

LINGUISTICS

GEOLINGUISTIC MODELS OF ANALYSIS OF THE SPATIAL DIFFUSION OF SOCIOLINGUISTIC INNOVATIONS

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0. Introduction

The concepts of space and spatiality, or the spatial properties, and, on the other hand, their necessary integration within the sociolinguistic theory have performed a marginal role in the evolution of linguistic thought (Britain 1991).¹ The traditional perception of space has been rather static so far, ignoring the existing inter-relationship and dynamism amongst the social and spatial settings, on the one hand, and linguistic processes, on the other: the questions of, for instance, why two given locations share or do not share certain linguistic features, or why a given innovation appears and spreads to a centre C from a centre B rather than from centre A, or simply what mechanisms promote or inhibit the geographical transmission of dialect forms, have always been deliberately avoided. According to Bailey – Wikle – Tillery – Sand (1993: 360), the problem in doing this kind of research lies in its apparently unmanageable nature and in the sociolinguists' obsession with confining their work to the social structure of speech communities: "The lack of work on spatial diffusion is primarily a result of two things: the difficulty in obtaining reliable data over an area broad enough to allow for the study of the spread of a feature in space and the interest of variationists in isolating the locus of change in the social structure of the (generally urban) speech community." In fact, scholars such as Bailey (1973: 86) al-

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ways thought that geography is an irrelevant factor in linguistic contact and diffusion phenomena: "Geographical dispersions can be so chaotic as to challenge the plausibility of any hypotheses about the orderliness of language variation". Geolinguistics, or the study of language in its geographical context, on the contrary, is completely aware of these shortcomings of traditional dialectology and provides us with a more dynamic dimension, where spatial inter-relationships of linguistic features are of greater importance:

Even *prima facie*, it is simply inconceivable that language, as a human property, would not reflect the spatial relationships which bring human beings together and keep them apart. True, the reflection of language in geography may not be as simple as Bailey and others apparently expected, but that is surely no reason to dismiss it altogether. What is required is a richer set of hypotheses about language variation and a more profound understanding of spatial networks and diffusion patterns (Chambers 1982: 2).

Even sociolinguistics, as Britain (1991: 11) advocates, must not disregard the spatial dimension: "It is impossible, I will claim, to conceive not only of a geolinguistics without a social content, but also that it is theoretically incorrect to investigate the social phenomena of language devoid of a consideration for the spatial." But only variationists such as Trudgill (1974, 1975), Callary (1975), Gerritsen – Jansen (1980), Chambers – Trudgill (1980), Larmouth (1981), Chambers (1982), Britain (1991), Bailey – Wikle – Tillery – Sand (1991, 1993), Horvath – Horvath (1996), or Wolfram – Schilling-Estes (1998) have underlined the importance of space with their work on the geographical diffusion of linguistic changes.

1. Objectives

Given these assumptions and motivations, the aim of this paper is to report on a study (Hernández-Campoy 1996) intended to incorporate principles, methods, findings as well as data from Human Geography into the analysis and prediction of geographical diffusion models of sociolinguistic innovations resulting from linguistic change. Additionally, the examination of both the advantages and disadvantages of the application of human geographical expertise will be able to tell us about its usefulness to the sociolinguist, or particularly to the geolinguist. Regarding its motivation, principles, object of study, methodology and techniques of analysis employed, it is a work located within the sociolinguistic field of Geolinguistics, i.e. within the sociolinguistic spectrum of language and geography, in Chambers – Trudgill's (1980) sense.

If language is where people are or go, the analysis of spatiality, particularly in the case of both social and geographical diffusion of linguistic innovations, is crucial to a further understanding of the mechanisms of change, transmission

and/or maintenance of linguistic forms: "An analysis of spatiality is critically important if we wish to fully understand the processes involved both in the diffusion of linguistic innovations and the development of typological differences in languages and dialects alike" (Britain 1991: 251-252).

2. Method and procedure

Assuming that linguistic variation is not only socially but also spatially conditioned, we put into practice a *macro*-sociolinguistic analysis of dialect urban centres, inasmuch as potential sources of linguistic diffusion, with the intention of applying and examining the Gravity Models used in Human Geography. As this article will show, the gravity, or hierarchical, models state that the diffusion of innovations is a function not only of the distance but also of the population size and density of the areas involved in the diffusion of a certain linguistic innovation.

For this purpose, the geographical space (landscape) of the United Kingdom was divided up into 19 cells, or grids, corresponding to the pre-determined modern dialect areas. In the same way as Labov (1966) worked with different social classes with the aim of determining the use they made of different variables, and just as Trudgill (1974), Callary (1975) or Gerritsen – Jansen (1980) did following Hägerstrand (1952), we operated with a cell network drawn on the landscape. This mosaic of regional variation entirely coincides with the modern dialect areas that Hughes – Trudgill (1979: 37-38) and Trudgill (1990: 63-65) set regarding their common features (Figure 1).²

The linguistic data used to contrast with geographical data is concerned with accent varieties, namely pronunciation. One of the main reasons for using phonological data in our study is the fact that the spoken language is the principal locus of language change in progress, at least in its earlier stages. In addition, phonology is much more closely tied to the regularly heterogeneous speech – i.e. the concrete performance – of speakers within the macro-linguistic level, since the homogeneous language and the ideal speaker, or his competence, are merely artificial products. Likewise, speech is an activity eminently and neces-

² Undoubtedly, this division made from the point of view of accent features is somewhat arbitrary and thus arguable. Many different places offer clear difficulties when allocated to one region or another. For this reason, the isoglosses delimiting the dialect boundaries in this study will be used, and paraphrasing Carver (1987: 13), simply as "a convenient fiction existing in an abstract moment in time" for merely "orientating" purposes. In this way, for example, Sheffield, although it is found in the area of Central North, has affinities with the East Midlands, Central Midlands and Northwest Midlands; Cambridge could fall in either East Anglia or South Midlands; likewise, Reading and Bournemouth would be found in the Home Counties group if we focus on younger speakers but in Central Southwest if we consider older people; or Worcester would be in a dubious position between West Midlands and Central Southwest (see Trudgill 1990: 64-65).

sarily social, and, as Trudgill (1992: 76) and Milroy (1992: 5) underline, speakers' interaction is essential for the transmission of linguistic innovations. In this way, if our study deals with the diffusion of innovative dialect forms through British English accents, our interest obviously is focussed on the phonological level.

Fig. 1

Northeast: Newcastle, Durham, Sunderland, Middlesborough.
 Central North: Carlisle, Lancaster, Leeds, Bradford, York, Sheffield.
 Central Lancashire: Blackburn, Burnley, Accrington.
 Humberside: Hull, Scunthorpe, Grimsby.
 Merseyside: Liverpool, Birkenhead.
 North west Midlands: Derby, Stoke-on-Trent, Chester, Manchester.
 West Midlands: Birmingham, Walsall, Wolverhampton.
 Central Midlands: Nottingham, Leicester.
 Northeast Midlands: Lincoln, Louth.
 East Midlands: Grantham, Peterborough.
 Upper South west: Gloucester, Hereford.
 Central South west: Bristol, Salisbury.
 Lower South west: Plymouth, Exeter, Truro.
 South Midlands: Bedford, Northampton, Cambridge.
 East Anglia: Norwich, Ipswich.
 South East (Home Counties): London, Brighton, Dover.



3. Macro-sociolinguistic analysis: gravity models

Broadly speaking, according to Rogers (1962), there are at least five factors influencing the diffusion innovations as amplifiers or barriers: i) the phenomenon itself; ii) communication networks; iii) distance; iv) time; and v) social structure. Whereas the work of Labov (1966, 1994) and Trudgill (1971, 1972) shows the impact of (i) and (v), the work of Callary (1975), L. Milroy (1980) and J. Milroy (1992) illustrates the influence of (ii) on language change and diffusion. Trudgill (1974), Gerritsen – Jansen (1980), Pederson – McDaniel – Adams (1990, 1991), Bailey – Wikle – Tillery – Sand (1991, 1993), and many other scholars, have emphasized the importance of factors (iii) and (iv).

The geographical diffusion of linguistic innovations, like any other innovation, depends not only on the physical location of dialect areas but also on *demographic factors* such as their relative population sizes and densities, commu-

nication networking amongst urban centres (inter- and intra-areas), together with other factors such as the geographical (spatial) and social (innovating social group) location of the innovation; and, crucially, *sociolinguistic factors* such as the relative prestige of the varieties in contact, the linguistic distance amongst those varieties, as well as the linguistic system itself as a possible resistance/accelerating factor of diffusion. At the geolinguistic stage, three factors were thus of paramount importance in our study: i) the population size of the urban centres implied, be they affected or not by linguistic innovations, ii) the geographical distance amongst them, and iii) the linguistic distance, or linguistic similarity, existing amongst the linguistic systems peculiar to those urban centres representing dialect areas.

