Vernacular language loyalty and social network
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INTRODUCTION
Several urban language studies over the past fifteen years have convincingly established the links between a speaker's language and her or his age, sex, and social class, yet very much more remains to be said about individual differences within these variable groups. Several linguists (e.g., Gumperz 1976; Russell 1977; Bickerton 1975) have made observations similar to Le Page (1968) that "the individual creates his system of verbal behaviour so as to resemble those common to the group or groups with which he wishes from time to time to be identified". This hypothesis is strikingly similar to Giles & Powesland's (1975) proposals for applying accommodation theory to explain linguistic code-switching.

Labov (1966) notes considerable variation within social groups defined on the basis of age, class, or sex, and he argues convincingly that studies of the "idiolect" are unlikely to reveal sociolinguistic structure as clearly as studies of the speech of whole social groups. The consistent patterns he himself uncovers are observable only on this basis; the size of Labov's sample in New York City, together with his method of aggregating data from all the individuals in the group, ensures that considerable variation between individual idiolects does not obscure more regular patterns of variation in the community as a whole. We should note here that Labov is not suggesting that individuals reveal only unstructured variations; he is showing specifically that the idiolect-based approach characteristic of earlier scholars (e.g. Bloch 1948; Hockett 1958) is inadequate. Bloch and Hockett hoped that the idiolect would be revealed as a tightly structured, self-consistent system, valid also for the wider community, except perhaps for minor differences of detail.

For many years now, sociolinguistics has shown us that this deterministic approach is unprofitable. Nevertheless, as long as we do not expect to find in the language of the individual a perfect replica in miniature of his or her

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dialect grammar, there is no reason why a speaker's output should be viewed as unstructured and unworthy of study. In fact, Bickerton, Le Page and Gumperz all take the individual as the basis of their descriptions of variation, principally because of the difficulty of defining corporate group boundaries. Le Page is additionally anxious to emphasise the individual's freedom of choice to use language as a means of identifying with different groups at different times. Although this approach may be more obviously attractive to a creolist than a sociolinguist working in a monoglot situation, we have found it strikingly appositive to our own observations of intra-group variation in Belfast.

The analysis in this paper focusses on the individual, not necessarily for reasons of difficulty in defining group boundaries (although that is sometimes a problem); rather, we would agree with Mitchell (1973) and Russell (1977) that the network of relationships within which an individual is embedded and the corporate social groups to which he or she can be said to belong are phenomena at different levels of abstraction. In studying linguistic variation, it seems reasonable initially to adopt Boissevain's (1974) view that persons are capable of interacting meaningfully with each other and that their behaviour does not depend entirely upon their position in an abstract society. The concept of social network has been developed by Mitchell, Boissevain and others as a result of this conviction that behaviour can often be explained by studying individual interactions. Attempts to explain it exclusively in terms of corporate group membership, culture, and systems of values may sometimes be less satisfactory.

The behaviour we are attempting to explain here is the linguistic behaviour of forty-six working-class Belfast speakers from three comparable working-class communities. As a result of regularities in the data, we formed the hypothesis that closeness to vernacular speech norms correlated positively with the level of individual integration into local community networks. To test this, we looked at a number of phonological variables against a new, combined measure of multiplexity and density in individual relationships. Thus, we are attempting to make a quantitative statement of the extent to which individual network structure predicts linguistic behaviour.

It should be noted here that the link between individual use of a vernacular language code and integration into a localised, relatively closed network has been pointed out before, particularly by Labov (1972b) and Gumperz (1972 with Blom; 1976a, 1976b). However, no systematic quantitative measure of this integration has been devised. To be integrated into the local community – or

[2] Although of course Labov's study of the Harlem gangs (reported in Labov 1972b) is highly systematic, its method is applicable only to groups or quasi-groups with a fairly clear membership. The kind of network study to which we are here referring does not postulate group boundaries of any kind and so (in theory at least) any individual can be studied in this way whether she or he belongs to a self-conscious group or not.

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'local team', to borrow Blom and Gumperz' expressive phrase – is to have contracted sets of relationships and adopted sets of values which mark out the 'local team' as an entity separate from the wider provincial or national community. In this wider community, explicitly codified and institutionally accepted sets of values, which may directly contradict local norms (Littlejohn 1976; Labov 1972b), are acknowledged. Blom and Gumperz make the same distinction between the 'local team' values of some Hemnes people and the more cosmopolitan, pan-Norwegian values of the professionals in the town. They point out the language/network link in Hemnes, expressing it as a tendency for speakers who use most dialect to be members of closed networks, while standardized speakers have open personal networks.

This paper gives an account of the basis and testing of the hypothesis that loyalty to vernacular norms correlates with level of integration into the localised network. It is structured as follows: (1) a brief account of the Belfast communities where the data was collected; (2) the concept of social network and its application in empirical studies by a number of scholars; (3) the construction of the Network Strength Scale as a means of measuring integration into the local community; (4) the statistical analyses carried out in measuring linguistic scores against NSS scores for forty-six speakers; (5) a brief discussion of the implications of these relationships for sociolinguistic theory.

THE COMMUNITIES

A fuller account of the social characteristics and socialisation patterns in the three Belfast inner-city communities may be found elsewhere (Milroy 1976; Milroy and Milroy 1977). In brief, Ballymacarrett (East Belfast), the Clonard and the Hammer (both West Belfast) are all self-contained communities located in the heart of traditional working-class areas now suffering severely from social malaise (Boal 1978) and considered in Belfast to be 'rough' areas. They are the kind of areas the British national press is fond of describing as 'ghettos'. Their vernacular-speaking inhabitants correspond more or less to the lower-working class group in Trudgill's (1974) Norwich survey. In Belfast, as in other cities, the more highly-skilled working-class families have, on the whole, moved out to the suburbs, leaving the most vulnerable and exploited members of the community concentrated in increasingly decaying and blighted areas of the inner city. We may consider our informants in this study to be victims of the process of 'pauperization' described by Pahl (1975: 167). Pahl refers to structural changes which result in a tendency for the lower working class to become relatively poorer as society becomes more skilled and the services of the unskilled or semi-skilled worker are consequently less in demand. The communities we studied seemed

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TABLE 1. Scores for nine phonological variables

<table>
<thead>
<tr>
<th></th>
<th>Index scores</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hannah McK</td>
<td>1.4 1.05 1.2</td>
<td>0 0 0 66.7 25.00 20.00</td>
</tr>
<tr>
<td>Paula C.</td>
<td>2.4 2.63 2.5</td>
<td>1 58.34 70.48 100 47.83 50.00</td>
</tr>
</tbody>
</table>

1–3 are index scores; 4–9 represent percentages. A higher score indicates a relatively close approximation to vernacular norms (see Milroy & Milroy 1977b for details of the variables).

to be isolated from the mainstream of upwardly mobile Belfast society,3 in that they maintained different, sometimes opposing, sets of values to those publicly acknowledged in the media and the educational system. Nor was it clear that they held in common with the rest of the Belfast community a shared set of linguistic norms (see Milroy & Milroy 1977a; Maclaran 1976). We may note that Trudgill in Norwich describes this group as isolated from changes which affect the rest of the speech community, revealing very much less clear sociolinguistic patterning in their speech than higher-status social groups.

Using classic sociolinguistic methods of analysis, it is possible to demonstrate clear age and sex grading in the language of the Belfast speakers (Milroy & Milroy 1977b). Yet sometimes dramatic differences between speakers of the same age, sex and social background are evident. We may illustrate the extent and consistency of these differences prior to a systematic analysis by referring to the contrast between Paula C. and Hannah McK. (see Table 1).

