A Corpus-Based Methodology for Comparing and Evaluating Native and Non-Native Speaker Accents

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by

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Abstract

The methodology I have developed for my PhD thesis provides a way of using relational databases in order to store transcriptions of native and non-native speaker data and for capturing the differences between them statistically. The use of a relational database furthermore not only makes it possible to enrich the basic segmental annotation on different levels so as to include annotations of transitional or prosodic features – such as assimilatory processes, pauses, stress, pitch patterns, etc. – but also to keep the general architecture of the corpus open and easily expandable.

Comparing native and non-native speaker data makes it possible to create a kind of reference model from the native speaker realisations, rather than relying on the more abstract established teaching models, such as RP. Such a model may then be used to evaluate the performance of the non-native speakers realistically. This has implications both for spoken language teaching, as well as testing purposes.

Apart from its use for the evaluation of non-native speaker accents, the methodology can also easily be applied to the study of different native speaker accents, not only for purely linguistic research purposes, but also potentially in order to establish criteria that may be used to improve speech recognition and other language engineering technology.

The thesis in its final form contains a comprehensive description of the methodology and complete and partial implementations of the segmental and supra-segmental databases respectively, complemented by an in-depth analysis of primarily the segmental aspects of pronunciation.

The accompanying CD (Appendix D) contains the data in form of annotated .wav files, an online copy of the thesis that may be used to view the sample spectrograms in colour and play them back, and a copy of the freeware analysis program used to perform the phonetic analysis and annotation.

I hereby declare that all the research and writing carried out in creating this thesis was carried out by myself personally.

Lancaster, 15 May 2001

To my son Jin,

on whose first birthday this thesis

was finally submitted

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1. Introduction.

1.1. The General Aim

The original aim of my study was to find out what exactly is responsible for creating the effect of a German accent when Germans speak English and to try to find ways in which their competence in this area could potentially be improved. During the course of my analysis, however, its scope and focus began to shift more and more, for two different reasons.

The first reason was that I realised that what may be applied to a certain category of non-native speakers could – with a little adaptation – probably just as well be generalised and applied to all non-native speakers, and therefore be turned into a general methodology for analysing and evaluating non-native speaker performance. Furthermore, a suitable methodology for analysing differences between native and non-native speakers also ought to naturally lend itself to an analysis of native speakers accents, which often differ from the so-called standard accents in somewhat similar ways to non-native speaker accents, and their use may have similar implications as far as general acceptability is concerned. Applied to native speakers, such a methodology would then become extremely useful, not only for general dialectology and linguistics, but also to form the basis for research into variability for the design of speech recognition, speech synthesis or spoken language systems, the latter being bound to become increasingly common over the next decade or so.

The second reason was motivated by the fact that, although the data collected for the study contained a large amount of material in the form of individual realisations and their associated annotations, the overall rather low number of speakers – both native and non-native – would not allow me to arrive at any statistically valid conclusions concerning native and non-native speaker populations in general, but could at best indicate relatively important trends. In the end, I therefore concentrated more on

developing a solid, flexible and expandable methodology, rather than performing a truly comprehensive analysis of all the relevant aspects. The methodology itself – including its implementation in the form of multiple databases – is intended to provide a means to perform an analysis that is as objective as possible under the circumstances. In the case of an analysis such as mine, it can of course only be called relatively objective because, although I have taken great care in transcribing my data and being as consistent in my transcriptions as possible, there will be obvious limitations.

One of these limitations is that, as a non-native speaker, I may not be able to hear all the features that a native speaker would be able to pick up on and might be somewhat biased towards the non-native speakers in my analysis. However, according to my experience in teaching accents and dialects to native speakers of English, there is not necessarily a disadvantage in being a non-native speaker, as native speakers do not always seem to be very good at perceiving and describing nuances in their own mother tongue. Therefore the previous argument may almost become invalidated to some extent.

The factor, however, that could be seen as more of a problem with the analysis is that I may not have been able to always maintain consistency, as doing research on one's own does not allow for having the constant checks and feedback from other researchers that may be necessary to establish consistency and a higher degree of objectivity in the first place. Thus, subjectivity and an element of inconsistency will always be an issue in an analysis like mine, especially if there is a wealth of data to be handled and therefore not all occurrences can be verified by making recourse to an in-depth phonetic analysis based on acoustic parameters. On the other hand, as we shall see in the later chapters on analysis, even when consulting waveforms, spectrograms, etc., it will not always be 100% possible to verify or ascertain the presence or absence of particular phonetic features in the speech signal.

