# *The Factorial Ecology of Dublin: A Preliminary Investigation*

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*Précis:* This paper reports a preliminary investigation of the underlying social and economic dimensions of Dublin city using factorial ecology techniques, which permit a large number of variables to be condensed into a small number of independent factors. Such factors, as result, can be similarly identified in studies carried out throughout the world, particularly in studies of the social geography of British cities. The results are useful to identify areas of similarity and dissimilarity throughout the urban area, and indicate that the city can be divided up in terms of housing conditions, socio-economic status, family status (or stage in the life cycle) and residual communities (in both a physical and social sense). In general terms, a belt of lower socio-economic status and poorer housing conditions, occupied by a higher than average proportion of single people, extends along the Liffey dividing higher status communities in north and south Dublin. One of the most important dimensions that permits the regionalisation of the city is housing conditions—the absence of running water or a fixed bath; a low number of people per household; a high proportion of households occupying a single room, with few young people; and a substantial number of dwellings built before 1900, indicate that not only is the Liffey "corridor" a relatively underprivileged area, but also that certain other parts of the city, including areas of Dun Laoghaire, are deficient in housing conditions.

## *Introduction*

THE unravelling of the wide variety of social, economic and demographic elements that characterise urban areas is of importance to a number of disciplines, including sociology, planning, economics, politics and geography, amongst others. The identification of a limited number of underlying dimensions operating throughout the urban area not only enables hypotheses of social differentiation and patterning to be tested, but also permits areas of

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similarity and dissimilarity, along specific dimensions, to be delimited, which in turn can provide the bases for decision-making, be these of a sociological or planning nature. Furthermore, such dimensions can provide the inputs to additional analyses to gain even greater insight into the social and behavioural structure of the urban community—the relating of such dimensions to voting patterns, for example, can indicate potential areas of strength and weakness for specific political parties, while the relationship with consumer purchasing decisions can indicate areas that are likely to be most receptive to local product promotional campaigns.

*Factorial Ecology*

Within the last decade there has been a renewed interest in the internal social structure of urban areas, partly stemming from the early work of the Californian ecologists who were concerned with social area analysis in the 1950s (Shevky and Bell, 1955), partly from an increasing awareness of the need to examine the structure of urban society in greater detail to provide more meaningful bases for decision-making processes, and partly as a result of the increasing availability of multivariate techniques such as factor analysis[1] which enable large data matrices to be manipulated with relative ease. The application of factor analytical techniques to the study of the social-structure of urban areas has been given the general term "factorial ecology" (Rees, 1971), and reviews of such studies have been included in works by Abu-Lughod (1969), Murdie (1969) and Timms (1971) as well as in a supplement to *Economic Geography* edited by Berry (1971).

Although the development of factorial ecology from social area analysis has been well reviewed by Johnston (1971), it is worth noting the major differences in approach. Social area analysis, as conceived by Shevky and Bell (1955), hypothesised that as a result of the increase in the scale of society (see Wilson and Wilson, 1945), which is an accompaniment of the industrialisation and urbanisation of developing societies, the urban area would be differentiated along three dimensions—socio-economic status, family status, and ethnic status. Timms (1970) has noted that the association of these three axes of residential differentiation with the changing scale of society has been strongly disputed (notably by Hawley and Duncan, 1957, among others) and suggests that the full emergence of the three axes demands a considerable degree of modernisation. Berry and Rees (1969) have suggested that the identification of these three axes as reflecting both the process of modernisation as well as the individual locational choices of specific households would provide a more generally acceptable model. The hypotheses of social area analysis have been largely tested by selecting a limited number of variables from census tract data to examine the relevance of the three axes to the differentiation of urban areas. The basic problem suggested by factorial ecologists is that by limiting the inputs, the dimensions identified are pre-determined, and it is perhaps

1. The term "factor analysis" is used in the present paper in the broad sense including Principal Components Analysis (see Clark, Davies and Johnston, 1974, p. 260). Excellent expositions of the technique are given in Harman (1966) and Rummel (1970).

only when comparative analyses using similar inputs for different urban areas are undertaken that the value of the model can be thoroughly tested.

The advantage of the factorial ecology approach is that it permits a much larger number of variables to be initially included in the analysis, and the technique can either be used to test specific hypotheses—including those postulated by Shevky and Bell, although with a larger data input—or to search for the existence of a larger number of underlying dimensions, by utilising a data matrix that contains a large number of variables, and reducing it to a matrix which contains a much smaller number of factors. The quite widespread use of the technique means that studies have been reported from North America, Australasia, Britain and Scandinavia, as well as Cairo and Calcutta in the less developed parts of the world. Increasingly comparative factorial ecologies are being undertaken of more than one urban area—for example, Evans (1973) has studied three towns in South Wales, while Timms (1970) and Johnston (1973) have studied the same four towns in New Zealand, although using different approaches to factorial ecology, and Davies and Barrow (1973) have compared three Canadian cities. Comparative factorial ecology and the problems associated with such analyses have been discussed by Clark, Davies and Johnston (1974).

Although the interpretation of the factors is the responsibility of the individual researcher, it is evident that certain general patterns emerge. In many North American studies, the three dimensions of socio-economic status, family status and ethnicity appear quite consistently, although sometimes each dimension is disaggregated into two or more factors (see Davies and Barrow 1973; Janson, 1974). Studies in Australia and New Zealand (Timms, 1971; Johnston, 1973) have resulted in the emergence of both the socio-economic and family status dimensions, although the ethnic dimension is less apparent. It is important to note in these instances that the variables included in a number of the analyses were more than merely those that would be expected to load onto these three dimensions, and it should also be emphasised that the disaggregation of these dimensions into two or more factors means that the important differences between places can be identified as well as their similarities. This point has been made by Palm and Caruso (1972) who have criticised "the continual rediscovery of the Life Cycle; Socio-Economic and Ethnic status dimensions of the intra-urban residential structure since it over-emphasises the similarity of places at the expense of the important peculiarities of individual cities" (Clark, Davies and Johnston, 1974, p. 275).

Elsewhere, the dimensions that have emerged from factorial ecology studies have varied. In Cairo, the socio-economic status and family status dimensions were intermingled and both loaded onto a single factor (Abu-Lughod, 1969). In Britain, a number of studies (Gittus, 1964; Herbert, 1970; Robson, 1969; and Evans, 1973), have indicated that the quality of housing is one of the most important dimensions underlying the social structuring of urban areas, while Davies and Lewis (1973) found that mobility was an important dimension in the factorial ecology of Leicester.

