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Operationalising Geographical Units in a Multilevel Research Model. The Case of Neighbourhoods in the Social Capital Literature.

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Abstract

This paper has two main focuses. The first is substantial and wants to test the hypothesis that the amount of facilities located in a neighbourhood positively influences the social connectedness of the residents of that neighbourhood. Second, it wants to check whether different operationalisations of neighbourhoods can influence the conclusions concerning such a research question. The data used are from the Quality of Life-survey of Ghent[1] (Belgium) during the year 2006 (n=1756). No significant influence of the presence of facilities can be found. The conclusions where the same for both operationalisations of neighbourhoods. The implications of both findings for policy and research are discussed.[2]

1. INTRODUCTION

Since the publication of *Bowling Alone: America's declining social capital* (Putnam 1995), political scientists as well as policy makers have started a quest for instruments to increase social capital in society. Within the tradition of the *Chicago School*, a number of studies focussed on how characteristics of neighbourhoods influence the social connections among inhabitants (e.g. Coulthard et. al. 2000, Wickrama & Bryant 2003). One of these characteristics is the availability of local facilities in people's living environment. It is the relationship between the presence of those facilities and social connectedness that is the main substantial focus of this paper.

[1] We would like to express our gratitude towards the city of Ghent for putting the data at our disposal.
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Just like many other studies with a geographical dimension, this research field is confronted with major difficulties regarding the operationalisation of the aggregated research units. Many studies pass over this problem, though different operationalisation can potentially lead to very different results. In this paper, two operationalisations of neighbourhoods are used. We examine whether the different classifications influence the result of our substantial analysis. The influence of operationalisations of neighbourhoods on our substantial conslusions is the main methodological focus of the paper.

To sum up, this paper has two aims. One is to examine whether the amount of facilities located in a neighbourhood influences the social connectedness of the inhabitants. The other is to see whether different operationalisations of neighbourhoods can influence the conclusions concerning such a research question. The data used are from the Quality of Life-survey of Ghent[3] (Belgium) during the year 2006 (n=1756).

1. THE THEORETICAL PROBLEM: NEIGHBOURHOODS, SOCIAL CAPITAL AND LOCAL FACILITIES.

The latest two decades, increasing attention from both researchers and policy makers has been given towards the concepts of social capital and social cohesion. Robert Putnam (1993, 1995, 2000) is one of the most important authors in this field. Especially his publication *Bowling Alone: America's Declining Social Capital* (1995), in which Putnam states that social capital in the United States has fallen dramatically since the seventies, urged scientist and politicians to find ways to increase the social connections among people.

The importance that has been attached to social capital originates from the idea that social connections and norms of reciprocity and trust generate a lot of advantages for the wider society (Coffé & Geys 2006). Nevertheless, social capital can also have a dark side. As Narayan (1999, p.10) states it: "the same ties that bind also exclude". Strong connections between people can restrict their individual freedom. Strong connections might lead to strong social control and prohibit people to rise against existing inequalities and oppression. However, in the literature social capital most frequently is associated with positive effects. People who very actively participate in social activities, also seem to have higher rates of political participation (Van Deth, 1992). Those who are better integrated in society seem to have lower rates of ethnocentrism (Jakobs et. al. 2001). Social Capital has been associated with better health (Latkin & Curry 2003, Cattell 2001, ...), economic development (Woolcock 1998, ...), and so on. Perhaps most significant of all, social integration seems to be the most important predictor of subjective well-being (Verlet & Devos, forthcomming). In other words, being well connected socially makes people happy. This is not surprising, since people are first of all social beings. Therefore, they want to interact with other people. When they can not, they start feeling unhappy, angry or unhealthy. Despite the fact that strong social connections can sometimes limit people's freedom, we must look at those connections as positive things. For being free but socially atomised can only for very few people be a satisfactory state of affairs.