Contrary to most studies, which have so far mainly concentrated on features of pronunciation on the purely segmental level, I had also originally intended to place considerable emphasis on investigating features of intonation and cohesion because I believe that this is an area which has always been rather neglected in teaching students from a Germanic (and other backgrounds) how to speak English, at least in language classes taught by non-native speaker teachers. Judging from my own experience in German secondary education and also at University level, hardly any attempt is ever made to provide the learner with even a basic understanding of the importance of intonation, let alone that the intonational systems of English and German show marked differences at all.

Even at University – although of course there are basic courses in phonetics and some universities even offer courses in practical phonetics –, future teachers of English in Germany are not properly taught how to make effective use of intonational functions and the meanings conveyed by them. At most, intonation is treated in a very academic, theoretical and scholarly fashion without any practical context whatsoever.

Because of this resulting lack of awareness of the important role that intonation plays in everyday spoken language, most of the prospective teachers of English will also not be able to perceive any nuances in the use of intonation on the part of native speakers. This is not very surprising as, according to my own experience in teaching certain aspects of prosody, even native speakers have great difficulty in identifying those subtleties with any degree of accuracy. Nevertheless, at least the native speakers will always be able to tell that somebody ***is*** making use of prosody to convey some specific meaning, whereas this is in many cases completely lost on the non-native speaker, even if he or she is a teacher of English. Therefore, at least a minimal degree of awareness towards the functions that intonation can fulfil should be raised in the foreign learner.

To this extent, the implementation of my methodology goes at least some way towards implementing the means of establishing ways of identifying the differences in the use of suprasegmental features by native and non-native speakers, even though I have ultimately not been able to perform any in-depth analysis of either stress or intonation in the corpus due to the large amount of data to be handled. However, to some degree elements of prosody are incorporated into the analysis, too, in conjunction with the segmental analysis, where some issues of pausing and rhythm become apparent through segmental features such as final release or the absence of weak forms.

One further aim I developed during the course of my analysis was to provide relatively detailed descriptions of some of the pitfalls and problem areas involved in performing a computer-based analysis of speech. I believe that this is extremely important as most textbooks dealing with acoustic phonetics generally only present examples of 'picture-book segments', i.e. extremely clear examples of phonetic features, and tend not to point out areas where there are often grounds for confusion between different phenomena that may not be immediately obvious to the inexperienced researcher.

1.2. Raising Awareness

As a matter of fact, many prospective teachers of English in Germany and probably other countries have no idea of the diversity of the English language with respect to its many accents and dialects, a situation that strangely seems to be partly true for native speaker teachers as well (c.f. 2.2.1, below). Many prospective teachers have also hardly ever been exposed to any natural language outside the classroom – a situation that does unfortunately not seem to improve considerably during the course of their studies. Much of this is probably due to the still prevalent anachronistic attitude in uni-

versity circles that the study of a language is mainly the study of its history and literature, rather than actual contemporary usage[1].

The obvious problem arising from this is that if even teachers of English do not know how to speak in any but a rather 'stilted', artificial way, schoolchildren can hardly ever be exposed to any natural language at all, unless of course they might be so lucky as to participate in an exchange programme with a twin town in an English-speaking country. Even exposure to mass media such as films or television programmes in foreign languages, which is technologically quite possible nowadays, does not help in this context, as often (at least in Germany) this material tends to get dubbed into the learners' L1 and even specific language teaching programmes tend not to reflect current usage.

Cruttenden, in his 5th edition of Gimson's *Pronunciation of English*, defines the competence required of the teacher of English in the following way:

> "The foreign teacher of English constitutes a special case. He has the obligation of presenting his students with as faithful a model of English pronunciation as possible. In the first place, and particularly if he is dealing with young pupils, his students will imitate a bad pronunciation as exactly as they will a good one; and secondly, if he is using illustrative recorded material, his own pronunciation must not diverge markedly from the native model." (Cruttenden, '94: p. 273)

The first one of these two is a very important point, as particularly younger pupils are more liable to imitate the teacher and thus form habits that may not easily be corrected at a later stage in their learning; even more so since in recent years attempts have been made to introduce EFL into primary school classrooms in Germany, as well as at least some other European countries such as Greece. As far as the second point is

[1] This can easily be seen in the names of many university departments in Germany that teach English Language and Literature, which are commonly known as 'Institutes of English Philology', which illustrates the analogy with the study of classical philology, which is, by necessity, based upon written language.

concerned, the problem there seems to be one of defining the "native model" and also the fact that most of the "illustrative recorded material" used in the foreign language classroom will usually be outdated anyway.

