THE AREAL ANALYSIS OF DIALECTAL FEATURES:
THE GRAVITY CENTRE METHOD AS APPLIED TO
SED MORPHOSYNTACTIC DATA

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The morphosyntactic data on which the descriptive maps below are based are those published in Viereck – Ramisch (1991, 1997).[1] The maps are produced by Harald Händler of the University of Marburg who also developed the gravity centre method further.

The dialectometric base of the method is to constitute centres of gravity: by adding all x and y coordinates of the localities of an area and dividing both sums by the number of the localities one arrives at the coordinates of the centre of gravity of that area. The most important geometrical characteristic of the centre of gravity, namely its position in the centre of an area, means that certain assertions about it are equally valid for the whole area. It is important to note that the centre of gravity never falls exactly on a particular locality. The program works in such a way that it looks for the nearest locality and establishes this as the centre of gravity. Thus the centre of gravity can also be a locality in which the investigated form is not attested at all. Without this program component no centres of gravity could be given, only coordinates. Taking the Isle of Man and the opposite coast into consideration they might, mathematically speaking, even fall into the water.

The results of the analysis of the centres of gravity can be presented either more quantitatively or more qualitatively. The first possibility is accomplished by means of a honeycomb map on which the various shades of grey (or the different colours) indicate quantity. More complex is the radiation map that is

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[1] Its database was provided in the mid-20th century by Harold Orton in his *Survey of English Dialects* (SED). On this survey see Viereck, "Dialectological aspects" in Viereck – Ramisch (1991: 3ff.).

based directly on the structure of the gravity centres. It provides inner connections of areal components and thus qualitative insights into a distributional area and works well with a small(er) amount of data. However, the higher the data input, the denser a radiation map becomes, but even then it provides information on how partial areas are intertwined.

In addition to the centre of gravity other parameters are necessary to describe an area more precisely, such as the size of the area, its compactness and its componential structure. Compactness is to be understood here as a kind of 'purity' of the area. The componential parameter reveals the number of spatially separate components each area of distribution has. Both parameters are determined by a special growth procedure. But already the analysis of the centres of gravity allows important dialectological insights.

In order to analyse an entire linguistic data corpus dialectometrically, the centre of gravity of every area of distribution for every reported response has to be established first. Then one counts how often a locality functions as a centre of gravity and differentiates the various frequencies on a map of accumulated centres of gravity. Here the frequency scales are divided into a maximum of eleven sections from white (not attested) to black (attested most frequently). The attestations of the other values vary between the numbers given below the respective fields.

The map of accumulated centres of gravity is decisive for the areal analysis of the atlas data. Thus all shadings of grey, for example, in the south of England are responsible for dialectal features that by far overwhelmingly occur there. If they occurred to a considerable extent in the North of the country this would have pushed their centres of gravity further north. It is likewise with all other peripheral areas. The situation in the middle of England is different, though. Thus a centre of gravity in Northamptonshire, for example, might derive from a feature that is distributed over the whole of the country or from a phenomenon that is typical of central England. Then the areal analysis must draw on the size of the area and its compactness. With regard to the substance of the program only a beginning has so far been made in this direction.

The potentials of this dynamic dialectometric approach can only be sketched in a short contribution such as this. The gravity centre approach offers two ways of selection: area-oriented and feature-oriented selection. The first will be illustrated with regard to morphosyntax and as to feature-oriented selection disjunctive possessive n forms were chosen.[2]

The areas selected are the southern regions of England. One assumes a hypothetical dialect boundary and tests it against the evidence of the database.

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[2] For more information on this approach, for an area-oriented analysis of the lexical data (in the north of England also morphosyntax is dealt with) and for an analysis of other grammatical features see Händler – Viereck, "Selective dialectometry" in Viereck – Ramisch (1997).

The researcher selects the localities that are to represent the partial area to be investigated. This procedure is well exemplified on the maps below.