3.1. Model 1: population potential

Regarding the first, *population size*, population density, and its social distribution, innovations, and subsequently their adoption, are more likely to arise in large, heavily populated cities that have historically been cultural centres, and to spread out from there to other moderately sized cities falling under the area of influence of the larger focal centre, thence to towns, and so on, until they ultimately and gradually reach the smallest and most sparsely populated villages, even though they are quite close to the original focal area of the innovative form. Population, therefore, is an important ingredient of diffusion processes, since it implies that interpersonal contacts are a function of population size: “the larger the population of a city, the more likely an individual from elsewhere is to come into contact with a speaker from that city” (Trudgill 1992: 76). In this sense, for example, “a speaker from Norwich ... is 30 or 40 times more likely to meet a Londoner than vice versa at a given time simply because the population of London is that much bigger than the population of Norwich” (Trudgill 1986: 40). People living in densely populated areas are expected to come into contact more easily and more frequently than those living in sparsely populated areas. In this way, innovations arisen in London “are more likely” to be successfully diffused.

One interesting aspect studied by Human Geography to consider is the fact that every single urban centre can be classified according to its interurban status (form, size, function, historical transformations, etc.), which implies the establishment of a *hierarchy* of central places with regard to their demographic elements, area of influence, and flow systems amongst the different settlements. From an interurban point of view, not all cities play the same role nor have they the same importance, but rather they constitute a hierarchy in which demographic distance as well as functional distance certainly have a significant influence. The first is supplied with the difference in population size existing amongst the different settlements, while the second is derived from the first and

determine the number of functions and activities provided by the urban centre. The difference in population size, or number of inhabitants, amongst the different settlements is crucially important in the organization into a hierarchy of urban nuclei. Normally, in developed countries there are no noticeable imbalances amongst different urban centres since they are of many different sizes (multicephalous system). However, underdeveloped countries show a very different situation, with the demographic distance between the largest city and the immediately preceding being the most noticeable (monocephalous system). Thus, the higher degree of organization into a hierarchy that developed countries have is due to their many urban centres with a diverse number of population size levels, and the existence of a gradation between the capital of a country and regional urban centres.

Yet, according to the framework developed by the German geographer Christaller (1966) in his *central place theory*, this hierarchy of population sizes subsequently implies normally functional and spatial hierarchies: the larger a city is, the higher the number of different activities and functions it monopolizes, which, in turn, results in a wider area of influence that embraces other urban centres with a lower centrality (or accessibility) and functional range. In this way, within this hierarchical system, urban centres with smaller ranges will always resort to the services provided by those others with a higher range. This fact implies, as Lacoste – Ghirardi (1983: 174) point out, that the hierarchy of urban nuclei depends on the unequal importance of the tertiary sector activities (services) they supply for their respective regions; hierarchy is thus the result of an inequality of tertiary functions. In every tertiary-sector urban centre, some services will be intended for its own inhabitants, while others, moreover, will embrace the surrounding areas, which will be less important and even rural settlements: the inhabitants living in the *area of influence* of a given *urban field* will travel to a given city, or *central place*, rather than to another depending on the services provided by that city. It is in this way that the city polarizes space, and that polarization is shown through population, merchandise, and currency movements, which constitute the flow systems amongst different urban settlements with transportation and communication networks as its own physical medium.

With this in view, in order to select 19 urban nuclei that are the central places, or gravity centres, in their relative dialect areas in accordance with the existing intra-area hierarchies, we proceeded to obtain their *population potential*. This is a concept used to measure the population concentration/dispersion which parallels that of the gravity model. This equation was developed by J.Q. Stewart starting from the same assumptions that Isaac Newton made on the basic relationship existing amongst heavenly bodies. In Stewart's opinion, the extent of influence exerted by a given settlement on another is directly propor-

tional to its mass, in this case its population size or range, and inversely proportional to the distance. Thus, the population potential of a point, according to Goodall (1987: 366), is "a measure of the nearness of people to that point, i.e. of the intensity of the possibility of interaction between the point and all other points in a system". The population potential exerted by the urban centre P on urban centre i would be defined as follows:

Population Potential Equation

$$PP_i = \sum_{j=1}^n \frac{P_j}{D_{ij}}$$

where P_j is the population of the j th urban centre, D_{ij} is the distance between points i and j , and n is the number of settlements in the system.³

According to the population potential index scores obtained (Figure 2), the urban nuclei would constitute the gravity centre in their relative dialect areas are Sunderland (Northeast), Leeds (Central North), Blackpool (Central Lancashire), Hull (Humberside), Liverpool (Merseyside), Manchester (Northwest Midlands), Birmingham (West Midlands), Leicester (Central Midlands), Lincoln (Northeast Midlands), Peterborough (East Midlands), Gloucester (Upper Southwest), Bristol (Central Southwest), Plymouth (Lower Southwest), Northampton (South Midlands), Norwich (East Anglia), London (South East), Glasgow (Scotland), Belfast (Northern Ireland) and Cardiff (Wales). In the case of London and Birmingham, with index scores of 6,948 and 1,087 respectively, their population potential in relation to the rest of urban centres in their dialect areas is sufficiently patent, convincing and even presumable. London, in South East, is the capital city of Great Britain, constituting one of the historically most important financial and cultural centres not only in the United Kingdom but also in the entire world, and is the point of reference for the whole communications and transportation networks in the British Isles. Birmingham, on its side, in the dialect area of West Midlands, is the second most important English city and the second industrial nucleus.

Manchester, in Northwest Midlands, is also notable as an industrial and harbour centre in the country. Leeds is the trade and industrial centre of the dialect area Central North and has excellent railway, road and waterway networks that make this city an important distribution centre. Leicester and Northampton are also the administrative and industrial centres in Central Midlands and South

³ In this way, "each individual contributes to the total potential at any point an amount equal to the reciprocal of their distance away – the population potential at point i being the sum of the ratios of populations at all points to the distances that those points are away from i " (Goodall 1987: 366). D_{ij} is thus closely related to the friction of distance, or also friction of space, which is a measure of the retarding effect of distance on human interaction.

Midlands respectively. Liverpool is the trade centre of a large metropolitan area and owns the second most important harbour in Great Britain, in addition to having traditionally operated as a port of entry and exit for movements to and from Ireland. Other harbour urban centres are Hull, with notable shipyards, Plymouth, which has an outstanding natural port and is the site of the principal English navy base (Royal Naval Dockyard), Gloucester and Bristol, with prominent manufacturing and shipment centres to export products mainly from the West Midlands region (Birmingham). Cardiff, in addition to being the capital city of Wales, is an important industrial centre with a harbour.

As far as the dialect areas Northeast Midlands and East Midlands are concerned, the quantification of their relative population potential has not been necessary, since Lincoln, in the former, and Peterborough, in the latter, are the most salient urban centres: Lincoln is the trade and transport centre for the surrounding agricultural region, and Peterborough is an important railway node with an industrial centre and a farming market. Finally, Blackpool, in Central Lancashire is an outstanding English tourist enclave.

But, some unpredicted and even disconcerting results arose: Glasgow (695), as opposed to Edinburgh (462) in Scotland, on the one hand, and Sunderland (338), as opposed to Newcastle (323) in the Northeast area of England, on the other. In the case of an urban nucleus such as Edinburgh, despite having historically been the main cultural, educational, financial and service industry centre in Scotland, it does not appear as the gravity centre of its dialect area. According to the parameters established by the population potential equation and the results emerged from the quantification, Glasgow seems to be the Scottish urban centre that conforms to the requirements. Although it is an eminently industrial city with an outstanding port and modern harbour installations, Glasgow does not enjoy the same historically cultural value that, on the other hand, Edinburgh does. The case of Newcastle is similar, but also, from a linguistic point of view, we know that the actual situation in the Northeast dialect area is that the urban dialect of Newcastle, a levelled variety which is Northeast in origin, is currently increasing its territory at the expense of the urban dialects of smaller towns, and even of Sunderland.

As Gerritsen – Jansen (1980: 21) state, “in using such a method mistakes and errors can easily creep in”, and we must admit that there are grids, or dialect areas, such as Scotland and Northeast, where the population potential formula does not work. Therefore, having initially aimed to avoid any possible risk of subjectivity from the field-worker by using “sophisticated” computer techniques, we however decided to resolve these incongruencies by resorting precisely to the preconceptions of the field-worker, whose “arbitration” in this particular case was more solid, reliable, and adhered to reality than that of the cold and decontextualized computered equation. In fact, as Milroy (1987: 138) un-

derlines, “it is important not to allow a mechanical aid, however powerful, to interfere with the careful specification of analytic goals and the selection of appropriate means of attaining them”. As we wanted to avoid Erickson – Nosanchuk’s fatal consequence that “when we plug in the computer we often ‘unplug’ our brains” (1977: 28), we decided to use Edinburgh and Newcastle as gravity centres for their relative dialect areas, as Figure 2 shows.

Fig. 2



This hierarchy of urban centres implies that, at an *intra*-regional level, innovations are more likely to reach the urban centre selected through the population potential quantification first, and subsequently they will spread out into other inferior nuclei (with a lower population potential score index) of the same grid. That is, within the area of West Midlands, for example, an innovation coming from an outside dialect area will touch Birmingham before it touches Coventry, Walsall or Wolverhampton, and so on, until it reaches other immediately inferior centres. In any case, population, goods or information movements between two

given cities depend not only on their relative sizes, but also on communications as well as transportation networks and, crucially, the physical distance existing between them.

