

CAPACITY AND NEED: A SPATIAL ANALYSIS OF AUSTRALIAN COMMUNITIES

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ABSTRACT: This paper presents the results of work undertaken to develop small area indexes of community capacity and need, and apply these indexes to identify those regions in Australia with a combination of reasonably high need and good levels of community capacity. These regions form possible suggested areas for the targeting of The Smith Family's Learning for Life program. This paper provides an introduction to the work undertaken for The Smith Family; and presents a brief description of the empirical and theoretical background to the concept of 'community capacity', and of the methodology applied in developing the indexes of community capacity and need. The particular focus of this paper is on the spatial analysis used to identify high capacity and high need areas at both a state and national level. This spatial analysis mostly entails a description of the spatial distribution of the two indexes, and how they overlap.

1. INTRODUCTION

The authors recently undertook a project for The Smith Family with an overall goal of identifying Australian communities that would most benefit from The Smith Family's Learning for Life program. The project goal centred on the development of two indexes to measure a community's relative capacity and relative need. The project took place in the context of a shift in the focus of the Learning for Life program from primarily assisting individuals, to supporting communities through the inclusion of a regional targeting element.

This paper presents a brief description of the empirical and theoretical background to the project, and of the methodology applied in developing the indexes of community capacity and need. The particular focus of this paper is on the spatial analysis used to identify high capacity and high need areas at both a

state and national level.

2. COMMUNITY NEED, COMMUNITY CAPACITY AND SOCIAL CAPITAL

2.1 Community Need

Measuring socio-economic disadvantage across geographically defined communities is a fairly established practice as a means of assessing the extent of social inequities. Vinson (2004) surmised “indicators of social deprivation or disadvantage are now in wide use in many countries” (p.14). This entails localities generally being “socio-economically graded along selected census variables” (Vinson, 2001, p.1). High relative disadvantage in a community can be measured by proxy social indicators – usually from the census - strongly associated with poor life outcomes (such as a low level of education and income), or by more direct measures of social or personal problems such as crime and poor health. Some studies combine census data with these other indicators that are “more immediately reflective of personal/social problems” (Vinson, 1999, p5). A number of studies linking spatial socio-economic characteristics with reduced life outcomes, including crime and health problems, have been undertaken in Australia and overseas. Comparative indexes across countries also exist, such as the UN Human Development Index. The more common indicators used to create indexes include unemployment, welfare receipt, overcrowding of housing, low rates of training, and low skilled occupations.

The most obvious examples of census-based measures of community need in Australia are the ABS Socio-Economic Indexes for Areas (SEIFA) indexes. The SEIFA indexes are constructed using principal components analysis from census data and in 2001 comprise four indexes: the Index of Relative Socio-Economic Disadvantage, Index of Relative Socio-Economic Advantage/Disadvantage, Index of Economic Resources, and Index of Education and Occupation. They each are intended to describe different facets of the socio-economic conditions of an area, and use three ‘levels’ of variables. First level variables are education, income and occupation. The ABS puts forward that there has been a consensus that these variables are fundamental in measuring socio-economic status.

Vinson (1999 and 2004) has prepared two studies of disadvantage in Victoria and New South Wales at the Postal Area level. The latter study also includes a preliminary index of ‘social efficacy’. Vinson’s disadvantage index, slightly expanded in the 2004 study, is constructed from a range of non-census data that Vinson claims is more directly indicative of disadvantage, including the childhood accident rate, mortality rates, criminal court convictions, disability/sickness support, early school leaving, imprisonment, low birth weight, low skilled workers, low income families, disconnection of the electricity supply (thought to be an indicator of extreme financial hardship) and the long term unemployed. Collating this non-census data at the Postal Area level proved to be a large part of the challenge of Vinson’s studies, due to unavailability and restrictions (such as privacy policy) on data usage. Ten disadvantage indicators

were used in 1999 and thirteen in 2004. Although Vinson stresses the use of direct indicators as a key to the study methodology, he acknowledges a “substantial degree of overlap” between SEIFA and this project, and the 2004 results correlate quite highly with SEIFA ($r = .867$).

2.2 Community Capacity

The idea of ‘community capacity’ has emerged partly as a reaction to the established ‘needs based’ methodology associated with the study of geographical disadvantage. Community capacity is one of a relatively new range of ‘strength based’ terms and approaches that seek to focus on the assets rather than shortcomings of communities. This is an alternative perspective but one which still holds to the same general aim of addressing differences in community outcomes. Kretzmann and McKnight (1993 and 1996) have been formative in the development of the ‘strength based’ view: they are widely acknowledged as having developed the concept of *asset-based community development (ABCD)*” which includes the recognition of social capital, and the promotion of participatory development approaches.

