red Deer	0.657	0.715	0.548	0.491	0.329	0.544	0.719	0.306	0.855	0.622	0.438	0.378
British Columbia												
Vancouver	0.636	0.550	0.408	0.491	0.221	0.572	0.748	0.373	0.837	0.493	0.351	0.281
Victoria	0.821	0.770	0.552	0.602	0.286	0.578	0.734	0.461	0.788	0.544	0.383	0.326
Kelowna	0.827	0.795	0.594	0.484	0.277	0.402	0.564	0.392	0.717	0.645	0.399	0.324
Matsqui	0.629	0.648	0.499	0.601	0.231	0.598	0.754	0.365	0.805	0.550	0.290	0.333
Chilliwack-Hope	0.783	0.738	0.496	0.548	0.326	0.616	0.934	0.566	0.855	0.542	0.296	0.197
Prince George	0.417	0.421	0.261	0.505	0.279	0.380	0.894	0.523	0.638	0.721	0.581	0.334

TABLE B

Latent scores, ranks, and transformed ranks by CMAs

	Latent Scores			Rank of Latent Scores			Exponentials of Ranks				Overall
	Social	Political	Economic	Soc	Pol	Eco	Social	Political	Economic	Overall	
Newfoundland											
St. John's	−0.2155	0.8952	−.5363	37	9	36	27.73	4.03	26.17	19.99	31
Corner Brk-Deer Lk	0.0071	−1.8309	−0.3183	34	48	33	23.37	72.23	22.11	37.52	46
Prince Edward Island											
Charlottetown	0.8711	0.7908	−0.2128	8	13	29	3.54	6.12	17.73	9.99	5
Summerside	0.9917	1.3491	−0.9473	5	3	43	2.14	1.25	41.06	17.44	24
Nova Scotia											
Halifax	0.1501	−0.2757	−0.2472	29	30	31	17.73	18.74	19.80	18.86	28
Sydney-Sdny Mines	0.8444	1.2931	−2.0050	9	5	48	4.03	2.14	72.23	30.74	44
New Brunswick											
St. John	0.8176	0.5426	−0.2678	10	15	32	4.53	7.25	20.92	11.90	7
Moncton	0.2613	0.7919	−0.8426	25	12	41	14.14	5.57	35.57	20.14	32
Fredericton	0.1948	0.2023	0.7818	27	21	12	15.85	11.09	5.57	10.31	6
Québec											
Chicoutimi-Jonq	−0.9908	0.4525	−0.6838	40	18	38	33.30	9.08	29.42	24.48	39
Québec	−2.5829	1.3049	−1.6602	49	4	45	100.00	1.69	48.65	49.97	47
Montréal	−1.7591	0.8128	0.5950	45	11	16	48.65	5.05	7.84	19.24	29
Hull	−2.2178	0.2880	0.3456	47	20	19	61.03	10.40	9.73	25.32	40
Trois-Rivières	−1.8153	1.6058	−2.4365	46	2	49	53.90	.83	100.00	56.42	49
Sept-Iles	0.3449	0.0200	0.1215	20	25	24	10.40	14.14	13.33	12.69	12
Baie-Comeau	−2.2389	0.8635	−0.7734	48	10	40	72.23	4.53	33.30	36.35	45