*The Study of Dublin*

This present paper reports the application of factorial ecology to the 1971 ward data for the continuous built-up area of Dublin. Inevitably when using a relatively complex technique many problems are apparent at almost all stages of the analysis. These have been examined in some detail by Clark, Davies and Johnston (1974) and Hunter (1972). One of the most fundamental relates to the variables that are included in the analysis and the spatial extent of the area to which these relate. The limitation of variables to only those that measure socio-economic status and family status will certainly produce these two major dimensions as far as western cities are concerned.[2] This is acceptable if the purpose is to examine the extent to which different variables load onto these factors and to investigate the spatial configuration of the factors. It does not, however, mean that these are the only two dimensions that describe the social patterning of the urban area. As a preliminary investigation of Dublin, it was therefore decided to adopt the broader approach to factorial ecology, which as Johnston (1973, p. 144) remarks has the advantage of not assuming that the three basic social area analysis dimensions are sufficient to describe the patterns of residential differentiation. The limitations placed upon the variables included in the analysis have been imposed by the availability of census material at a sufficiently low level of spatial disaggregation. In common with most previous studies it was decided to employ the census tract as the basic spatial unit, and in the Dublin context this meant utilising the unpublished ward and District Electoral Division returns, which are as yet incomplete.[3] Even so, the present analysis will give a preliminary indication of the extent to which Dublin conforms in patterning to either the "North American-Colonial" or the "British" ecological structure.

A second problem often encountered by factorial ecologists is in delimiting the urban area. Frequently the administrative area does not correspond to the built-up area, "spill-over" having taken place on the periphery as the suburbs have expanded into other administrative areas. This situation is true of Dublin, and inevitably the limitation of a factorial ecology to the older parts of the urban area included within the County Borough boundary would seriously reduce the effectiveness of the study. The continuous built-up area of the city which included the Borough of Dún Laoghaire and the suburban areas of both boroughs as defined by the Central Statistics Office (1972, p. 164) was used as the study area, which resulted in 196 census tracts (Fig. 1). In certain parts of the rural-urban fringe difficulties were encountered in defining the exact limits of the urban area. This problem has been discussed by Brady (1975) and the arbitrary boundaries are also indicated on Fig. 1.

Fifty-six variables were defined for inclusion in the analysis, and these are

2. In the case of Cairo, Abu-Lughod (1969) found that she was unable to achieve factorial separation of these two dimensions.

3. As additional data becomes available it is intended to extend the range of variables included in the factorial ecology of Dublin.

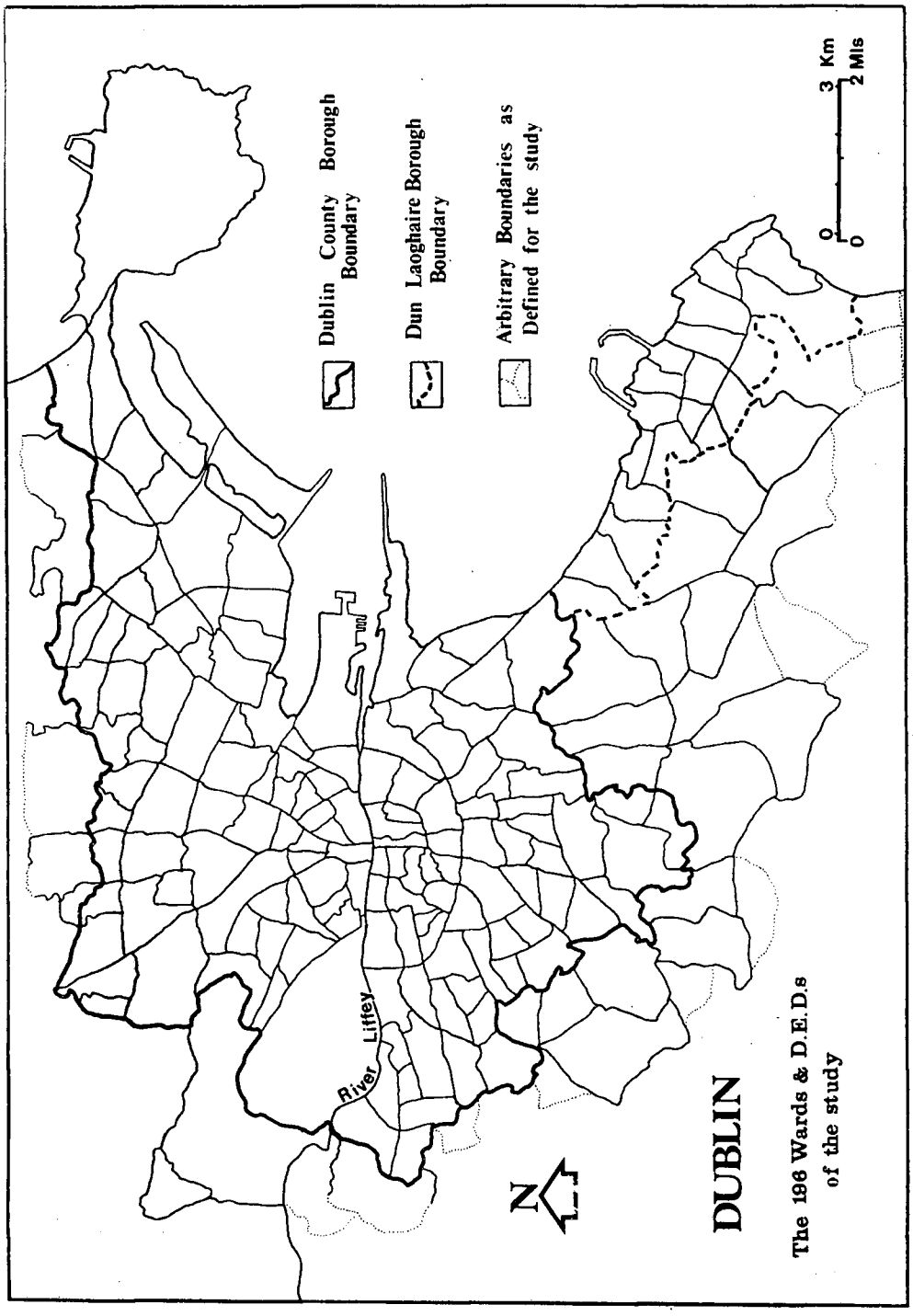


FIGURE 1: *Dublin wards and D.E.D.s included in the study.*

summarised in Table 1. Within the limits imposed by data availability as wide a range of demographic, occupational-economic and housing variables as possible were included. In the absence of other data, certain proxy variables were included —SCH providing some measure of education level, and PCP and PCAR providing possible mobility indicators.

