THE SOCIAL AND SPATIAL STRUCTURE OF SOUTH-EAST QUEENSLAND

John Western
Department of Anthropology and Sociology, University of Queensland, St Lucia, Qld, 4072, Australia.

Alison Larnach
Australian Housing and Urban Research Institute,Queensland University of Technology, G.P.O. Box 2434, Brisbane, Qld. 4001, Australia.

ABSTRACT   In order to understand urban development processes we need to develop analytical procedures that recognise the complexity of the urban system and are prepared to draw on the approaches of several disciplines. To this end the analysis provided in this paper is a component of a broader project concerned with developing improved methodologies for the integrated study of social, economic and environmental issues in South East Queensland. In this paper the results of a factorial ecology for the South East Queensland urban region are reported. A brief discussion of urban structural and social change introduces the issues that provide the context for the study and then six measures of socio-economic structure are developed from a factor analysis of data taken from the 1991 Census of Population and Housing. The reliability, spatial distribution and intercorrelation of these measures is discussed. Further, a cluster analysis of the measures enables the construction of a typology of statistical local areas (SLAs). The six measures and a typology of how they are spatially manifested are useful descriptive tools in themselves but more importantly, they will enable further research on the development of composite quality of life indexes and the links between socio-economic characteristics and economic and environmental performance.

1. INTRODUCTION

This introduction briefly surveys some of the issues that influence the social and economic structure of cities and suggests that the application of a long established, but currently out of favour, methodology (factorial ecology) may provide a valuable empirical perspective.

Over the last decade, European and North American researchers have drawn attention to the marked changes in urban social and spatial structure that occurred with the demise of old style cities and the emergence of new urban forms. Notable among the former are declining industrial cities like Detroit and epitomising the latter are emerging global cities like London and New York. Other new urban forms are evident as well, one of the most dramatic being the polycentric, or multinucleated, urban region. Typically these are compact regions comprising a number of cities of different size, towns, acreage residential areas, farmlands and natural environments. The Los Angeles basin typifies this development in the United States while South East Queensland is possibly the most striking Australian

example.

The demise of old cities and emergence of new urban forms have been attributed to the significant social and economic changes that occurred in the late twentieth century. Globalisation has been manifested in the increasing independence of cities and regions from nations and their consequent exposure to international trends. Within urban regions the effect of economic restructuring, growth of the service sector and changing employment opportunities is argued to be compounding economic, political and social divisions.

The term social polarisation describes this increasing divide between an 'underclass' and the more advantaged in a society. Hamnett (1994), Marcuse (1993), Sassen (1991) and others have contributed to a growing literature on the definition, measurement and implications of social polarisation. For Australia, Raskill and Urquhart (1995) have shown a growing income polarisation in the major Australian cities during the 1980s, and particularly in Sydney and Melbourne (see also Gregory and Hunter, 1995). To date incomplete definition of appropriate indicators (besides income) and inadequate data at a low spatial level have hampered rigorous testing of the social polarisation thesis. Application of the measures developed here to previous periods would provide an opportunity to test the social polarisation thesis by examining patterns of socio-economic differentiation over time.

To specify and analyse the nature of the South East Queensland urban region we have employed factor analysis techniques. Factorial ecology is a multi-variate methodology for analysing the spatial dimension of urban socio-economic structure. In this paper a review of past applications of the technique and contemporary developments in urban social and spatial structure suggests that the traditionally descriptive role of factorial ecology can be extended to create summary dimensions of socio-economic structure within a conceptual framework consistent with empirical developments and theoretical research.

The remainder of the paper details the data and methodology employed and identifies six measures - non-traditional household structure, traditional household structure, high socio-economic status, low socio-economic status, ethnicity and social disadvantage. A series of figures shows the spatial patterning of these dimensions in the South East Queensland Region. It is possible to investigate associations between the spatial distribution of these individual dimensions by creating a typology which classifies areas with similar characteristics, as measured by the six dimensions, into five groups. A discussion of the patterns revealed by this classification provides insights into the spatial expression of variations in the urban population.

2. FACTORIAL ECOLOGY

Factorial ecology refers to the use of a large pool of variables as input to an exploratory technique for determining the underlying structure of an area of interest. This method was introduced in 1950 by Shevky and Bell with the aim of understanding residential differentiation within cities. They identified three major

dimensions of differentiation: socio-economic status of residents, family status (primary birthrates and women's participation in the labour force) and segregated ethnic groups (Shevky and Bell, 1955). The same three dimensions were identified in a large number of factorial ecologies which were undertaken in the United States in the 1950s and 1960s. Similar studies were carried out in Australia by Duncan Timms (1971) and Frank Jones (1968). In comparing the ecological structure of Brisbane and Auckland, Timms identified similar dimensions, although he notes that in the Brisbane analysis, two distinct family-related factors could be identified. One of these denoted a young family suburban dimension of differentiation, the other indicated a non-family or family dissolution factor. Jones (1968), in a study of Melbourne, identified three major factors which he described as socio-economic status, household composition and north-western European settlers. In reviewing these three studies Timms concluded that "the factorial ecology of Melbourne has a great deal in common with that of Brisbane and Auckland" (Timms, 1971; 83).

More recently, Stimson (1982), in *The Australian City*, reviews studies that were undertaken in Sydney and Adelaide at the time of the 1971 Census, and Perth at the time of the 1976 Census. In addition, Logan *et al.*'s work (1975) which was an examination of social differentiation among residential areas in all Australian capital cities based on the 1971 Census, is discussed. The net result of all of these analyses was the identification of dimensions that can broadly be described as socio-economic status, family structure and ethnicity.

From the early 1970s, the application of factorial ecology to urban analysis virtually ceased. In his influential work *The Urban Question*, Manuel Castells (1977) suggests that while social area analysis and factorial ecology had enabled the spatial location of particular social categories to be identified, it offered no explanation of the factors responsible for the observed social patterning. Subsequent work has argued that to understand urban phenomena it is necessary to recognise that the economies of advanced societies rest on the process of consumption and that consumption processes are increasingly organised in terms of collective consumption such as housing, schools, health services and leisure. Debate about the management of collective consumption means the entire urban perspective becomes politicised and political opinions become linked to the class structure of the society. A recognition of the increasing politicisation of urban affairs has been central to both the theoretical developments and empirical research of the new urban sociology (Castells, 1989).

A great deal of work at a general conceptual and theoretical level has followed from the initial formulation of Castells (Harloe, Pickvance and Urry, 1990). This work is concerned with attempting to understand contemporary urban regional development. Initially it focused on cities and regions in decline, specifically those affected by deindustrialization (see for example Anderson *et al.*, 1983; Hill and Negri, 1987) while more recent efforts have focused on the rise of new urban forms, notably global cities like London, New York and Tokyo. These new global cities are playing critical economic, political, social and cultural roles in the

development of the contemporary world and in urban development specifically (see Fainstein *et al.*, 1992; Fujita, 1991; Mollenkopf and Castells, 1991; Smith 1989; Blakeley and Stimson, 1992).