3.2. Model 2: interaction potential

Regarding the second factor, *physical distance*, the influence exerted by two urban centres on each other is directly proportional to its relative population mass (size) and inversely proportional to the distance between them. That is, given that social face-to-face interaction is crucial in the process of diffusion of innovations, and given that communication is an act that decreases with distance, the possible neighbourhood effect also decreases with distance: the nearer to the source of innovation (or to a centre where it has already been adopted) the potential adopting unit is, the greater the possibility of being adopted will be. This simply means that "other things being equal, people on average come into contact most often with people who live closest to them and least often with people who live furthest away" (Trudgill 1992: 76), which implies that, for example, broadly speaking, "London-based innovations reach Norwich before they reach Sheffield, and Sheffield before they reach Newcastle" (Trudgill 1986: 40). Flow systems amongst the different settlements, i.e., the inhabitants' mobility within their geographical space, will provide a higher or lower exposure to innovations: "the pitcher goes too often to the well, but it is broken at last". The degree of mobility directly affects urban centres, regions, and particularly their inherent characteristics, such as their extent of conservativeness or innovativeness.

If we now intend to weight the spatial interaction amongst the different urban centres at an *inter-regional* level, taking into consideration both population size and distance, we will be able to find out the actual flow of inter-regional social communication. This is ultimately fulfilled through speakers' action, since both linguistic change and its subsequent diffusion starts from the very speakers. If, on the one hand, as Milroy (1992: 4) states, linguistic change is the product of speaker-activity in social contexts (face-to-face interaction), on the other, as Trudgill (1992: 76) asserts, speakers' interaction is, in turn, essential for the transmission of linguistic innovations.

With the object of obtaining the spatial interaction index for the 19 urban centres selected to represent the 19 dialect areas, or grids, of the United Kingdom, we made use of the *gravity model* assumptions. This macro-analytical model was borrowed from the Physical Sciences, particularly from Isaac Newton's *law of universal gravitation*, and adapted by the geographer E. Ravenstein, initially, and, later, the sociologists John Q. Stewart and George K. Zipf. Newton's *law of gravitation*, put forward in 1687 to explain the observed motion of planets and their moons, states that any particle of matter in the universe attracts any other with a force varying directly as the product of the masses and in-

versely as the square of the distance between them. Obviously, as Jones (1990: 189) points out, although people are not molecules, they can be regarded as predictable in their aggregate behaviour on the basis of mathematical probability.

With Newton's law in mind, therefore, the geographers' assumption is that movements of population, goods or information between two given centres depend not only on their relative sizes, but also on the distance existing between them. In this way, the variables population size and distance were incorporated in order to quantify their interaction in the analysis of migrations. According to Goodall (1987: 198), such a model is "an approach to summarizing in mathematical terms the essential nature of patterns of use of networks which relates interaction to the attraction or generating power of the nodes and the length or friction of the routes between them". Paraphrasing Newton's law, the movement, or interaction, between two cities (M_{ij}) is directly proportional to the product of the population sizes (P_i and P_j) and inversely proportional to the square of the distance between them (D_{ij}):

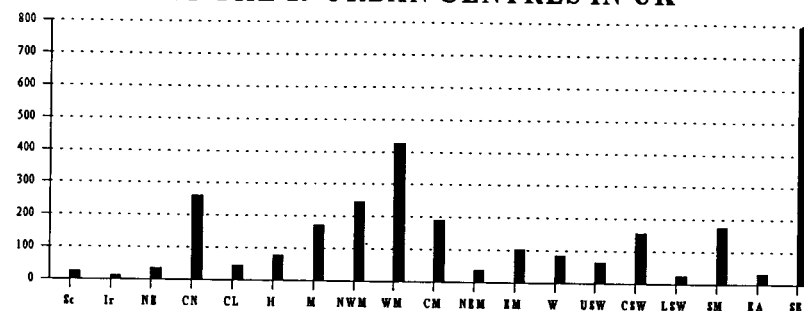
Gravity Model Equation

$$M_{ij} = K \frac{P_i \cdot P_j}{D_{ij}^b}$$

K being a gravity constant to be determined at calibration, and b a distance exponent (measure of the frictional effect of distance) assumed to have a value of 2 in the original gravity model. Regarding the interaction potential of the 19 urban centres (Figure 3), the nucleus that has the highest degree of mobility by large is obviously London, followed by Birmingham, Leeds and Manchester, and then by other smaller urban nuclei.

Fig. 3

INTERACTION POTENTIAL OF THE 19 URBAN CENTRES IN UK



This interaction gravity model obtained suggests two basic types of relationships: given two urban centres, i) the larger the population size of one or both centres is, the higher the movement between them will be; and ii) the more geographically distant urban centres are, the lower the movement between them will be. This means that distance has a *frictional effect* on the possibility of mobility, a phenomenon which is known as “the friction of distance” (see Bradford – Kent 1977: 115). If the degree of mobility amongst the different urban centres provides a higher or lower exposure to innovations in the process of diffusion, the ranking of interaction obtained above serves for determining the extent of exposure.

Nevertheless, speaking in terms of probability, interaction between two given urban centres can never be equal if they have different population sizes. Thus, a measure of the influence of one urban centre on another is needed: if we assume, as Trudgill (1974: 235) does, that “interaction consists of influence in each direction proportional to population size”, a modification has to be made in the equation so as to include a calibration, or correcting, index that considers the population density of the influencing centre. In this way, the degree of influence exerted and received by the different centres can be quantified, and, taking into account interaction potential, an explicit model of geographical distribution and diffusion of innovations can be developed. The formulation would be as follows:

Influence Potential Equation

$$M_{ij} = K \frac{P_i \cdot P_j}{D_{ij}^b} \cdot \frac{P_i}{P_i + P_j}$$

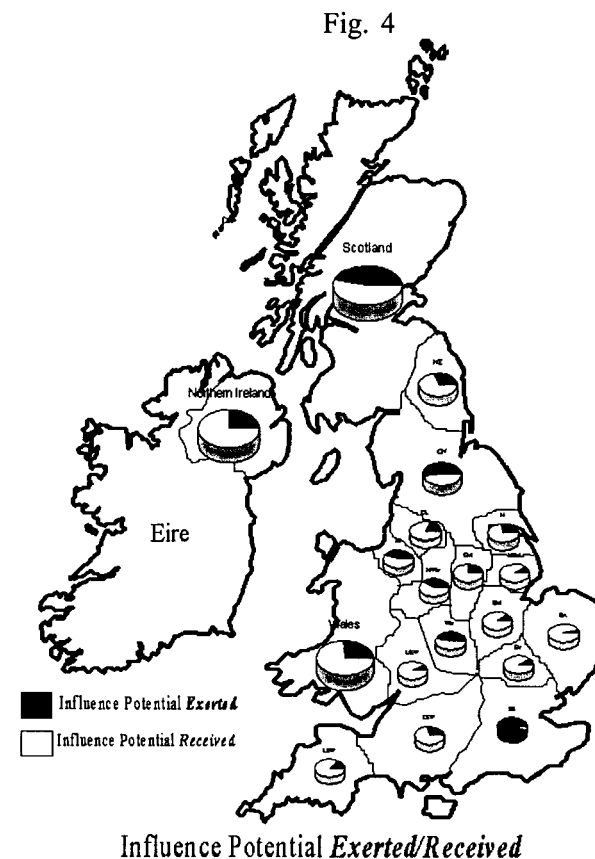
From the above results and rankings we can deduce a very similar situation to that offered by the results of the quantification of the interaction potential of the 19 urban nuclei involved. Again, it is London that is, by far, the most influencing urban centre in the United Kingdom (Figure 4), followed mainly by Birmingham, Leeds, Manchester, Liverpool and Leicester. London (South East) constitutes the principal spatial diffusing nucleus from which innovations normally radiate outwards:

The economic, social and cultural cohesion fostered by the new means of transport and communication clearly had important geographical consequences. Of these, perhaps the most important was the continuing dominance of London as the centre of economic, social and cultural life. Throughout the period from 1730 to 1914 the transport and communications systems tended to reinforce rather than undermine this dominance. Nearly every one of these systems centred on London: the turnpike roads used by the stage coaches, the ‘post roads’ used by the mail coaches, the railway system based by the trams, even the telegraph and telephone systems ... throughout the period from 1730

to 1914 London was a powerful influence on England and Wales. It was the centre of the web of government, business and upper-class social life. It was the place from which news flowed. It was the place from which the process of standardization of manners, fashion and speech emanated. It was the generator of ‘London time’, as Greenwich Mean Time tended to be known. Thus ‘London and its institutions penetrated much more deeply into the day-to-day lives or ordinary people in the provinces’ (Thrift 1990: 478).

In short, “... there was the magnetic pull of London. The presence of such a great metropolis provided the centre for the whole transport system in very many ways – as a focus of migration, as a node for mercantile capital and control, as a generator of fashion and news, as the pole of state power” (Thrift 1990: 454). A good example of this phenomenon is the increasing expansion of the Southeast dialect based on London English, also known as Estuary English (see Lillo forthcoming).