Joanne Kenworthy similarly states that:

> "Learners who plan to become teachers of English will want to approximate a native accent and, depending on their future teaching situations, may want to be familiar with several of the major accents of English in the world." (Kenworthy, '87, p. 3).

Even though I would certainly agree with her on both points, this statement seems to somewhat over-optimistic considering the case that most prospective teachers of English are normally struggling to achieve the first of these two goals.

1.3. The Need for an Appropriate Reference Model

One of my aims in this study is therefore to devise a methodology that is suitable for extracting the most salient features out of the speech of a group of native speakers of a certain educational background and contrast them with commonly accepted ideas about the use and validity of RP as an appropriate teaching model. I believe that this approach is more realistic than simply comparing the speech of non-native speakers to

a) established teaching models, whatever their ideological and practical foundation may be, and

b) to a model of rhetorical capabilities often expected from non-native speakers that would be unreasonable to expect from any but the most educated professional native speakers.

The latter point is one that particularly comes up in the context of English language assessment, where learners are often, and I personally believe unfairly, assessed on their rhetorical skills in sustaining conversations and expressing complex ideas

coherently, even if they may not – and cannot always be expected to – necessarily have this ability in their own native language.

1.4. The Social Context Or Why Foreign Learners Should Need to Learn How to Speak 'Better'.

1.4.1. 'Who Needs It, Anyway?'

English as a foreign language has been taught in schools in most countries all over the world for quite a long time now, and always apparently quite successfully so. Its use as a language of commerce and communication – in a variety of aspects ranging from the political to the purely touristic – is generally accepted and, I believe, not without reason. Mainly because of its character as a non-inflective language, its basic SVO structure and the fact that it incorporates a large amount of vocabulary that constitutes part of the learned vocabulary in other languages, its fundamental grammar and vocabulary are rather easy to acquire and the foreign learner, whatever his or her purposes may be, can make him/herself somehow understood after a relatively short period of learning. This could be rather important in an area such as politics, and especially within the changing face of the European Union and general trends of globalisation, where communication between the members of individual countries is becoming increasingly important. Thus the emphasis that is being placed on learning English as opposed to learning and using other (European) languages whose basic grammatical structures are far more difficult to grasp, in this context, seems to be fully justified.[2]

[2] Nevertheless, this argument should certainly not be perceived as an argument for teaching English as the only foreign language in other European countries outside Britain, as being able to understand other languages and their ways of expressing concepts and ideas in a different manner is an important factor in establishing the general cultural understanding and acceptance that is needed for co-operation between the different member-states of the Union.

Another, albeit admittedly controversial, factor in advocating the use of English as an official language of world-wide communication is the fact that it has been widely used and established as such for a fairly long time, so that more or less everybody in the world has already been or will be exposed to it from a certain age onwards (usually very early through mass media, popular culture or consumer goods), so that there is at least a certain amount of passive knowledge present. In several European countries such as the Netherlands, Greece and some within Scandinavia, and indeed many other countries all over the world, this is even further facilitated by the availability of subtitled films in English on television, which can represent excellent learning tools. No matter how one might think about the ideological or commercial reasons as to why the English language has come to gain this status, this argument can be interpreted as something that is of possibly great advantage to the learner, who, instead of having to familiarise him- or herself with something absolutely new, can draw upon 'resources' that have been acquired outside the classroom.

However, the apparent ease of being able to learn the English language can also be very deceptive. Although the basic grammatical structure of the English language may be comparatively easy to acquire, many of the problems for foreign learners really arise from the fact that they lack awareness of the use of collocations and, even more importantly, intonation, which are two factors that are to a very large extent responsible for perceiving and conveying meaning. Thus, while a foreign speaker may actually have a rather good command of vocabulary and syntax and be able to pronounce the words of the language in a 'fairly English way', there will still remain lots of grounds for misunderstanding.