The conceptual analyses these authors have undertaken can provide the theoretical framework needed to understand and explain the socially and spatially patterned dimensions of social differentiation, family structure and ethnicity identified in earlier factorial ecologies.

3. THE FACTORIAL ECOLOGY OF SOUTH EAST QUEENSLAND

The rapid development of South East Queensland over the last 25 years has given rise to a polycentric urban region covering an area of 200 kilometres by 100 kilometres in size and comprising a metropolitan area (Brisbane), other cities (the Gold Coast and Sunshine Coast), additional urban centres (Beaudesert and Laidley, for example), acreage residential districts abutting these towns and cities, extensive tracts of rural land and areas of natural environment. This new and unique urban region contains Australia's fastest growing urban centres. The Gold Coast and the Sunshine Coast, for example, are the most rapidly developing urban centres of 100, 000 and over population, while the Brisbane metropolitan region has the second fastest rate of population growth of Australia's large metropolitan areas, centres of

1, 000, 000 or more people. In demographic terms, the region is growing as a result of the largest internal migration in Australia's history: the continuing movement of people from New South Wales, Victoria and South Australia to Queensland (see Bell, 1992; Rowland, 1979; Maher, 1993).

The Australian Census of Population and Housing collects a great deal of data about the socio-demographic and economic circumstances of individuals and households[1]. The present analysis is based on the 1991 Census and the choice of variables for inclusion in the analysis was based on theories of urbanisation, past factorial ecologies and *á priori* knowledge of the population characteristics of South East Queensland (Appendix I provides a complete list of the 76 variables selected)[2]. The primary units of analysis are ABS Statistical Local Areas (SLAs) which, in cities, roughly correspond to suburbs and known urban areas. However, existing 1991 Census Boundaries were modified according to boundaries derived by the Queensland Department of Housing and Local Government. These are sub-

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[1]   The Australian Bureau of Statistics (ABS) produces Socio-Economic Indexes for Areas (SEIFA). Although these measure similar characteristics to those measured in the present analysis, Tyler and Morrison (1996) have shown that the ABS measures are not sufficiently sensitive to the complexities and spatial disparities inherent in socio-economic patterns. Thus, the region-specific measures developed here can be expected to provide a more sensitive measure of South-East Queensland's socio-economic structure.

[2]   An initial set of variables was derived from the research interests of a multidisciplinary group, those variables most highly correlated with each other were excluded.

divisions of existing SLAs (Ipswich, Redcliffe, Caboolture, Maroochy Parts A and B and Noosa) outside Brisbane City. The basis for disaggregating these areas is that their size and rates of change mean it is impractical to consider them as homogeneous regions.

In order to determine the factors that best represent the data, a principal components analysis followed by a varimax rotation of the 76 variables was undertaken. The principal components analysis is based on the correlation matrix derived by intercorrelating the 76 variables. The analysis reduces these variables to a summary set of factors based on the percent of variance in the data matrix explained by each factor. A general criteria for the retention of factors for further analysis is that only those with an eigen value (the sum of squares of the factor loadings) greater than 1 should be retained. The eleven factors meeting this criteria and retained in the analysis explained 57.45 per cent of the total variance in the data matrix.

The varimax rotation, by maximising both high and low factor loadings, identifies a set of independent or orthogonal factors which can be meaningfully interpreted. The varimax rotation revealed four factors on which selected variables loaded highly and which were relatively easily interpretable in terms of their similarity to factors identified in earlier analyses. The four factors together with the variables defining them and their factor loadings are shown in Table 1. As can be seen, factor one contains a number of variables relating to household characteristics; factor two contains variables relating to socio-economic status and factor three comprises variables relating to ethnicity. All are very similar to the factors extracted in the factorial ecologies discussed earlier. The addition is a factor relating to unemployment (factor 4) and one which was not revealed in the earlier work.

This varimax rotation has produced a set of factors almost identical in important respects to those obtained in factorial ecologies undertaken over the past forty years. However, in order to develop a set of measures to inform the integrated study of social, economic and environmental issues in South East Queensland, both the household structure and socio-economic status factors have been split into two components. The identification of positive and negative manifestations of these dimensions is believed to be more appropriate for the purpose of developing indicators of social structure, this is borne out by the results of the cluster analysis.

Inspection of both factors 1 and 2 indicate that there are variables with high positive and high negative factor loadings on each, these can be seen as providing two measures of household characteristics and socio-economic status respectively. The same does not apply to the factors dealing with ethnicity and unemployment for which all variables included exhibit positive factor loadings.

Table 1. Factor Structure

Factor	Variables	Loading
Household Structure	% Lone person household	0.89
	% Dwellings rented (non-govt.)	0.88
	% Medium/high density dwellings	0.81
	% Households with 0 cars	0.79
	% Person divorced/separated	0.66
	% Annual hh income < $16 000	0.66
	% Group households	0.61
	% Rec, personal and other services	0.59
	% Persons aged 64 or more	0.56
	% Persons never married	0.50
	% Two parent family households	-0.96
	% Persons aged 5 - 14	-0.89
	% Dwellings being purchased	-0.79
	% JTW -private transport	-0.69
	% Female labourforce part-time	-0.56
	% Persons age 0 - 4	-0.53
	% Households with 3+ cars	-0.53
Socio-Economic Status	% LF graduate qualifications	0.94
	% Females emp as professionals	0.91
	% Managers, ad and professionals	0.86
	% Fin, prop and business services	0.78
	% Community services	0.69
	% Annual household income > $70 000	0.68
	% LF with no qualifications	-0.87
	% Tradesperson	-0.81
	% Labourers	-0.70
	% Manufacturing	-0.64
	% Left school < 15 yrs	-0.62
	% Vocational qualifications	-0.53
Ethnicity	% Persons - non-Christian	0.78
	% Born in SE Asia	0.78
	% Born Southern Europe	0.60
	% Born Eastern Europe	0.56
	% Born USSR	0.47
	% Born Sth/Central America	0.45
Disadvantage	% Unemployed females	0.63
	% Unemployed males	0.60
	% Dwellings rented (government)	0.60
	% Single parent familyl households	0.57
	% Labour force 15-19 unemployed	0.51

The first measure of household characteristics comprises variables indicative of 'non-traditional' household structure and family structure. Variables included are the proportion of lone person households; separated or divorced households; households without a vehicle; medium to high density dwellings; privately rented

dwellings; low family incomes and persons employed in recreational, personal and other services. The second measure, comprises the variables with negative factor loadings. It shows strong correlations with variables describing two parent households, children in the age group 0-4 and 5-14; dwellings being purchased; travel to work by private transport and owning multiple motor vehicles. This suggests a measure of household and family structure which can be termed 'traditional' household structure, in the sense that it refers to the nuclear family, the goal of home ownership and car ownership which are historically typical characteristics of Australian society.