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As we stated before, many scientist and politicians agree with the idea that social capital is a positive thing, and therefore seek for ways to improve the amount of social capital in our society. For that reason it is important to know what indicators can predict the level of social connectedness within people. Many individual level factors, such as tv-viewing habits, religious or philosophical involvement, age, education (Hooghe 1999), work conditions (Vézina et. al. 2004, Lindström 2006), and so on have been identified as accounting for a part of the variance in social connectedness. Next to individual indicators, attention has also been given to the effect of the living environment. Studies have brought forward that there are differences in social capital between neighbourhoods that can not be accounted for by differences of the individuals living in them (e.g. Hart & Dekker 2003). Within the tradition of the Chicago School, differences in levels of trust, shared values etc. are explained by a concentration of neighbourhood disadvantage, such as poverty, unemployment and cultural heterogeneity. For Flanders Coffé & Geys (2006) have shown that heterogeneous communes have lower rates of social capital. Another neighbourhood characteristic that could account for differences in social capital is the amount and quality of facilities located in the neighbourhood. In Britain, Bowling & Stafford (2007) have found these facilities to positively influence the social functioning of older people. It is understood that the availability of social facilities and services increases the opportunity for people to socially participate. Those facilities 'provide informal meeting places, outside home and work, where social relationships can be formed and maintained' (Witten et. al. 2001). It is that relationship, between neighbourhood facilities and social connectedness, that will be the main substantial focus of this paper.

2. THE METHODOLOGICAL PROBLEM: MEASURING NEIGHBOURHOOD EFFECTS

2.1 Respondents in neighbourhoods: violation of independence of observations

In the theoretical problem described above, we are dealing with variables measured at different levels. In our vision, social capital (or social connectedness) is an attribute of an individual. The presence of neighbourhood facilities is an attribute of neighbourhoods. Therefore we are dealing with two levels in our sample: the first level is that of the respondents, the second that of the neighbourhoods.

Ordinary Least Squares regression assumes that all observations are independent from one another. When our observations are individuals nested in neighbourhoods, this assumption tends to be violated. People in neighbourhoods might know each other, often neighbourhoods attract people with a common Socio-economic status, etc. When observations are independent, scores on a variable for one observation tell us nothing about the score on that same variable for another observation. (Cohen et. al. 2003). In more statistical terms: the average correlation between variables measured on residents of the same neighbourhood can not be higher than the overall correlation. In hierarchical datasets this is most often not the case. The correlation between observation from the dame neighbourhood (intra-class correlation) will mostly be stronger than the correlation between observations from different neighbourhoods (Rasbash et. al. 2004).

In the past, the problem with hierarchical structures was solved using aggregation or disaggregation. In our case that would mean that information of residents of a neighbourhood would be added together on the level of neighbourhoods, or that information of neighbourhoods would be assigned to the different inhabitants. However, this solution creates two problems. First of all, the researcher may come to invalid conclusions when he would analyse the data at one level, and postulate conclusion at another. In this way the researcher might make the ecological fallacy or the atomistic fallacy. A second problem is statistical. When data from a lower level are aggregated at a higher level, a lot of information is lost. But when data from a higher level are assigned to a lower level information is multiplied because there are more observations at the lower level than at the higher level. OLS-regression would consider all this information to be independent, resulting in far to small standard errors (and thus in accepting spurious relationships as real relationships). Therefore, multilevel regression modelling is used. This technique accounts for intra-class correlation by performing a regression on the regression coefficients. (Hox, 2002)

2.2 What is a neighbourhood? Defining relevant geographical units

In our present study, we are looking for the effect of a person's living environment on his social functioning. An evident difficulty that arises here, is how to define and operationalise the boundaries of such a *geographical unit*. Nevertheless, many studies investigating environmental influences on social connections pass over the issue in silence.