Therefore, I believe that it is not, as some textbooks like Cruttenden (^{5}1994) seem to claim, just a matter of making oneself 'somehow understood', but a question of communicating one's needs or the requirements of a situation. Cruttenden states that:

> "It must be admitted that the great majority of foreign learners will have a severely practical purpose for acquiring English and will perceive no important benefit in approaching the performance of the native speaker. Indeed, the learner may derive some advantage in retaining a clearly foreign image in his dealings with English speakers; e.g. the waiter or the taxi-driver, whose discourse with a native speaker is likely to be limited and stereotyped, is unlikely to progress beyond a level of basic intelligibility." (Cruttenden, '94: p. 273).

It seems hard to imagine any such group of learners who might actually need to use the language for such "a severely practical purpose" as opposed to those

> "[...] many learners who, for academic reasons or because their work requires them to deal on equal terms with native speakers in Britain or abroad or even as tourists, [will] wish to communicate easily without signalling too blatantly their foreign origin." (ibid.),

and for whom he sets more realistic target standards. We can therefore assume that the main target population of learners will have a very strong need to communicate as efficiently and intelligibly in order to achieve whatever aims they have set for themselves.

1.4.2. The Foreign Learner and the Issue of National Identity.

There somehow seems to be a basic misconception of the importance of the learner's needs and choice in this argument, too. Some people even use the argument that non-native speakers may not want to sound like native ones, as a means of preserving their own cultural identity and status. While this may well be the case for some learners who are particularly conscious of the image of their home-country they might want to convey, it often seems to be used as an excuse for not being able to achieve the covert aim of attaining a certain level of 'proficiency'.

Be that as it may, of course the learner cannot and should not be forced to give up his/her native accent if he/she does not want to do so, but on the other hand should be made aware of the fact that there may be a risk of mis-communication involved in not trying to master the target language to the best of one's abilities. The point I am here trying to make about mis-communication is not necessarily that a few mispronounced words here and there would make it absolutely impossible for the native speaker to understand the learner, which seems to be one that many language teachers seem to have in mind when they drill their students in the production of minimal pairs or talk about concepts such as intelligibility (Kenworthy, '87, p. 13ff), but that not being able to make certain distinctions a native speaker would make could lead to potential embarrassment. Thus imagine a tourist from one of the Southern European countries that is not renowned for employing British politeness formulae saying to a hotel receptionist "I want a [Sit]!"[3]. Not only could this potentially lead the receptionist to mistakenly direct the tourist towards the toilets, but even if it were understood correctly and pointed out, make both the receptionist and the tourist feel embarrassed or the latter begin to doubt his/her competence in communicating in English.

Thus it is not only politicians or business-people who are involved in important negotiations who need to be aware of the subtleties of the language, but also the common traveller who wants to enjoy the real cultural experience of communicating with native speakers.

1.4.3. Negative Attitudes towards Local and Foreign Accents.

However, another commonly overlooked factor is that speaking with a foreign accent is in some ways akin to speaking with certain types of local native-speaker accents. In every country, certain types of local accent are more and some less

[3] c.f. the similar example by Wells (1982, p. 84) about "[…] the Londoner […] who, invited back for coffee by a visiting American, upset him by accepting the invitation [ÆÃp j ur ÈQ«s], sc. *up (at) your house*.", where a similar kind of miscommunication occurs between speakers of what is often referred to as the same language.

prestigious than others. In Britain, it is mostly urban accents, such as Cockney, Scouse, Brummy, Geordie or Glaswegian, that are often perceived as particularly lazy or ugly, and their speakers as being 'lower class' and 'thick'. On the other hand, the so-called standard accents (Wells, '82, p. 34ff), like RP or General American, are often seen as more beautiful and characterising their speakers as being more intelligent. But this kind of social prestige or acceptance can also be reversed. Very often speakers of the urban accents mentioned above tend to look upon speakers of RP – or, to be more exact, speakers of what they themselves perceive to be RP – as being posh and snobbish, and it may therefore not be ideal for foreign learners to speak RP if they should plan to travel around those areas. Furthermore, the influence of television programmes, such as Eastenders and Brookside, can raise the acceptance level towards some urban accents, so that they may even reach a relatively higher status as people's familiarity with them increases.