A variety of techniques are available under the general heading of factor analysis, and the effects of different procedures have been noted by Davies and Lewis (1973) and Clark, Davies and Johnston (1974), among others.[4] The majority of studies have used a principal axis or common factor analysis, and this technique was adopted in the study of Dublin. A certain amount of debate has revolved around the need to transform the input variables because of the linearity assumptions involved in using factor analysis.[5] To resolve this problem, the present analysis utilised Spearman's rank order correlation coefficients rather than the more traditional Pearson's product moment coefficient. A principal axes analysis was performed upon the data, and a varimax orthogonal rotation was then employed to simplify the structure and aid the interpretation of the factors.

TABLE 1: *Variables included in the study*

All variables except SEX (1), PFERT (15), PPH (16), PPR (37), VALPOP (54) and VALHU (55) are expressed as percentages.

| *No.* | *Variable name* | *Description of variable* |
|---|---|---|
| 1. | SEX | Sex ratio: females to males |
| 2. | PXM21 | Males under 21 years |
| 3. | PXF21 | Females under 21 years |
| 4. | PXM | Males 21–64 years |
| 5. | PXF | Females 21–64 years |
| 6. | PXXM | Males aged 65+ years |
| 7. | PFOLD | Females aged 65+ years |
| 8. | PTSF | Single females |
| 9. | PTSM | Single males |
| 10. | PM19 | Males under 19 years married |
| 11. | PF19 | Females under 19 years married |
| 12. | PMM | Married males |
| 13. | PMF | Married females |
| 14. | PM | Married population |
| 15. | PFERT | Fertility ratio (0–4 years: females 14–45 years) |
| 16. | PPH | Persons per household |

4. See also the methodological debate that took place in *Area* between Davies and Mather during 1971 and 1972.

5. See Robson (1971, p. 159); Johnston (1971, p. 320) and Clark, Davies and Johnston (1974, p. 269).

TABLE 1—CONTINUED

| *No.* | *Variable name* | *Description of Variable* |
|---|---|---|
| 17. | SCH | Population aged 14–20 years in full-time education |
| 18. | PGM | Gainfully employed males |
| 19. | PFM | Gainfully employed females |
| 20. | PNGM | Non-gainfully employed males |
| 21. | PNGF | Non-gainfully employed females |
| 22. | PHPM | Male higher professional workers |
| 23. | PHPF | Female higher professional workers |
| 24. | RPM | Male professional workers |
| 25. | RPF | Female professional workers |
| 26. | RCM | Male clerical workers |
| 27. | RCF | Female clerical workers |
| 28. | RWM | Male skilled manual workers |
| 29. | RWF | Female skilled manual workers |
| 30. | RUM | Male unskilled manual workers |
| 31. | RUF | Female unskilled manual workers |
| 32. | PCAR | Households with car |
| 33. | PH1 | Permanent households with one room |
| 34. | PH10 | Permanent households with 10+ rooms |
| 35. | PP1 | Permanent housing units with one person |
| 36. | PP12 | Permanent housing units with 12+ persons |
| 37. | PPR | Persons per room |
| 38. | PLA | Local Authority housing units |
| 39. | PUF | Housing units, rented unfurnished |
| 40. | PFF | Housing units, rented furnished |
| 41. | PAL | Housing units being acquired from Local Authority |
| 42. | POO | Housing units, owner occupied |
| 43. | PB1 | Housing units built pre-1860 |
| 44. | PB2 | Housing units built 1860–1899 |
| 45. | PB3 | Housing units built 1900–1918 |
| 46. | PB4 | Housing units built 1919–1940 |
| 47. | PB5 | Housing units built 1941–1960 |
| 48. | PB6 | Housing units built 1961+ |
| 49. | PWT | Housing units with water |
| 50. | PWC | Housing units with flush toilet |
| 51. | PBAT | Housing units with bath or shower |
| 52. | PCON | Conventional houses |
| 53. | PCAV | Caravans or other temporary housing units |
| 54. | VALPOP | Valuation per head of population |
| 55. | VALHU | Valuation per household |
| 56. | PCP | Population increase 1966–71 |

*Results*

Five factors were extracted with eigenvalues of at least 1·9[6] which after rotation collectively explained 71·24 per cent[7] of the variance of the data matrix. The individual explanatory power of each factor is given in Table 2, and the individual variable loadings on each factor are summarised in Appendix I, where to ease interpretations all loadings of less than ±0·3 have been omitted.

TABLE 2: *Explanatory power of the rotated factors*

| *Factor* | *Individual percentage explanation* |
|---|---|
| 1 | 22·27 |
| 2 | 18·90 |
| 3 | 9·93 |
| 4 | 11·47 |
| 5 | 8·67 |

Factor one can be identified as being associated with housing conditions (Table 3), with high positive loadings upon the number of dwellings built before 1900 many of which comprise single person households occupying a single room, often rented unfurnished. High negative loadings indicate that many of these dwellings do not possess either a bath, or shower, or water, and the households rarely contain males or females under the age of 21 years. The inclusion of these latter two variables is important for it indicates that the factor is not related to the young and more mobile sections of the population, who often live in traditional flat areas of the city, but measures what may be termed "twilightism". This includes two kinds of older housing areas, the subdivided dwellings, rented unfurnished, in the inner city and those households of similar age and household composition which are located in higher amenity areas and have retained their value.

Figure 2 plots the scores for factor one throughout Dublin,[8] and these two types of area become immediately apparent: parts of Arran Quay, Kilmainham, South Dock and the Heytesbury Street area constitute the true twilight areas, while the Ballsbridge-Pembroke area represents the higher value older housing

6. This level was arbitrarily determined in the absence of a general concensus upon the ideal cut-off level. Studies have arbitrarily chosen eigenvalues of 1·0 and 5·0, although Davies and Lewis (1973) have advocated the use of the scree-test (see Cattell, 1966).

7. Although direct comparison with the level of explanation achieved by other studies is difficult because of different numbers of variables, it is worth noting that 71·24 per cent of explained variance by five factors is in general agreement with the findings of other workers. Robson (1971) having explained 77 per cent, a study of Merseyside (Gittus, 1964) explaining 69 per cent, and Herbert (1970) and Evans' (1973) studies of South Wales towns explaining between 63 per cent and 73 per cent.

8. It should be noted that because equal intervals have been used in mapping the factor scores, both the lowest and highest categories will contain a much wider range of values than the four intermediate categories.