Kretzmann and McKnight argue that there are two broad possible responses to the (United States) problem of “devastated communities”. Impacted by the loss of industrial jobs, older inner city neighbourhoods in the United States are described as troubled places, to which the traditional response, in the view of Kretzmann and McKnight, equates to simply quantifying and focusing on the deficiencies and problems that make them so. The argument from Kretzmann and McKnight is that the delivery of outside assistance to such areas therefore tends to reinforce residents’ perceptions of their own negative characteristics (for example - unemployment, drug abuse, welfare dependence), and render a psychological dependence on outside welfare services because residents are accustomed to viewing themselves in terms of their deficiencies. The broader implication is that outside assistance delivered to such areas, when assistance focuses on deficiencies, is counterproductive and ineffective.

The alternative response put forth by Kretzmann and McKnight is a capacity based focus, “to develop policies and activities based on the capacities, skills, and assets of low-income people and their neighbourhood” (p.3). In focusing on the positive characteristics of low-income people and neighbourhoods the argument is that assistance to them is ultimately more effective. Instead of needs surveys, Kretzmann and McKnight promote “regenerating” asset mapping of individual and organisational capacities and assets. Community capacity is defined by Kretzmann and McKnight as comprising primary, secondary and tertiary building blocks; ranging in significance from skills and organisations within the community, to physical infrastructure and services, then to largely external resources such as welfare and investment programs. Such asset mapping exercises are inherently positive approaches to community management and service delivery: this is a type of approach to be undertaken by individual communities, using handbook-style guides to identifying and leveraging hidden or undervalued assets.

Differences are to be expected – particularly in the required degree of

terminological specificity – between mapping an individual community’s capacities, and assessing a number of communities for their degree of relative community capacity as was attempted for the Learning for Life index. In this context, Kretzmann and McKnight provide a relevant conceptual definition for looking at community capacity, but are limited in the way of specific indicators. Also at a conceptual level, Easterling, et al. (1998) described community capacity as “the set of assets or strengths that residents individually and collectively bring to the cause of improving local quality of life” (p.12). Goodman et al. (1998) identified key dimensions of community capacity as: participation and leadership, community values, and capacity for critical reflection. The Centre for Research and Learning in Regional Australia (CRLRA) (2002) identified the following as means of measuring community capacity in surveys: leadership, associational networks, feelings of security, and civic participation.

Vinson used a very similar term, ‘collective efficacy’, in his 2004 study of *Community Adversity and Resilience*. Vinson defines collective efficacy as a combination of social cohesion and social control. Collective efficacy is an indication of the strength of relationships within a community and dedication to common interest goals (“a close-knit and trusting neighbourhood that is willing to work towards the best interest of the community”p.8). Social control is a measure of residents’ willingness to intervene in “young people’s misbehaviour”. Vinson attempted to develop a large-scale means of measuring collective efficacy – with considerable effort.

2.3 Social Capital

Woolcock (1998) put forward that the common conception is that communities with high levels of social capital are safer, cleaner, and rate highly on other measures suggesting being generally happier or healthier. ‘Social capital’ is a strongly related though not interchangeable term to community capacity, and one perhaps longer established and more often measured. Onyx views social capital as “a slippery but nonetheless important concept...slippery because it has been poorly defined, important because it refers to the basic raw material of civil society” (p.24). Like community capacity, social capital provides a strength-based view of communities.

Chaskin (2001) identified some commonalities in the discussion of social capital as including “resources...relationships, leadership, and participation” (p.293). Despite a degree of uncertainty with definitions and indicators, the concept of social capital “is important to consider because it is more theoretically and empirically developed than community capacity.” (Sustainable Communities Network, 2003, p.13) The ABS has identified social capital as an area of potential insight into a range of issues of social concern, noting that many “policy makers, social analysts and researchers” in Australia have shown an interest in the idea in relation to topics such as health, community safety, and education.

The Community Capacity index developed for this project does not seek to measure social capital explicitly. Community capacity, however, has a great

degree of overlap with this and other terms – including, as identified by the Sustainable Communities Network, “community competence, public capital, civic capital...strong communities, sustainable communities, resilient communities, and healthy communities” (p.9). Social capital and community capacity are inherently linked. The ABS workshopping process with stakeholders established that there is a strong interest in whether social capital can explain observed community capacity outcomes (ABS, 2002, p.11):

One of the major interests articulated by stakeholders is gaining an understanding why some communities adapt better to change than others, why some communities are able to do better with a given set of resources, and what influences shape community confidence in achieving goals.

Drawing on common themes in the relevant literature, and particularly upon the Aspen Institute’s (1996) definition, for the purpose of this study the choice was made to define community capacity as:

the resources and assets in a community that provide the capacity to positively address community problems and opportunities.

In this study the aim was to develop an index of capacity. While this type of study allows the assessment of measures of assets and strengths, it is much more difficult to assess the ability of a community to draw upon these strengths - as discussed below.

2.4 Measuring Community Capacity

As might be expected given the relative proliferation of needs-based indexes, in his 2003 study of *Community Adversity and Resilience*, Vinson found it easier to collate indicators of social disadvantage than of social efficacy. This is particularly so as Vinson sought direct measures of social efficacy rather than using census variables, which he termed proxy social indicators. This distinction is important - “in some studies collective social capital is measured by aggregating the social capital of individuals” (Bush and Baum, 2003) resulting, potentially, in much contextual information being lost. However, as Bush and Baum argue measuring strengths-based aspects of a community by the alternative more direct approach of measuring “the qualities of social structures, such as networks”... cannot be applied to large-scale population studies and is mainly used for local community studies”. This particular study was faced with the reality of this.