Paula shows perfectly consistently a closer approximation to the vernacular than Hannah; yet both are middle-aged women from the Clonald, married to unskilled workers. Neither seemed particularly dissatisfied with life in the Clonald or ambitious of upward mobility — in fact, both expressed considerable satisfaction in the warmth and friendliness of the community.4 The difference in their language is consistent enough to invite some explanation —

[3] There is an intriguing parallel to this very underprivileged group in Latin American cities. Individuals there who are outside the normal industrial structure, in that they have no job security or union membership, and in that their sporadic employment typically is of little direct relevance to industrial production, are known as marginals. They may remain marginals for generations, without showing any sign of upward mobility (L. A. Lomnitz, Networks and Marginality. Academic Press, 1977). Although it is, of course, dangerous to compare the class or economic structure of developed and underdeveloped countries, our informants had much in common with the marginals; the main points were that they had insecure jobs with little relevance to industrial production and showed little sign of ever attaining security or mobility by becoming employed in important jobs protected by powerful unions.

[4] The variable of local satisfaction is often found to be important in analysing behaviour in working-class communities. Fried (1973) discusses its importance at some length.
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Indeed, intra-group differences are, in very many cases, consistent over a large number of variables.

It is difficult to see how variation of this kind can in any way be explained by correlating linguistic scores with external social factors. A complex social class index of very great delicacy could no doubt be constructed, taking into account such factors as family size, quality of furniture, condition of house, and a great number of other possible factors. This did not seem either practicable or reasonable. A much simpler approach, based on the structure of each individual's relationship with others in the community, was possible.

The Concept of Social Network

This concept has been developed to examine individual (mainly informal) relationships between people and so offers a set of procedures for looking at the vague but important notion of 'integration into the community', discussed in the introductory section. Network analysis has also been found useful for examining unstable social situations of the kind found in cities, where mobility is the norm; this is because the procedure does not compel the analyst to postulate corporate group boundaries. Further, although the concept presents a set of procedures rather than a fully-fledged theory, several researchers have found that it has a powerful capacity to explain social behaviour, rather than simply to describe correlations between network type and behaviour. It should be noted that, in general, urban sociolinguistic studies tend to correlate linguistic and extra-linguistic variables, rather than to use one set of variables to explain the other in any specific way. Since we shall be focussing ultimately on the extent to which an individual's personal network structure may be said to explain her or his linguistic behaviour, it is helpful at this stage to consider in some detail the use one scholar has made of the concept as an explanatory device.

Elizabeth Bott's (1957) study of twenty London families is now a classic of the anthropological literature. Initially she set out to describe patterns of variation in the way husband and wife shared household tasks in terms of social class and neighbourhood (corporate group factors), but she was forced to look for a more effective explanation. Applying the concept of social network, as developed by Barnes (1954), she found that clear separation of each spouse's area of responsibility and their degree of independence of each other corresponded to the structure of their personal networks. Where the level of segregation was high and responsibility for tasks rigidly allocated (these conditions went together), each spouse tended to have contracted long-standing relationships with people who also knew each other. Where spouses were dependent on each other and did not allocate areas of responsibility as clearly, their personal networks were less 'dense'; that is, their contacts did not normally know each other. Bott further commented that
where the networks were *dense*, role relationships were usually *multiplex*; that is, individuals interacted with each other in more than one capacity — a person’s neighbour might also be a kinsman and a fellow employee.

At first sight it is difficult to see why there should be a link between marital segregation and network structure, but Bott argues convincingly that network structure is the causal factor. Dense, multiplex network ties have, she argues, been contracted prior to marriage, and such a network forms in effect a bounded group capable of imposing normative consensus on its members. Marriage partners are therefore kept relatively independent of each other and more dependent on individuals in their own network. Absence of pressures applied by a dense multiplex network results in greater interdependence between spouses and a sharing of tasks and responsibilities. Thus, level of marital segregation is explained in terms of the *capacity of a particular kind of network to act as a norm enforcement mechanism*; some kinds of personal network have a more powerful capacity to influence behaviour than others. As we shall see, it is possible to argue in a similar manner that the more dense and multiplex an individual’s network, the greater is its capacity to impose on him or her its own norms of *linguistic* behaviour. These norms may be different from any institutionally acknowledged set of prestige norms.

Bott further pointed out the links between network type and social class; only in traditional working class areas, where there is little turnover of population and people work together in the same occupation, are extremely dense, multiplex networks likely to be found. The classic studies of working-class communities (e.g. Fried 1973; Young and Wilmott 1962; Dennis, Henriques and Slaughter 1956; Wiener 1976) have all confirmed several recurrent patterns. Relationships are multiplex; sex roles are clear and male solidarity strong; there are many overlapping kinship links within the area; network density is high; and territorial loyalty is always strong. Frankenberg (1969) and Southall (1973) have used the concepts of network density and multiplexity to characterise a number of different types of community ranging from Irish and Welsh mountain settlements, through traditional working class areas, to newly settled working- and middle-class suburban estates.

Although important modifications have been made to her original analysis, and both terminology and quantification procedures have been considerably refined, a number of Bott’s observations have become accepted by scholars applying the network concept. It is now agreed that density and multiplexity usually go together, that dense, multiplex networks act as norm-enforcement mechanisms (Mayer 1963; Kapferer 1969; Boissevain 1974; Cubitt 1973), and that a variable closely related to network density is geographical mobility (Turner 1967). On the whole, networks in rural areas tend towards density and multiplexity and in urban areas to uniplexity and spareness. The exceptions to this generalisation are, of course, the old, established working-
class areas, such as those described by Young and Wilmott (1962), Hannerz (1974), Fried (1973), and Wiener (1976). In these areas, often described as 'urban villages', personal networks tend to multiplexity and density.

All three Belfast areas studies are of this type, but only Ballymacarrett retains the characteristic traditional source of male employment. Men in the Hammer and Clonard are forced to seek work away from their areas because of the recession of the linen industry on which they were once dependent.

We may further note that when people are forced to move from their traditional neighbourhoods, their networks become less dense and less multiplex. One man from Bethnal Green (Young and Wilmott 1962), who was compulsorily rehoused in a suburban housing estate, summed up the distaste many working-class people feel when their traditional neighbourhoods are destroyed. When asked about contacts with his neighbours, he replied that he had not grown up among them; they were different kinds of people and did not mix. The Bethnal Green women suffered particularly by being cut off from their kin and their work. Frankenberg suggests that when networks become less dense, people are more anxious to achieve a higher social status; 'the less the personal respect received in small group relationships, the greater is the striving for the kind of impersonal respect embodied in a status judgment' (1969: 232). Several studies point out a concern with upward mobility and adequate education of children as characteristic of working-class people whose network structures have been disrupted.

One important modification to Bott's original view of network density as a norm-enforcement mechanism should be noted here. Cubitt's (1973) study of the networks of working- and middle-class Edinburgh families suggests that density in key sectors or clusters of the network – that is, compartments associated with specific fields of activity – is a more important means of compelling normative consensus than overall density. In practice, it is extremely hard to measure overall density in a network of several hundred (or more) relationships; and where it is possible, Cubitt suggests that density is nearly always low. Specific clusters are isolated as being particularly important here and varying significantly in density from one personal network to another, 'those of kinship, neighbourhood, work situation (both husband's and wife's) and voluntary association' (1973: 81). In fact, the literature on traditional working-class communities, including the relevant parts of Bott's work, tends to support this view. In practice, most comment focusses on ties of kinship, neighbourhood, work and friendship.