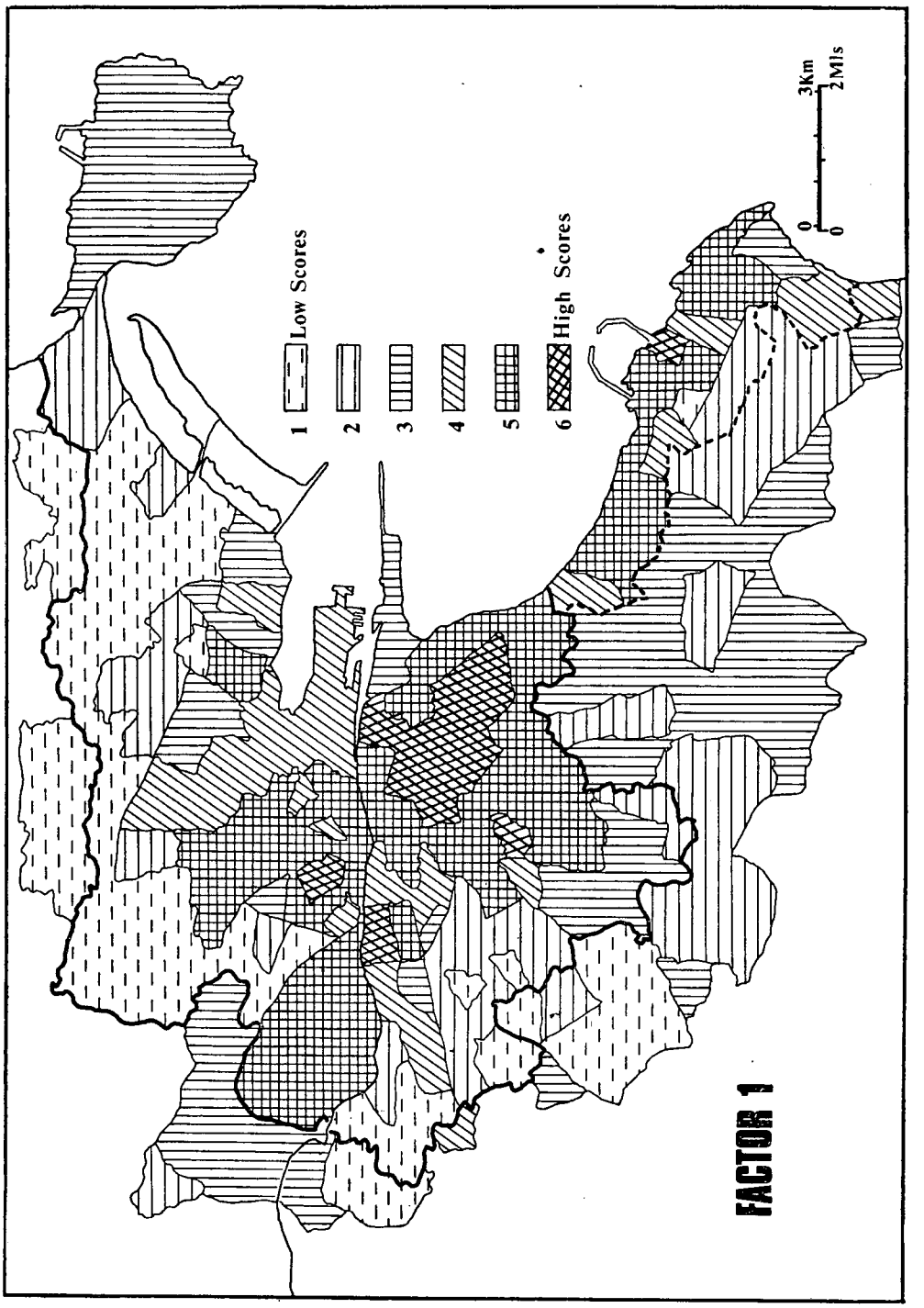


FIGURE 2: *Scores on Factor One: Housing conditions.*

TABLE 3: *Factor 1: Original variables with ten highest loadings*

| | *Variable* | *Loading* |
|---|---|---|
| 44 | Housing units built 1860–1899 | 0·867 |
| 16 | Persons per household | —0·857 |
| 43 | Housing units built before 1860 | 0·800 |
| 35 | Housing units with one person | 0·796 |
| 39 | Housing units, rented unfurnished | 0·785 |
| 51 | Housing units with bath or shower | —0·785 |
| 2 | Males under 21 years of age | —0·737 |
| 33 | Households with one room | 0·733 |
| 49 | Housing units with water | —0·723 |
| 3 | Females under 21 years of age | —0·720 |

areas. This latter aspect can also be noted along the coast in Blackrock, Dún Laoghaire and Dalkey, although the factor scores are not as high as in the Pembroke-Ballsbridge area. The areas with low scores upon this factor are naturally those around the urban periphery, particularly on the north side of the city where there are a large number of census tracts with very low scores.

TABLE 4: *Factor 2: Original variables with ten highest loadings*

| | *Variable* | *Loading* |
|---|---|---|
| 30 | Male unskilled manual workers | 0·933 |
| 29 | Female skilled manual workers | 0·922 |
| 38 | Local Authority housing units | 0·860 |
| 37 | Persons per room | 0·847 |
| 27 | Female clerical workers | —0·788 |
| 42 | Housing units, owner occupied | —0·764 |
| 24 | Male professional workers | —0·759 |
| 17 | Population aged 14–20 years at school | —0·742 |
| 26 | Male clerical workers | —0·714 |
| 28 | Male skilled manual workers | 0·680 |

The second factor measures socio-economic status (Table 4) with emphasis upon the distinction between manual and non-manual workers. Variables with high loadings on this factor include three of the four measures of manual economic activity, together with high proportions of local authority housing and large numbers of persons per room. The converse of these factors have high negative loadings upon this factor, including measures of the proportion of owner-occupied housing units, the proportion of children continuing education after the age of 14 and professional and clerical workers. Figure 3 plots the reversed