Much of the existing work on community capacity and social capital is useful for drawing out the positive characteristics of a community, but quite limited in the potential to assess large numbers of uniformly defined spatial units against each other. The existing data collection is a contributor to this difficulty. Lack of data is a major consideration in endeavouring to undertake projects such as the development of a Community Capacity index. Given that the interest from researchers is acknowledged by the ABS, this problem may be reduced in the future. For example, it is proposed by the ABS that a specific survey on social capital will be undertaken in 2005/2006.

Further, an important consideration of community capacity is the level at which it is analysed. One approach is the individual level and then aggregated to

the approximate community level – basically, survey data. The alternative view is of the social organisational level – measured by structural features and processes, suggesting the quantification of organisations and administrative structures. This implies the use of administrative data, for which jurisdictional issues mean that compiling consistent geographically disaggregated data is difficult to obtain in the correct format.

In the meantime, in Australia, there are three broad possible approaches to measuring community capacity or related concepts at a small area level:

- Analysing aggregated proxy social indicators from the existing census data.
- Collating existing alternative sources of direct measures – such as connectivity and participation within the community, and organisational data.
- Administering a new survey specifically addressing the topic.

The collection of alternative direct measures was attempted by Vinson with considerable difficulty. He explored many possible data sources unsuccessfully, and eventually drilled down to two data sources. The main data source used by Vinson was the Victorian Population Health Survey. This includes two measures incorporated into his study: the ability to get help from friends in times of need, and whether the respondent volunteers in a local group. He cites participation in local elections as a good direct indicator of cohesion, but one that is not possible to obtain at a small area level. Essentially, “it is much easier to think of data that would be relevant for the appraisal of social cohesion than to find it in existing form across 1200 post-code areas of Victoria and New South Wales” (Vinson, 2004, p. 44).

Onyx and Bullen (2000) endeavoured to explore the distribution of dimensions of social capital across communities. The Onyx and Bullen study used an individualised questionnaire of 68 relevant items with ranked answers and was applied to five communities – two rural, one outer metropolitan (Sydney) and one inner city (also Sydney). The authors used a hierarchical factor analysis to determine the relevant items – the solution in the end identified eight specific independent factors and one clear secondary factor, together accounting for 49.3% of total variance. Specific individual factors were: Participation in the Local Community, Social Agency/Proactivity in a Social Context, Feelings of Trust and Safety, Neighbourhood Connections, Family and Friends Connections, Tolerance of Diversity, Value of Life and Work Connections. This study drew out important aspects of social capital – for example, “the longer one has lived in a community, the more likely there will be stronger Neighbourhood Connections” (p.36) – but was obviously a large undertaking and limited to a small number of communities.

The advantages of using existing proxy indicators from the census are the availability and coverage of the data. Drawbacks are that the indicators can be viewed as indirect and lacking context. The key advantage of collecting direct indicators is to provide a more satisfactory measure. However, the effort of compiling consistent data across a large number of communities is much more challenging than the use of census data. Administering surveys specifically

concerned with community capacity has the advantage of providing a very direct insight into the dimensions of the issue. The resources required to apply a direct survey to a large number of communities, however, are prohibitive, and was beyond the scope of this project, which focused on using existing data only.

2.5 Issues with the Concepts and Definitions

Tautologies

The Sustainable Communities Network suggested that a number of issues in the process of defining community capacity should be borne in mind – including “understanding it as a process and an outcome” (p.6). This points to the tautologies inherent in concepts of social capital and community capacity, in that frequently the measures used to define or explain these concepts are also often used as outcomes. The same phenomena that define the existence of community capacity or social capital can also often be used to explain their success - a pertinent example may be education. A high level of educational attainment is often used as a defining characteristic of community capacity (a strength), but also used as an indicator of its potential outcomes.

Pitfalls

The presence of community capacity or social capital in a community is arguably not an entirely positive phenomenon. Pitfalls of social capital highlighted in the literature (see for example ABS, 2001 and Onyx and Bullen, 2000) include that it encourages conformity and restriction, intolerance of difference, and the strengthening of some institutions which are not of benefit to the wider public (such as organised crime). Rural and isolated communities, for example, can be expected to have higher levels of community strength measures, “however these communities are also likely to demonstrate more conservative attitudes and lack of tolerance of difference ...” (Onyx and Bullen, 2000, p. 26). In Onyx and Bullen’s study, the factor ‘Participation in the Local Community’ is strongly linked to other factors except ‘Tolerance of Diversity’. Urban communities have higher levels of the latter and lower in the former, and vice versa for small rural communities. ‘Neighbourhood Connections’ also has a limited relationship to ‘Tolerance of Diversity’. There is therefore often a “concern that social capital is highest in closed communities” (Onyx and Bullen, p. 36).