TABLE B
Continued

	Latent Scores			Rank of Latent Scores			Exponentials of Ranks				Overall
	Social	Political	Economic	Soc	Pol	Eco	Social	Political	Economic	Overall	
Sherbrooke	−1.5969	1.1591	−0.1108	44	6	28	44.50	2.59	16.77	20.83	35
Ryn Nrnda/Val Dor	−1.4212	1.6892	−1.5579	43	1	44	41.06	.41	44.50	30.24	43
Manitoba											
Winnipeg	0.1992	0.0794	0.3306	26	23	20	14.97	12.56	10.40	12.42	11
Brandon	0.7676	0.7657	−0.9222	11	14	42	5.05	6.68	38.13	18.77	27
Saskatchewan											
Regina	0.2689	−0.3015	−0.2141	24	31	30	13.33	19.80	18.74	17.43	23
Saskatoon	0.6581	−10.3232	−0.4771	13	46	35	6.12	53.90	24.72	27.89	41
Moose Jaw	0.3701	−0.1124	0.1627	18	26	22	9.08	14.97	11.81	11.94	8
Prince Albert	0.0605	0.9140	−0.6237	30	8	37	18.74	3.54	27.73	17.77	26
Ontario											
Ottawa	−0.3295	−0.2081	1.0171	38	28	7	29.42	16.77	3.06	15.08	20
Sudbury	0.3476	0.1937	0.4910	19	22	17	9.73	11.81	8.45	9.84	4
Toronto	−0.1877	−0.9012	1.9256	36	43	1	26.17	41.06	.41	20.33	34
Hamilton	0.3779	−0.2473	0.8600	16	29	9	7.84	17.73	4.03	9.28	1
St. Cath-Niagara	1.0298	−0.3183	0.6485	4	32	14	1.69	20.92	6.68	9.45	2
London	0.0440	−0.3389	1.0090	32	33	8	20.92	22.11	3.54	14.32	16
Windsor	−0.4186	−0.4908	1.6757	39	36	3	31.27	26.17	1.25	17.73	25
Kitchnr-Waterloo	0.3442	−0.7546	1.8270	21	41	2	11.09	35.57	.83	14.33	17
Thunder Bay	0.2819	0.4518	−0.0720	23	19	27	12.56	9.73	15.85	13.03	13

TABLE B
Continued

	Latent Scores			Rank of Latent Scores			Exponentials of Ranks				Overall
	Social	Political	Economic	Soc	Pol	Eco	Social	Political	Economic	Overall	
Oshawa	−0.0412	−0.7275	0.8056	35	40	11	24.72	33.30	5.05	19.43	30
Kingston	0.3763	−0.6643	0.6188	17	39	15	8.45	31.27	7.25	14.81	19
Guelph	0.9137	−0.5402	−0.0222	6	37	25	2.59	27.73	14.14	14.75	18
Brantford	0.0322	0.5236	0.1255	33	16	23	22.11	7.84	12.56	14.01	15
Sarnia-Clrwater	−1.3412	−0.3832	0.1773	42	35	21	38.13	24.72	11.09	23.29	36
North Bay	0.6737	0.0571	−1.8505	12	24	47	5.57	13.33	61.03	30.08	42
Alberta											
Calgary	0.5408	−0.8538	0.3531	14	42	18	6.68	38.13	9.08	17.07	21
Edmonton	0.5029	−0.6333	1.1100	15	38	6	7.25	29.42	2.59	12.04	9
Lethbridge	1.9088	−1.2242	−0.3574	1	45	34	.41	48.65	23.37	24.07	38
Red Deer	1.1581	−0.3437	0.6923	3	34	13	1.25	23.37	6.12	9.84	3
British Columbia											
Vancouver	0.1766	−1.6071	1.3939	28	47	4	16.77	61.03	1.69	24.02	37
Victoria	0.2840	0.4741	−0.0308	22	17	26	11.81	8.45	14.97	12.07	10
Kelowna	1.7540	0.9937	−0.7461	2	7	39	.83	3.06	31.27	13.67	14
Matsqui	0.0483	−0.9375	1.2601	31	44	5	19.80	44.50	2.14	20.14	33
Chilliwack-Hope	−1.0411	−0.1974	0.8487	41	27	10	35.57	15.85	4.53	17.24	22
Prince George	0.8922	−3.8246	−1.7429	7	49	46	3.06	100.00	53.90	52.48	48

Descriptive Statistics

	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
Latent social	−2.583	1.909	0.006	1.009	−0.893	0.482
Latent Political	−3.825	1.689	−0.011	1.007	−1.058	2.956

TABLE B
Continued

	Latent Scores			Rank of Latent Scores			Exponentials of Ranks				Overall
	Social	Political	Economic	Soc	Pol	Eco	Social	Political	Economic	Overall	
Latent Economic	−2.437	1.926	−0.010	1.008	−0.329	−0.137					
RANK of SOCIAL	1.000	49.000	25.000	14.289	0.000	−1.200					
RANK of POLITICAL	1.000	49.000	25.000	14.289	0.000	−1.200					
RANK of ECONOMIC	1.000	49.000	25.000	14.289	0.000	−1.200					
Expon ranks social with 20	0.410	100.000	20.430	20.378	1.853	4.199					
Expon ranks political with 20	0.410	100.000	20.430	20.378	1.853	4.199					
Expon ranks economic with 20	0.410	100.000	20.430	20.378	1.853	4.199					
Overall Index (weighted)	9.282	56.418	20.430	10.827	1.801	3.323					