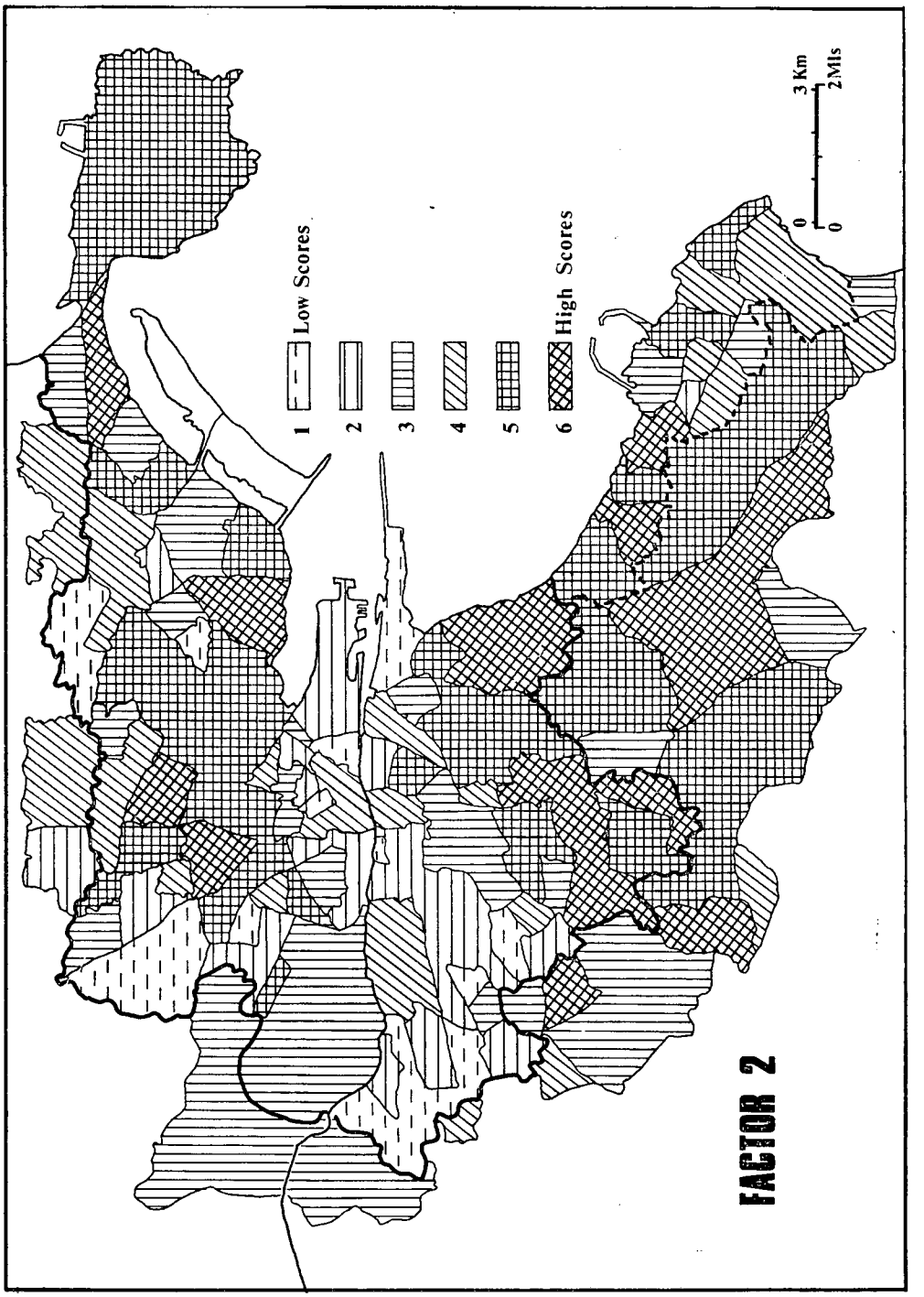


FIGURE 3: *Scores on Factor Two: Socio-economic status.*

scores[9] of this factor throughout Dublin, and clearly indicates the belt of lower socio-economic status that generally follows the Liffey, extending towards the public housing areas to the west of the city. A number of suburban tracts, particularly on the northside, register strong concentrations of lower socio-economic status, while much of the area to the south and east of a line from Kimmage to Irishtown is of higher socio-economic status. The differences in scores between areas like Ballsbridge and the inner city tracts which all scored highly on factor one, are indicative of the different types of housing areas included within the term "twilightism" when the socio-economic dimension is considered. Even so, few of the inner city twilight areas have very low scores on the socio-economic factor, probably because it reflects the local authority housing dimension quite strongly.

The third factor can be interpreted in the broad sense as a family status dimension, and the ten highest loadings are indicated in Table 5. A number of elements of family status are included within this factor which contains high negative loadings on variables measuring the percentage married population, fertility ratio and proportion of owner occupied housing units. High positive loadings are associated with variables that measure the proportion of single males and females, housing units with 12 or more persons, households with one room and gainfully employed females. The areas that score highly upon this factor are illustrated in Fig. 4, and include the traditional flatland of Rathmines-Ranelagh, where a considerable number of housing units are sub-divided and contain one room households, occupied by single people. High scores occurring in the eastern part of the inner city area around South Dock and Amiens Street are indicative not only of the older single person household associated with either widowhood or spinsterism, but also the public housing flatblocks which are to a certain extent also evident in these areas. The high proportion of children evident in certain

TABLE 5: *Factor 3: Original variables with ten highest loadings*

| | *Variable* | *Loading* |
|---|---|---|
| 14 | Married population | —0·897 |
| 12 | Married males | —0·879 |
| 8 | Single females | 0·861 |
| 13 | Married females | —0·857 |
| 9 | Single males | 0·704 |
| 36 | Housing units with 12 or more persons | 0·500 |
| 15 | Fertility ratio | —0·452 |
| 42 | Housing units, owner occupied | —0·343 |
| 33 | Households with one room | 0·340 |

9. The scores were reversed in Fig. 3 so that the highest socio-economic status areas would appear darker and have high scores, and lower socio-economic status would appear lighter and have low scores.