3. METHODOLOGY

3.1 Community Capacity Index – Variables Used

In developing an index of community capacity related to the Learning for Life program, consideration was taken of the aims of the program. Previous studies (see for example Vinson, 2004) that sought to measure community resilience were also considered, as well as literature that has found links between particular community characteristics and the well being of a community.

Many possible data sources were considered and evaluated, including the 2001 Census of Population and Housing, ABS national surveys, and the Household Income and Labour Dynamics of Australia (HILDA) survey. The criteria for a variable to be included in the scope of the capacity index included the extent to which the variable measures an aspect of community capacity, the availability of the variable at a geographically disaggregated level and the relevance of the variable to the Learning for Life program. Consequently, variables have all been taken from the 2001 Census and provide the level of small area data necessary for the project, as well as possessing positive characteristics that are reflective of an area possessing strong community capacity.

Eleven variables from the 2001 census were initially chosen for inclusion in the capacity index (although only ten were finally included in the index, for reasons explained in the section “creating the indexes”). These were:

- Proportion of 15-19 year olds at school/other educational institution,
- Proportion of population aged 15+ who have completed Year 12 or equivalent,
- Proportion of those aged 15+ with post-secondary qualification,
- Proportion of homes that are fully owned/being purchased,
- Proportion of population using internet at home,
- Proportion of total labour force employed,
- Proportion of population aged 15+ in labour force,
- Proportion of households with income greater than \$78,000 per annum,
- Accessibility/Remoteness Index of Australia (ARIA),
- Number of people at same address 5 years ago as a proportion of the total population (aged 5 years and above).

In selecting appropriate variables, we divided the dimensions of community capacity into six domains, each of which reflects a resource, either communal or individual, that is thought to contribute to community capacity. These domains were: Education, Housing, Internet and Computer Technology (ICT), Labour Force, Income and Remoteness. Each domain measures human, social or economic capital, and together the domains create a comprehensive base on which the index of community capacity is founded.

Human capital measures the quality of humans through their health, knowledge and skill base, and their contributions to a community (Black and Hughes, 2001). Variables within the domain of education seek to measure an

aspect of human capital. There is a consensus that levels of education within a community are strongly related to the social and economic well-being of that community (see for example Behrman and Stacey, 1997, and Lynch 2004). Consequently, variables such as school retention rates, the ratio of students to teachers and the number of persons with university qualifications have been chosen as indicators of human capital.

Economic capital is also considered to be important when determining the strength and resilience of a community. Economic capital provides both the infrastructure and the financial resources necessary for a community to function effectively and achieve a higher standard of living. Many of the variables selected from the census for the capacity index seek to quantify economic capital within a community. For example, high employment rates may mean that the ability of the community to accumulate economic capital is enhanced, and a high proportion of medium-high income households may mean a greater ability to obtain economic capital.

Social capital measures the quality of relationships and social patterns within a community (Black and Hughes, 2001). Social capital contributes significantly to the strength of a community through the existence of quality interactions between people, which promote trust, reciprocity, tolerance and a sense of belonging to a community (Black & Hughes, 2001). Putnam (2000) suggested that social capital is what facilitates the advancement of communities. The variables available for the capacity index at this time do not allow social capital to be fully quantified as such, but instead the choice was to use variables that may be considered tools for the accumulation of social capital. The proportion of people using the internet has been chosen as one of these tools. The thinking being that a high proportion of people using the internet may indicate a more connected community, as the internet can aid social participation and relationships through the provision of information, e-mail and chat rooms, and consequently the creation of stronger social networks which add to social capital. The Accessibility/Remoteness Index of Australia (ARIA) has also been used as a proxy indicator of social capital, with the reasoning that the more accessible essential services are to people, the greater likelihood of persons having the opportunity and ability to participate socially, enhancing social capital within a community.

Some of the variables chosen are often quantifying more than one type of resource. For example, employment levels capture human, economic and social capital. Human capital is enhanced through greater skill levels and experience being achieved with higher employment levels. Economic capital is heightened when employment levels are high as production is greater and incomes higher, which in turn flow on to the whole community and its ability to purchase essential infrastructure and resources. Lastly, higher employment levels also enhance social capital through providing social networks between employees, and positive role models for younger generations.

3.2 Need Index – Variables Used

In developing the index of need related to the Learning for Life program, the

aims of the program were given the main consideration. The program is aimed at giving children from economically disadvantaged backgrounds the opportunity to participate more fully in the process of education. Hence areas most in need of the program will have high levels of socio-economic disadvantage particularly related to income and educational factors.

The ABS Index of Socio-economic Disadvantage (one of the Socio-Economic Indexes for Areas (SEIFA) series) is an appropriate measure of this. SEIFA has been developed by the Australian Bureau of Statistics and provides four indexes that rank geographical areas based on their relative social and economic well being (ABS, 2003). For the purpose of the project, the Index of Socio-Economic Disadvantage was chosen. This index includes attributes such as low income, low educational attainment, high unemployment, jobs in relatively unskilled occupations and dwellings with no motor cars. For a full list of variables used to calculate the Index of Socio-Economic Disadvantage, see ABS Cat No. 2039.0.