Scholars dedicating attention to the definition of a neighbourhood differ very much in their approaches and conceptualisations. This is not surprising, for these scholars come from a multitude of different disciplines and research fields (i.g. Chaskin 1995, Diez-Roux 2001, Dietz 2002, Moudon et. al. 2006, Coudeneys & Rammelaere 2006, Galster 2007). And even when we would agree on a definition, fixing the exact boundaries of an area remains a very difficult task. Researchers, often confronted with no better option, choose to use census tracks or another form of administrative division as operationalisations. When using fixed administrative areas for research, it is very useful to consider the criteria on which the boundaries of these areas have been decided. After all, some context-effects may disappear when they are measured in an area that is too small or too large, or that has too artificial frontiers. Checking whether the scale and boundaries of neighbourhoods used to study the effect under consideration is appropriate or not, is of importance for everyone investigating neighbourhood effects (Galster 2007). In other words, we must look for "geographical areas whose characteristics may be relevant to specific [...] outcomes being studied" (Diez-Roux 2001, p.11).

In this paper, two different operationalisations of neighbourhoods are used. In the next chapter we describe the political and historical background of the classification in neighbourhoods and the criteria used to make the division. Next we examine whether the different classifications used influence the result of our substantial analysis.

3. METHODS

3.1 The survey

Data come from the Quality of Life-survey of the city of Ghent. The city uses the survey to monitor the general quality of life of the inhabitants and have a view on the differences between neighbourhoods. Information was gathered using a postal survey. In total 4946 inhabitants of Ghent where contacted, which resulted in 1673 valid surveys, a responsrate of 33.8%. (Vandekerckhove 2006)

3.2 Dependent variables

Social capital or social cohesion can be seen as attributes of individuals or of communities. In our case, we regard them as individual traits, and therefore we might also use the term social connectedness. Following Timpone (1998) we can define social connectedness as the intensity of the relationship between the individual and his or her wider social environment.

The relationship between individual and society expresses himself in many different ways. Therefore we use several indicators to identify the relationship: the intensity of social relations, socio-cultural participation, associational life, and neighbourliness. The intensity of social relations was measured asking individuals how often they meet with friends, relatives and neighbours. Socio-cultural participation measures the amount respondents take part in cultural and sport events, go out eating or visiting a restaurant, follow trainings or courses and go on an outing. Associational Life measures how many different clubs participants actively take part in. Finally, neighbourliness combines questions on how much people like to live in the neighbourhood, are proud on their neighbourhood, etc.

3.3 Independent variables

The principle independent variable is the amount of basic facilities located in the neighbourhoods under investigation. With basic facilities we understand the kind of facilities people use in every-day life. In order to determine how much facilities were present, we asked the participants if they thought there were enough basic facilities (such as shops, banks, post offices, ...) in their neighbourhood. The respondents could answer on a scale from 1 to 5. Afterwards we calculated the average score per neighbourhood and brought this score in as a higher level-variable.

Five individual-level control variables where used, namely Gender, Age, Nationality (migrant or Belgian), the amount of hours respondents watch television and self-rated health.

3.4 The two operationalisations of neighbourhood

In our first analysis neighbourhoods are defined as statistical sectors. The statistical sectors where first defined in 1970 by the Belgian Institute for Statistics. The aim of the operation was to give the users of the information of the institute insight in the internal differences within the Belgian communes. A statistical sector is theoretically an area where services for daily needs are provided. This definition served mostly in the countryside where small villages where

determined as individual sectors. In the main agglomerations (such as Ghent), the internal division aimed first at defining sectors with a different economical en social structure. The creation of the different sectors was based on cartographic information, areal photographs and knowledge of the own region. The borders of some of the sectors where adopted several times in order to keep up with the changing demographic, economic and social structure. The sectors are the smallest operationalisations of neighbourhoods used in this article. They have an average size of more or les 1100 inhabitants, with great differences going from less than 50 till almost 5000 inhabitants. (Rousseau 1984, Jamagne 2004)