CONSTRUCTING THE NETWORK STRENGTH SCALE

We may infer from this extensive literature that density and multiplexity are excellent indicators of the pressures a person is under to adopt the norms and values – including linguistic norms and values – of the 'local team'. It may
also be noted that several other structural and content characteristics of a personal network may be good indicators of the same phenomenon. For example, degree of connection (number of contacts within a given time); centrality of position; intensity (affective value placed on relationships); all are apposite to any attempt to explain behaviour. (See Mitchell (1969) and Boissevain (1974) for a discussion of these terms.) However, most studies utilising the network concept have in fact found that either density of one or more of the clusters specified by Cubitt or level of multiplexity offers powerful means of explaining various behaviours (e.g. side-taking in a fight (Kapferer 1973) or patterns of gift exchange (Trouwborst 1973)). To some extent these two subsume other, less easily measurable variables. For example, one of our informants set a low affective value on her relationships with her neighbours and appeared to reject 'local team' values. Devising a reliable measure for these attitudes would have been difficult and was in any event unnecessary; the low level of multiplexity in her personal network ties formed a kind of objective correlative to her subjective attitudes. She seemed to avoid multiplex ties with local people as far as possible in that she did not interact with her neighbours on a friendly basis and avoided working with a cluster of neighbourhood women who were employed as domestics in a local school. Her kin ties in the area were not strong.

Taking into account the significance of high multiplexity and density scores as indicators of level of integration into the community, two criteria have been considered in selecting the specific indicators to be used in constructing the Network Strength Scale.

1. They must reflect the conditions which have repeatedly been found important in predicting the extent to which normative pressures are applied by the local community; it is specifically the capacity of some kinds of network to enforce consensus which interests us here.
2. They must be recoverable from the data collected in Belfast, and easily verifiable. (For this second reason, affective measures are unlikely to be reliable.) All informants were extensively questioned about kin, place of work, corporate and informal group membership, and territorial loyalties. Their behaviour was also closely observed over a period of about five weeks (in each area).

The implications of the second condition are important; if we accept it, we cannot use multiplexity and density scores directly. Both can, indeed, be computed mathematically; density can be expressed as a proportion of actual relationships within a personal network to possible relationships. Multiplexity can be expressed as a proportion of multiplex relationships to all relevant relationships. But these calculations clearly require a quantitative statement of the size of a total personal network which we are not in a position to provide. For our purposes then, multiplexity and density will be expressed
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indirectly by five indicators which are readily verifiable from the data, and reflect recurrent observations from the extensive literature discussed in the previous section.

Each informant is assigned a score on a scale ranging from 0-5. One point is assigned for each of the following conditions he or she fulfills:

1. Membership of a high density, territorially based cluster.
2. Having substantial ties of kinship in the neighbourhood. (More than one household, in addition to her or his own nuclear family).
3. Working at the same place as at least two others from the same area.
4. The same place of work as at least two others of the same sex from the area.
5. Voluntary association with work mates in leisure hours. This applies in practice only when conditions three and four are satisfied.

Condition One is designed as an indicator of density, and to reflect Cubitt's insistence on the importance of density of specific clusters in norm enforcement. A cluster is defined as a portion of a personal network where relationships are denser internally than externally. The Jets, Cobras and T-Birds described by Labov (1972b) form clusters; many of the young men we studied belonged to similar clusters; some of the middle-aged women belonged to clusters of six or seven individuals who met frequently to drink tea, play cards and chat. Some individuals avoided association with any group of this kind.

Conditions Two, Three, Four and Five are all indicators of multiplexity; if they are all satisfied, the proportion of ego's interactions which are with members of the local community is very high. Three and Four are intended to reflect the particular capacity of an area of homogeneous employment to encourage the development of dense, multiplex networks; Four also reflects the fact that polarisation of the sexes usually occurs when there is a large number of solidary relationships in a specific neighbourhood. The densest, most multiplex networks are in fact found in areas where men are employed in such occupations as mining, shipbuilding, or steelworking. In Ashton, for example, Dennis et al. (1956) observed that many of the miners were both kin and neighbours. Male solidarity was strong, and the level of sex segregation high. They took their recreation together in pubs and working men's clubs, ensuring that a high proportion of any individual's interactions took place within an almost closed network. The shipyard men in Ballymacarrett behave in a similar way; and in fact multiplex ties of the kind found in the conditions specified above are usually contracted by men, who might therefore be expected to score higher on the NSS. It should, however, be noted here that both the Hammer and the Clonard were areas of high male unemployment; consequently, women frequently scored as high as or higher than men.
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The scale is capable of differentiating individuals quite sharply; scores range from zero for someone who fulfills none of the conditions (although a zero score is rare) to 5 for several informants who fulfill them all. Such individuals must be considered extremely closely integrated into the community in the sense that their kin, work and friendship ties are all contracted within it; additionally, they have formed particularly close ties with a corporate or informal group in the neighbourhood. (A positive score is given under one for membership in either an informal group or a corporate group based in the area, such as the local football fans' club). Conditions One and Two further reflect the defined territorial base associated with the kind of network structure which interests us. As we have noted in Bethnal Green and in the Hammer area of Belfast, geographical mobility has the capacity to destroy the structure of long established networks.

STATISTICAL ANALYSIS METHODS

The most important consideration in choosing methods of analysis was to find means of testing and using the NSS as an explanatory device to account for interpersonal differences in linguistic variable scores. A further possibility was the use of the NSS as a tool of sociolinguistic analysis to look at differences in network structures and language in more detail in each area and in age and sex subgroups in the areas. A third useful focus for analysis of particular interest to the sociolinguist is the investigation of similarities or differences in the distribution of the linguistic variables (LVs) themselves and whether they differ according to area, sex, or age. It will be clear in the course of this paper that the network data are more illuminating if the relationship between language and these other important extra-linguistic variables is taken fully into account.

The statistical techniques used in the analysis are explained below, and freely discussed throughout the paper as results are reported.

Correlation. Our basic hypothesis is that differences in NSS scores may be associated with variations in linguistic variable scores, i.e. that increasing NSS scores are related to increasing linguistic variable scores. The statistical test which measures and gives a mathematical value to relationships of this kind is correlation. Since one cannot assume that the LV's are distributed fairly equally (normally) around their means, a correlation test based on the rank ordering of scores was used (the Spearman Rank Order Correlation). This test estimates how far the rank order of scores for each individual on one factor (NSS) are similar to the rank order of scores on another (LV). A statistic $r$ is produced which reflects how closely the rank orders for each factor for all individuals match. The value of the correlation $r$ is influenced by the number of individuals in a sample tested. It is important to test how much
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reliance can be placed on $r$ in terms of whether or not there is indeed a relationship at any given level of $r$. The nearer $r$ approaches 1.0 (a one-to-one relationship between rankings) the greater the relationship and more certain one can be that the $r$ is not a result of chance variation in the sample. The smaller the sample, the more stringent the test for significance against chance. To test the value (significance) one can put on $r$, another statistical test (the $t$ test) is carried out. If there is a probability that a particular $r$ score is only likely to have occurred by chance 5% of the time, $r$ is said to show a significant relationship between variables. It is possible to determine by means of the $t$ test and the use of statistical tables whether the $r$ for any given size of sample is significant – that is, whether a real and reliable relationship exists. This means that the probability ($p$) of $r$ occurring by chance is less than .05 ($p < .05$). A more significant result is a $t$ score which indicates that $r$ would occur only 1% of the time by chance ($p < .01$). These two levels of significance will be indicated against each result. If $p > .05$, $r$ would have occurred more often than 5% of the time by chance, it could be concluded that the variables tested did not stand in a significant (real or reliable) relationship to each other. If the $t$ score is close to one which would give a significant result, it is reasonable to discuss the results in terms of a tendency for the first variable to correlate with the second.