Although it includes a variable that is the proportion of low-income families with children, the focus of the SEIFA Index of Socio-Economic Disadvantage is wider than just families with children, the target group of the Learning for Life program. Hence, it was decided to supplement the SEIFA index with information about the estimates of the number and proportion of families that were eligible for the Learning for Life program in each small area. To do this spatial microsimulation techniques were applied, which combine information from national sample surveys with regional information in the census (For more information on spatial microsimulation, see Lloyd and Harding, 2004).

The Index of Socio-Economic Disadvantage was then combined with the proportion of families eligible for the Learning for Life program to give an overall index of need for the program. This was done using principal components analysis, which is described below.

3.3 Choice of Spatial Unit

The spatial unit chosen for the development of indexes of capacity and need for the Learning for Life program was the Australian Standard Geographical Classification (ASGC 2001) Statistical Local Area (SLA). There are 1,353 SLAs in Australia in the 2001 ASGC. SLA is the base spatial unit used to collect and disseminate statistics other than those collected from the censuses.

SLAs were chosen as the most appropriate spatial unit for the construction of these indexes for a number of reasons. Firstly, the availability and quality of data at this level was seen to be much better than data at the CD level, whilst still providing a very high level of spatial disaggregation for analysis. Secondly, SLAs are considered to be a more manageable spatial unit to implement and target programs, particularly as these areas aggregate to form larger spatial units including Statistical Subdivisions (SSDs) and Local Government Areas (LGAs). The disadvantages of SLAs as a spatial unit are that they are not easily identifiable and vary in population size, with Queensland and the ACT having smaller SLAs than the other states and territories. For this reason the spatial analysis also includes state-by-state analysis.

A total of 28 SLAs have been excluded in the calculation of these indexes, due to missing values on one or more of the index input variables. Missing data on census variables and census-derived variables is due to characteristics such as low population levels, low response rates and high proportions of non-private dwellings. (For full details of exclusion criteria see, for example, SEIFA Technical Paper, ABS Cat No. 2039.0.55.001).

3.4 Creating the Indexes

Having identified variables that measure community need and community capacity, as well as deciding on a suitable unit of spatial analysis, a way to combine the variables to develop indexes of need and capacity that can be applied to each spatial area was then needed. We decided to use principal components analysis (PCA), a widely used method for developing indexes, to do this. For example, the ABS SEIFA indexes (described above) are created using PCA. The Socio-Economic Status (SES) score used by the Department of Education, Science and Training to allocate non-government school funding is another example.

Principal components analysis is a multivariate statistical procedure which reduces a number of correlated variables into one or more new variables, or principal components, which capture most of the variation of the original variables. While the procedure produces several new principal component variables, the first principal component explains the largest amount of the variation in the original variables, and can be used to capture the underlying meaning of the original set of variables. This first principal component thus becomes the index.

Having included the eleven original capacity variables in the PCA, it was found that the variable measuring the proportion of people living at the same address as 5 years ago correlated in unexpected ways with the other variables in the model. It did not appear to be contributing to the measurement of community capacity, and it was decided to drop it from the model. Using only one of the internet-use variables (internet use at home and internet use anywhere) was considered, however, as the correlation between these two variables was not overly high ($r = .77$), and as both appeared to contribute to the strength of the index, it was decided to keep them both. The ARIA variable (measuring remoteness) is quite skewed, with many SLAs receiving a value of zero, meaning not at all remote. While PCA works best with variables that are not highly skewed, a decision was made to leave the ARIA variable in the analysis (particularly given its appropriately high correlation with the final index).

These decisions left 10 variables, which were used to create the Capacity Index, and 2 variables which were used to create the Need Index. The new indexes captured the majority of the variation in the original sets of variables, and were highly correlated with the original sets of need and capacity variables.

The principal components analyses resulted in each SLA in Australia receiving two scores – one on the Need Index and one on the Capacity Index. To make these scores easier to interpret, the raw scores were standardized, giving each of the indexes a mean of 1000 and a standard deviation of 100. This is the

same method the ABS uses to standardize the SEIFA indexes (ABS, 2003). It should be noted that the indexes are designed to be used for ranking SLAs in terms of need/capacity, but should not be used to otherwise quantify relationships between regions. Thus an SLA with a score of 1000 on the Need Index is not twice as needy as an SLA with a score of 500 (see ABS, 2003).

It is important to interpret the Need and Capacity Indexes correctly. Lower scores on the Need Index reflect high disadvantage and a larger number of LFL-eligible families in an SLA. In regard to the Capacity Index, the higher the score on the index, the higher the degree of community capacity. Therefore SLAs that are appropriate for targeting by the LFL program are those with lower scores on the Need Index, and higher scores on the Capacity Index.

4. SPATIAL ANALYSIS METHODOLOGY

The aim of the spatial analysis component of the project was to identify regions in Australia that have both *high capacity* and *high need*, as measured by indexes of community capacity and community need. This process sought to allow the recommendation of potential regions for the targeting of the Smith Family Learning for Life program. The spatial analysis mostly entails a description of the spatial distribution of the two indexes, and how they overlap.