TABLE C
Percentile distribution of exponentiated ranks for all domains and of the overall score

Percentile	Exp. ranks	Overall
5	1.0413	9.6444
10	2.1373	9.9878
15	3.2996	11.9211
20	4.5306	12.068
25	5.8459	12.8586
30	7.2498	14.0071
35	8.7644	14.5397
40	10.3978	15.0798
45	12.1829	17.3355
50	14.1354	17.732
55	16.309	18.8124
60	18.736	19.4252
65	21.5143	20.1417
70	24.7212	20.8336
75	28.5727	24.0416
80	33.3018	25.3203
85	39.5918	30.1616
90	48.6492	36.3495
95	66.6328	51.2222

NOTES

[1] One of the most recent noteworthy contributions towards understanding the concept of interest is *The Problem of Solidarity: Theories and Models*, edited by Doreian and Fararo (1998). The central idea of this book is that we need a synergy between theorizing and advanced mathematical modeling in understanding what cohesion means and how it is related to other social realities.

[2] Legitimacy, which refers to whether or not organizations (usually, political) duly represent their constituents, is inherently a group attribute. An individual level counterpart of legitimacy is a basic political right of citizenship – to vote or to select one's representative in the government in federal, provincial, or local elections. People in a cohesive society participate more in the political processes, one of which is the exercise of their right to elect their representatives in the government. As Stanley (2003, p. 12) says, "...increased social cohesion means increased political support for action to produce collective goods...", and voting is one way of expressing such political support.

[3] The heterogeneity measure is computed in this study only for those variables that have three or more categories (e.g. job types, ethnic groups, etc.); simple proportions are used for dichotomous variables. In general, the heterogeneity measures, called also *qualitative variation*, can be computed as follows:

$$\mathrm{QV} = \frac{\sum_{i \neq j} f_i f_j}{\left[\frac{n(n-1)}{2}\right] \left(\frac{F}{n}\right)^2}$$

where $f(i)$ = (weighted) frequency of the i-th category, n = number of categories, and F = total (weighted) frequency. The measure takes values from 0 to 1, indicating the degree of

heterogeneity. QV is highest when the proportions for all categories are equal – for example, in the case of a trichotomous variable, when the three categories have almost equal frequencies.

[4] This is confirmed by these statistics for the model: Model $\chi^2 = 52.55$ with $p = 0.24$, Root Mean Square Error of Approximation (RMSEA) = 0.054, Comparative Fit Index (CFI) = 0.93.

[5] As was described in the text, these transformed ranks have the same distribution across all the three domains with a mean of 20.43, a standard deviation of 20.38, a skewness of 1.853 and a kurtosis of 0.34. The interpretation of these transformed domain scores is straightforward. For example, let us consider Toronto. It has scores of 26.16, 41.06, and 0.41 for the Social, Political and Economic dimensions (recall that the smaller the score, the greater the "cohesiveness"). Thus, Toronto falls 6 points above the mean for the Social domain, but one standard deviation above the mean for the Political domain, and 20 points below the mean for the Economic domain (thus holding the first rank). It may be easier to interpret a CMA's position on a domain scale by using the percentile distribution (see Appendix Table C). This percentile distribution holds for all the three domains. Toronto's Social score, for example, falls near the 75th percentile, its Political score around 80th percentile.

[6] For example, let us consider Hamilton which gets the first rank in overall score. It holds the 9th and the 16th place in Economic and Social dimensions, which are much above the average rank of 25; its 29th place in the Political dimension is near the average. Thus, a greater weight attached to the Economic domain pushes it to the top place in overall ranking. In contrast, let us consider those CMAs which manifest average scores/ranks in all the 3 domains – for example, Thunder Bay, Victoria, Sept-îles and Winnipeg. These CMAs have their overall ranks in the tens, and looking at the percentile distribution of exponentiated ranks, they fall around the 25th percentile. As a third contrast, consider Halifax. It has greater than average scores in all three domains with an overall score of 18.86 that places it in the 55th percentile. Quebec CMA shows the lowest overall ranking because it has scores for Social and Economic domains falling above the 95th percentile, although it has a score on the Political domain falling below the 10th percentile.

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