Birmingham, Northampton, Manchester, Leicester, Leeds, Bristol and Liverpool are in turn the urban centres that show a greater potential for receiving in-



fluence. In contrast, places such as Edinburgh, Belfast, Plymouth, Lincoln and Norwich have a low or even null potential for both influencing and being influenced.

Linguistically speaking, the comparison of these results with those obtained in Hernández-Campoy (1993) shows a similar picture. In his study, the quantification of the conservative and/or innovative nature of British English accents was carried out using eight sound changes that have been, or even are, taking place in the United Kingdom. These innovating tendencies are, following Wells' labels (1982), Happy-Tensing ([ɪ]>[i:]), Yod-Dropping ([ju:]>[u:]), R-Dropping ([r]>∅), Long-Mid-Diphthonging ([e:]>[eɪ], /ʊ/-/ʌ/ Split, NG-Coalescence ([ŋg]>[ŋ]), H-Dropping ([h]>∅) and L-Vocalization ([l]>[ɫ]). Some (/j, e:, ʊ, ŋg/) experienced changes before the Great Divide occurred, around 1750, when General American and British English ceased sharing linguistic developments and began to undergo separate evolutions. Others (/ɪ, r, h, l/) developed after the Great Divide. The result in percentages of the quantification of their nature regarding the usage or non-usage of the innovating features, as well as their distribution, is offered in Table 1 and Figures 5-12.

Table 1

Dialect Areas	Features								Percentages	
	Happy Tensing	Yod-Dropping	R-Dropping	Long-Mid Diphthonging	/ɒ/-/ʌ/ Split	NG-Coalescence	H-Dropping	L-Vocalization	Conservatism	Innovatism
	Sc	-	-	-	-	+	+	-	-	75.0%
Ir	-	-	-	-	+	+	-	-	87.5%	12.5%
NE	+	-	+	-	-	+	-	-	62.5%	37.5%
CN	-	-	+	-	-	+	+	-	62.5%	37.5%
CL	-	-	-	-	-	-	+	-	87.5%	12.5%
H	+	-	+	-	-	+	+	-	50.0%	50.0%
M	+	-	+	+	-	-	+	-	50.0%	50.0%
NWM	-	-	+	+	-	-	+	-	62.5%	37.5%
WM	+	-	+	+	-	-	+	-	50.0%	50.0%
CM	-	-	+	+	-	+	+	-	50.0%	50.0%
NEM	+	-	+	+	-	+	+	-	37.5%	62.5%
EM	-	+	+	+	-	+	+	-	37.5%	62.5%
W	+	-	+	-	+	+	+	-	37.5%	62.5%
USW	+	-	-	+	+	+	+	-	37.5%	62.5%
CSW	+	-	-	+	+	+	+	+	25.0%	75.0%
LSW	+	-	-	-	+	+	+	-	50.0%	50.0%
SM	+	+	+	+	+	+	+	+	00.0%	100%
EA	+	+	+	+	+	+	-	-	25.0%	75.0%
SE	+	-	+	+	+	+	+	+	12.5%	87.5%

Fig. 5

▨ (i) = [i:]
□ (i) = [ɪ]

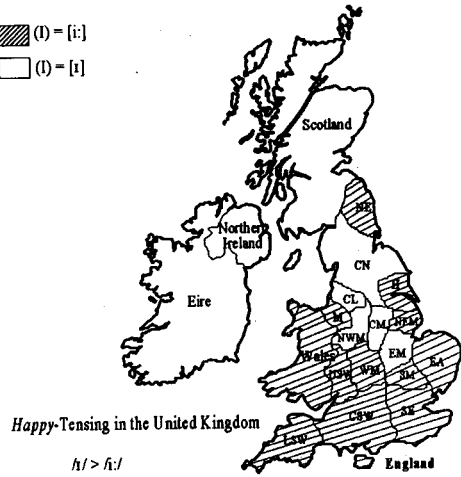


Fig. 6

▨ (i) = [u:]
□ (i) = [ju:]

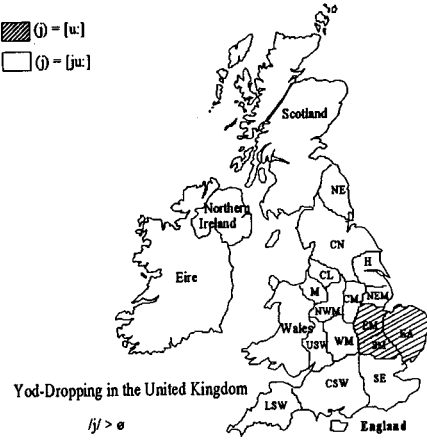


Fig. 9

▨ (u) = /ɑ/ and /a/
□ (u) = /ɒ/

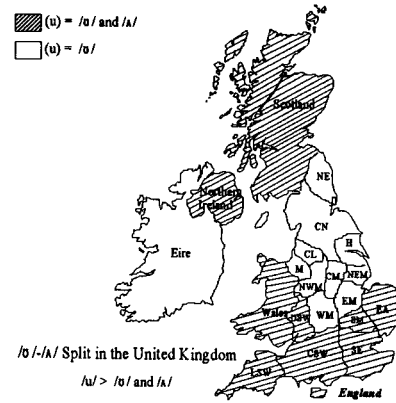


Fig. 10

▨ (ng) = [ŋ]
□ (ng) = [ŋg]

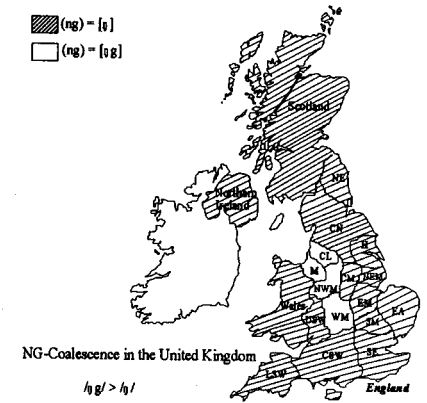


Fig. 7

▨ (r) = ø
□ (r) = /r/

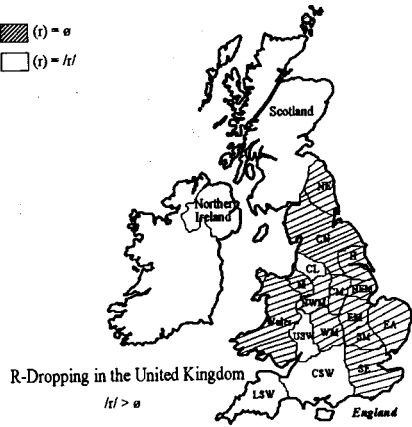


Fig. 8

▨ (e) = [eɪ]
□ (e) = [e:]

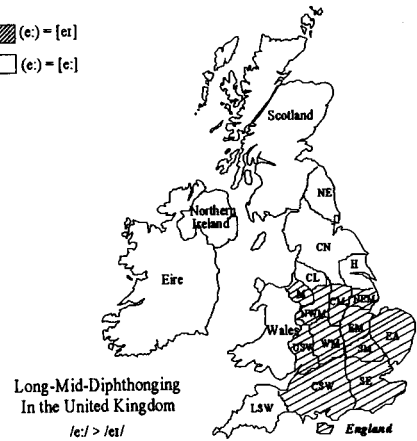


Fig. 11

▨ (h) = ø
□ (h) = /h/

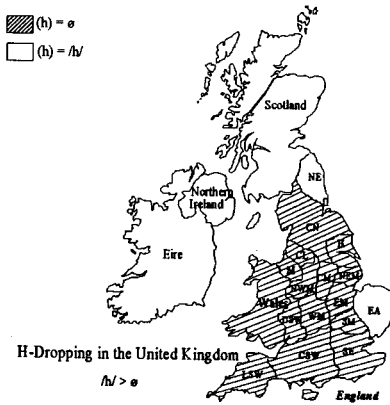
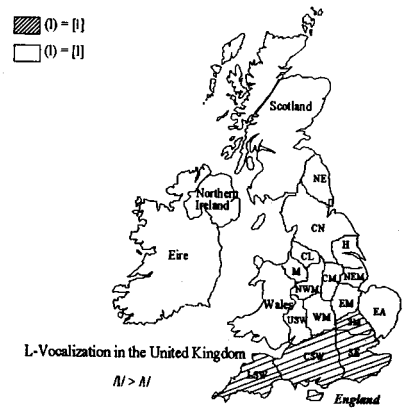


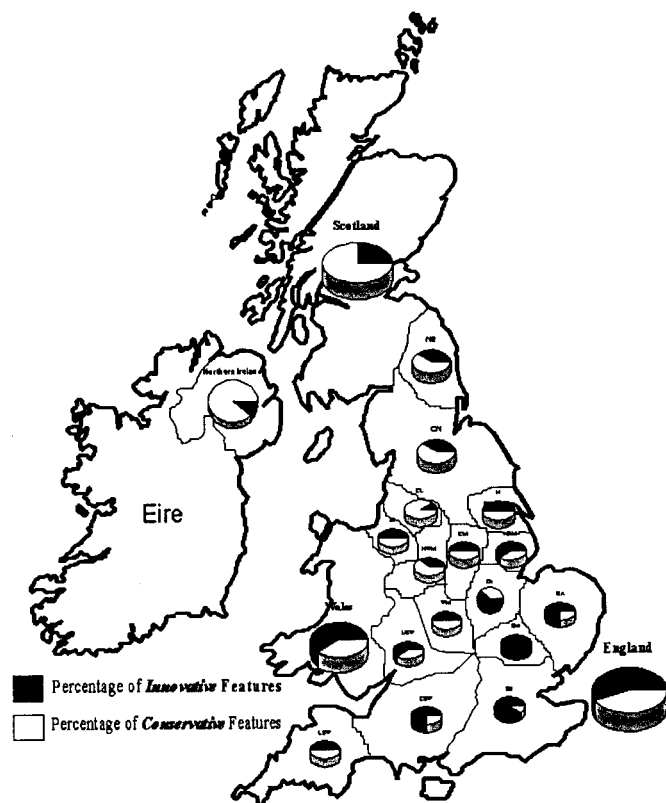
Fig. 12

▨ (l) = [ɫ]
□ (l) = [l]



The results from Table 1 can be displayed graphically in Figure 13, where each pie chart represents a dialect area (grid).