The challenge in identifying regions of high capacity and high need was to use a meaningful criteria or cut-off to successfully encompass this notion. This should take into account the spatial patterns of regions meeting these criteria (for example, are there potentially too few or too many regions, are they all in the one city, and is there any sort of meaningful commonality?). There was also a need to be conscious of what might constitute consequential and practical regions in the context of targeting the Learning for Life Program at a community level.

Although there is some intuitive element in determining criteria for regions which have 'high capacity and high need', ideally through this spatial analysis a roughly consistent and transparent definition can be applied. This type of definition may or may not be ultimately suitable for program targeting; however, this paper demonstrates how spatial analysis may provide insight into a policy decision.

4.1 Defining 'High Capacity and High Need'

Several possible criteria were reviewed for defining 'high capacity and high need', looking at which regions met these criteria and at their spatial distributions. Ultimately one particular approach was focused on and is presented, following an initial review of the results.

It should be noted here that, as the need index is scored in reverse – a lower score indicates higher need, in the same way as with the SEIFA indexes - to refer to 'high need' does not refer literally to a high score on the index itself. For convenience both indexes are referred to in terms of 'high' and 'above' when describing having *greater* capacity or *greater* need.

The regions ultimately defined as having 'high capacity and high need' for the Learning for Life program were:

- In metropolitan areas, SLAs/SSDs which were ranked in the top two

quintiles (40 percent) of regions by the index of community capacity, and in the top two quintiles (40 percent) of regions by the index of community need.

- In non-metropolitan areas, SLAs/SSDs which were ranked in the top half (50 percent) of regions by the index of community capacity, and in the top two quintiles (40 percent) of regions by the index of community need.

The differential approach to metropolitan and non-metropolitan areas was applied due to the tendency for rural areas to receive slightly lower capacity scores on average than metropolitan areas. These lower average scores are caused at least in part by the incorporation of the remoteness indicator into the capacity index.

4.2 State and Territory Analysis

Due to the likelihood that The Smith Family would want to target regions across all the states and territories, a focus on individual state and territory analysis is a large part of this study. This means defining 'high capacity' and 'high need' relative to each state and territory, as well as relative to all Australian regions.

This approach is further warranted by the fact that there are limitations presented by the inherent characteristics of Statistical Local Areas, the spatial unit used. SLAs vary in size and population between the states and territories. For example, in Queensland the average population of an SLA is 8,051 while in NSW the average population is 32,019. As a result, there is a risk of overrepresentation of certain States and Territories when regions are defined and ranked at the national level. Although some degree of variation between states and territories is in part intrinsic to the indexes, some areas might be discernibly suitable for the program with reference to the scale of their state or territory, but not rank highly on a national level. It is noted that the initial findings looking at SLAs at the national level are not especially useful, and analysis on a state and territory basis and at a larger geographical scale (Statistical Subdivision), as discussed below, provided a better measure.

4.3 Aggregating to Statistical Subdivision level

Partly because SLAs can be small and vary in size and number between states and territories and also because it was considered that a larger unit may be more useful for management of the Learning for Life program, this spatial analysis ultimately presents the results when aggregated to the Statistical Subdivision (SSD) level. Statistical Subdivisions are a larger spatial unit than SLAs (of which they are direct aggregations) and are more uniformly distributed both by population and across the states and territories.

This being said, the indexes were prepared for SLAs and the results and findings at the SLA level are vital and informative. Were a spatial analysis to *begin* at a larger unit this would compound the effect of the Modifiable Areal Unit problem – in that the larger the areal unit used to display the underlying data, the greater the smoothing effect and potential inflated inferences. This

disguises smaller level patterns.

However, it is more plausible and practical to recommend possible regions at a larger scale. Thus the indexes are aggregated to the Statistical Subdivision level, with population weighting. Population weighting means that the populations of the SLAs making up a SSD, and their respective index scores, are taken into account in calculating the index for and SSD. An SLA with a large population will contribute more to the index than an SLA with a small population. This method of aggregation is contingent upon first having the SLA results (the indexes themselves are not recalculated for SSDs).

5. SPATIAL ANALYSIS FINDINGS

The spatial analysis findings presented here are comparisons of the indexes at the ASGC Statistical Subdivision scale; firstly at the national level and then at a state and territory level. As noted the indexes have not been recalculated at the SSD level but rather aggregated up from the SLA level. A spatial analysis was carried out and presented to The Smith Family at the SLA level at the national level and for each state and territory. These results have not been included here due to insufficient space to cover the volume of the work done, as well as the decision described above regarding the usefulness of SSD-based analysis in regional targeting of services

5.1 Statistical Subdivisions at the National Level

The Capacity Index

A capacity index score was calculated for each Statistical Subdivision (SSD) by summing up the scores of SLAs within each SSD with a weighting according to the population in each small region. The distribution of the capacity index at the SSD level is no longer standardised to a mean of 1000, and the overall average score is 975 (Table 1). Victoria has an average score of 1,000 and the ACT of 1,150, remembering that the higher the score, the higher the capacity. The other states and territories have averages below 1,000 at the SSD level. The median scores are generally lower than the averages, and the national median community capacity score at the SSD level is 963.