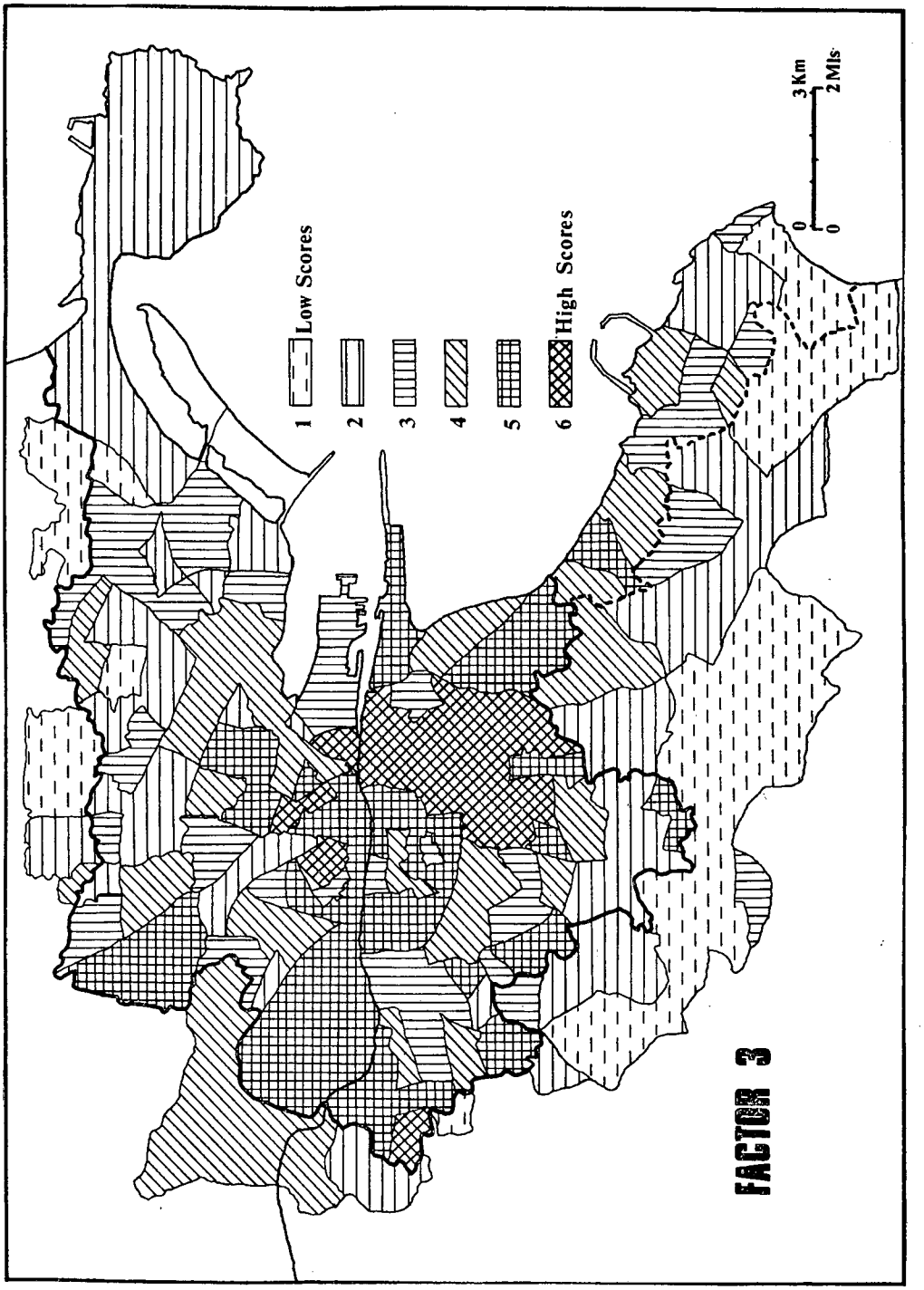


FIGURE 4: *Scores on Factor Three: Family status.*

quite mature local authority housing estates, notably Ballyfermot, accounts for the high factor scores in these areas. In many instances the families are in their teens, hence the negative loading on the fertility ratio variable and positive loading on the variables measuring proportion of single males and females and housing units with 12 or more persons. The relative proportion of single people accounts for the high negative loadings on variables measuring the percentage of married persons.

Factor four may be termed residual communities, being characterised by a high proportion of inter-war housing, and a substantial number of aged males and females (Table 6). High negative loadings occur on variables measuring the proportion of under 21s in the population, the fertility rate and the rate of population growth in the last intercensal period. Because most of these areas are quite long established with a mature population it is to be expected that areas such as Drumcondra, parts of the inner city, Blackrock and parts of Dun Laoghaire will score quite highly upon the factor. The spatial distribution of scores (Fig. 5) also indicates that the area from Sandymount to Rathgar also scores highly upon this factor, and this is indicative in part of the mixed nature of parts of this area in terms of land-use. Although Rathmines and Ranelagh are traditionally regarded as flatland, there are substantial older elements present in the communities, and these are even more apparent in areas to the east, north and west of flatland—areas into which flats are gradually encroaching, possibly as houses fall vacant due to deaths.

The fifth factor, which accounts for over 8 per cent of the variance in the data matrix, represents a sub-grouping of socio-economic status, reflecting the relative professionalism of the tracts. Only one of the ten highest loading variables is positive, and that is the proportion of male skilled manual workers. All other variables are negatively related to the factor, with professional workers comprising four of the variables and other demographic and economic measures of professionalism dominating the factor. To clarify the factor, the scores have been

TABLE 6: *Factor 4: Original variables with ten highest loadings*

| | *Variable* | *Loading* |
|---|---|---|
| 46 | Housing units built 1919–1940 | 0·759 |
| 48 | Housing units built from 1961 onwards | —0·720 |
| 6 | Males aged 65+ years | 0·715 |
| 15 | Fertility ratio | —0·662 |
| 20 | Non-gainfully employed males | 0·660 |
| 7 | Females aged 65+ years | 0·655 |
| 3 | Females under 21 years of age | —0·600 |
| 2 | Males under 21 years of age | —0·576 |
| 56 | Population increase, 1966–71 | —0·553 |
| 19 | Gainfully employed females | 0·500 |