Thus, in some ways, negative reactions towards or outright stigmatisation of certain accents seem to be linked to some extent to the level of exposure one has to them. The less exposure there is, the more the likelihood of rejecting an accent as being ugly seems to rise, just because it strikes the listener as being different. Joanne Kenworthy, in her textbook on teaching the pronunciation of English, quite rightly points out that familiarity with an accent is a major factor in native speakers' understanding one another:

> "We can also make a comparison with the various regional accents of English – a Cockney and a Scot from Glasgow may have a great deal of trouble understanding each other, until they get used to each other's accents." (Kenworthy, '87, p. 15).

If we accept the above concept as being true, we then need to think further about the reasons for accents appearing different and unfamiliar. Is there just one single level that is responsible for creating this 'foreign' effect? Are there instead a number of different levels that work independently of one another? Or are there a number of diffe-

rent levels that work together to achieve this effect? Very often it seems to be the case that the latter is true, i.e. that it is not only due to segmental, but also suprasegmental features, that someone's accent leaves a strange impression on a listener. For example, during seminars discussing issues on the evaluation and assessment of foreign learners, one invariably tends to hear stereotypes such as "Germans sound aggressive.", "Greeks are impolite.", etc. A former student of mine who was writing an assignment on Japanese English and had interviewed a few of his fellow students on their perception of Japanese students' English was even told something along the lines of "They sound so boring. We don't want to talk to them anymore.". When questioned further about the topic, they often answered that this was only partly due to pronunciation problems, but rather to an odd rhythm and lack of intonation.

1.4.4. Implications.

Returning to my previous argument about the social and political implications of globalisation, it should be easy to see that there will also be an increasing number of learners with an even more specific need of mastering English as a means of real and effective communication caused by increasing social mobility in the world, mainly those who come to Britain and other English-speaking to live and work, but also those who move to any non-English-speaking countries and will need to use English as their initial means of communication before they can acquire the language of this country.

Furthermore, foreign learners who want to be able to communicate effectively should at least be aware of all the implications of what it means to, to use a colloquial Scouse expression, 'get up people's noses' when speaking with an accent that either cannot easily be understood by the majority of the population in their host country or that simply sounds odd because it does not conform with any accent that native speakers will at least be familiar with. An awareness of this kind of problems may then form an incentive to improve one's speaking abilities.

2. The Evaluation of Non-Native Speaker Performance.

In the following chapter, I shall try to present some preliminary and tentative criteria for evaluating the performance of non-native speakers of English. Evaluation of this kind has so far more or less been the domain of Language Testing and ELT practice, but the criteria developed in those domains for the evaluation of spoken language as yet show considerable weaknesses as most of them are almost purely impressionistic. I will begin by discussing relevant textbooks in both areas and, during the process, attempt to dispel some of the more common myths about the kind of pronunciation and rhetorical skill often expected from non-native speakers. Having pointed out where the most serious conceptual problems lie, I shall then try to come up with an improved general framework for handling the speech of learners that is both realistic and fair, as well as aiming at greater objectivity. This framework itself will then be expanded upon in the light of my analyses in later chapters.

2.1. Assessment Criteria in Language Testing.

Criteria for the assessment of spoken language in the domain of Language Testing are not very highly developed, although testing is an area of research that normally prides itself on its objectivity[4]. According to Heaton

> "Testing the ability to speak is a most important aspect of language testing. However, at all stages beyond the elementary levels of mimicry and repetition it is an extremely difficult skill to test, as it is far too complex a skill to permit any reliable analysis to be made for the purpose of objective testing. Questions relating to the criteria for measuring the speaking skills and to the weighting given to such components as correct pronunciation remain largely unanswered." (Heaton, '75, p.88).

[4] N.B.: This section could have been subtitled "… or why someone has to come up with a few valid and reliable criteria."

As Heaton's book from which this text is taken was first published in 1975, one would assume that in the interim period, attempts may have been made to answer those very questions, but even if they have, the answers are still not there. I assume that this is due to three of the major constraints involved in the development and implementation of language tests, time, knowledge and money:

> "There are enormous practical constraints on the large-scale testing of spoken language proficiency. These include administrative costs and difficulties and the sheer logistics of testing large numbers of candidates either individually or in small groups." (Weir, '93, p.40).