In the same way factor 2 can be seen as providing two measures of socio-economic status. The first measure consists of variables with high positive factor loadings. These include labour force participants with graduate qualifications; females employed as professionals; persons employed as managers, administrators and professionals; families with annual incomes over $70,000 and persons employed in community services (including health, education and other community services) and finance, property and business services. The variables associated with this measure appear to provide an indicator of high socio-economic status (SES). In contrast the variables which define the second measure all have negative factor loadings and describe lower SES. They include the proportion of persons employed as labourers and trades persons; persons employed in manufacturing; population who left school before the age of 15; labour force with no qualification and labour force with vocational qualifications only.

Returning to the factor provisionally entitled ethnicity, we see that it is defined, in order of factor loadings, by percentage of non-Christian persons, percentage of immigrants born in South East Asia, Southern Europe, Eastern Europe, USSR and South and Central America.

Finally the unemployment factor is a composite identifying unemployment, for males and females overall and 15-19 year olds in particular, and associated characteristics of public housing and single parent households. In contrast to the low SES measure, which describes the proportion of the labour force who have low levels of education and work in predominantly unskilled industries or occupations, this measure appears to represent the relationship between unemployment and household characteristics suggesting a more general indicator of disadvantage.

In summary, the results of the principal components analysis and the varimax rotation has led to the identification of six major measures. The first we have called non-traditional household structure, the second traditional household structure, the third high SES, the fourth low SES, the fifth ethnicity and the sixth social disadvantage.

The reliability or stability of these measures can be further assessed from a coefficient (Cronbachs' Alpha) which measures the extent to which the variables in the six measures are intercorrelated. Table 2 provides the Cronbach Alpha for each of the measures. All are relatively high indicating that the measures have an acceptable level of reliability. This is a useful measure in the present context as

earlier we took the perhaps unusual step of splitting two factors into four measures. The reliabilities of the four measures are sufficiently high for them to be used separately with confidence in later analyses.

The units which formed the basis for the factorial ecology were statistical local areas (SLAs). Calculation of scores for each statistical local area on each of the measures of social structure identified above facilitates discussion of the spatial distribution of these measures within the region. These scores may be calculated in one of two ways. Firstly, by multiplying the standardised value of each variable included in the principle components analysis by the corresponding factor score coefficient and secondly by basing the scores only on those variables included in the relevant measures and assigning each SLA scores of 0 or 1 for each variable in each measure according to whether the SLA was above or below the median value for that variable. It has been demonstrated that both these methods will yield similar results that are broadly comparable (Horn : 1965). Given that two factors had been divided into four measures and that we have used the factor analytic procedures to construct a series of measures, the second and in fact simpler procedure was preferred.

Scores for each of the 300 SLAs on each of the six measures were then calculated. The data is displayed visually in Figures 1 to 6.

The non-traditional SLAs are concentrated in Brisbane and Gold Coast cities, with suburbs around Brisbane and in the coastal hinterland scoring next most highly on this measure (Figure 1). This reflects the increased heterogeneity of household types found in urban centres as opposed to non-urban areas. While, in spatial terms, the majority of the region has below average scores on the non-traditional lifestyle measure, considerably higher population densities in the high-scoring areas means that these figures do not necessarily translate to numbers of households.

Traditional household structure, as shown in Figure 2, reveals a more definite pattern of contiguous areas sharing similar profiles than was the case with the previous measure. The areas with highest scores (Noosa, Maroochy, Caboolture, Pine Rivers, Moreton, Laidley, Gatton, Beaudesert and Albert Shires as well as fringe suburbs of Brisbane city and the Gold Coast) correspond to the rapidly developing suburban and semi-rural areas of the region where the availability

Table 2. Cronbach's Alpha Coefficient for Six Social Structural Measures

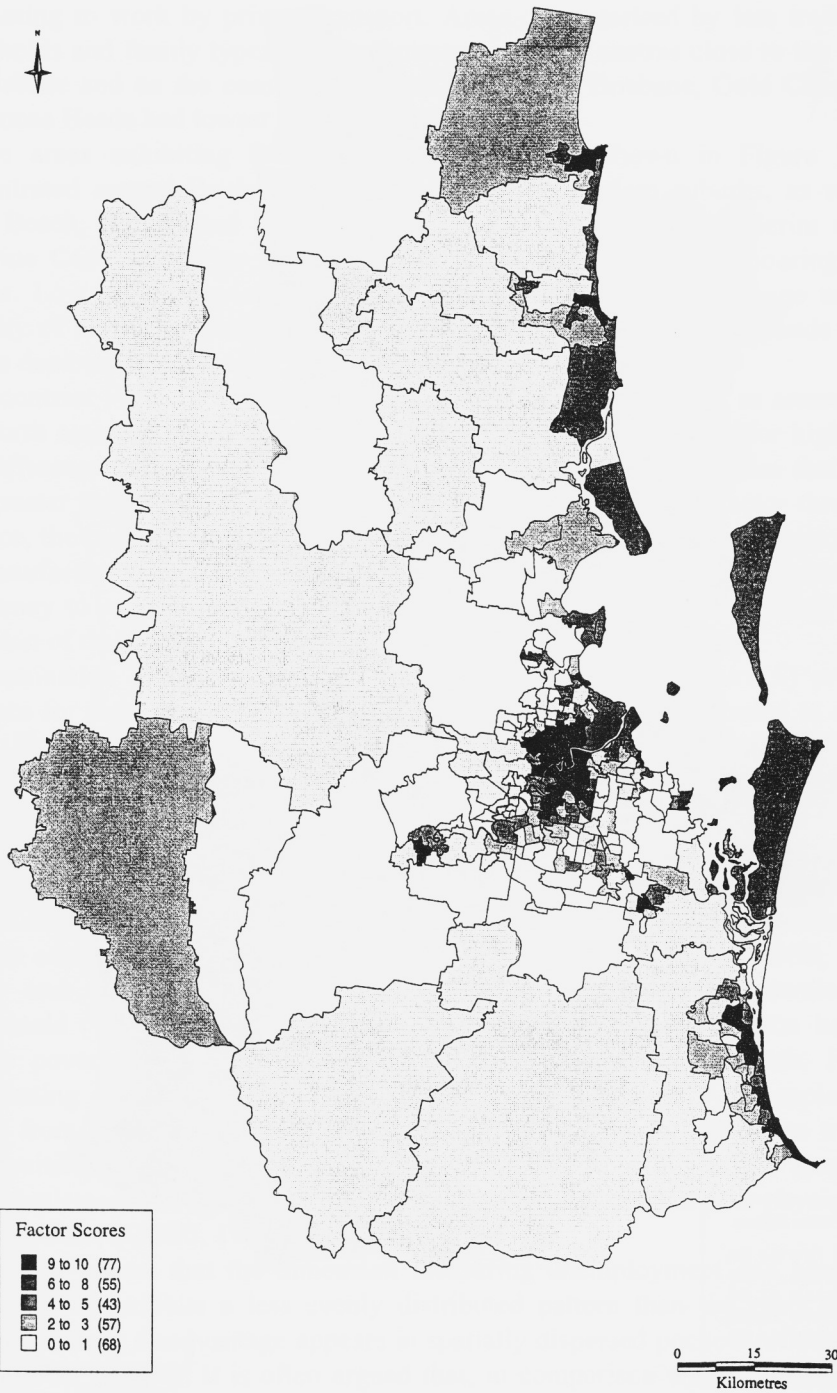| Measures	Raw	Standardised
Non traditional households	0.89	0.91
Traditional households	0.83	0.87
High socio economic status	0.89	0.92
Low socio economic status	0.85	0.85
Ethnicity	0.73	0.79
Social Disadvantage	0.75	0.81