Analysis of variance. The correlation tests reported below examine the relationship between increasing linguistic variable scores and increasing NSS scores. This is a test of the usefulness of the NSS, involving as it does every point on the six-point scale. In cases where the correlation is not significant but a marked tendency (or trend) is noted, it is possible to divide the NSS scores into high and low scoring groups (omitting the median score NSS = 3) and test for the significance of the difference between linguistic variable scores of high and low NSS scorers. Thus the value of the network concept can be assessed in terms of high and low scores rather than by using a continuous scale. A statistical analysis which can do this is the analysis of variance. At the same time it can test separately for both the significance of the difference between the linguistic variable scores of various sub-groups (i.e. informants grouped by sex, age, and area in this study), and in relation to high and low NSS scores. Thus, analysis of variance and correlation are powerful tools of sociolinguistic analysis; they can together show a quantitative relationship between linguistic and extra-linguistic variables, and they can also indicate how extra-linguistic variables may be related to each other in their capacity to influence linguistic performance.

The analysis of variance tests the significance of the difference between means of each group, taking account of the deviation of each score round the mean. Thus it automatically incorporates a test for the homogeneity of groups with respect to a particular variable. The same analysis can also measure the
extent to which variation between subgroups in respect of one variable is influenced by variation between subgroups in respect of another (interaction of variables). Consider, for example, the variables of age and network: if the effect of age on a linguistic score is parallel in high and low NSS scoring groups, it could be concluded that there was no interaction between those variables. If, on the other hand, linguistic scores are higher in the older groups than in the younger for low NSS scorers but are lower than the younger group's score for high NSS scorers, one would conclude that the variables of network and age interact with each other in influencing this particular linguistic score. This is important if we want to assess which extra-linguistic factor best explains the patterning of a linguistic variable; as we have seen, the sexes have characteristically different network structures. Clearly, it is of interest to be able to state here whether sex and network structure interact significantly in their effect on language.

The analysis of variance test gives a ratio statistic (F) for the degree of interaction, as it also does for differences between group means for all variables. F is then tested for significance in the same way as r in the correlation tests, taking into account the number of people in each group. Chance probabilities of F are given as a measure of the reality of (a) differences between groups or (b) of interaction between extra-linguistic variables.

The linguistic variables. The linguistic scores discussed in this paper are obtained from counts of the occurrences of the variables (a), (ai), (l), (th), (x'), (x'), (e'), and (e') in the speech of the Belfast informants. The data for all variables is drawn from the same parts of the tape. Two styles were sampled for each speaker – an interview style where she or he is talking to the field worker in response to direct questioning, and a spontaneous style, usually where he or she is talking to friends or family or occasionally to the field worker (i.e. not responding directly to the field worker’s elicitation). Thus, the scores represent samples from at least two different points in the tapes collected for each speaker (Milroy & Milroy 1977a).

The scores were computed using the now-classic methods described by Labov (1966). Where possible, the variables are treated as binaries and a percentage score is given; in fact most of the variables are scored as percentages, with a high score indicating relative closeness to the vernacular. The vowel variables (a), (ai), and (l) were not treated as binaries, as it was possible to score several points on a phonetic continuum with one end of the

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[5] A full analysis of the distribution of each linguistic variable by age, sex and area appear in Milroy 1980. The results of the analysis are referred to at various points throughout this paper.
continuum lying closest to vernacular norms and the other furthest away. The scores referred to for these three variables are therefore index scores.

Where possible, the total number of tokens for each individual is between 60 and 80. This was achieved for all variables except those with a limited phonological or lexical distribution – (th) and (A') in this study. The scores for (th) are based on only 16–20 tokens per speaker, those for (A') slightly more. The total number of tokens scores for (A') was 1,500 (compared with 856 for (th)). The phonetic realizations coded for each of the eight variables are described briefly below.

1. (a) An extremely phonologically complex variable. Index scores measure degree of retraction and backing to [a] and [e] in items such as hat, man, grass. Items with a following velar are excluded since backing is prevented in this environment. A five-point scale is used, ranging from zero for [a] to 4 for [e]
2. (ai) Index scores measure on a three point scale degree of fronting and raising of the first element of the diphthong in items, such as pipe, line, life. Scores range from 0 for [ai] to 2 for [ei]
3. (i) Index scores measure on a three point scale degree of lowering and centralisation to [i ~ ɪ] in items such as hit, kill, tin. Scores range from 0 for [i] to 2 for [ɪ ~ ɪ]
4. (th) Scores measure variable deletion of intervocalic [ə] in a small lexical set: e.g. mother, brother.
5. (A1) Scores measure lip-rounded variant [3] in items such as hut, mud.
6. (A2) Like (th) this variable has a restricted lexical distribution, but unlike (th), membership of the lexical class is not phonologically predictable. It is a variable occurring in items such as would, pull, took (but not wood, wool, book) which alternate between [a] and [u] realisations. There is evidence that the membership of the class of items which can alternate in this way has declined in Belfast over the last century (Maclaran 1976; Patterson 1860). The figures refer to the occurrence of the [A] variant.
7. (e1) The figures refer to a low vowel as opposed to a mid vowel in items such as bet, peck, rent, else. The analysis is restricted to monosyllables closed by a voiceless stop, or by a voiceless obstruent preceded by a liquid or nasal.
8. (e2) These scores measure the same low vowel in di- and polysyllables. It is necessary to treat these environments separately from those in which (e1) occurs, as they have a different distribution phonologically and across the community: this distribution is masked by the levelling effect of considering (e1) and (e2) as a single sociolinguistic variable. (See Milroy and Milroy 1978 for a fuller discussion of the complexities of the /e/ vowel).
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The statistical analysis showed an overall positive and significant relationship between the NSS and five of the eight linguistic variables studied ((a), (th), (A²), (e'), and (e'')). For the purposes of discussion these will be handled separately from (ai), (i) and (A¹) which did not show an overall significant relationship but showed some significant relationships when subjects were divided into subgroups. The correlation results will be presented first, followed by those from the analysis of variance. Discussion of the implications of the results will be deferred until all the statistical data have been considered.

Several correlation tests were carried out for each linguistic variable. All subjects were tested together and then divided according to sex, age, area, and age by sex. Clearly the number of subjects is small if the total N (46 max.) is divided by 3 or 4. It should be noted that the smaller the N, the higher the correlation must be before a significant relationship can be demonstrated. Although the statistic r may sometimes be similar for a small and a large N, it may not be sufficient to indicate a real relationship for the smaller N although it does so for the larger.

[6] Because our original analysis was not designed to focus on individuals, the number of informants varies a little depending on the linguistic variable we are studying. The low N for (a) and (th) reflects an early interest in direct comparison of Clonard and Ballymacarrett scores; we analysed only a few Hammer speakers because of the apparently chaotic sociolinguistic patterning which we felt reflected the chaotic social conditions there. However, the application of the r test ensures that variation in N's does not reduce the reliability of the results reported in this paper. As soon as we developed means of dealing with individual scores, we felt we could deal with the apparent absence of pattern in the Hammer and analysed Hammer data as fully as the data from the other areas. In fact, many more than 46 speakers were recorded and analysed; some, however, fell outside the age groups, and we could not examine more than about 30 tokens for other speakers on some variables because of pressure of time. All the speakers included in this analysis have been analysed in the manner reported in section 5 of this paper, where the number of tokens is specified.