Spoken language 'proficiency', as it was expressed in Heaton's earlier quotation, is far more difficult to assess than written language skills because it involves a combination of many features that would normally be assessed individually, such as knowledge of grammar, comprehension of the structure of the language, cultural/idiomatic elements, etc., and is of a far more volatile nature than written communication. Thus a great amount of effort has been put into developing methodologies that enable the assessor to elicit information about the more 'rhetorical' aspects of the learner's competence, to the exclusion of hard and fast categories for the assessment of basic features of pronunciation. Therefore the current approach in language testing resembles more a top-down approach that tries to capture higher-level features, rather than a bottom-up approach that attempts to resolve what it is that may make certain learners more difficult to understand than others.

The very nature of this top-down approach, coupled with the above mentioned constraints, therefore encourages the assessor to conflate low-level features that should technically be assessed separately, and leads to the establishment of impressionistic rating categories like *fluency*, *accuracy*, *comprehensibility* and *appropriateness*, as I shall try to illustrate below.

The following table is taken from Heaton (Heaton, '75: p. 100) and represents an example of a possible rating scale according to which a teacher may assess students at the lower intermediate level. Highlighting is provided by me to draw attention to certain relevant criteria.

	Accuracy	**Fluency**	**Comprehensibility**
6	Pronunciation is only very slightly influenced by the mother tongue. Two or three minor grammatical and lexical errors.	Speaks without too great an effort with a fairly wide range of expression. Searches for words occasionally but only one or two **unnatural pauses**.	Easy for the listener to understand the speaker's **intention** and **general meaning**. Very few interruptions or clarifications required.
5	Pronunciation is slightly influenced by the mother tongue. A few minor grammatical and lexical errors but most utterances are correct.	Has to make an effort at times to search for words. Nevertheless, smooth delivery on the whole and only a few **unnatural pauses**.	The speaker's **intention** and **general meaning** are fairly clear. A few interruptions by the listener for the sake of clarification are necessary.
4	Pronunciation is still moderately influenced by the mother-tongue but no serious **phonological errors**. A few grammatical and lexical errors, but only one or two major **errors causing confusion**.	Although he has to make an effort and search for words, there are not too many **unnatural pauses**. Fairly smooth delivery mostly. Occasionally fragmentary but succeeds in conveying the **general meaning**. Fair range of expression.	Most of what the speaker says is easy to follow. His **intention** is always clear but several interruptions are necessary to help him to convey the message or to seek clarification.
3	Pronunciation is influenced by the mother-tongue but only a few serious **phonological errors**. Several grammatical and lexical errors, some of which cause confusion.	Has to make an effort for much of the time. Often has to search for the **desired meaning**. Rather **halting delivery** and fragmentary. Range of expression often limited.	The listener can understand a lot of what is said, but he must constantly seek clarification. Cannot understand many of the speaker's more complex or longer sentences.
2	Pronunciation seriously influenced by the mother tongue with **errors causing a breakdown in communication**. Many 'basic' grammatical and lexical errors.	Long pauses while he searches for the **desired meaning**. Frequently fragmentary and **halting delivery**. Almost gives up making an effort at times. Limited range of expression.	Only small bits (usually short sentences and phrases) can be understood - and then with considerable effort by someone who is used to listening to the speaker.
1	**Serious pronunciation errors** as well as many 'basic' grammatical and lexical errors. No evidence of having mastered any of the language skills and areas practised in the course.	Full of **long and unnatural pauses**. Very **halting** and fragmentary **delivery**. At times gives up making an effort. Very limited range of expression.	Hardly anything of what is said can be understood. Even when the listener makes a great effort or interrupts, the speaker is unable to clarify anything he seems to have said.

Table 1: Heaton's example of a teacher's rating scale for the lower intermediate level.

It is obvious from this example where the problems with such an approach lie. First of all, the list of criteria in this table is far too complex to bear in mind while trying to assess a student's performance in an interview situation. It is difficult enough to concentrate on some of the criteria all of the time, but near impossible to keep track of all of them, even if the interviewer him/herself is not actually the one who is doing the assessment. Thus it would be at least strongly advisable to do the evaluation of the interview in (minimally) two or three stages, instead of trying to conduct a 'real-time' analysis. However, this is not necessarily current practice as many interviews are still not being recorded.