In the second analysis we use the delineation of Ghent into 25 neighbourhoods the city uses for the project *Gebiedsgerichte Werking* (Area-directed Action). The aim of the project is to enable the city to develop specific policies for different parts of the city and to enable inhabitants of those neighbourhoods to participate more directly into the policy of their neighbourhood. To realise this aims, the city gathers all kinds of information about this neighbourhoods and develops action plans for the different neighbourhoods. The borders of these neighbourhoods where drawn by the staf of the city. They primarily based themselves on the impression they had about what the people of Ghent identified as the different neighbourhoods of their cities. As a consequence, criteria are not very objective, but the division should be in line with the feelings of the Ghent population. These neighbourhoods are much bigger than the statistical sectors. They have an average size of proximally 9100 inhabitants. Information on the differences in population between the respective neighbourhoods is not at our disposition[4].

4. Analysis

In tables 1A till 2B we show the results of our analysis. We will first discuss the results of the analysis for of the models based on the sectors. Afterwards, we will discuss the differences that appear with the results of the neighbourhoods-models.

4.1 The sectors-models

For the variable *Neighbourliness*, we see that 4.34% of the variance is situated at the neighbourhood level. The second-level variance is significant, witch means neighbourhoods have a significant influence on the amount of Neighbourliness of its inhabitants. When we bring the individual-level variables in the model, nearly have of the variance at neighbourhood level disappears. This means that half of the differences between neighbourhoods can be accounted for by the differences between the people living in them. The variance remaining at neighbourhood level still is significant however. The characteristics of people significantly influencing neighbourliness are *Age*, *TV-viewing* and *Self-reported health*. In our third model we try to see of the neighbourhood variance can be accounted for by the amount of facilities present in that neighbourhood. As we can see in table 1A, the coefficient is not significant. There

[4] Most information concerning the 25 neighbourhoods was directly gathered from the staff of the city responsible for the construction of the neighbourhoods. Some information can be fined in anon. (2007) and anon. (2008).

Table 1A: Multilevel-models based on 158 statistical sectors

Independent = SCP

Variables	Model 1		Model 2		Model 3	
	β	p	β	p	β	p
intercept	**5,909*** **	0,000	**7,324*** **	0,000	**6,924*** **	0,000
Women			0,136	0,178	0,133	0,190
Age			**- 0,017*** **	0,000	**- 0,017*** **	0,000
Migrant			- 0,215	0,400	- 0,220	0,390
TV			**- 0,427*** **	0,000	**- 0,426*** **	0,000
Health			**0,316*** **	0,000	**0,315*** **	0,000
Facilities					0,132	0,318
σ^2_{u0}	**0,211** **	0,004	**0,117***	0,034	**0,115***	0,034
VPC	4,34%		2,89%		2,84%	

Independent = Neighbourliness

Variables	Model 1		Model 2		Model 3	
	β	p	β	p	β	p
intercept	**5,891*** **	0,000	**4,292*** **	0,000	**6,282*** **	0,000
Women			0,118	0,262	0,119	0,129
Age			**0,021*** **	0,000	**0,021*** **	0,000
Migrant			- 0,475	0,070	- 0,473	0,072
TV			0,079	0,076	**0,078***	0,040
Health			**0,140***	0,026	**0,140***	0,026
Facilities					- 0,099	0,532
σ^2_{u0}	**0,470*** **	0,000	**0,427*** **	0,000	**0,423*** **	0,000
VPC	10,55%		10,55%		10,00%	

Table 1B: Multilevel-model based on 158 statistical sectors

Independent = InSoRe

Variables	Model 1		Model 2		Model 3	
	β	p	β	p	β	p
intercept	**7,137*** **	0,000	**7,405*** **	0,000		
Women			- 0,008	0,928		
Age			**0,009***	0,002		
Migrant			**- 0,557***	0,014		
TV			0,012	0,353		
Health			0,049	0,098		
Facilities						
σ^2_{u0}	0,071	0,136	0,059	0,120		
VPC	2,29%		1,90%			