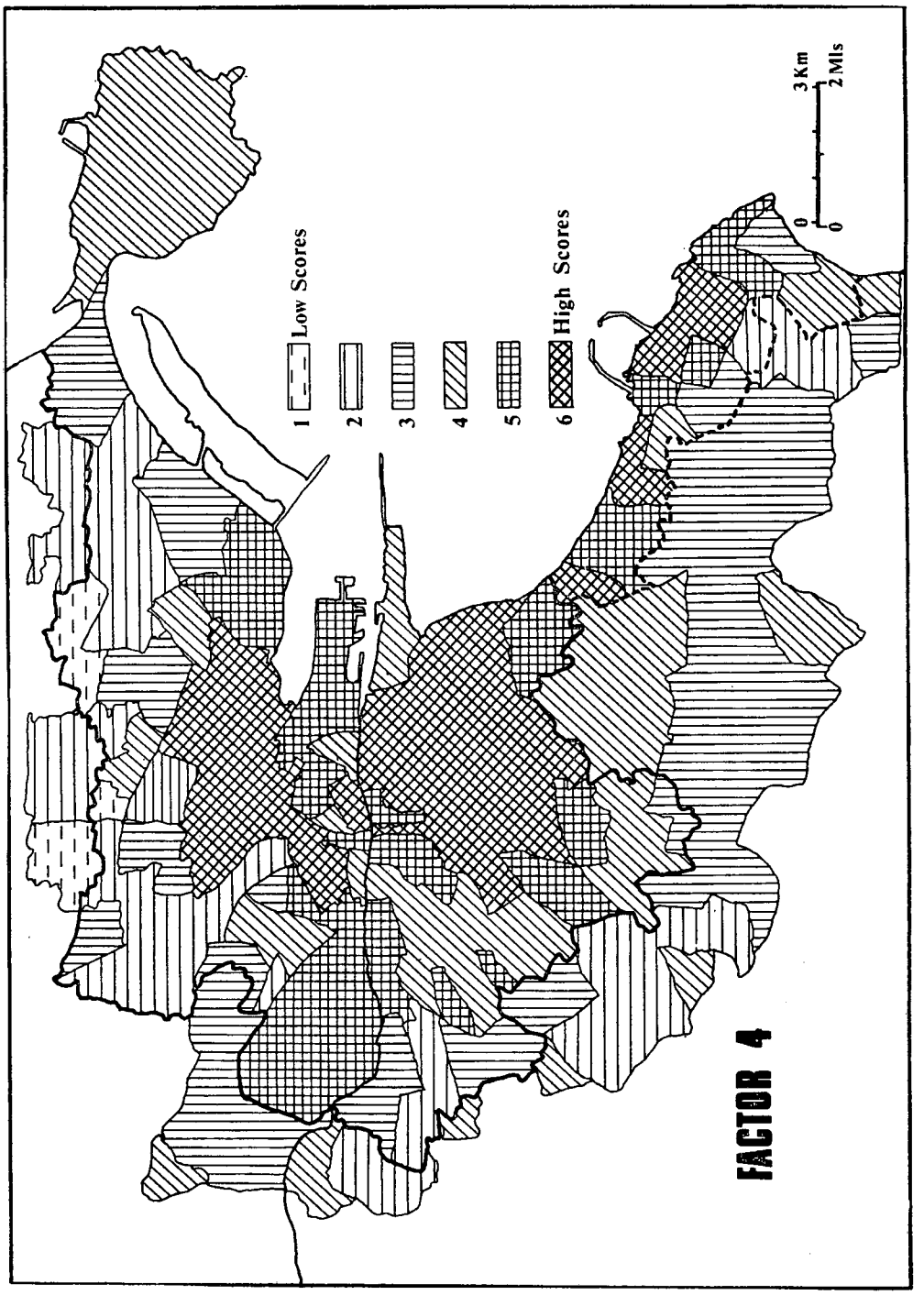


FIGURE 5: *Scores on Factor Four: Residual communities.*

reversed and plotted in Fig. 6, the darkest shading indicating areas of high professionalism where a high proportion of workers employed in professional and managerial jobs can be expected, houses will have high valuations and can be quite large, most households will possess at least one car and a substantial proportion of the population aged between 14 and 20 will still be attending full-time education. Areas which score highly on the map include Howth, Clontarf, a large part of south Dublin extending from Sandymount to Blackrock, Foxrock and westwards to parts of Rathfarnham, as well as much of Dalkey and a part of Dún Laoghaire. To an extent this factor may be regarded as amplifying the structures apparent in factor two, the degree to which the variables loading onto the two factors overlap being relatively small.

TABLE 7: *Factor 5: Original variables with ten highest loadings*

| | *Variable* | *Loading* |
|---|---|---|
| 34 | Permanent households with 10+ rooms | —0·685 |
| 22 | Male higher professional workers | —0·683 |
| 23 | Female higher professional workers | —0·592 |
| 24 | Male professional workers | —0·586 |
| 25 | Female professional workers | —0·525 |
| 55 | Valuation per household | —0·524 |
| 32 | Households with car | —0·495 |
| 54 | Valuation per head of population | —0·450 |
| 28 | Male skilled manual workers | 0·444 |
| 17 | Population aged 14–20 years at school | —0·433 |

*Conclusions*

This preliminary investigation of the factorial ecology of Dublin has revealed that on the basis of the variables included in the study, five factors can be identified, each of which accounts for over 8 per cent of the variance of the initial data set, and which collectively account for some 71 per cent of the variance. These five factors have been termed "housing conditions-twilightism", "socio-economic status", "family status", "residual communities" and "professionalism". Although two of the social area analysis dimensions, of socio-economic and family status, appear, perhaps more important is the first factor, which would seem to indicate that in terms of social patterning Dublin is more akin to British cities than to the North American or Australian urban areas.[10] To an extent this is perhaps to be expected, since the city was linked so closely to Britain for many centuries.

10. Timms (1971, p. 230) has noted that attempts have been made to relate the factorial ecology structuring of cities to the theories of Burgess and Hoyt. Although certain aspects of both theories are noticeable in relation to a number of the factor maps the extent to which these theories are validated in the present work is questionable, and the authors believe that considerably more work is required before they can be thoroughly tested in the Dublin context.