When aggregated to the SSD level, regions in the 'very high' capacity quintile map reasonably closely to those that ranked highly in the SLA level analysis. Statistical Subdivisions in the North and Inner South of Sydney, the east of Melbourne, inner Brisbane, and all of Canberra have very high capacity levels. The distribution is more blunted in Adelaide, Hobart, Perth and Darwin – where there are only four or five SSDs in total in the metropolitan Statistical Division. Notably, Eastern and South Adelaide SSDs have 'very high' capacity, whereas northern and western Adelaide has 'average' capacity. Similarly, Perth is divided into three SSDs of 'very high' capacity and three of 'high' capacity.

The Need Index

The need index at the Statistical Subdivision level has an overall average score of 975 (Table 2). Victoria has an average score of 1,004 and the ACT of 1,097. The other states and territories have averages below 1,000 at the SSD

level (this means greater need – the ACT and Victoria thus have generally low need and high capacity). The national median need score at the SSD level is 975.

High need SSDs reflect the underlying SLA patterns. South-west Sydney, the inner south of Brisbane, pockets of north western and south eastern Melbourne and northern Adelaide are metropolitan areas with high levels of need. Most inland rural areas also have high levels of community need. The regions of very low need include inner west of Brisbane, northern Sydney, eastern Melbourne, and most of Canberra and Perth. Again, Perth, Adelaide, Darwin and Hobart do suffer from the smoothing effect of only a few SSDs in the metropolitan area.

Table 1. Capacity Index: Basic Statistics by State and Territory

	N	Capacity Index (Population Weighted) Average	Capacity Index (Population Weighted) Median
NSW	49	982	962
VICT	45	1000	988
QLD	30	965	965
SA	20	949	941
WA	28	960	954
TAS	8	917	909
NT	11	872	851
ACT	8	1150	1162
Australia	199	975	963

Source: Authors' Calculations

Table 2. The Need Index: Basic Statistics by State and Territory

	N	Need Index (Population Weighted) Average	Need Index (Population Weighted) Median
NSW	49	982	966
VICT	45	1004	997
QLD	30	957	960
SA	20	975	977
WA	28	965	975
TAS	8	941	939
NT	11	843	857
ACT	8	1097	1093
Australia	199	975	975

Source: Authors' Calculations

'High Capacity' and 'High Need' Areas

Combining the metropolitan SSDs in the top two national quintiles of both indexes, with the non-metropolitan SSDs in the top two quintiles of need and above the median of the capacity index, gives the list of 21 SSDs shown in Table 3 and mapped in Figure 1. This was the initial potential list of target regions of high capacity and high need – as defined at the national level. This list includes no potential target regions in South Australia or the ACT.

Table 3. SSDs – Potential Target Regions (National Level)

Statistical Subdivision	State	Population	Capacity Index	Need Index
Logan City	QLD	164,541	990	867
Palmerston-East Arm	NT	20,788	995	890
Blacktown	NSW	256,364	1008	912
Hume City	VIC	131,585	997	914
Thuringowa City Part A	QLD	43,973	1005	922
Canterbury-Bankstown	NSW	296,551	989	936
Outer South Western Sydney	NSW	226,928	1013	945
Gladstone	QLD	39,003	988	957
Greater Bendigo City Part A	VIC	75,839	981	959
Wagga Wagga	NSW	50,634	1011	961
Bunbury	WA	46,913	989	962
Nowra-Bomaderry	NSW	28,876	965	909
Greater Shepparton City Part A	VIC	42,749	968	932
La Trobe Valley	VIC	71,088	964	934
Rockhampton	QLD	62,845	969	937
Dubbo	NSW	34,232	965	946
Mackay City Part A	QLD	63,145	972	950
Gladstone	QLD	39,003	988	957
Greater Bendigo City Part A	VIC	75,839	981	959
Newcastle	NSW	470,610	972	960
Wagga Wagga	NSW	50,634	1011	961

Notes: Highlighted areas are non-metropolitan. The capacity and need indexes are calculated from the SLA index scores and population weighted.

Source: Authors' calculations.

Apart from this limitation, the nationally defined list at Table 3 provides positive and intuitively sensible results. Most of the SSDs listed are in lower socioeconomic status areas of capital cities, or regional centres, and in both cases the regions tend to be known for a large existing or past industrial presence. For example, Gladstone and Bunbury (significant port towns), and the La Trobe Valley in Victoria and Newcastle in New South Wales (formerly based on energy and steel industries).

5.2 State and Territory Analysis

In order to be able to identify high need/high capacity regions in all states and territories (an important issue for the practical application of the indexes), we also undertook a review of distributions at the state level.

Through a state and territory analysis of the indexes at the Statistical Subdivision level a total of 33 potential target regions were highlighted as potential target regions relative to their states and territories. The majority of these possible target regions are in New South Wales (9), Victoria (11) and Queensland (5). This distribution is consistent with populations.