### TABLE 1. Correlations between network score and linguistic variable score for all subjects.

<table>
<thead>
<tr>
<th>Variable</th>
<th>r</th>
<th>t</th>
<th>N</th>
<th>level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>0.529</td>
<td>3.692</td>
<td>37</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td>(th)</td>
<td>0.485</td>
<td>3.591</td>
<td>44</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td>(A²)</td>
<td>0.317</td>
<td>2.142</td>
<td>43</td>
<td>p &lt; .05</td>
</tr>
<tr>
<td>(e')</td>
<td>0.255</td>
<td>1.709</td>
<td>44</td>
<td>p &lt; .05</td>
</tr>
<tr>
<td>(e'')</td>
<td>0.321</td>
<td>2.200</td>
<td>44</td>
<td>p &lt; .05</td>
</tr>
</tbody>
</table>

N refers to the number of subjects tested for a given variable.
The variables (a), (th), (\(A^2\)), (\(e^1\)), and (\(e^2\)): correlations

The results in Table 1 show that there is in fact a real and reliable relationship between a speaker's language and the structure of his or her social network. As scores on the network scale increase, so do linguistic scores. The relationship is strongest for the variables (a) and (th).

The results in Table 2 give further insight into the scores in Table 1. The variables (a) and (th) are shown to be as sensitive to network for both sexes as they are overall. However, the level of significance is greater for women than for men.

Scores for (\(A^2\)) indicate, in contrast with (a) and (th), a correlation with men's NSS scores. Since the result for women is not significant, the overall significant result is dependent on the just significant \(r\) for men. Since neither sex shows a significant \(r\) between either (\(e^1\)) or (\(e^2\)) scores and NSS scores, it is now clear that the significant overall result (Table 1) for these LV's is attributable to a larger N. However, higher \(r\)'s for men on both these LV's indicate a trend towards a relationship with network. This trend is most clearly absent from women's (\(e^1\)) scores. In other words, women show no tendency whatever to use (\(e^1\)) as a symbol of community loyalty.

The most revealing fact to emerge from the Table 3 data is the strikingly close correlation between linguistic and network variables in Ballymacarrett. There are no significant results in either of the other areas. Thus, the overall correlations in Table 1 are the result of the high Ballymacarrett \(r\). The only variable in Table 3 which does not yield a significant result in this area is (\(A^2\)). However, the Ballymacarrett \(r\) does show a clear tendency to increase with the linguistic variables score; in fact the Ballymacarrett \(r\) for (\(A^2\)) is greater than the \(r\) for all subjects. A significant result is not achieved here because the

<table>
<thead>
<tr>
<th>Variable</th>
<th>sex</th>
<th>(r)</th>
<th>(t)</th>
<th>N</th>
<th>level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>M</td>
<td>0.485</td>
<td>2.287</td>
<td>19</td>
<td>(p &lt; .05)</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>0.683</td>
<td>3.741</td>
<td>18</td>
<td>(p &lt; .01)</td>
</tr>
<tr>
<td>(th)</td>
<td>M</td>
<td>0.406</td>
<td>1.935</td>
<td>21</td>
<td>(p &lt; .05)</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>0.539</td>
<td>2.932</td>
<td>23</td>
<td>(p &lt; .01)</td>
</tr>
<tr>
<td>((A^2))</td>
<td>M</td>
<td>0.411</td>
<td>1.066</td>
<td>23</td>
<td>(p &lt; .05)</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>0.171</td>
<td>0.777</td>
<td>22</td>
<td>(p &gt; .05)</td>
</tr>
<tr>
<td>((e^1))</td>
<td>M</td>
<td>0.292</td>
<td>1.368</td>
<td>22</td>
<td>(p &gt; .05)</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>0.085</td>
<td>0.381</td>
<td>22</td>
<td>(p &gt; .05)</td>
</tr>
<tr>
<td>((e^2))</td>
<td>M</td>
<td>0.276</td>
<td>1.283</td>
<td>22</td>
<td>(p &gt; .05)</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>0.210</td>
<td>0.663</td>
<td>22</td>
<td>(p &gt; .05)</td>
</tr>
</tbody>
</table>
TABLE 3. Correlations between NSS scores and LV scores calculated separately for three areas

<table>
<thead>
<tr>
<th>Variable</th>
<th></th>
<th></th>
<th></th>
<th>level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r</td>
<td>t</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>(a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>0.930</td>
<td>8.360</td>
<td>13</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td>C</td>
<td>0.345</td>
<td>2.287</td>
<td>15</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>H</td>
<td>-0.344</td>
<td>2.286</td>
<td>9</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>(th)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>0.816</td>
<td>4.679</td>
<td>13</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td>C</td>
<td>0.011</td>
<td>0.039</td>
<td>15</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>H</td>
<td>0.346</td>
<td>1.379</td>
<td>16</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>(A2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>0.426</td>
<td>4.679</td>
<td>13</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td>C</td>
<td>-0.042</td>
<td>0.151</td>
<td>15</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>H</td>
<td>0.247</td>
<td>0.920</td>
<td>15</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>(c)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>0.771</td>
<td>4.016</td>
<td>13</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td>C</td>
<td>-0.118</td>
<td>-0.429</td>
<td>15</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>H</td>
<td>0.053</td>
<td>-0.199</td>
<td>16</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>(c)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>0.719</td>
<td>3.433</td>
<td>13</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td>C</td>
<td>0.027</td>
<td>0.098</td>
<td>15</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>H</td>
<td>0.096</td>
<td>0.361</td>
<td>16</td>
<td>p &gt; .05</td>
</tr>
</tbody>
</table>

B - Ballymacarrett, H - Hammer, C - Clonard.

TABLE 4. Correlations between NSS scores and LV scores calculated separately for 2 age groups 40-55 and 18-25

<table>
<thead>
<tr>
<th>Variable</th>
<th></th>
<th></th>
<th></th>
<th>level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-55</td>
<td>0.623</td>
<td>3.188</td>
<td>18</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td>18-25</td>
<td>0.474</td>
<td>2.223</td>
<td>19</td>
<td>p &lt; .05</td>
</tr>
<tr>
<td>(th)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-55</td>
<td>0.366</td>
<td>1.758</td>
<td>22</td>
<td>p &lt; .05</td>
</tr>
<tr>
<td>18-25</td>
<td>0.352</td>
<td>1.680</td>
<td>22</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>(A2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-55</td>
<td>0.366</td>
<td>1.712</td>
<td>21</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>18-25</td>
<td>0.248</td>
<td>1.145</td>
<td>22</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>(c)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-55</td>
<td>0.268</td>
<td>1.214</td>
<td>21</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>18-25</td>
<td>0.413</td>
<td>2.078</td>
<td>23</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>(c)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-55</td>
<td>0.202</td>
<td>0.897</td>
<td>21</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>18-25</td>
<td>0.444</td>
<td>2.268</td>
<td>23</td>
<td>p &gt; .05</td>
</tr>
</tbody>
</table>

small size of the sample requires a more stringent t test. The very high r for (a) should be noted here: this is the highest r found in the entire investigation (0.930), representing an extremely close relationship (nearly a 1:1 correlation) between network and language scores.

The results in Table 4 reveal that the variables (a), (th) and (A2) are more closely correlated with increasing NSS scores in the older age group than the
TABLE 5. Significant correlations between NSS scores and scores calculated separately for 2 age groups and both sexes

<table>
<thead>
<tr>
<th>Variable</th>
<th>sub-group</th>
<th>r</th>
<th>t</th>
<th>N</th>
<th>level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>F_{40-55}</td>
<td>-0.728</td>
<td></td>
<td>9</td>
<td>p &lt; .05</td>
</tr>
<tr>
<td>(th)</td>
<td>F_{40-55}</td>
<td>0.556</td>
<td>2.114</td>
<td>12</td>
<td>p &lt; .05</td>
</tr>
<tr>
<td>(t')</td>
<td>F_{18-25}</td>
<td>0.631</td>
<td>2.442</td>
<td>11</td>
<td>p &lt; .05</td>
</tr>
<tr>
<td>(t'')</td>
<td>M_{40-55}</td>
<td>0.586</td>
<td>2.284</td>
<td>12</td>
<td>p &lt; .05</td>
</tr>
<tr>
<td>(t'')</td>
<td>M_{18-25}</td>
<td>0.658</td>
<td>2.767</td>
<td>12</td>
<td>p &lt; .01</td>
</tr>
</tbody>
</table>

younger: this may reflect either on interactions between network and age structures, or on the varying values attached to specific phones by different age groups. Together, (t') and (t'') show a contrasting increase. We should note that the (t'') r for the older age group approaches significance: it is in fact the same as the r for (th). Since the N for this group is one less than the N for the group tested for (th), a more stringent t test means that the (t'') r does not quite meet the .05 level of significance.