49 localities are chosen on Figure 1. The choice looks somewhat arbitrary at first, but as the analysis of the accumulated centres of gravity reveals, quite a number of centres of gravity lie in the South so that an independent dialect area can be expected there. The system works fully automatically: the computer produces honeycomb and radiation maps as well as lists of those responses that made up the maps – a very important aspect of qualitative dialectology. Apart from the relevant responses the lists contain the centre of gravity, marked specifically on the radiation maps, the map number (an asterisk refers to maps in Viereck – Ramisch 1991), the map title on which the particular feature appears plus its frequency of occurence. The latter way is space-saving; if all localities were listed individually, the lists would, of course, be much longer. Only then, however, would it become apparent that the centre of gravity could also be a locality in which the investigated form is not attested at all. Yet outliers are shown individually.

What is recognisable already on Figure 1 is further substantiated on Figure 4 where the locality numbers are reduced to 39, almost exclusively in the northern Southwest. It becomes evident that, at least from this level on, there exists a rather clear linguistic divide between the southeast and the southwest of England. Southeastern features do not contribute to areal patterning in the Southwest. Yet the Southwest is clearly characterised by quite a number of morphosyntactic features, a result that Händler – Viereck (1997) also noted for lexis.

With regard to feature-oriented selection one investigates whether and if so, how, dialectal phenomena participate in dialectal patterning. The cartographical presentation consists of three components: a honeycomb map showing the distribution of the feature and its frequency of occurrence without the centres of gravity, a radiation map with the centres of gravity and a list of forms together with the map number (an asterisk, again, refers to maps in Viereck – Ramisch 1991), the frequency of occurrence and the gravity centre.