There are one or two potential SSDs in each state and territory, although to include the ACT required a more relaxed definition than used previously. Probably as a product of the small number of SSDs in the ACT, the low level of

variance in the indexes for the ACT, and the less clear spatial delineation of the indexes, it was difficult to identify a region in the ACT of 'high capacity and high need' given the definition applied. No Statistical Subdivisions had scores on both indexes in the top two quintiles for ACT SSDs on each index. Instead, the Belconnen SSD has been chosen as it scores above average on both indexes. It should be noted that this is not as strong a definition as used for the other states and territories.

There are more non-metropolitan SSDs than metropolitan SSDs in the suggested list, and it may be that in the effort to avoid metropolitan bias there has been overcompensation in favour of rural over urban regions.

Thus, the suggested target regions for the program (based on findings at the state/territory scale at the SSD level) are illustrated in Figure 2. They are also listed in Table 4.

6. CONCLUSIONS

The overall goal of the project this paper describes was to identify Australian communities which would most benefit from The Smith Family's Learning for Life program. This was done by developing indexes of both community capacity and need. This paper particularly focused on describing the spatial analysis through which possible suggested target regions that have **both** moderate to high capacity and moderate to high need were identified. This spatial analysis mostly entailed a description of the spatial distribution of the two indexes, and how they overlap. Through this process, 33 target regions were highlighted by the indexes of community capacity and need as potential regions for the program.

Community capacity and similar terminologies have been popular topics of debate in the literature for several years, and have featured in recent government policy. This paper acknowledges the difficulties and limitations inherent in both the concept of 'community capacity' and the available means of satisfactorily quantifying this. However, a major facet of this project was the collection and amalgamation of suitable and accessible data sources at a small area level. The methodology utilises existing data sources and provides a geographically comprehensive means of comparing Australian regions in relation to a topic of increasing policy relevance and research interest. This type of national analysis is not available in existing quantitative work in the area of community capacity, which is often focused on individual areas. The methodology applied here is an approach which can be used to inform decision making for policy work on a larger geographic scale.

The findings will be used to improve the targeting and outcomes of an important and wide-reaching community organisation by highlighting regions that possess both moderate to high levels of community capacity and high levels of need.

Table 4. Possible Suggested Learning for Life Regions

Statistical Subdivision	STE	Population	Capacity Index - Population Weighted	Need Index - Population Weighted	In National Results	In State Results
East Arnhem	NT	13,136	850.86	693.255		yes
Logan City	QLD	164,541	990.47	867.142	Yes	yes
Fairfield-Liverpool	NSW	336,223	974.91	874.657		yes
Palmerston-East Arm	NT	20,788	995.07	890.423	Yes	
Burnie-Devonport	TAS	73,682	908.75	903.984		yes
Nowra-Bomaderry	NSW	28,876	964.94	908.81	Yes	yes
Blacktown	NSW	256,364	1008.45	911.566	Yes	yes
Northern Adelaide	SA	337,580	969.39	913.263		yes
Hume City	VIC	131,585	996.71	913.814	Yes	
Thuringowa City Part A	QLD	43,973	1004.56	921.947	Yes	yes
Greater Shepparton City Part A	VIC	42,749	968.3	931.57	Yes	
La Trobe Valley	VIC	71,088	963.66	933.938	Yes	
Canterbury-Bankstown	NSW	296,551	988.85	936.409	Yes	yes
Rockhampton	QLD	62,845	969.41	937.391	Yes	yes
Tamworth	NSW	40,878	961.78	943.849		yes
Outer South Western Sydney	NSW	226,928	1013.14	944.587	Yes	yes
Dubbo	NSW	34,232	964.99	945.62	Yes	yes
King	WA	39,307	954.02	948.749		yes
Mackay City Part A	QLD	63,145	972.02	949.5	Yes	
Gladstone	QLD	39,003	988.45	956.931	Yes	
Greater Bendigo City Part A	VIC	75,839	981.18	959.163	Yes	
Newcastle	NSW	470,610	972.15	960.049	Yes	
Wagga Wagga	NSW	50,634	1011.06	961.2	Yes	
Western Adelaide	SA	202,634	970.94	961.542		yes
Bunbury	WA	46,913	989.07	962.102	Yes	
Western Melbourne	VIC	409,790	1010.5	963.88		yes
Ballarat City	VIC	80,045	990.23	966.932		yes
Wodonga	VIC	43,802	1001.84	967.666		yes
Greater Geelong City Part A	VIC	151,851	995.19	972.774		yes
South Eastern Outer Melbourne	VIC	221,479	1025.84	976.105		yes
Frankston City	VIC	110,179	1012.84	978.791		yes
Melton-Wyndham	VIC	136,999	1033.47	983.434		yes
Belconnen ^a	ACT	82,198	1151.04	1078.74		

a Belconnen has much lower need but is included as a concession to inclusion of all states and territories. See the text above.

Note: Highlighted areas are non-metropolitan. Areas are sorted from greatest need to lowest need.

Source: Authors' calculations.

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Figure 1. High Capacity and High Need – Australian SSDs