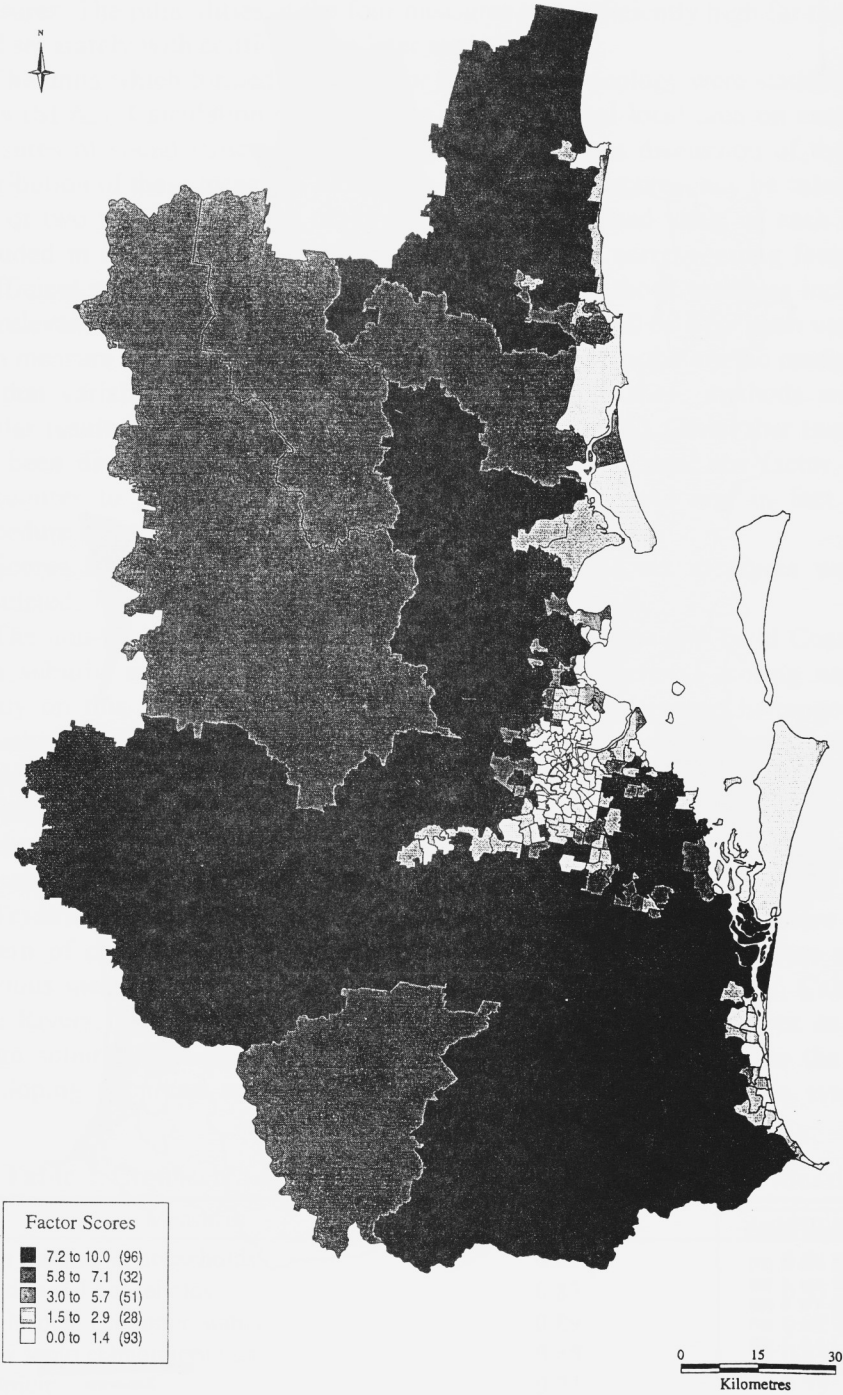**Figure 1.** Non-Traditional Household Factor 1991

Figure 2. Traditional Household Factor 1991

of cheaper land has attracted two parent families who are purchasing homes and commuting to work by private transport. Areas characterised by less traditional households and family types are concentrated in urban centres close to the centre of Brisbane and on the coast. The central suburbs of Brisbane, Gold Coast City and Noosa Heads had lowest scores on this measure.

The areas exhibiting the highest level of SES, shown in Figure 3, are concentrated around Brisbane city, particularly the western suburbs, as well as Main Beach, Robina and Mudgeereba on the Gold Coast and Buderim on the Sunshine Coast; moderate scores are characteristic of areas neighbouring these centres. Low scores predominate in the southern outskirts of Brisbane and the majority of non-urban areas. To some extent this distribution corresponds to the pattern depicted in the map of non-traditional lifestyles.

In contrast Figure 4 shows the distribution of lower SES areas as assessed by the fourth measure and is approximately the reverse of that shown for high SES. The difference between the two is a result of the inclusion of variables that apply to a greater proportion of the population than those covered by factor three; for instance, the proportion of the labour force with no qualifications and employed in the manufacturing sector. Analysis of spatial variations in the labour market, such as journey to work by industry sector, will enable a better understanding of the operation of these measures.

Examination of the spatial distribution of measure five (Figure 5) provides evidence for the proposition that ethnic groups tend to be concentrated in certain areas. In South East Queensland these are selected suburbs of Brisbane, particularly on the southside, and the Gold Coast. This results from the tendency of migrants to settle initially in urban centres, particularly those in which their compatriots have previously settled, and then not to disperse due in part to lack of personal or public resources and because they have established networks in the area. In an assessment of poverty and disadvantage in Queensland the connection between ethnicity and poverty is raised but not closely examined (QCOSS, 1995). Taylor and others (1994), Smith and Camichael (1992) and Brownlee and MacDonald (1993) are all cited as national studies of the connection between relative poverty and coming from non-English speaking backgrounds. Factors exacerbating disadvantage for these families include barriers to employment arising from lack of English proficiency, lack of training and access to training opportunities, lack of recognition of overseas qualifications, high costs associated with resettlement and family reunion, pre-immigration stress and poor physical and mental health (QCOSS, 1995, 70).