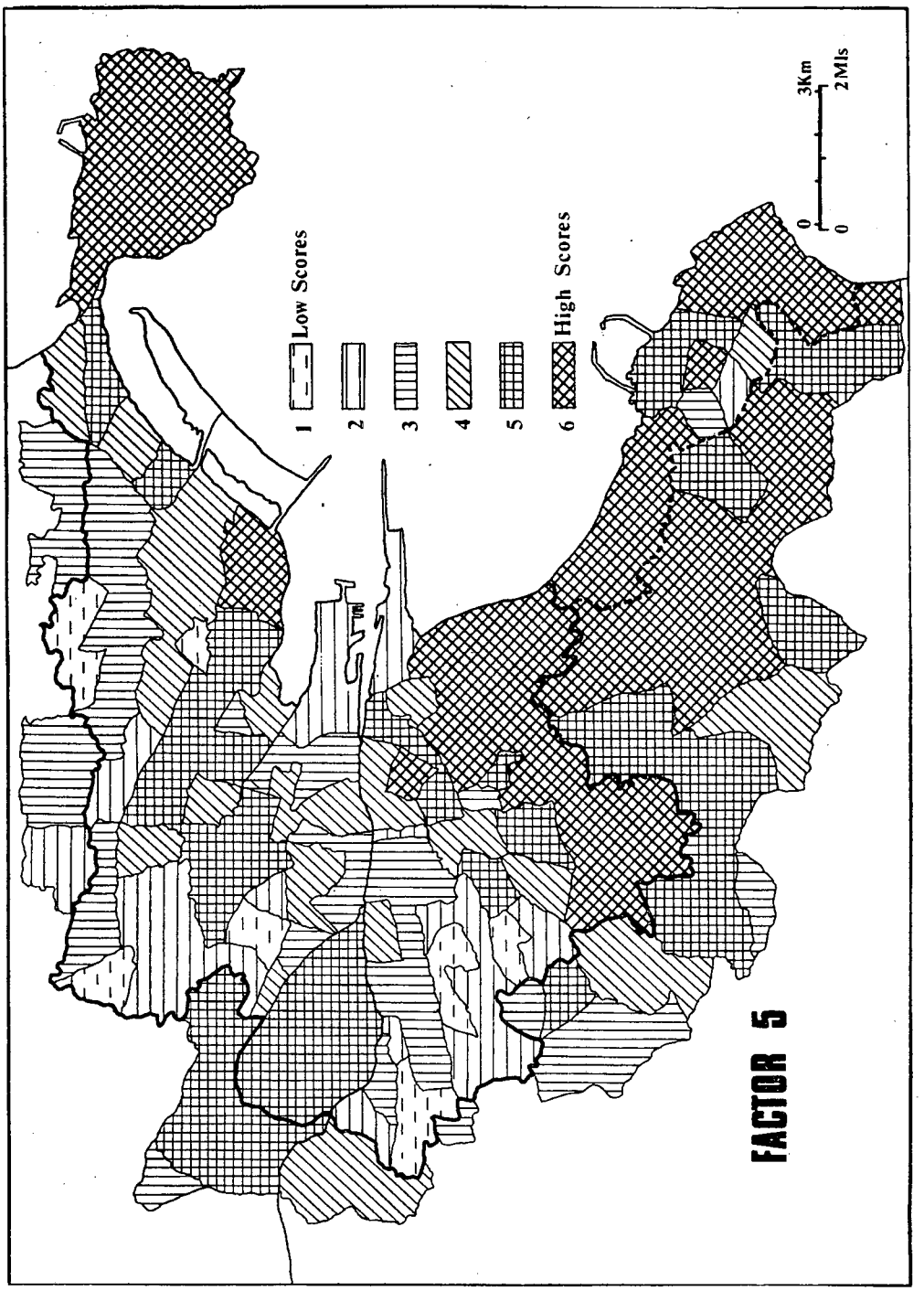


FIGURE 6: *Scores on Factor Five: Socio-economic status—professionalism.*

The material presented in this paper not only throws some initial light upon the social differentiation of Dublin but can also be used to provide a sampling frame for more micro-studies of the urban area along given dimensions. Studies which require very similar or alternatively highly contrasting areas along housing, socio-economic status or family status dimensions could utilise the areas delimited in the factor score maps as a sampling base. At the same time it is important to emphasise the preliminary nature of this work in the Dublin context. The availability of additional census material, together with perhaps data on social *malaise* and pathology[11] could do much to improve our knowledge of the underlying dimensions of the social patterning of Dublin through the use of factorial ecology techniques. Furthermore, cognitive and perceptual information related to how well people know specific areas and aspects of Dublin and how they structure the city in their minds could well add considerably to this work, not only in the local context, but in terms of improving the approach as a whole.

Appendix I

| | | *Factor Loadings* | | | | |
|---|---|---|---|---|---|---|
| *No.* | *Variable Name* | *1* | *2* | *3* | *4* | *5* |
| 1 | SEX | ·546 | —·304 | — | ·464 | — |
| 2 | PXM21 | —·737 | — | — | —·576 | — |
| 3 | PXF21 | —·720 | — | — | —·600 | — |
| 4 | PXM | ·709 | — | — | ·445 | — |
| 5 | PXF | ·552 | —·389 | — | ·474 | — |
| 6 | PXXM | ·569 | — | — | ·715 | — |
| 7 | PFOLD | ·662 | — | — | ·665 | — |
| 8 | PTSF | — | — | ·861 | — | — |
| 9 | PTSM | — | ·409 | ·704 | — | — |
| 10 | PM19 | — | ·452 | — | — | — |
| 11 | PF19 | — | ·462 | — | — | — |
| 12 | PMM | — | — | —·879 | — | — |
| 13 | PMF | — | — | —·857 | — | — |
| 14 | PM | — | — | —·897 | — | — |
| 15 | PFERT | —·319 | — | —·452 | —·662 | — |
| 16 | PPH | —·858 | — | — | —·374 | — |
| 17 | SCH | — | —·742 | — | — | —·433 |
| 18 | PGM | — | ·508 | — | —·474 | ·351 |
| 19 | PFM | ·408 | — | ·539 | ·500 | — |
| 20 | PNGM | ·519 | — | — | ·660 | — |
| 21 | PNGF | ·567 | — | — | ·409 | — |
| 22 | PHPM | — | —·552 | — | — | —·683 |
| 23 | PHPF | — | —·310 | — | — | —·592 |

N.B. To facilitate interpretation loadings +0·3↔—0·3 have been omitted.

11. See the work of Boal, Doherty and Pringle (1974) on Belfast.

Appendix I—*continued*

| No. | Variable Name | Factor Loadings 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| 24 | RPM | — | −·759 | — | — | −·586 |
| 25 | RPF | — | −·635 | — | — | −·525 |
| 26 | RCM | — | −·714 | — | — | — |
| 27 | RCF | — | −·788 | — | — | — |
| 28 | RWM | — | ·680 | — | — | ·444 |
| 29 | RWF | — | ·922 | — | — | — |
| 30 | RUM | — | ·933 | — | — | — |
| 31 | RUF | — | ·628 | — | — | — |
| 32 | PCAR | −·405 | −·644 | — | — | −·495 |
| 33 | PH1 | ·733 | — | ·340 | — | — |
| 34 | PH10 | ·330 | −·371 | — | — | −·685 |
| 35 | PP1 | ·796 | — | — | ·437 | — |
| 36 | PP12 | — | ·504 | ·560 | — | — |
| 37 | PPR | — | ·847 | — | — | — |
| 38 | PLA | — | ·860 | — | — | — |
| 39 | PUF | ·785 | — | — | ·306 | — |
| 40 | PFF | ·595 | −·469 | — | ·356 | — |
| 41 | PAL | −·564 | — | — | — | — |
| 42 | POO | — | −·764 | −·343 | — | — |
| 43 | PB1 | ·800 | — | — | — | −·351 |
| 44 | PB2 | ·867 | — | — | — | — |
| 45 | PB3 | ·689 | — | — | ·366 | — |
| 46 | PB4 | — | — | — | ·759 | — |
| 47 | PB5 | −·683 | — | — | — | — |
| 48 | PB6 | — | — | — | −·720 | — |
| 49 | PWT | −·723 | — | — | — | — |
| 50 | PNC | — | — | — | — | — |
| 51 | PBAT | −·785 | — | — | — | — |
| 52 | PCON | −·696 | — | — | — | — |
| 53 | PCAV | — | — | — | — | −·422 |
| 54 | VALPOP | −·642 | — | — | — | −·450 |
| 55 | VALHU | ·550 | — | — | — | −·524 |
| 56 | PCP | −·353 | −·334 | — | −·553 | — |

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