Correlations for sub-groups divided according to sex and age (4 cells)

In these tests, few significant results were obtained, and only significant results are presented below. We would consider them to be important, however, as an extremely close relationship is needed to achieve significance where the N is so small. Table 2 results (p. 57 above) showed that women's linguistic scores correlated more closely than men's with network scores on the variables (a) and (th) which in turn showed the most significant overall correlations of all the variables tested. Table 5 further reveals that it is the older female group with whom this strong network/language relationship is particularly associated. This confirms the results for this variable reported in both Table 2 and Table 3, where the older age group is revealed as more likely to show a correlation than the younger.

The variables (t') and (t''), on the other hand, are seen in Table 5 to be particularly linked with male network structures – (t'') shows a highly significant correlation despite the low N with young men's NSS scores, while (t') is significant for the older group at the .05 level.

It should be noted that, in general, the results of these tests point convincingly to a strong link between sociolinguistic structure and network structure – the central concern of this paper. However, many further lines of enquiry emerge when subjects are divided into groups according to age, sex and area and tested for a relationship between LV scores and NSS scores. The information obtained from analysis of variance is relevant to further discussion of the data reported above. When all the statistical results are
LESLEY MILROY AND SUE MARGRAIN

considered together, we shall be in a better position to assess the manner in which sex, age, geographical location and personal network structure work together in influencing linguistic performance.

The variables \((a), (th), (A^2), (e^t), and (e^i)\): analysis of variance.

In this subsection we discuss the results on the analysis of variance tests which measure the extent to which variation between sub-groups on one variable is influenced by variation between sub-groups on another. Our interest is in assessing whether the variables of age, sex, and area interact significantly with network (see p. 53 above) in their effect on linguistic scores. For the purpose of the analysis, NSS scores were divided into high and low scoring groups, and both NSS and LV means were computed for all sub-groups. Two-way analyses of variance for unequal groups were carried out, measuring the interaction between sex and network, area and network, and age and network in producing variable linguistic scores. Only where there are significant interactions are results presented here. Other results are discussed briefly without detailed reference to the statistical tables which appear in Milroy 1980.

(i) Sex and network. None of the LV scores showed an interaction between sex and network: the effect of high and low network scores on language was the same for both sexes. We may conclude that both sexes use these LV’s in a parallel fashion as network markers. Additionally, there were significant or highly significant differences between means for the two sexes on four of the variables – \((a), (th), (e^t), \) and \((e^i)\) – indicating that they function simultaneously as sex markers. Thus, although the sexes use these LV’s as network markers in a parallel way, their second function as sex markers results in their being used at different levels, with the men scoring higher (see Milroy & Milroy 1978).

(ii) Area and network. Only one LV – \((a)\) – showed any significant interaction between network and area \(F = 7.2402; \ p < .01\). As we would expect from the correlation results, there is a significant difference between \((a)\) scores for high and low NSS scorers. This difference varies by area as follows: the \((a)\) scores are higher in the high NSS scoring group than in the low scoring group in Ballymacarrett (means: 3.3475; 1.9700). A similar pattern appears in the Clonard with a smaller difference between means \(2.5767; 2.2100\). However, in the Hammer the pattern is reversed with the mean \((a)\) score slightly higher for the low NSS scoring group \(2.4800; 2.6800\). Therefore, \((a)\) seems to function most strongly as a network marker in Ballymacarrett, less clearly in the Clonard, and cannot be said to have this function at all in the Hammer. These analysis of variance results confirm the correlation results in linking \((a)\) as a network marker firmly to Ballymacar-
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rett. Interestingly, the means for (a) do not vary significantly according to area, and so it would not be possible to link this LV to Ballymacarrett simply by comparing mean scores for all subjects from each area. The analysis of variance reveals why this should be so when the correlation tests have already shown a clear link between (a) and Ballymacarrett; the interaction between network and area, in controlling LV scores, levels out mean area differences.

(iii) Age and network. No significant age by network interactions were revealed for any of these linguistic variables; however, a tendency for older subjects to have a larger gap between high and low NSS scores for \( \epsilon^1 \) should be noted, as there is almost no difference for the younger group. This confirms the correlation results for \( \epsilon^1 \) – only in the older group is there a significant relationship between this variable and network structure. Thus, \( \epsilon^1 \) seems clearly to function as a mark of community loyalty only for the older group.

The variables \( \lambda' \), (ai), and (i): correlation and analysis of variance.

Since the main interest of these variables is that social meaning seems to be attached to them by limited sub-groups only, results of both tests are presented together. Only significant relationships and differences are discussed; none of these LV’s shows an overall correlation with NSS scores.

The \( \lambda' \) scores show a significant relationship to NSS scores for the older age group only: \( r = 0.474, t = 2.349, N = 21, p < .05 \) (but see Milroy 1980 for a discussion of the changing social functions of this variable).

(ai) scores show a significant relationship to NSS scores in Ballymacarrett only: \( r = .557, t = 2.322, N = 14, p < .05 \). In contrast with (a), the \( r \) for (ai) is only just significant in this area, and there is no tendency for (ai) to be related to network in the other areas. The analysis of variance tests reveal no significant differences or interactions.

(i) scores show a significant relationship to NSS scores only in the Hammer: \( r = 0.528, t = 2.327, N = 16, p < .05 \). The analysis of variance tests confirm this result and provide further information. The probability level for the area ratio is below the .05 and only just above the .01 level, revealing a significant difference between area means. The difference lies between the Hammer means (2.2000) and both the Clonard and Ballymacarrett means together (1.8333; 2.0104). Thus, (i) seems to be a socially meaningful variable associated particularly with the Hammer.

These results show that even in a single speech community – and it would be plausible to describe Belfast vernacular speakers in that way – there are many differences in the manner in which speakers take hold of ‘pieces’ of the language and use them as symbols of community loyalty. Some variables – (a) and (th) – function more clearly as network markers for women than for men; some function in this way in one community but not in others – (ai) and
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(i) – while others – \((e^{1.2})\) and \((\lambda')\) – appear to be linked to age structure in their capacity to indicate vernacular loyalty. Sometimes a simple comparison of mean LV scores for sub-groups cannot reveal these relationships; the special function of (a) in Ballymacarrett can be shown only by correlation tests and analysis of variance.

We have also noted in passing that there are differences in the LV means for the sexes on a number of variables, always, as might be expected, with men scoring higher. Consequently, although this analysis has revealed a great deal about sociolinguistic structure at the micro level, often confirming the findings of earlier work (Labov 1972a, 1972b), it has raised a number of further questions. The most obvious and pressing of these concerns the kind of network structure associated with different sexes, areas and age groups.

Can it be said that men score significantly higher on most vernacular variables because of their higher NSS scores? Is the Ballymacarrett network structure different from that in the other areas? For it is in Ballymacarrett that the strongest relationships between language and network are to be found.