As to the disjunctive possessive pronouns, dialects in southern England often show a regularisation to follow the pattern set by mine and thine. Wakelin notes that "these -n forms are on the whole widespread dialectally except in the north" (1977: 116). Figure 7, however, shows that some of the geographically peripheral – relic – areas (the northern West Midlands, the whole Southwest and East Anglia) do not have hisn, hern, yourn, ourn and theirn. As the core of the -n area is in the central Midlands it must be assumed that this innovation started there. It is one of those features that resisted the influence of Standard English.
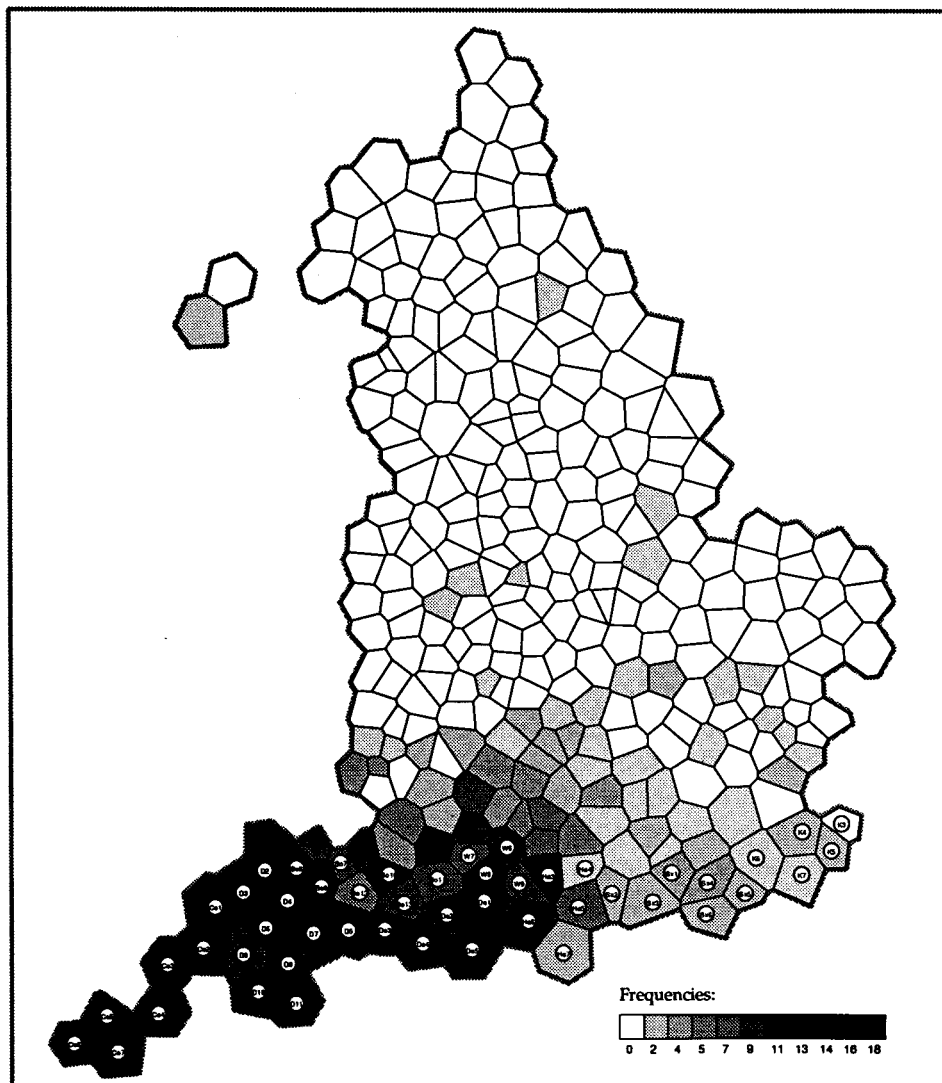
Figure 1. Dialectometrical Evaluation
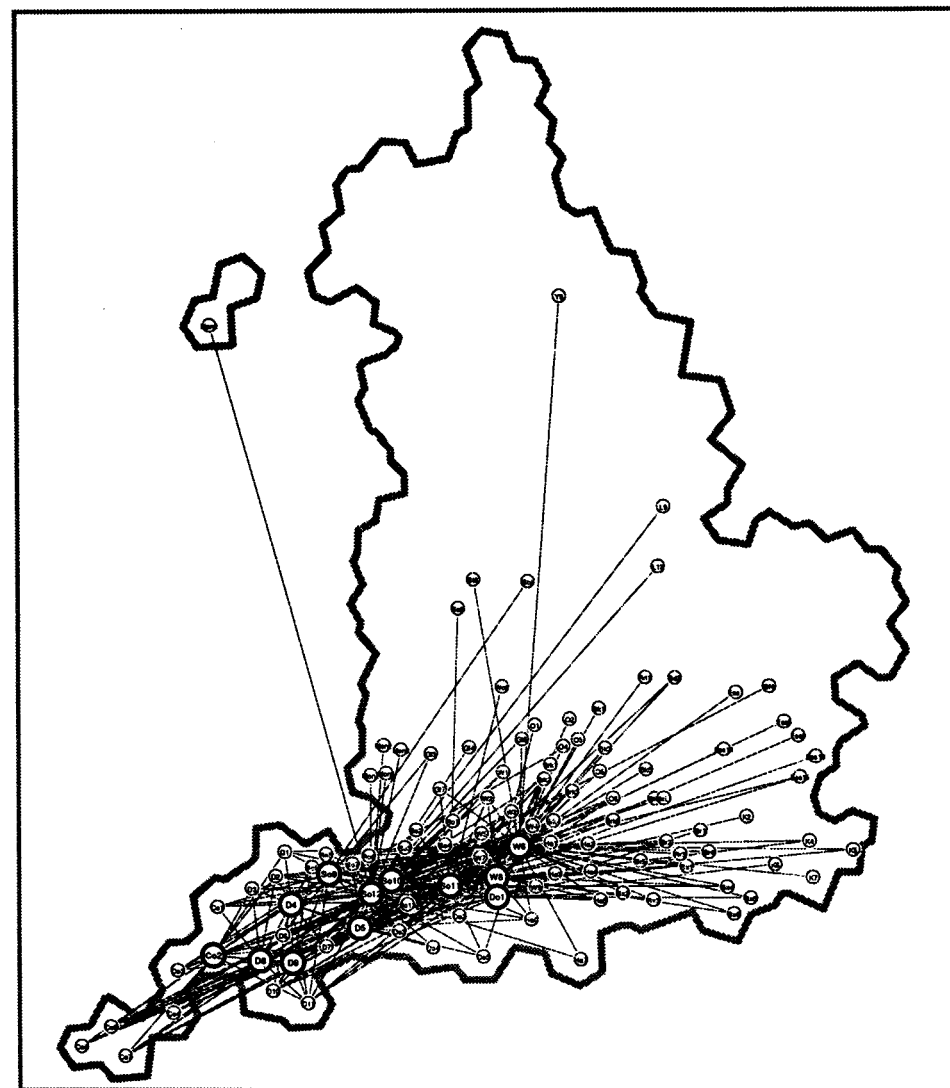the South - honeycombs (49 localities)
morphosyntactic responses