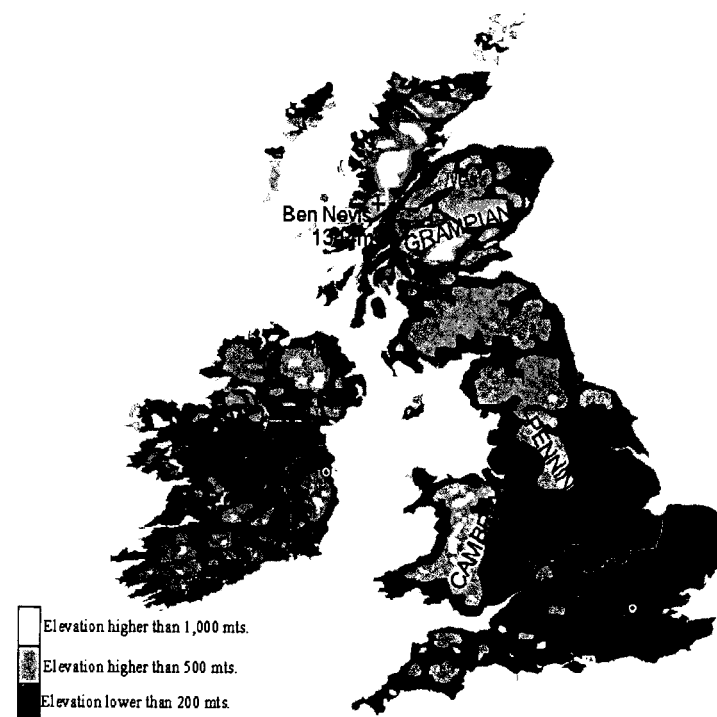
Fig. 13



At a macro-level of interaction, and regarding the eight sound changes in question, the Southeast (SE) is clearly a *focal area* (87.5% usage of the innovative variants), from which innovations spread taking the form of *wedges* driven into the areas of older linguistic features. The difference between Southeast (with 87%) and South Midlands (with 100%) is that whereas the latter (SM) has been an adopter of all those sound changes, by contrast, the former (SE) has been the locus and thus the initial diffuser of most of them. Surrounding these central places, or urban centres, there are other areas like the East Midlands (EM), East Anglia (EA), Central Southwest (CSW), Upper Southwest (USW) and Northeast Midlands (NEM), in England, and Wales (W), which form a kind of *transition area*, although the clearest examples are the Lower Southwest

(LSW), Central Midlands (CM), West Midlands (WM), Merseyside (M) and Humberside (H), all with 50% of both conservative and innovative features. On the other side of the transition area it is possible to find the dialect areas having more conservative features in their accents, and there are two grids, Northern Ireland (Ir), Central Lancashire (CL) and Northwest Midlands (NWM), which are extremely conservative places, or isolated "islands", in a transition zone. They could be considered as *relic areas* due to their constantly major usage of conservative variants (87.5%, 87.5% and 62.5% respectively).

Fig. 14

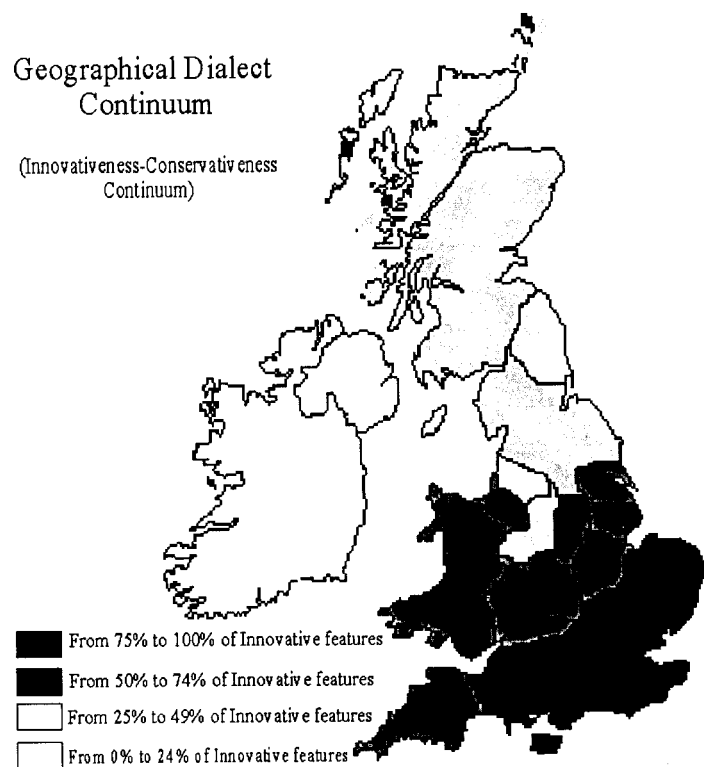


Physical Geography of the British Isles (hilliness)

While focal areas from which innovations spread are generally either urban centres or major lines of communication, conversely, relic areas tend to be normally located in isolated places like mountain valleys or on the distant periphery of language areas. As we can notice in Figure 14, the largest areas in Central

Lancashire and Northwest Midlands are the Forest off Bowland and Peak District National Park, places officially considered as “areas of outstanding natural beauty” (AONB), being rather distant from urban centres like Blackburn, Burnley, Accrington, Preston, or Blackpool in Central Lancashire, and Derby, Stoke-On-Trent, Chester or Manchester in Northwest Midlands, and in turn separating them from those other urban centres reached by innovations at a greater degree.

Fig. 15



On observing the above different graphical displays, the existence of a *geographical diffusion continuum*, or *innovativeness continuum*, can be perceived. That is, the innovative/conservative nature of the dialect areas in the United Kingdom changes gradually from place to place as one moves from the north to the south of the British Isles, depending on the adoption or non-adoption of the

innovations concerned with those sound changes. Figure 15 is a grey-scaled choropleth map that shows clearly the gradation situation.

At an *inter-regional* level, if we follow strictly the assumptions of the hierarchically structured transmission, and considering the ranking of influence exerted during the process of diffusion of a given innovation (Figure 4), inferior urban centres (villages) will not directly receive an innovation arisen in London from this very focal area, despite the magnitude of their relative population sizes, nor will they receive it before an immediate neighbouring larger urban centre has been reached and has in fact adopted it. That is, an innovation coming from London would not reach, for example, Penzance directly before reaching Plymouth. In any case, the higher or lower degree of similarity amongst the linguistic systems peculiar to the different dialect areas also affect the process and pattern of diffusion conditioning them and, consequently, it might probably alter the ranking here obtained.

3.3. Model 3: linguistic influence potential

Regarding the third factor, the linguistic system itself and the prior-existing *linguistic similarity*, the higher or lower compatibility of a given innovation having the inherent characteristics of a dialect variety will make the process of adoption easier or more complicated. A linguistic system can certainly have either a restraining (slowing/rejecting) or stimulating (accelerating) effect on the adoption of a given innovation during the process of geographical diffusion (the unfavourable system theory). A sound change, by means of which X becomes Y , will spread geographically to other dialects, providing there are no internal linguistic disorders caused, until it reaches the boundaries of a dialect where the Y feature is already present; the diffusion will stop there since the collapsing of Y_1 and Y_2 usages would induce ambiguity in the system (Gerritsen – Jansen 1980: 30). In this way, quoting Trudgill's words, “it appears to be psychologically and linguistically easiest to adopt linguistic features from those dialects or accents that most closely resemble one's own, largely, we can assume, because the adjustments that have to be made are smaller” (Trudgill 1974: 234). This is simply due to the fact that, for example, “... Norwich English is probably more like that of Canterbury than that of Peterborough, for example, although this is a difficult thing to measure” (Trudgill 1974: 224).