Figure 6 shows that the dimension measuring unemployment and associated characteristics exhibits a less evenly distributed pattern than the other factors. Within Brisbane disadvantage appears in spatially dispersed pockets reflecting the conventional wisdom. It is often argued that, in comparison with Melbourne and Sydney, there is not a clear suburban stratification system in Brisbane whereby
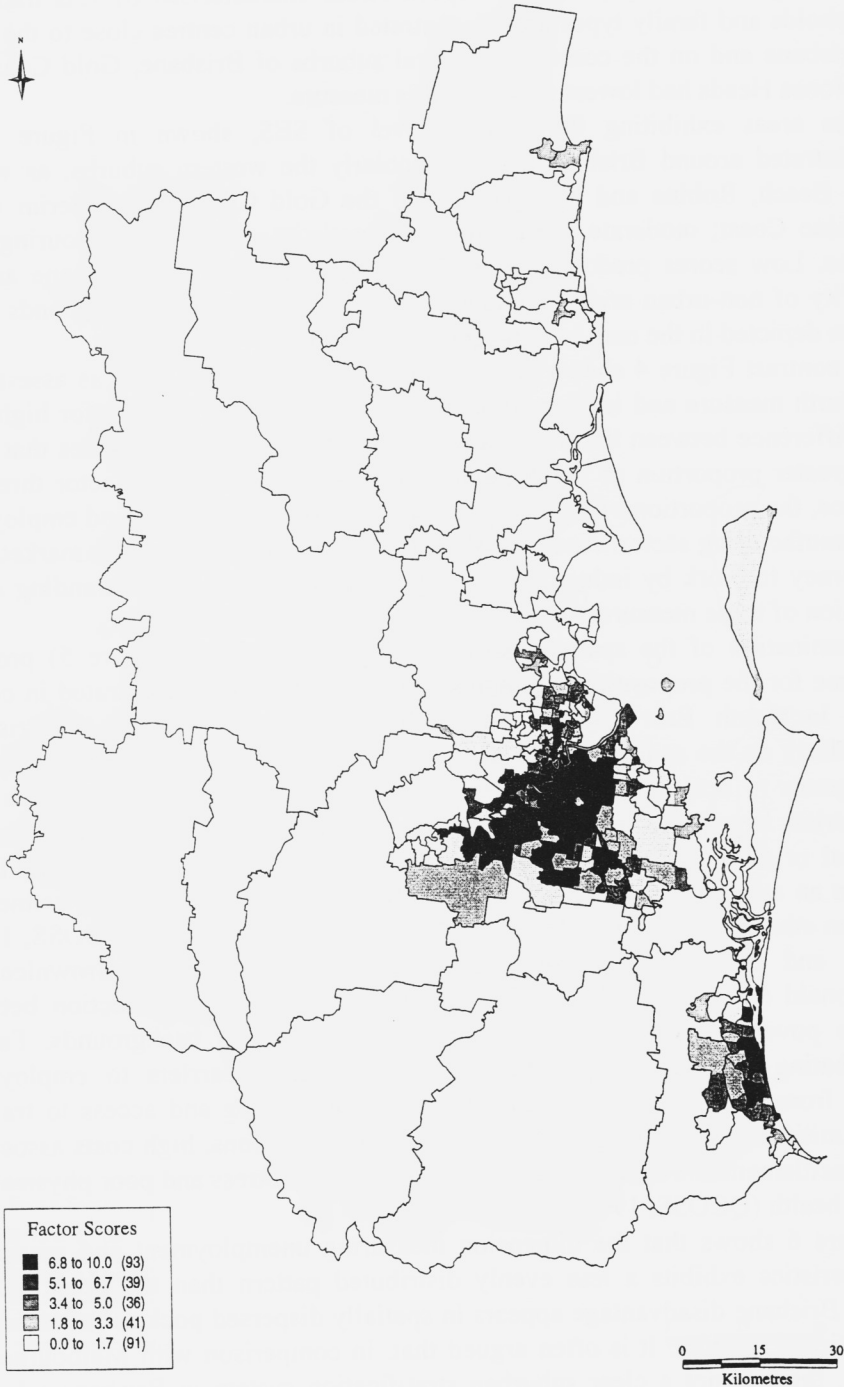
Figure 3. High SES Factor 1991

Figure 4. Low SES 1991

privileged and underprivileged suburbs can be clearly identified and spatially separated.

The figures reveal a degree of overlap and hence association between the measures which is to be expected. The first four measures were derived from two factors identified in the factor analysis and were split largely for substantive reasons based on the meanings that could be attributed to the measures. Therefore if we intercorrelate the measures (see Table 3) we find these obverse pairs to be interrelated but we find other relationships as well. The measures describing reverse levels of traditional lifestyle and SES exhibit strong inverse relationships, - 0.87 and -0.85 respectively. Other notable relationships are that social disadvantage, factor six, is positively correlated with non-traditional household structure, with a coefficient of 0.54, and low SES (0.40) while being negatively correlated with traditional household structure (-0.43) and high SES (-0.41). Similarly, ethnicity is positively correlated with non-traditional households and high SES, and negatively correlated with traditional household structure and low SES.

This pattern of relationships describes the manner in which the measures are intercorrelated across the South East Queensland region at large but tells us very little about the spatial distribution of particular relationships. In order to determine whether typologies of sub regions within the South East Queensland region could be identified the cluster analysis procedure FASTCLUS from SAS was employed. This procedure assigns each case (SLA) to the cluster for which the distance between the case and the centre of the cluster is smallest, given a specified number of clusters. Several numbers of clusters were specified, with the set of five discussed below appearing to describe the data best. Table 4 gives the means of the six measures for each cluster and the number of SLAs in each cluster. These enable a profile of a 'typical' member for each cluster to be given. Figure 7 shows the location of these clusters in the South East Queensland region.

Cluster 1 shows that the inner city zone (roughly bounded by Kedron, Morningside, Upper Mount Gravatt and Indooroopilly); Broadbeach, Main Beach-Broadwater, Runaway Bay and Surfers Paradise on the Gold Coast and Noosa on the Sunshine Coast generally score highly on factors describing non-traditional household structure, high SES and ethnicity.