Figure 2. Dialectometrical Evaluation
the South - rays (49 localities)
morphosyntactic responses (32 of 557 responses = 5.7%)

em >D8< (M19*, Give it me, 13)
>> Co6 (Dist.: 1.1)
do bellow >D5< (M27*, Bulls bellow, 17)
>> Co6 (Dist.: 1.1)
do keep >So12< (M28*, keep hens, 10)
do make >So12< (M29*, makes, 15)
>> Co6 (Dist.: 1.1)
do take >D5< (M30*, takes, 15)
>> Co6 (Dist.: 1.1)
drinked >So12< (M40*, drunk, 29)
>> Sf14 (Dist.: 1.1)
>> K4 (Dist.: 1.0)
>> Co6 (Dist.: 1.1)
with a-prefix >So12< (M41*, drunk, 25)
whichy >Co2< (S11*, Which one, 17)
>> Co6 (Dist.: 1.1)
fight one tother >D4< (S12*, fight each other, 6)
one tother's >D4< (S13*, pull each others hair, 11)
quarter twelve >So11< (S27*, A quarter to twelve, 14)
>> Ess13 (Dist.: 1.1)
>> K5 (Dist.: 1.1)
>> Co6 (Dist.: 1.1)
home >So12< (S29*, stay at home, 52)
>> Co6 (Dist.: 1.1)
>> Man2 (dist.: 1.7)
by I >So11< (S31*, with me, 4)
wapses >W6< (M7, Wasps, 73)
>> Y9 (Dist.: 1.7)
>> Ess5 (Dist.: 1.1)
>> Ess15 (Dist.: 1.0)