With the ultimate goal of illustrating how innovations “would spread” now at the end of the 20th century and under these conditions, we applied Trudgill's (1974) equation considering the existing *linguistic influence amongst dialects*:

Linguistic Influence Equation

$$I_{xy} = S \cdot \frac{P_x \cdot P_i}{(D_{xy})^2} \cdot \frac{P_x}{P_x + P_y}$$

In order to obtain the degree of linguistic similarity assignable to every single linguistic system representing every single dialect area, we took into account the eight innovations in question. The determination of a numerical value for this factor in our study was based neither on the differences amongst dialects under consideration, as however Gerritsen – Jansen (1980) did, nor on our intuition, as Trudgill (1974) did. Rather, as we were weighing the linguistic similarity factor and its impact on the *linguistic influence* potential, it was based on the similarity amongst them. If the adoption or non-adoption of those innovating forms makes these dialect varieties be more or less alike, a numerical value as high as the number of innovations it adopted, ranging from 0 to 8, can thus be assigned to every single dialect area (see Table 2).

Table 2

DEGREE OF LINGUISTIC SIMILARITY AMONGST DIALECT AREAS IN UK		
Dialect Area	Main Urban Centre	Linguistic Similarity (0-8)
Scotland (Sc)	<i>Edinburgh</i>	2
Northern Ireland (Ir)	<i>Belfast</i>	2
Northeast (NE)	<i>Newcastle</i>	3
Central North (CN)	<i>Leeds</i>	3
Central Lancashire (CL)	<i>Blackpool</i>	1
Humberside (H)	<i>Hull</i>	4
Merseyside (M)	<i>Liverpool</i>	4
North West Midlands (NWM)	<i>Manchester</i>	3
West Midlands (WM)	<i>Birmingham</i>	4
Central Midlands (CM)	<i>Leicester</i>	4
North East Midlands (NEM)	<i>Lincoln</i>	5
East Midlands (EM)	<i>Peterborough</i>	5
Wales (W)	<i>Cardiff</i>	5
Upper Southwest (USW)	<i>Gloucester</i>	5
Central Southwest (CSW)	<i>Bristol</i>	6
Lower Southwest (LSW)	<i>Plymouth</i>	4
South Midlands (SM)	<i>Northampton</i>	8
East Anglia (EA)	<i>Norwich</i>	6
South East (SE)	<i>London</i>	7

The definition of the total linguistic influence potential exerted (potential for influencing) or received (potential for being influenced) by every single urban

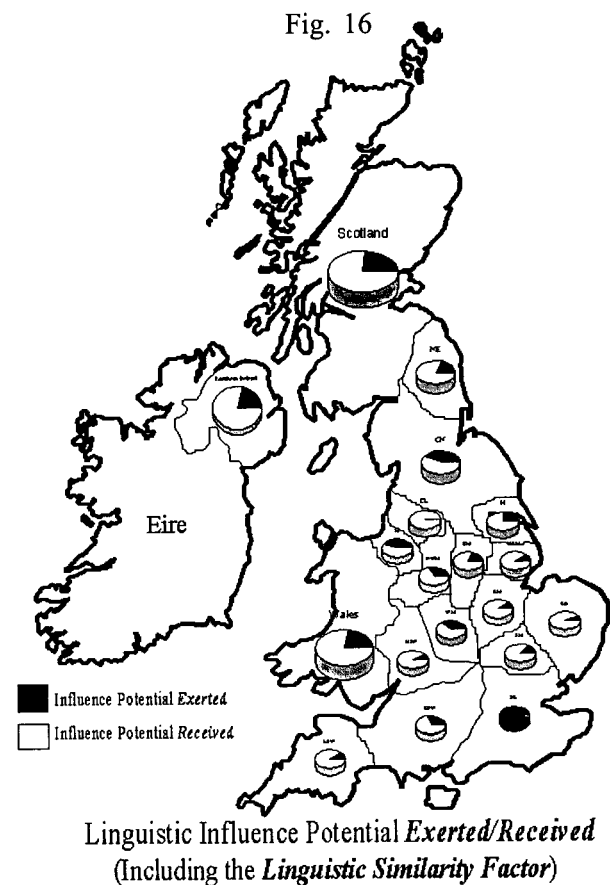
centre as the summation of its different individual influence potentials with respect to the rest of centres gives us the following results (Table 3):

Table 3

INFLUENCE POTENTIAL EXERTED/RECEIVED BY THE 19 URBAN CENTRES IN UK								
	Potential for Influencing				Potential for Being Influenced			
	Without Linguistic Similarity Factor		With Linguistic Similarity Factor		Without Linguistic Similarity Factor		With Linguistic Similarity Factor	
1.	<i>London</i>	749	<i>London</i>	5,231	<i>Birmingham</i>	225	<i>Birmingham</i>	1,424
2.	<i>Birmingham</i>	201	<i>Birmingham</i>	810	<i>Northampton</i>	152	<i>Northampton</i>	943
3.	<i>Leeds</i>	138	<i>Leeds</i>	418	<i>Manchester</i>	148	<i>Leicester</i>	795
4.	<i>Manchester</i>	96	<i>Liverpool</i>	310	<i>Leicester</i>	142	<i>Bristol</i>	684
5.	<i>Liverpool</i>	76	<i>Manchester</i>	291	<i>Leeds</i>	121	<i>Manchester</i>	641
6.	<i>Leicester</i>	49	<i>Bristol</i>	278	<i>Bristol</i>	111	<i>Leeds</i>	608
7.	<i>Bristol</i>	45	<i>Leicester</i>	204	<i>Liverpool</i>	96	<i>Peterborough</i>	545
8.	<i>Northampton</i>	23	<i>Northampton</i>	189	<i>Peterborough</i>	87	<i>Liverpool</i>	413
9.	<i>Cardiff</i>	21	<i>Cardiff</i>	112	<i>Cardiff</i>	62	<i>Cardiff</i>	383
10.	<i>Hull</i>	20	<i>Hull</i>	84	<i>Gloucester</i>	60	<i>Gloucester</i>	346
11.	<i>Peterborough</i>	14	<i>Peterborough</i>	72	<i>Hull</i>	55	<i>Hull</i>	267
12.	<i>Edinburgh</i>	10	<i>Gloucester</i>	38	<i>London</i>	50	<i>London</i>	214
13.	<i>Newcastle</i>	9.5	<i>Newcastle</i>	30	<i>Blackpool</i>	37	<i>Norwich</i>	208
14.	<i>Blackpool</i>	9.4	<i>Lincoln</i>	25	<i>Lincoln</i>	32	<i>Lincoln</i>	167
15.	<i>Gloucester</i>	7	<i>Edinburgh</i>	20	<i>Norwich</i>	32	<i>Blackpool</i>	161
16.	<i>Lincoln</i>	5	<i>Plymouth</i>	18	<i>Newcastle</i>	24	<i>Plymouth</i>	133
17.	<i>Plymouth</i>	4	<i>Norwich</i>	17	<i>Plymouth</i>	21	<i>Newcastle</i>	113
18.	<i>Belfast</i>	3	<i>Blackpool</i>	9	<i>Edinburgh</i>	15	<i>Edinburgh</i>	74
19.	<i>Norwich</i>	2	<i>Belfast</i>	8	<i>Belfast</i>	9	<i>Belfast</i>	46

Figure 16 shows the results of the quantification of the linguistic influence using pie charts for each grid. As far as the the top larger urban centres are concerned, differences are unimportant with or without the linguistic similarity factor, as there are no drastic changes in their position: only Manchester and Liverpool, on the one hand, and Leicester and Bristol, on the other, fluctuate. However, from 13 to 19, the position in the ranking of the places exerting and receiving influence considerably varies depending on the inclusion of the linguistic similarity factor. It is the case of smaller urban centres thus where instability predominates.

Given the existence of a hierarchical system of urban centres, the most likely as well as frequent type of diffusion of innovations in these patterns is hierarchically structured. This is the structure of diffusion normally found in those (developed) countries with a high degree of hierarchization of urban nuclei, i.e.



with a gradation between the capital and regional centres (multicephalous system). There are studies such as those carried out by Trudgill (1974, 1983 and 1986) in East Anglia and Brunlanes, or Callary (1974) in Illinois, which demonstrate the fact that the diffusion of linguistic innovations, like any other innovations, is generally hierarchically structured. Kloeke (1929) and Kurath (1949) also showed their inclination to this kind of hierarchical process when underlining the importance of cities in the diffusion of linguistic innovations. Generally speaking, this is due, according to Trudgill (1995: 147-149), to "the general economic, demographic and cultural dominance of town over country, and to the structure of the communication network". Patterns of diffusion of linguistic innovations having an *epidemic* (contagious) structure, contended by historicist linguists through the Wave Theory, can be normally found in those (under-developed) countries, where there is no urban nuclei gradation but rather an abrupt demographic distance between the largest city and the rest (monocephalous sys-

tem). But a combined structure (both epidemic and hierarchical), and even a *contra-hierarchical* structure (from smaller to larger urban spaces) are also feasible (see Bailey – Wikle – Tillery – Sand 1991, 1993).