Table 3. Correlation Matrix of Six Social Structural Measures

	2	3	4	5	6
1. Non traditional households	-0.87	0.09	-0.10	0.33	0.54
2. Traditional households		-0.15	0.13	-0.35	-0.43
3. High socio-economic status			-0.85	0.33	-0.41
4. Low socio-economic status				-0.31	0.40
5. Ethnicity					0.12
6. Social disadvantage					

Factor Scores

- 6.8 to 10.0 (104)
- 5.1 to 6.7 (29)
- 3.4 to 5.0 (24)
- 1.8 to 3.3 (30)
- 0.0 to 1.7 (113)

0   15   30
Kilometres
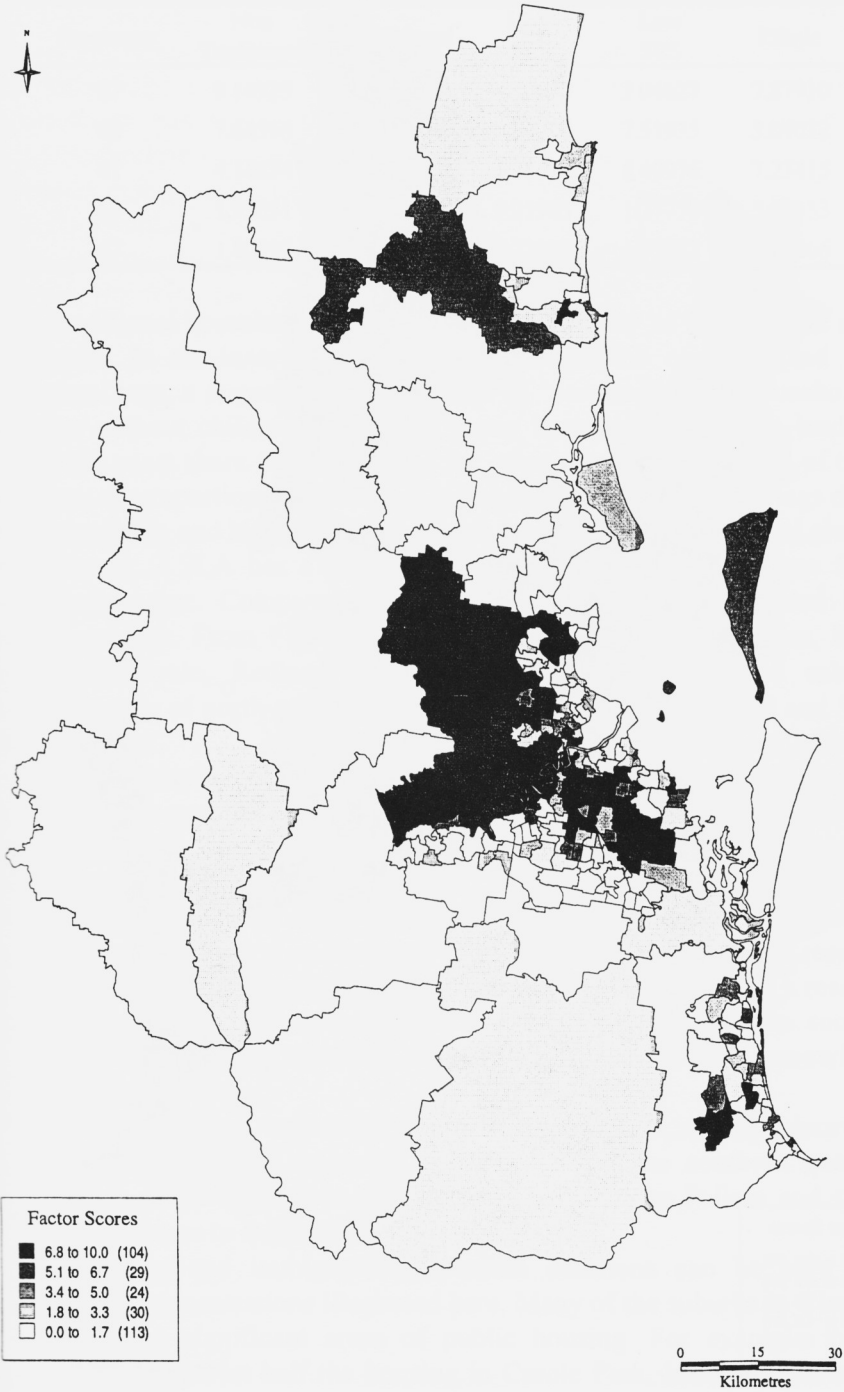
Figure 5. Ethnicity Factor 1991
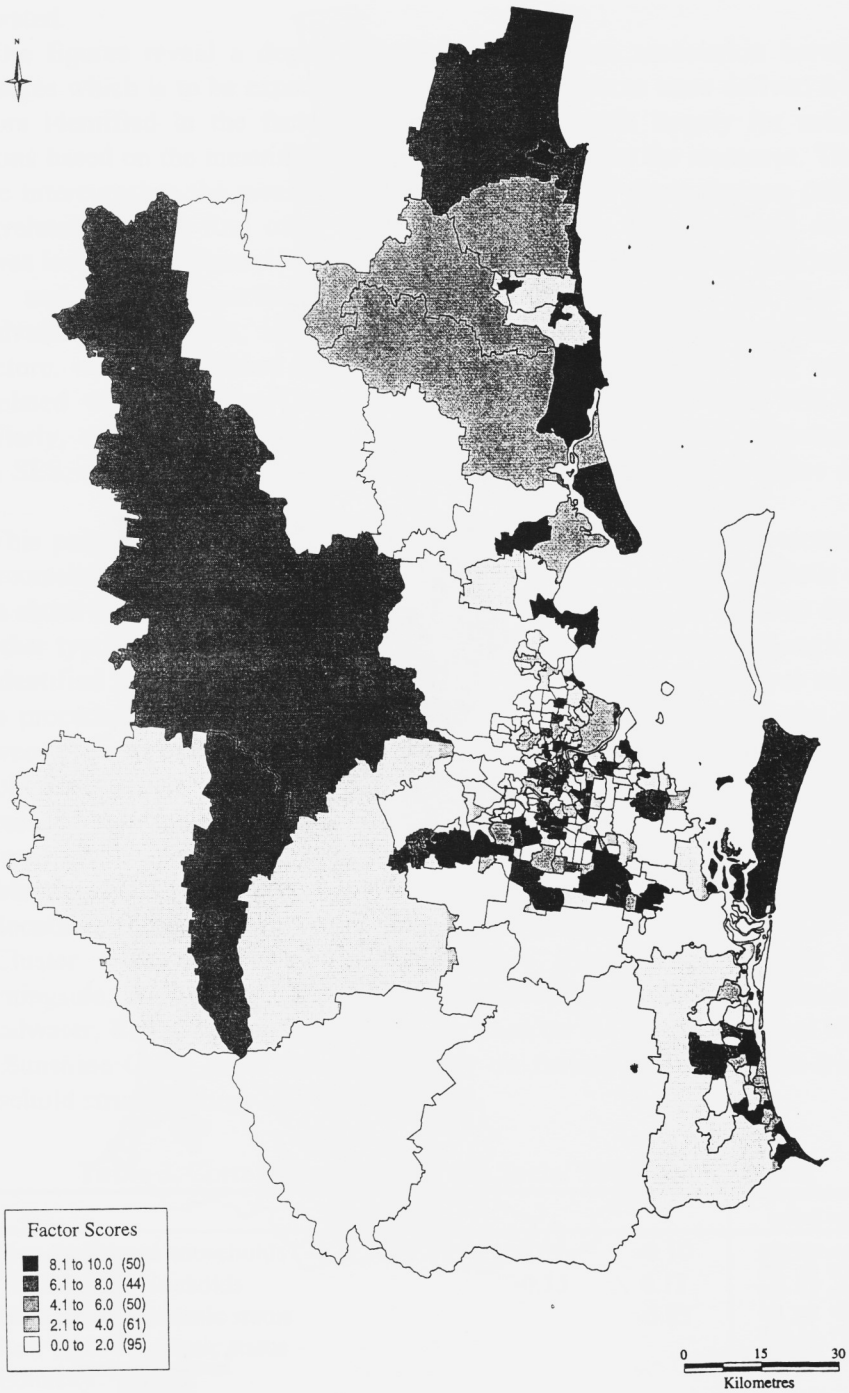
Figure 6. Social Disadvantage Factor 1991