>> K4 (Dist.: 1.0)
>> K5 (Dist.: 1.1)
>> Co6 (Dist.: 1.1)
en >So12<(M13, To weigh it, 38)
>Co6 (Dist.: 1.1)
en >D8< (M14, tasted it, 8)
>> Co6 (Dist.: 1.1)
er >So10< (M19, isn't he, 15)
us >D4< (M20, we are, 14)
thicky >D4< (M27, this, 11)
do wear >So12< (M35, She wears the breeches, 11)
>> Co6 (Dist.: 1.1)
do go >So12< (M38, They to to church, 12)
>> Co6 (Dist.: 1.1)
do steal >So12< (M40, burglars steal them, 14)
>> Co6 (Dist.: 1.1)
a-done >So11< (M43, done, 37)
a-doed >D4< (M43, done, 4)
stoled >So12< (M45, stole, 19)
stoled >So12< (M47, stolen, 18)
stealed >So9< (M47, stolen, 12)
idn't >So12< (M58, isn't he, 32)
>> L9 (Dist.: 1.3)
>> L 13 (Dist.: 1.1)
>> Co6 (Dist.: 1.1)
bain't >W8< (M58, isn't he, 19)
I ban't >D9< (M60b, I'm not, 4)
purpose >Do1< (S7, on purpose, 13)
(a-)doing of >So11< (S11, doing, 9)
>> Ess9 (Dist.: 1.1)
>> Co6 (Dist.: 1.1)
>> Ess15 (Dist.: 1.0)
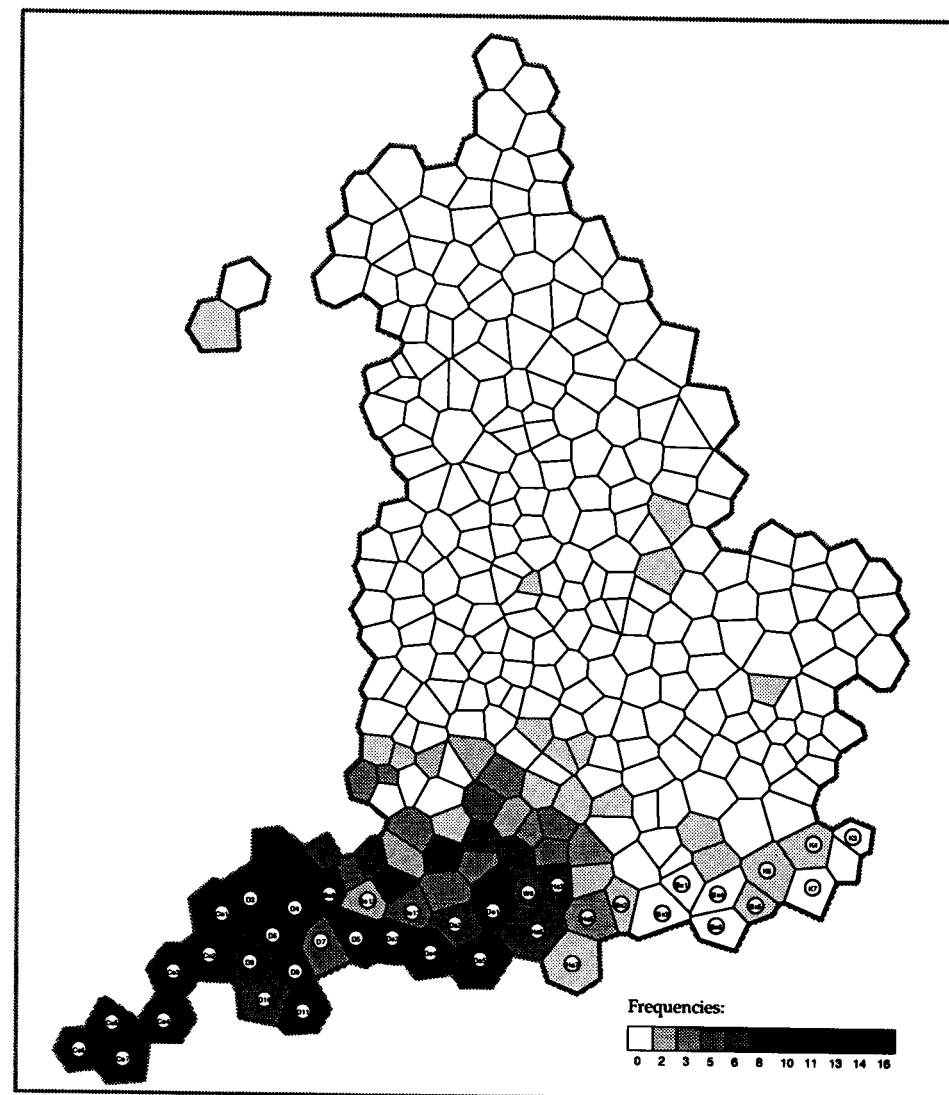
Figure 3. List of Forms