Independent = Clublife

Variables	Model 1		Model 2		Model 3	
	β	p	β	p	β	p
intercept	**0,975*** **	0,000	**1,173*** **	0,000		
Women			0,050	0,362		
Age			0,001	0,616		
Migrant			- 0,101	0,458		
TV			**- 0,079*** **	0,000		
Health			0,011	0,742		
Facilities						
σ^2_{u0}	0,013	0,139	0,002	0,856		
VPC	1,05%		0,16%			

Table 2A: Multilevel-models based on the 25 neighbourhoods

Independent = SCP

Variables	Model 1		Model 2		Model 3	
	β	p	β	p	β	p
intercept	**5,858*** **	0,000	**7,258*** **	0,000	**6,210*** **	0,000
Women			0,142	0,162	0,139	0,164
Age			**- 0,017*** **	0,000	**- 0,017*** **	0,000
Migrant			- 0,264	0,304	- 0,261	0,304
TV			**- 0,418*** **	0,000	**- 0,415*** **	0,000
Health			**0,315*** **	0,000	**0,316*** **	0,000
Facilities					0,362	0,072
σ^2_{u0}	**0,175***	0,016	**0,106***	0,034	**0,093***	0,044
VPC	3,60%		2,62%		2,31%	

Independent = Neighbourliness

Variables	Model 1		Model 2		Model 3	
	β	p	β	p	β	p
intercept	**5,713*** **	0,000	**4,052*** **	0,000	**9,940*** **	0,000
Women			0,113	0,282	0,115	0,272
Age			**0,022*** **	0,000	**0,022*** **	0,000
Migrant			- 0,342	0,192	- 0,344	0,194
TV			**0,090** **	0,018	**0,088** **	0,020
Health			**0,143** **	0,026	**0,142** **	0,028
Facilities					- 0,313	0,298
σ^2_{u0}	**0,369** **	0,004	**0,330** **	0,008	**0,316** **	0,006
VPC	8,20%		7,72%		7,42%	

Table 2B: Multilevel models based on 25 neighbourhoods

Independent = InSoRe

Variables	Model 1		Model 2		Model 3	
	β	p	β	p	β	p
intercept	**7,147*** **	0,000	**7,419*** **	0,000		
Women			- 0,011	0,902		
Age			**- 0,010*** **	0,000		
Migrant			**- 0,536***	0,018		
TV			0,011	0,732		
Health			0,051	0,346		
Facilities						
σ^2_{u0}	0,022	0,312	0,016	0,374		
VPC	0,71%		0,52%			

Independent = Clublife

Variables	Model 1		Model 2		Model 3	
	β	p	β	p	β	p
intercept	**0,967*** **	0,000	**1,170*** **	0,000		
Women			0,049	0,228		
Age			0,000	1,000		
Migrant			- 0,079	0,560		
TV			**- 0,074*** **	0,000		
Health			0,009	0,444		
Facilities						
σ^2_{u0}	0,017	0,090	0,013	0,300		
VPC	7,37%		1,06%			

is also nearly no descent in VPC. This means that the amount of facilities present in neighbourhoods can not explain differences in Neighbourliness between neighbourhoods.

For the *Socio-cultural participation* (SCP) we see that as much as 10.55% of the variance is situated at the neighbourhood level. This variance is highly significant. The addition of the individual-level control variables does not explain that variance at the higher level. Significant individual-level variables are *Age* and *Health*. In the third model TV-viewing becomes significant. Although there is a high amount of neighbourhood-level variance, the presence of facilities can not explain this variance (the coefficient is insignificant).

For the variables *Intensity of social relations* (InSoRe) and *Clublife* we can not identify any significant influence of the neighbourhood-level. We therefore did not perform a multilevel analysis for these variables. InSoRe and Cublife are respectively influenced by *Age* and *Nationality* and by *TV-Viewing*.