In the light of these data, results and structure of transmission (hierarchically), Hernández-Campoy (1996, 1999) attempts to trace the primary (inter- and intra-regional) routes followed by a given sociolinguistic innovation arisen normally, according to the probabilistic models, in London during the process of

Fig. 17



geographical expansion throughout the present United Kingdom. Focussing on the principal route followed by a given sociolinguistic innovation generated by a London-based linguistic change (Figure 17), it largely coincides with the distribution of innovative or conservative dialect areas (innovativeness-conservative-

ness continuum) shown in Figure 15 in 3.2 and with the population distribution and physical geography in Great Britain (Figure 14). Particularly, the dialect areas of South Midlands, West Midlands, Central Midlands, East Midlands, Northeast Midlands, and Humberside – which have more than 50% of innovative features adopted and a linguistic similarity index of more than 4 when passing through them – authentically constitute a corridor, or passage, through which innovations arisen in the South East focal area flow. Additionally, this diffusion corridor is probably the main, if not the only, access to the northern areas of England and Scotland, since it is surrounded by a number of physical barriers impeding communication through other possible routes (Northwest Midlands, Merseyside, Central Lancashire, Central North and Northeast): according to Figure 14 and Figure 17, the diffusion corridor is bounded by, on its right side, the North Sea, and, on its left side, the Pennines, where the Peak District Natural Park is found.

Nevertheless, the situation is much more complicated than what these human geographical models have detected. Firstly, from a methodological point of view, these predictions are based on modern demographic data (*Regional Trends*, 1993, Central Statistical Office, HMSO). However, most of the changes that led to the present dialect situation took place some centuries ago, when things were supposed to be very different. Predictions thus should be unlikely to be confirmed by the data: although happy-tensing and l-vocalization are currently in operation in England, yod-dropping, /ʊ/-/ʌ/ split and ng-coalescence date back to the 17th century; r-dropping and h-dropping probably started in the 18th century approximately; and long-mid-diphthonging came about in the 19th century.

Secondly, from the point of view of the models themselves, a critical dysfunction was detected. Model 1 (population potential) and Model 2 (interaction potential) do work, in the sense that the situation predicted for contemporary dialect gravity centres and interaction potential in the United Kingdom can be confirmed by the data. Model 3 is able to estimate the possible degree of linguistic influence of one dialect area upon another, as Trudgill's exemplary study (Trudgill 1974) demonstrated with all its linguistic evidence from Norway and Norwich. Using factors such as distance and population size, not only can linguistic influence be explained but also determine whether or not a language change is the result of it. However, the general pattern of geographical diffusion traced, despite its precision, cannot be tested positively against data due to its aggregate nature, and thus is untenable and speculative as a regular process. That is, the actual geographical distribution of any of the eight sound changes seen (Figures 5-12) do not follow this general pattern, but rather different ones. For example, as far as ng-coalescence is concerned, it is Central Lancashire, Merseyside, Northwest Midlands and West Midlands that clearly constitute a

relic area, while in the case h-dropping, the relic area is the dialect area of East Anglia, as Northeast, Scotland and Northern Ireland may have not been reached yet. Speaking in terms of dispersion density, the current uniformity predominating in the distribution of these changes was not likely to be identical 200 years ago. Thus Model 3 is useful to account for particularly specific phenomena, as Trudgill (1974) or Gerritsen – Jansen (1980) did, but not for detecting the general model of an accumulation of different linguistic phenomena, unless used for illustrating how diffusion patterns change as the importance of urban centres and prestige of local dialects vary from period to period throughout the history of the English language in the United Kingdom (see Conde-Silvestre – Hernández-Campoy 1997 and Hernández-Campoy – Conde-Silvestre 1998, 1999).

The /ʊ/-/ʌ/ split presents a definitely singular distribution, since the distinction /ʊ/ and /ʌ/ appears in the dialect areas of Lower Southwest, Central Southwest, Upper Southwest, Wales, South East, South Midlands, East Anglia, Northern Ireland and Scotland, but not in West Midlands, East Midlands, Northwest Midlands, Central Midlands, Northeast Midlands, Humberside, Merseyside, Central Lancashire, Central North and Northeast (see Figure 9); that is, the distinction /ʊ/-/ʌ/ made in the south and north of the United Kingdom (Southern England, on the one hand, and Scotland and Northern Ireland, on the other) is separated by a wide intermediate area (northern England), forming a kind of relic area, where there is no such distinction. To complicate the configuration even more, between the two main areas of the United Kingdom – one, clearly and predominantly user of the innovative variant /ʌ/ (the south), and other, clearly and predominantly user of the conservative variant /ʊ/ (the north) – there is a transition area where we can find what Chambers – Trudgill (1980) call *mixing lects* and *fudged lects*. The former imply a variability in use of both [ʊ] and [ʌ], while the latter, fudged lects, entail the use of an interdialect form having a phonetically intermediate value [ɥ]. From the point of view of dialects in contact (Trudgill 1986), it is evident that the /ʊ/-/ʌ/ transition zone is in a state of constant flux, with the innovative variant still being progressing geographically through the intermediate forms. But, what is the explanation of the existing situation in Scotland? “Is this the result of a separate but almost identical innovation? Or did the London-based innovation jump to, say, Edinburgh, leaving the intervening Midlands and North unaffected? Or did the innovation perhaps start in Scotland?” (Trudgill 1974: 243).

Happy-tensing presents a situation alike; in this particular case, it is the dialect area of Northeast rather than Scotland that is reached by the innovative variant [i:], despite being completely isolated from the innovating region (the whole South of England and Wales) by a large conservative expanse of land (Central Midlands, Northwest Midlands, Central Lancashire and Central North), which

constitutes a relic area (see Figure 5). As Trudgill (1974: 243) suggests, the fact that these linguistic changes present dissimilar configurations having non-coinciding isoglosses must be due to different participating factors which might have generated the differing diffusion characteristics: "... either (a) the innovations began at different periods of time, when population distribution was different and distance a factor having a different kind of weighting because of different transport conditions; and/or (b) they began in different places; and/or (c) there are linguistic factors to take into consideration".

Thirdly, linguistically speaking, as Table 4 shows, change goes through a number of stages in the transition from a categorical use of one variant to its categorical replacement by another (see Bailey 1973).

Table 4

DIFUSSION THROUGH LINGUISTIC ENVIRONMENTS					
Linguistic Environment	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
E_1	x	x/y	x/y	y	y
E_2	x	x	x/y	x/y	y

The process of yod-dropping occurs in most parts of the United Kingdom only in certain environments: i) after palatals (including palato-alveolars), as in *chew*, *yew*, or *juice*; ii) after /r/, as in *rude* or *crew*; and iii) after consonant plus /l/, as in *blue*. But it is the accents of East Anglia, East Midlands, and South Midlands that omit the palatal glide in nearly all postconsonantal environments, as in *few*, *music*, *cube*, etc.; in this way, pairs of words such as *cute/coot* or *mute/moot*, which sound different in RP, are homophonous in these varieties. From the point of view of the structure of diffusion, though the majority of these sound changes appears to have spread hierarchically, in contrast, yod-dropping seems to be dispersing contra-hierarchically: this linguistic innovation began in smaller regional urban centres, from which it diffusing to large metropolitan areas. It is widely known that happy-tensing, r-dropping, long-mid-diphthonging, /u/-/ʌ/ split, l-vocalization, ng-coalescence and h-dropping started in the South-east dialect area, particularly London. However, yod-dropping is developed further, not precisely where most of these innovations come from, namely the London area, but rather in the East Anglia, East Midlands and South Midlands dialect areas, where it is also a prominent feature in their phonological systems. Instances of contra-hierarchical diffusion involve the reaffirmation of traditional speech norms, whereas instances of hierarchical diffusion tend to reflect the imposition of external speech norms (see Bailey – Wikle – Tillery – Sand 1993: 385). If this process seems to be spreading to other linguistic environments in the majority of the dialect areas while undergoing the transition from a categori-

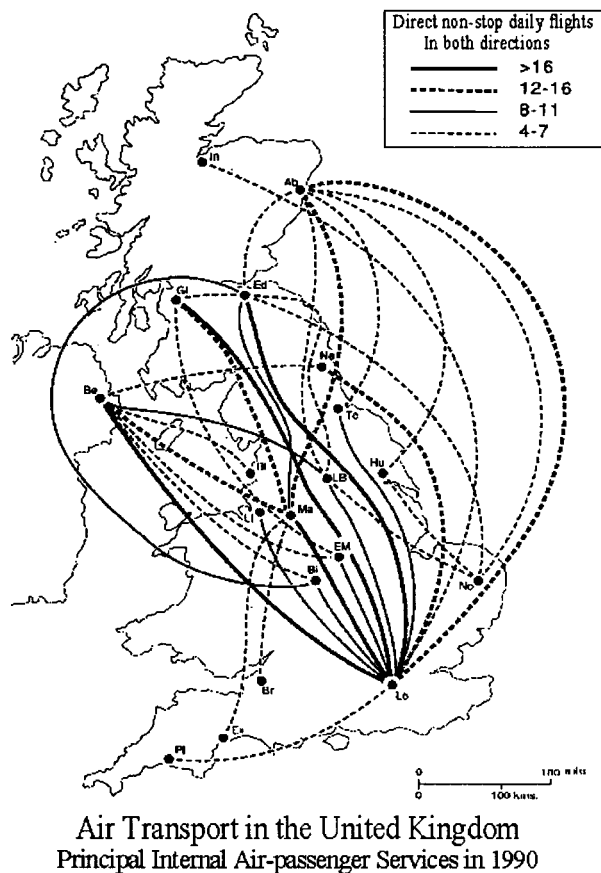
cal use of one variant to its categorical replacement by another, it cannot be acting as an identifying characteristic for speakers from Norwich, Ipswich, Cambridge or Peterborough.