Figure 4. Dialectometrical Evaluation the South - honeycombs (39 localities) morphosyntactic responses
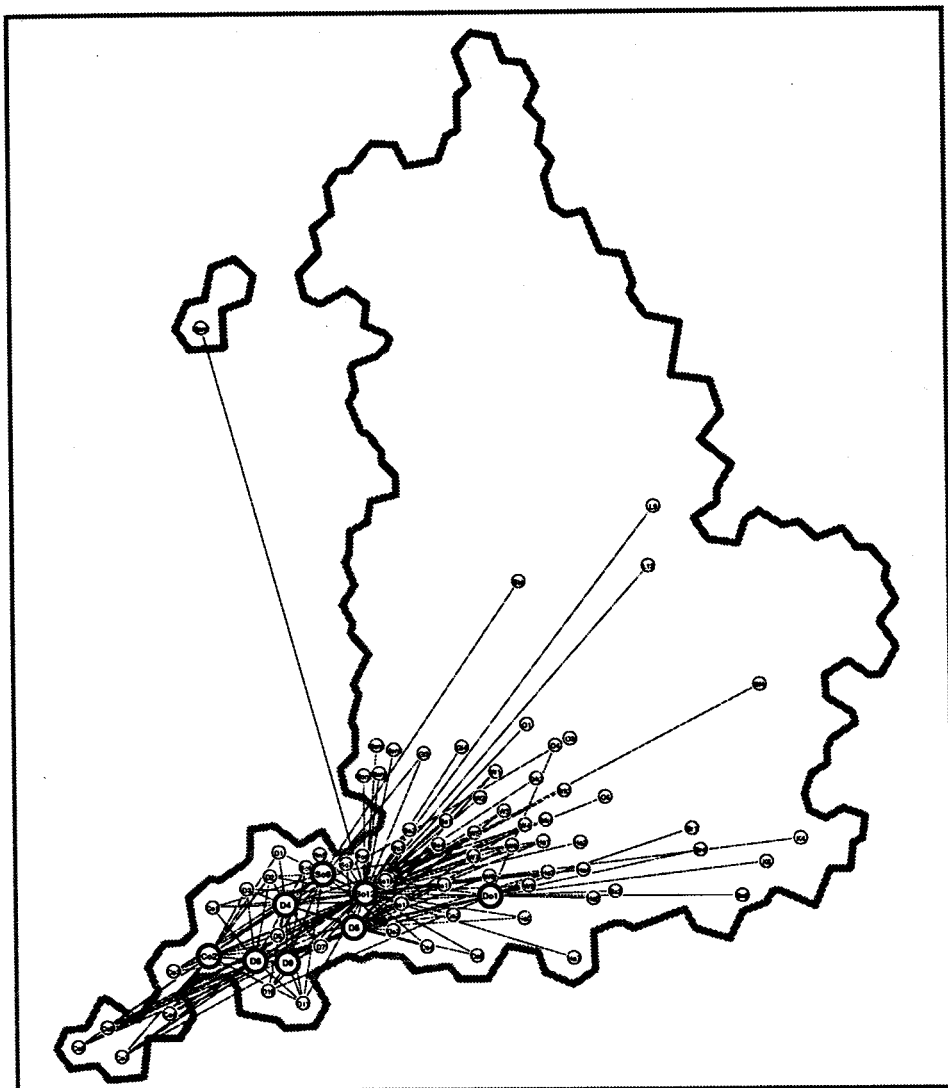
Figure 5. Dialectometrical Evaluation
the South - rays (39 localities)
morphosyntactic responses (25 of 557 responses = 4.5%)

em>D8< (M19*, Give it me, 13)
do bellow >D5< (M27*, Bulls bellow, 17)
do keep >So12< (M28*, keep hens, 10)
do make >So12< (M29*, makes, 15)
do take >D5< (M30*, takes, 15)
drinked >So12< (M40*, drunk, 29)
    >>Sf4 (Dist.: 1.0)
with a- prefix >So12< (M41*, drunk, 25)
whichy >Co2< (S11*, Which one, 17)
fight one tother >D4< (S12*, fight each other, 6)
one tother's >D4< (S13*, pull each other's hair, 11)
home >So12< (S29*, stay at home, 52)
    >>Man2 (Dist.: 1.7)
en >So12< (M13, To weigh it, 38)