To sum up, the influence of the neighbourhood on the different forms of social connectedness taken under consideration in this paper, is relatively small. An important exception however is neighbourliness: the attachment of people to their neighbourhood is, not surprisingly, more strongly influenced by the neighbourhood itself. Still, the variability in the indicators of social connectedness can not be explained by the availability of facilities in the neighbourhood. Our main substantial hypothesis must therefore be rejected.

Though we can not identify neighbourhood-level causes of connectedness, we can draw some conclusions on the individual-level causes. Age seems to have a negative influence on socio-cultural participation, but a positive one on intensity of social relations and attachment to the neighbourhood. Older people obviously go out less, but are more attached to their neighbourhood and have more intense relationships with their family, friends and neighbours. Migrants have less intense social relations than have Belgians. For the interpretation of this result, we must go back to the operationalisation of *Nationality*. Only people with a foreign nationality are considered migrants. But in Belgian most migrants of the first generation who live in the country for a longer time, and definitely migrants of the second, third and fourth generation mostly have the Belgian nationality. People with a foreign nationality typicaly have been in the country for a smaller period, and therefore haven't got the time to build up a large social network. Very often their family still lives abroad, so relations with them are certainly less frequent. TV-viewing has a negative influence on SCP and Clublife. Clearly the amount of time people spent on watching TV competes with the amount of time they can spent on other, more social, leisure activities. Self-rated health has a positive influence on socio-cultural participation and neighbourliness. It seems logically that unhealthy people participate more often than healthy people. The influence on neighbourliness is less clear. Maybe people who perceive their health as being inferior feel bad in general through witch their perception of all kinds of things, for instance their neighbourhood, becomes more negative.

4.2 Differences with the 25 neighbourhoods-models

For SCP, the differences that appear between the two models are very small. There is slightly less variability at the neighbourhood level, but the same variables are significant as is the case in the sectors-model. The same counts for Neighbourliness, though here TV-viewing is significant in both the second and the third model. Also the introduction of individual level variables takes away more variability at the second level than is the case in the sectors-model. Here it seems that the sectors-model is more appropriate to the choice to analyse neighbourliness, then is the 25-neighbourhoods model.

Discussion

The first aim of our paper was to check the hypothesis that the amount of facilities in the neighbourhood has an influence on social connectedness. As we can see, for most of the indicators individual-level variables are of much more importance for the explanation of the phenomenon The possibility for governments to influence social connectedness trough the adaptation of the living environment seems very small. Possibly, (local) authorities should focus more on target-group specific policies, then on trying to influence the living environment. In turn, researchers should probably focus more on what brings certain subgroups to have higher or lower levels of social connectedness than others.

In our definition and operationalisation of social connectedness, we assumed the concept to be multidimensional. The results of our analysis seem to confirm this assumption, for the distinct dimensions that are investigated in this paper seem to be influenced differently by the independent variables in our model. TV-viewing, for instance, has an important negative influence on socio-cultural participation and clublife, but a positive one on neighbourliness. Being a migrant seems to negatively influence the intensity of social relations, but not the other aspects of connectedness. Fully understanding social connectedness means that all the different dimensions need to be considered.

The second aim of our paper was to check whether using different conceptualisation of neighbourhoods could have an influence on our substantial conlcusions. The analysis shows that the operationalisation here only marginally influences the results. In this example clearly the choice between the neighbourhoods does not make much difference: both in the sectors-model, as in the neighbourhoods-model we must reject our main hypothesis. But does this mean not much attention should be paid to the choices made how to determine the borders of neighbourhoods?

We are convinced that would be a false conclusion. The neighbourhood-level variance of the independents is very low, except for neighbourliness. And just for that variable we see more differences between the two models. Probably, how more influence of the neighbourhood on the independent variable, how more important the choice between two operationalisations. Trying different operationalisations is always a good thing. Even in our case, where we must

reject our hypothesis in both cases, we are more sure this conclusion is not purely influenced by our choice how to define the neighbourhoods under investigation.

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