Factor Scores

- 8.1 to 10.0 (50)
- 6.1 to 8.0 (44)
- 4.1 to 6.0 (50)
- 2.1 to 4.0 (61)
- 0.0 to 2.0 (95)

0   15   30
Kilometres

Table 4. Cluster Frequency and Means

Cluster	Frequency	Non Traditional	Traditional	High SES	Low SES	Ethnic	Social Disadvantage
1	67	9.14925	0.64030	8.32687	2.04627	7.87910	6.11940
2	62	7.64516	2.41935	2.32097	7.51935	3.04032	7.41935
3	41	4.14634	6.20244	1.18537	8.40976	7.23415	7.85366
4	63	1.93651	7.71429	9.01905	1.37778	5.63333	1.20635
5	67	1.80597	8.46418	2.72090	6.93582	1.96866	3.49254

Non-traditional households in each of these areas may be the result of different determinants. In the inner city there is a concentration of rental and medium density dwellings, a disproportionate number of 'non-traditional' households such as couples without children, single and group households and high land values. Areas of the coast share the dimensions for other reasons - the centre of the Gold Coast has a disproportionate number of rental and high density dwellings due to its tourist orientation and Noosa Heads has both a tourist and professional element. A typical Cluster 2 SLA has a non-traditional household structure, low SES and social disadvantage. Compared to Cluster 1 these SLAs are located in more dispersed pockets. From Figure 7 these can be identified as Rocklea, Berrinba, Parkinson-Drewvale, Redland, Beenleigh, Eagleby, the western suburbs of Ipswich, a group of north-eastern suburbs, and strips along the Gold and Sunshine Coasts.

These areas display a wide range of attributes. The existence of predominantly non-traditional households suggest fewer nuclear families and a greater diversity of household types. Low SES probably reflects varying occupational structures - in traditional extractive industries, such as mining in Ipswich and new service industries such as tourism on the Gold and Sunshine Coasts. Social disadvantage suggests the occurrence of unemployment. In Ipswich this may be the result of the declining importance of traditional industries. On the coast it may be a result of the attraction of perceived lifestyle benefits outweighing considerations such as the limited employment opportunities available in the relatively narrowly based economies of these areas.

Cluster 3 comprises traditional households, low SES, ethnic minorities and social disadvantage. The cluster is concentrated on the southern outskirts of Brisbane in a group of suburbs ranging from Salisbury to Pallara and stretching from Ipswich across to Bethania-Waterford.

Public policy and immigrants' settlement decisions can be seen to have influenced the concentrations illustrated here. Many of the suburbs in Cluster 3 are characterised by significant areas of public housing. For example the public housing stock is almost half the housing in Carole Park, Inala and Riverview, in contrast to the state average where only a quarter of housing is publicly provided. This pattern is likely to alter with government policy being reoriented towards integrating public housing with job opportunities and established

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CLUSTER
- 5 (67)
- 4 (63)
- 3 (41)
- 2 (62)
- 1 (67)

0   15   30
Kilometres

Figure 7. Socio-Economic Typology of SLAs in the SEQ Region Derived from a Multi-Factor Cluster Analysis

infrastructure and services. The high ethnicity scores typical of these suburbs support the expectation that people leaving the Wacol Immigration Centre tend to settle within familiar surroundings and that subsequent immigrants are likely to locate in regions according to family, cultural and language ties. Again policy changes have seen this centre closed and the government committed to more actively integrating immigrants in the community generally. Further analysis could be undertaken to determine the extent to which elements of low SES, ethnicity and social disadvantage (including household structure, education, proficiency in English, employment and income) are related.

The results show the value of disaggregating larger SLAs into their component parts, using the DHLGP boundaries. This analysis shows the components exhibit considerable diversity in socio-economic profiles; within Ipswich and Maroochy, for instance, a number of different clusters are identified.

Cluster 4 is characterised by SLAs which scored highly on traditional household structure and high SES measures. These are predominantly in two groups of fringe suburbs to the North West and South East of Brisbane; as well as Robina-Clear Island Waters and Worongary-Tallai in the Gold Coast area.

Many of the suburbs identified by Cluster 4 have experienced rapid growth recently largely as a function of the availability of cheaper land and housing relative to more central and established suburbs. The high ranking on the traditional household measure suggests it is families who are trading off inner urban locations for more affordable land, that is accepting longer commuting distances in order to be able to purchase a home. Whether these people are taking into consideration the full cost of commuting, financially, environmentally and socially, when making this tradeoff, is a question that could be addressed in future research. In addition, because of rapid growth, existing physical and social infrastructure may be inadequate to meet growing demands and this may impact negatively on households moving into new areas.

The nature of the census data used to approximate SES in this analysis (such as income levels and occupation) may mask the emergence of new types of disadvantage. For instance, mortgage holders identified by the traditional household measure also rank highly on SES, as measured here, but increasingly many are experiencing financial stress.

Cluster 5 includes those SLAs that scored most highly on factors identifying traditional households and low SES. These are predominantly in the semi-rural hinterland. In addition there are a scattering of southern suburbs (including Algester, Doolandella, Karawatha, Rochedale South, Underwood Pt B., Karalee), northern suburbs (such as Bald Hills, Geebung, Keperra, Kuraby, Bray Park, Kallungar, Petrie, Strathpine) and the eastern suburbs (from Wynnum to Redland Bay).