en >D8< (M14, tasted it, 8)
us >D4< (M20, we are, 14)
thicky >D4< (M27, this, 11)
do wear >So12< (M35, She wears the breeches, 11)
do go >So12< (M38, They go to church, 12)
do steal >So12< (M40, burglars steal them, 14)
a-doed >D4< (M43, done, 4)
stoled >So12< (M45, stole, 19)
stoled >So12< (M47, stolen, 18)
stealed >So9< (M47, stolen, 12)
idn't >So12< (M58, isn't he, 32)
    >> L9 (Dist.: 1.2)
    >> L13 (Dist.: 1.1)
1 ban't >D9< (M60b, I'm not, 4)
purpose >Do1< (S7, on purpose, 13)
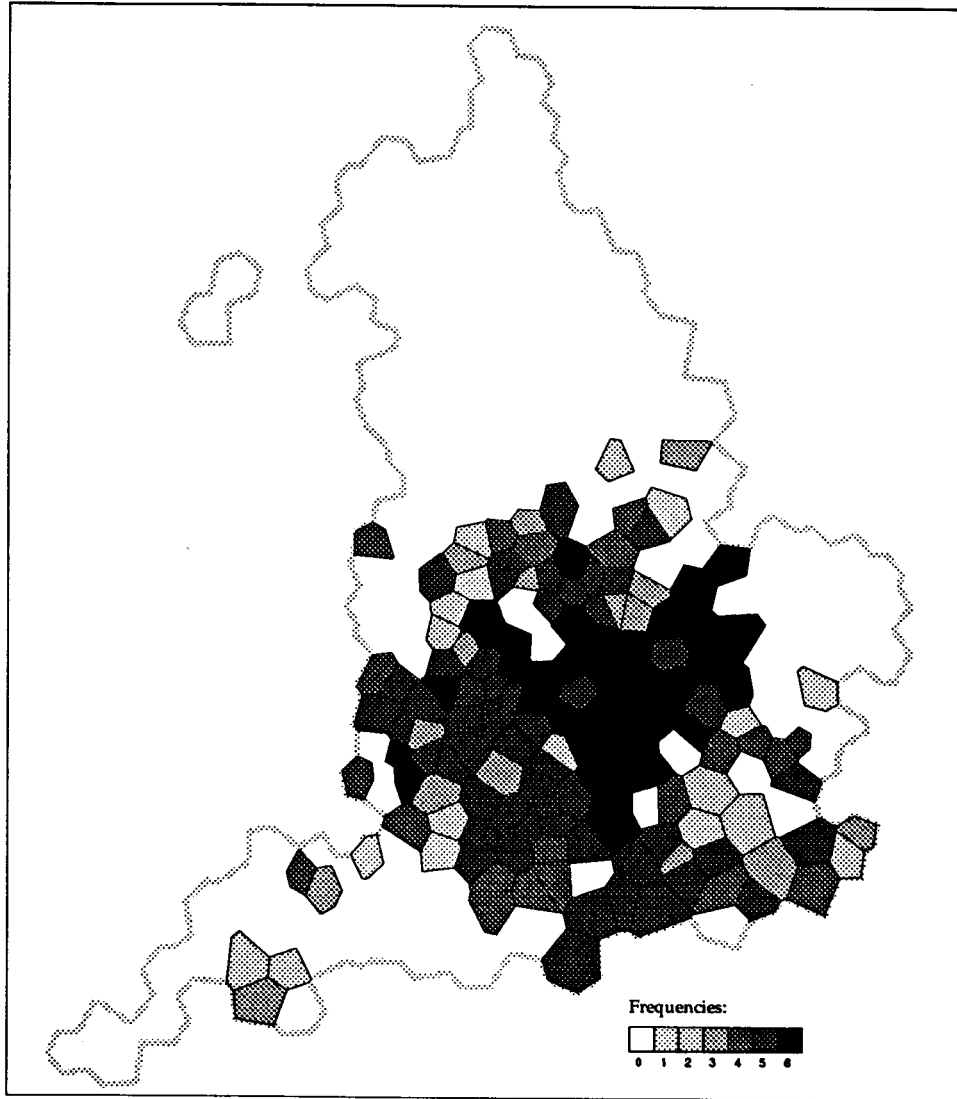
Figure 6: List of Forms

Figure 7. Disjunctive possessive *n* forms - honeycombs

Figure 8. Disjunctive possessive *n* forms - rays

hisn: M22*, Frequency: 91, Gravity centre: Wa6
hern: M23*, Frequency: 103, Gravity centre: O2
theirn: M24*, Frequency: 114, Gravity centre: O2
yourn: M22, Frequency: 85, Gravity centre: Bk1
yourn: M23, Frequency: 127, Gravity centre: O2
ourn: M24, Frequency: 117, Gravity centre: O2

Figure 9: List of Forms

REFERENCES

Händler, Harald – Wolfgang Viereck
    1997   "Selective dialectometry", in: Wolfgang Viereck – Heinrich Ramisch.
Viereck, Wolfgang
    1991   "Dialectological aspects", in: Wolfgang Viereck – Heinrich Ramisch, 3-9.
Viereck, Wolfgang – Heinrich Ramisch
    1991   *The Computer Developed Linguistic Atlas of England* 1. Tübingen: Niemeyer.
    1997   *The Computer Developed Linguistic Atlas of England* 2. Tübingen: Niemeyer.
Wakelin, Martyn F.
    1977   *English dialects: An introduction*. London: Athlone Press.