Finally, sociolinguistically speaking, we also know that, as in geographical space, within a stratified population a change will typically be initiated in a particular social class and spread to others in the population. Linguistic diffusion is both a social and spatial phenomenon, and that is the reason why variation theory must be sensitive to these external factors, in addition to internal linguistic factors. Maybe, in the future, the loss of the yod will expand to all the other linguistic environments in those dialect areas where it does not currently occur. Or maybe the opposite phenomenon will take place, since /j/ has an explicit social stratification, though this seems to be less likely: in spite of that the omission of /j/ is a local feature in East Anglia, the variant [ju:], typical in RP accent, is especially frequent in the middle class speech, while the variant [u:] is more consistently used by working class and rural speakers. Likewise, r-dropping and h-dropping, for example, present a clear social stigmatization in the case of their conservative variants. Yod-dropping and long-mid-diphthonging are markers, since they establish a patent social stratification and convey stylistic variation: [ju:] as opposed to [u:] and [e:] as opposed to [eɪ]. Also the initial stages of the innovative velarised realisation ([ɫ]) of /l/ are attributed to London dialectal speech, from which it is seeping not only into other regional dialects but also into RP, the British social dialect. In fact, as Wells (1982: 259) points out, "it seems likely that it will become entirely standard in English over the course of the next century". According to Trudgill (1990: 62), l-vocalization is a process very similar to r-dropping: "we are probably seeing here the beginnings of a whole new change in the language that will lead to the disappearance of 'l' in these words altogether in the same way that 'r' began to disappear 200 years ago in words like *arm*".

In any case, the aggregate pattern detected here would be predictably altered in the future as a result of the changes that transport is undergoing. If previously sea traffic lost influence with the advent of cars and the subsequent asphaltting of roads, by contrast, the increasingly use of air transport can compensate the inconveniences of road traffic and thus neutralize the friction of distance in the case of those so isolated and remote urban centres such as Belfast (Northern Ireland), Edinburgh (Scotland), Blackpool or Newcastle (Figure 18).

Yet this alteration of patterns would take place, ultimately, providing that dramatic demographic, economic, politic or even geographical changes are produced, or simply, providing that attitudinal and linguistic factors are sufficiently favourable to allow it, since the receptivity of both Scotland and, specially, Northern Ireland to linguistic innovations coming from England would not seem

Fig. 18 (after Turton 1992: 117)



to be great enough.⁴ Scotland and Northern Ireland have such strong historical, cultural and linguistic identities that the adoption in its environment of any change arisen in a nucleus such as London, which they consider as the cause and source of the centralism that implements political subjugation on them, would simply fail. Furthermore, from the point of view of linguistic change and diversity, as Trudgill (1990a) ventures, innovations in the English language will continue arising, extending and receding, like Aitchison's (1991) "everwhirling

⁴ Sometimes one of the problems of multilingualism for national governments is the fact that language acts as a very important symbol of group consciousness and solidarity, a signal of group identity, and where language constitutes a *defining* characteristic of a minority (normally ethnic) group claiming independence, it certainly plays an important role (see Trudgill 1995: Chapter 3).

wheel", so that there will never be a complete homogeneity in the pronunciation of English in the British Isles:

Happily, however, it is certain that there will never be total uniformity across the country, because innovations will always continue to spread and recede and thus continue to produce the rich mosaic of regional variation in pronunciation which has characterized England ever since English first became its language (Trudgill 1990a: 78).

In the meantime of this everlasting process, a contrastive study using a real-time methodology in 50 or 100 years time, for example, would probably show other patterns and – why not? – a different structure of diffusion, and even a different mosaic of regional accents to that of the present-day 19 dialect areas analysed here.

4. Conclusion

The models of analysis of diffusion developed in Human Geography, which we have intended to examine in this study by applying them to the British dialect areas, have both advantages and disadvantages. According to Gerritsen (1988: 1589), "the most important advantage of the use of human geographical models for dialect geographical purposes is that it prevents giving ad hoc explanations", since it requires from the researcher the determination of i) the factors causing a diffusion, and ii) the presence of those factors in the diffusion area and not where the phenomenon did not spread; i.e., not only to *describe* the geographical distribution of linguistic features but also to *explain* this distribution: why linguistic innovations appear and spread to a centre A from a centre B and not from centre C. In this way, as Trudgill (1974) states, we will be able to understand, more accurately, the sociolinguistic mechanisms that lie behind the geographical distribution of linguistic innovations. According to Hard (1972: 58), these simulation models are useful to verify hypotheses about the causes of a diffusion process, accepting or rejecting them, since they can at best show that a given explanation is or is not highly probable. For their part, Trudgill (1974) and Chambers – Trudgill (1980) go further and defend the models; these sociolinguists consider the fact that they are not only useful in that they allow the researcher to verify or invalidate hypotheses about the origins of a diffusion but also have a heuristic value, since, in cases where the model does not work, the researcher necessarily has to find out the reasons and explain them.

It could be true that these probabilistic models of macroscopic analysis are characterized by a deterministic approach, involving a specification of the relationship between diffusion and its explanatory variables; it could also be true that they are specifically designed for predicting diffusion flows but only under restricted assumptions, as Jones (1990: 199) states in the case of probabilistic

models for migration. In fact, in their search for empirical regularities in aggregate data, holistically, they offer general tendencies that, atomistically, however, do not have to coincide with particular phenomena. But, a real-time contrast between two models, though obtained through aggregate data, may provide us with a wider perspective for perceiving how diffusion patterns change as the importance of urban centres and prestige of local dialects vary from period to period throughout the history of a given language, and ultimately for a better understanding of the mechanisms of diffusion.

Yet linguistic diffusion is not simply a by-product of geographical and demographic attributes, but also face-to-face interaction between the speakers of the urban centres in question, local social networks and the social as well as psychological meanings attached to different dialect forms can drastically affect the process of diffusion, or rather sociolinguistic diffusion. Although the geolinguistic gravity models often give adequate statistical explanation for the volume, distance and direction of geographical diffusion flows by submitting aggregate data to macroscopic analysis, however, they do not manage to reveal to us anything at a microscopic level of analysis (micro-sociolinguistics): i) in which particular social group the innovation arose (the diffusing social group); ii) the profile of potential diffusers and adopters; iii) the reasons leading speakers to adopt or reject an innovation; as well as iv) the extent to which overt prestige or covert prestige might or might not be involved. An approach to these diffusion phenomena from the micro-sociolinguistic level of interaction is thus also necessary, since there are also attitudinal factors that may stimulate or retard the adoption of innovations and its subsequent transmission both horizontally (geographical axis) and vertically (social axis). The arbitrary and subjective nature of social attitudes towards the prestige of language or dialect varieties is largely an originator of changes in linguistic systems; and, in turn, some linguistic systems will offer more resistance to an innovation than others not simply for purely linguistic but also extra-linguistic (attitudinal) reasons.

In any case, there is no room for doubt, that regardless of their precise evidencing and explanatory power, the geolinguistic approach to linguistic diffusion processes developed with models adopted and adapted from Human Geography is considerably more well-founded than that of Traditional Dialectology: as Wolfram – Schilling-Estes (1998: 145) point out, they often provide “a better picture of dialect diffusion than a simple wave model”, since the wave model’s consideration of only distance and time in accounting for linguistic diffusion was excessively and naively simplistic. Obviously, as Gerritsen (1988) states, this supplementary evidencing and explanatory value has a price to pay, which is its inconveniences: i) the need to collect and work with data unfamiliar to linguists, such as population sizes, distances, communications, (air, land and sea) connections, physical geographical aspects, etc.; ii) quantification of data; and

iii) the division of the landscape into areas of uniform size and shape (grids or cells); in addition to iv) the obtainment of sociological and linguistic data for each cell under regard.

Accordingly, with the incorporation of the *geo-* into sociolinguistics, concepts such as *space* and *spatiality* will gain more prominence, both theoretically and methodologically, in the study of the transmission and maintenance of linguistic forms, together with the social and contextual dimensions. As stated at the beginning of this article, in addition to emphasising the spatial organization of society (classes), taking into account those aspects concerning the social organization of space becomes necessary. If, as Soja (1989: 12) advocates, society is the result of the confluence of time, space and social being, a more relevant part should be played by space and spatiality in the development of sociolinguistic research for studying the inter-relationships between language and society. Following one of the tenets of our study, “language is where people are or go”, in the particular case of both social and geographical diffusion of linguistic innovations, with this work we hope to have helped to emphasize the fact that the analysis of spatiality through the sociolinguistic *language* and *geography* paradigm, or the study of language in its geographical context, is also crucial, simply because space also matters.

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