It is important to note that within some of the SLAs that represent single local government areas (LGAs) there is considerable diversity. For instance within LGAs such as Beaudesert and Esk there are likely to be differences in household structure and SES between those who live in the main towns of these areas and

those living in a rural setting. The Australian Bureau of Statistics has recognised these differences in constructing their SEIFA Indexes by making a distinction between urban and rural socio-economic advantage and disadvantage.

Notably there is no absolute pattern in the combination of factors within the clusters. For instance while low SES and disadvantage are significantly correlated, cluster 1 provides an exception in that the average level of social disadvantage is significant at the same time as high SES is present. As discussed this is likely to be a function of the considerable diversity that is characteristic of the high density areas identified.

4. CONCLUSION

The factorial ecology has demonstrated that the social structure of South East Queensland can be described in terms of six major measures. Two of these have to do with the nature of households in the region, traditional and non-traditional; two concern the socio-economic status of the region, high and low; one points to the ethnic minorities and the final measure deals with the distribution of social disadvantage.

Areas within the region are socially patterned. One group, typically new suburbs in the north west and south east of Brisbane, can be described as high socio-economic status and traditional household structure. Other areas were also of high SES but comprised non-traditional rather than traditional households and areas in which ethnic minorities were disproportionately represented. Inner Brisbane suburbs and the urban areas of the Gold and Sunshine coasts displayed this pattern. Non-traditional households of low socio-economic standing and displaying evidence of significant social disadvantage are more dispersed and found in the outer western suburbs of Brisbane and strips along the Gold and Sunshine coasts. In the southern outskirts of Brisbane are suburbs comprising relatively traditional households of low socio-economic status, notable levels of social disadvantage and concentrations of ethnic minority groups. Finally, there were suburbs in the semi-rural hinterland of Brisbane where significant numbers of low SES, traditional households were found.

These patterns support the proposition of multinucleated urban regions by showing clearly the difference between the socio-economic features of the population of the region's major centres and hinterland, or peripheral, areas. In summary the data suggests that there are both poor and wealthy suburbs comprising largely traditional households as well as poor and wealthy suburbs comprising largely non traditional households. Further the patterning provides support for the locational disadvantage associated with the existence of social polarisation. However, to assess the extent to which the pattern observed in the data presented here has emerged recently requires a study of changes over time. This analysis will be the subject of the second paper in this series.

The ability to summarise the array of census data in this way provides a useful basis for further analysis although it is important to remember the scope for heterogeneity within census boundaries. The results suggest directions for further

research. In the first place, while indicators of population mobility did not appear within any of the measures it will be important to investigate the relationship that exists between the measures and population movement into, and within, the region. Secondly the measures can be linked to data describing aspects of environmental and economic performance of the region as well as other social indicators and perceptions of quality of life.

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APPENDIX 1. Variables Derived From Census for Factor Analysis

V1 % AGE 0-4
V2 % AGE 5-14
V3 % PERSONS 15-64
V4 % AGE 64+
V5 FEMALES PER 100 MALES
V6 % LONE PERSON H-HOLDS
V7 % SINGLE PARENT FAMILY H-HOLDS
V8 % COUPLE WITHOUT OFFSPRING H-HOLDS
V9 % TWO PARENT FAMILY H-HOLDS
V10 % GROUP H-HOLDS
V11 % PERSONS WIDOWED
V12 % PERSONS DIVORCED OR SEPARATED
V13 % PERSONS NEVER MARRIED
V14 % DIFFERENT SLA 5 YEARS AGO
V15 % FEMALES 15-64 IN LABOUR FORCE
V16 % PERSONS 15-64 IN LABOUR FORCE
V17 % FEMALE LABOUR FORCE PART-TIME
V18 % PERSONS LABOUR FORCE PART-TIME
V19 % OF LABOUR FORCE 15-19 UNEMPLOYED
V20 % OF MALE LABOUR FORCE UNEMPLOYED
V21 % OF FEMALE LABOUR FORCE UNEMPLOYED
V22 % MANAGERS, ADMIN. & PROFESSIONALS
V23 % TRADES PERSONS
V24 % CLERICAL, SALES & PERSONAL SERVICES
V25 %FEMALES EMPLOYED AS PROFESSIONALS
V26 %FEMALES EMPLOYED AS CLERKS
V27 %FEMALES EMPLOYED IN SALES
V28 %PERSONS EMPLOYED AS LABOURERS
V29 % AG, FORESTRY, FISHING & HUNTING
V30 % MINING
V31 % MANUFACTURING
V32 % ELECTRICITY, GAS & WATER
V33 % CONSTRUCTION
V34 % WHOLESALE & RETAIL TRADE
V35 % TRANSPORT & STORAGE
V36 % COMMUNICATIONS

V37 % FINANCE, PROP. & BUSINESS SERVICES
V38 % PUBLIC ADMIN. & DEFENCE
V39 % COMMUNITY SERVICES
V40 % RECREAT., PERSONAL & OTHER SERVICES
V41 % LABOUR FORCE GRADUATE QUALS.
V42 % LABOUR FORCE SKILL VOC QUALS.
V43 % LABOUR FORCE BASIC VOC QUALS.
V44 %NOT QUAL
V45 % ANNUAL HH INCOME <$16,000
V46 % ANNUAL HH INCOME >$70,000
V47 % ABORIGINAL OR TSI
V48 % PERSONS BORN OCEANIA
V49 % PERSONS BORN UK OR IRELAND
V50 % PERSONS BORN SOUTHERN EUROPE
V51 % PERSONS BORN WEST EUROPE
V52 % PERSONS BORN NORTHERN EUROPE
V53 % PERSONS BORN EAST EUROPE
V54 % PERSONS BORN USSR
V55 % PERSONS BORN MIDDLE EAST
V56 % PERSONS BORN NTH AFRICA
V57 % PERSONS BORN SE ASIA
V58 % PERSONS BORN NE ASIA
V59 % PERSONS BORN STH ASIA
V60 % PERSONS BORN NTH AMERICA
V61 % PERSONS BORN STH/CENT AMERICA
V62 % PERSONS BORN AFRICA
V63 % PERSONS CHRISTIANS
V64 % PERSONS NON-CHRISTIANS
V65 % PERSONS NO RELIGION
V66 % LEFT SCHOOL <15
V67 PERSONS PER DWELLING
V68 % DWELLINGS OWNED
V69 % DWELLINGS BEING PURCHASED
V70 % DWELLINGS RENTED - GOVT
V71 % DWELLINGS RENTED - OTHER
V72 % H-HOLDS NO MOTOR VEHICLE
V73 % H-HOLDS 3+ MOTOR VEHICLE
V74 % MEDIUM/HIGH DENSITY DWELLINGS
V75 % JOURN. TO WORK - PUBLIC
V76 % JOURN. TO WORK - PRIVATE