To answer some of these questions, the final section of the analysis examines the distribution of NSS scores across areas, sexes and age groups.

STATISTICAL ANALYSIS: ANALYSIS OF VARIANCE SHOWING DISTRIBUTION OF NSS SCORES ACROSS AREA, SEX, AND AGE SUBGROUPS

This analysis tests for any significant difference in the distribution of NSS scores between areas, sex and age groups, and also reveals any significant interactions – i.e. whether any of the sub-groups NSS scores vary across sub-groups of the other groups.

The analysis (a three-way analysis of variance for unequal groups) shows that since many of the chance probability levels are below .01, there are many significant differences and interactions between the NSS scores sampled in each of the sub-groups. These differences would not necessarily be found in a larger controlled random sampling within the total population of Ballymacarrett, the Clonard and the Hammer. We can say no more than that they apply to the three partial networks studied, which are well established within the areas. Although, as we have seen, network studies have the capacity to examine sociolinguistic structure in great depth, they will lack generality in this way until some means is found of determining the personal network characteristics of a larger number of randomly sampled informants. Meanwhile, variations in NSS distribution must be taken into consideration before conclusions can be drawn from the correlation and analysis of variance tests carried out on each linguistic variable.
Sex differences

The NSS analysis of variance (summarised in Table 8) indicates a significant difference between male and female NSS’s (F = 9.0964; p < .01). This was confirmed at .05 level in a Mann Whitney U Non-Parametric Test. The men score significantly higher on the NSS than the women on a scale ranging from zero to five (means = 2.9444; 2.0248). The sex by age interaction is not significant; i.e. the sex difference is of the same order for both age groups. However, there is a significant sex by area interaction: the means for sex and area sub-groups indicate little or no difference between the sexes for two of the areas (Hammer and Clonard respectively) but a substantial difference of over 2.5 on the NSS between men and women in Ballymacarrett (3.9583; 1.3333). Ballymacarrett women’s NSS scores are substantially lower than any of the sub-groups, and the same areas NSS scores for men are substantially higher than in any other sub-group.

The area by sex by age interaction is also significant, so that we can conclude that differences for sub-groups within each of these groups vary with each of the other groups: in other words, area, sex and age interact in controlling NSS scores. If we are considering the variable of sex, this means that male and female NSS scores vary between area samples with each age group. The three-way mean table shows that the young Ballymacarrett women have the lowest NSS scores, and yet the young Clonard women have the highest overall scores and are the only female group that have substantially higher NSS scores than males in the same age group. We can now see that the similarity of male and female overall scores in the Clonard is due to the interaction effect for age in the Clonard; the older group shows that the overall trend for males is to score higher on the NSS than females (2.5000; 1.0000) while in the younger Clonard age group the females have significantly higher NSS scores (3.0000; 4.7500). The largest difference between male and female NSS scores occurs by way of contrast in the young Ballymacarrett sample (.6667; 4.2500) while in the Hammer the sex difference is small for both age groups.

Area. The p > .05 for area indicates not quite significant differences between areas. We should, however, note that the Hammer has a substantially lower mean NSS than the other areas, which are more nearly comparable. The means and interaction between area and sex have already been considered. The results also show a significant interaction between area and age.

The higher NSS scores for the younger age groups for Clonard and Hammer are reversed for Ballymacarrett, where the older age group has the higher NSS. This difference is small, however, compared to the reverse
difference for Hammer and Clonard. Further, both young male and female groups in all areas have higher NSS scores than their older counterparts (see below) except for the women in Ballymacarrett, where the older women have higher NSS scores.

We should note in a general way that areal differences in network structure seem to show up when significant interactions of variables are considered and are not revealed simply by comparison of area NSS means.

Age. As has already been noted, the younger group scores significantly higher on the NSS overall than does the older group. The level and difference between old and young scorer's is similar to the difference between the sexes (1.9028; 3.0694). The difference between the age groups is greater for women than for men, but not enough to produce a significant sex by age interaction.

It is tempting to relate some of these sex, age, and area differences and interactions in the NSS scores to different social conditions in the communities (see L. Milroy 1976) and also Boissevain (1974) for a general account of how many social variables may influence network structure). Only in Ballymacarrett are traditional sex roles retained in the form familiar from descriptions in the literature on working class communities. The men are locally employed in a traditional and homogeneous form of employment (the shipyard) and contract solidary relationships associated with their work. The women are employed in more diffusely, have fewer solidary relationships associated with work, but may contract multiplex relationships with kin and neighbours. The Clonard area, on the other hand, was experiencing severe male unemployment at the time of the interviews. (Both the Clonard and the Hammer had in the past been dependent on the now-receding linen industry).

In the Clonard, the young women emerged as the only group who worked together and spent their leisure time together, contracting the kind of solidary relationships usually associated with working-class men. The Hammer area suffered similar unemployment, but was principally notable for the geographical mobility of most of its inhabitants: as a consequence of urban redevelopment, many had been moved to houses several miles from the Hammer, and although much of their social life centred there, they had suffered a severe disruption of all the important sectors of their personal networks (Wiener 1976). The regular sex/network relationships found in Ballymacarrett, where there are big differences between male (high) and female (low) NSS scores, seem characteristic of a traditional working-class society. We can say with assurance that this sex/network equivalence (with men scoring high and women scoring low) co-occurs over several LV's with a higher r between network and language than it is possible to demonstrate in areas without a sex/network equivalence; there, only a trend is indicated. Thus, we may say that network and sex conspire with each other to some
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extent in producing variable linguistic scores. The direct effect of this sex/network equivalence pattern on language is rather more problematic. As we have seen, age, area and network interaction effects are complex and make a blunt statement about sex and network relations to linguistic scores very difficult. However, if we consider the variables (a) and (th) (which show the highest $r$'s to network in the entire investigation) we see here at least that a sex/network equivalence seems to be associated with sharper sex grading in language than is found in the Hammer, where there is less difference both between men's and women's linguistic scores and also between their NSS scores. Where there is a sex by age by area interaction, as in the Clonard, with young women scoring as high as men on the NSS, the sharp patterns of sex differentiation which occur in LV scores for Ballymacarrett seem likewise to be blurred or confused. If we examine the distribution of (a) by sex, age and area (see Milroy 1980), we find that it corresponds closely to the NSS distribution, with the same interaction effect observable in the Clonard. It is this which blurs the sex grading in the linguistic scores, and we can say with assurance (of this important LV at least) that it is network structure rather than sex which seems to control linguistic variable scores.

CONCLUSION

We can argue convincingly at this point that it is possible to devise a measure of a speaker's 'degree of integration' into her or his immediate community, and using statistical techniques, to show that language is related to that elusive but important variable. The concept of social network, as developed by Barnes, Mitchell, Boissevain and others, has provided a starting point for the construction of a quantitative measure of community integration – the Network Strength Scale – which is capable of statistical treatment. Individuals can be given a rating on the NSS which may then be correlated with their linguistic scores. Clearly significant relationships emerged for eight linguistic variables. Further correlation tests carried out on data from speakers divided according to age, sex, and area (but still considered individually) succeeded in isolating those sections of the population who showed the strongest relationship between NSS scores and a particular linguistic variable. Ballymacarrett was revealed as the area where in general the closest relationships were found between linguistic structure and network structure; but otherwise different linguistic variables could be shown to have a network significance for

[7] The linguistic and network scores for each individual are given in Milroy 1980. Scores for a further variable (o) (the vowel in items like shop, hot is variably unrounded before voiceless stops) are also included. However, although this variable will undoubtedly be interesting when higher social groups are studied, its distribution here makes it unsuitable for statistical analysis. There are too many speakers using only the unrounded form.
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different groups. The variables (a) and (th) correlated with network more closely for women than for men; (x²) more closely for men than for women; (e'), (e²), and (x'), on the other hand, were associated with different age groups. Thus we find, not unexpectedly, that sociolinguistic structure is woven in a complex way throughout the community, with different phonological elements being associated with various social groups.

The analysis of variance showed in considerable detail the distribution of both linguistic and network scores through the community and isolated significant differences in the scores of some groups of subjects. For example, (a) showed a network by area interaction, which meant that high NSS scorers did not use it at a comparable level in all areas. We were also able to show a network by sex by area interaction in the Clonard, which is reflected by unexpectedly high NSS scores for the young women there. This interaction corresponds in fact exactly to the distributional pattern for (a), suggesting that network loyalty, rather than sex, controls linguistic scores for this variable. On the whole, however, these results suggest that many factors work together in controlling linguistic scores, and that we should be cautious of attributing too much importance to any single extra-linguistic variable.

We noted in the final section of the analysis that network structure varied significantly according to area. The main point was that Ballymacarrett showed the biggest difference between high and low NSS scorers, with the men on the whole scoring high and the women scoring low. This network/sex equivalence pattern was not clearly observable in the other areas; and we suggested that it was this pattern which was responsible for producing the clear correlation between language and network – and so between language and sex to some extent – observable in Ballymacarrett.

The implications of this point are very far-reaching. It may well be that changes in social structure, resulting in the break-up of close-knit networks (which are commonplace in modern cities – the Hammer is very typical in this respect), produce a breakdown of sex- and network-linked vernacular norms. We are referring here to linguistic norms; but we have already noted (Frankenberg 1969) that other behavioural norms change as network structure changes. This process was carefully documented in Bethnal Green, and linguistic norms are unlikely to be exempted from it; if we accept the general thesis that a dense, multiplex network structure supports intact vernacular norms, we may consider changes in network structure to be responsible for some linguistic changes. This may or may not involve a movement towards a prestige variety of the language, although it will involve a change in the vernacular: we have noted that (x'), (e'), and (e²) are all linked with age and network structures and are very probably changing. The variants used by the younger group, however, are not particularly near any prestige standard. We should note in the case of (x') that the movement seems to be away from the rounding of /x/ in words such as cup, hut, rub. This rounding is in fact an Irish rural stereotype and the younger group may be seen as moving away
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from rural speech as they continue to form their own norms, rather than moving towards any specific prestige model.8

Less speculatively, however, we can say that the breakup of the local Hammer network seems to have had the linguistic consequences of blurring sex-grading in language. It would be difficult to identify vernacular norms by a study of the Hammer alone, although this could be accomplished in Ballymacarrett.

The network concept also gives us a good deal of insight into the manner in which alternative sets of sociolinguistic norms are maintained. We know that institutional prestige norms are maintained through public speakers, the educational system and the media. We also know that equally powerful vernacular norms exist - this has been demonstrated most convincingly by Labov in Harlem and by Trudgill in Norwich. Taking into account the network studies carried out by a completely different group of scholars, we note that the function of dense, multiplex networks as norm-enforcement mechanisms is now widely accepted. We would suggest, therefore, that in showing this close correlation between vernacular usage and network, we have revealed the characteristic rural and working-class network structure to be an important mechanism for the maintenance of vernacular norms. It seems plausible to suggest that speakers become more susceptible to influence from the standard as their network structures become less dense and multiplex, probably because their personal networks no longer have the power to exert counter-institutional pressures on their behaviour.

This thesis (which we advance cautiously for the moment) fits well with sociolinguistic fact. A less dense, more uniplex network structure is associated with the urban middle classes, and all the urban studies in the UK and US have shown a movement away from the vernacular in these social groups. Perhaps the sharp manner in which Labov's lower middle class avoids the vernacular is linked to a conscious attempt to escape from the grip of the networks characteristic of the social group immediately below them. We found that some of our less vernacular working-class speakers consciously avoided too much local interaction: people are generally quite conscious of network pressures. Women too appear consistently to approximate less closely to the vernacular than men; again their network structures (as we have found) are less inclined to multiplexity and density than men's are. As we have seen

[8] We would suggest that the norm of rounding the vowel observable in the older group was (and is in the Ulster countryside) maintained by rural networks (the older group are first generation city dwellers). The younger urban group stigmatized this rural stereotype (see Labov 1972a: 299) which could no longer be maintained because the networks of the original migrants had been disrupted. The newly formed urban networks in turn provide mechanisms for the maintenance of emerging vernacular norms. The manner of their emergence is the subject of another study: rural/urban vernacular differences are discussed in Milroy and Milroy (1977b) and also elsewhere in this volume. Certainly the stigmatization of rural forms together with the internal 'economy' of the vowel system seem to be important in determining the form an urban vernacular will take.

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with the young Clonard women, linguistic behaviour may not follow the expected female pattern if their network structure does not do so.

Network structure also varies with age: our analysis reveals significantly higher NSS scores for the younger age group. Again, urban linguistic studies have repeatedly looked for their most extreme examples of vernacular speech in younger people. Thus, it would appear that a dense, multiplex network structure is often associated with strongly vernacular speakers well outside working class Belfast. We would suggest that this happens because this particular network structure can function powerfully to maintain vernacular norms.

Closer examination of some of the linguistic variables provides further insight into the effect of social network on linguistic behaviour. It is extremely difficult to be categorical here, as we have seen that many LV's are associated in a complex way simultaneously with different age, sex and area groups. However, we may consider the variables (a) and (th) which show the strongest overall relationship to network structure (p < .01). We also note that they both function strongly overall as sex markers with men scoring very significantly higher than women (but see p. 60 above). However, if we examine the correlation data, we find that women have a stronger relationship between their network structures and these variables than men. What this seems to mean is that the men, even to some extent the low NSS scorers, use a high level of these vernacular variables (although there is still a probability level of p < .05 for the men's r). However, there is a much closer 'fit' - p < .01 - between women's network structure and their language. Thus, speakers who use a high level of a vernacular variable do not necessarily show the closest correlation with network. Ballymacarrett, which consistently shows a close language/network relationship, also has some of the lowest scorers in the entire investigation. The Hammer, on the other hand shows an insignificant language network relationship; but the highest scores for some of the vernacular variables are found there.

We would conclude by suggesting that a network analysis of this kind could be replicated in other working-class communities. The results of statistical analysis show that the five indicators used in the NSS scale are reliable indicators of network structure (otherwise it would have been impossible consistently to demonstrate so many highly significant relationships.\footnote{Much more remains to be done on refining the NSS as an analytic tool. For example, it should be possible to work out which of the five indicators is the most powerful in predicting linguistic scores: it may be that we could show an even sharper differentiation between high and low network scores. It may also be possible to include questions based on the NSS in a linguistic survey to test the wider validity of the concept. The most serious problem with the procedure is the difficulty of applying it outside working class areas. We know that middle-class networks are usually differently structured; it may be that the concept is not useful in studying the speech of socially and geographically mobile individuals.}
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Furthermore, the network studies discussed in this paper suggest that the kind of network structure we have described here, and is most clearly observable in Ballymacarrett, is in fact generally characteristic of vernacular speakers in large cities. One scholar (Lewis 1973) has pointed out that this kind of network structure has been reported as characteristic of the urban poor in Africa, the Americas and Europe. He suggests that it is universal because its basis is economic; the maintenance of strong solidary relationships is necessary for survival. It should certainly be possible to test out these results by replicating the study in other speech communities; an approach based on the network patterns of the individual seems likely to contribute to our knowledge of how speakers use language to express various social identities. Network studies also seem capable of casting light on the processes of vernacular change and vernacular maintenance.

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