Furthermore, most of the above categories are not at all clear-cut and analytic, and some of them are even conflated. For example, the criterion of being able to *convey meaning* appears both under the headings of "fluency" and "comprehensibility" and is at the same time not clearly distinguished from that of *conveying intention*, which is, at least, only subsumed under comprehensibility. It is, to say the least, arguable whether conveying meaning could ever be regarded as a feature of "fluency", as the latter is probably in general understood to refer to the presence or absence of features of cohesion[5] and the style of delivery. The very category of *fluency* is, in itself, highly disputable as it represents a purely impressionistic category, based on the subjective evaluation of the assessor as to what constitutes an appropriate rate of delivery, number of hesitations and pauses for a given speaker. Heaton, for example, in the above table refers to "unnatural pauses", yet it is very difficult to say what actually constitutes an unnatural pause. The common conception seems to be that it is a pause of perhaps half a second, or a second, while the speaker is trying to prepare the next utterance or is trying to find an appropriate wording for a response. If this is taken to be the case, then probably many competent and even rhetorically skilled speakers like teachers and lecturers may be regarded as non-fluent speakers as they might at times

[5] I understand cohesion with respect to spoken language to refer to such features as the use of intonation, accentuation and deaccentuation in order to relate different parts of a spoken text to one another.

find it necessary to pause for such a time in order to find an appropriate and exact expression that will make their explanations as concise and easy to understand for the listener as possible. However, whereas in a skilled speaker this kind of structural device would probably be interpreted as a communication management device, the learner in an interview situation may, by an assessor who has potentially had little formally training, be judged as being 'non-fluent'. To be fair, some of the more recent textbooks about language testing practice, like Weir (1993), do tend to stress that communication management strategies, which are referred to under the headings of "routine" (p. 41) and "improvisational skills" (p. 42) represent an important part of spoken language, but nevertheless do not give any concrete advice on how to deal with them. Weir admits that

> "Given that our understanding of the continuum of proficiency in speaking is currently limited, we might be better served for the moment by analytical scales where assessments are made in terms of each criterion separately." (Weir, '93: p. 45),

and gives an example of a table containing a list of "criteria of assessment" (Weir, '93: p. 43/44) containing a band of four descriptors each, comprising the categories of "Appropriateness", "Adequacy of vocabulary for purpose", "Grammatical accuracy", "Intelligibility", "Fluency", and "Relevance and adequacy of content", which are nevertheless sometimes more appropriate for the assessment of written language skills. For example, his category of "Fluency" specifies "Signs of developing attempts at using cohesive devices, *especially conjunctions*. Utterances may still be hesitant, but are gaining in coherence, *speed* and *length*.", in one band, or, "Inter-sentential connectors are used effectively as *fillers*", [my italics] in another. Those criteria still show some misunderstanding of the basic nature of spoken interaction as the latter is normally characterised by fairly short sentences with a rather low degree of syntactic complexity, unless, of course, we are dealing with more academic genres, which are

obviously quite distinct from ordinary everyday spoken interaction[6]. Furthermore "Inter-sentential connectors" can hardly be categorised as "fillers" as the latter are normally defined as phatic devices like particles, such as *well* or hesitation markers (in its neutral sense) such as the one commonly (and sometimes canonically) transliterated *e(r)m*.

To sum up, while techniques for eliciting fairly natural language in the assessment of spoken language are highly developed, most of the evaluation 'criteria' and procedures so far established and implemented are too non-descript, difficult to handle, highly inaccurate and non-quantifiable. Many of them represent more of an attempt to test rhetorical skills which can probably in many cases not be learned in the language classroom and may depend highly on the individual speaker's personality. Objective measures to evaluate spoken interaction in 'real life situations' based on basic phonetic criteria are almost non-existent, even though the nature of spoken language is supposedly taken into account.

Therefore some basic and realistic criteria that may help to develop a framework for a bottom-up analysis and evaluation of the spoken language performance of non-native speakers, which I shall attempt to set from section 2.3, are desperately needed.

2.2. Assessment Criteria in EFL Textbooks.

In this section, I will discuss the way that textbooks in English Language Teaching (EFL) deal with categorising and assessing the performance and level of non-native speakers, and whether the concepts used in EFL teaching are any more realistic than the ones employed in language testing. Out of a large variety of textbooks available in the area, I have picked two that I consider quite exemplary of the genre. They are Kenworthy, '87, which seems to be one of the most influential textbooks of this kind

[6] However, this is not to say that a minimal set of coordinating conjunctions like *and, but*, etc. does not have to be present even in basic spoken interaction.

in Britain, and Pennington, ‘96, which partly draws on the former and claims to approach the subject “[…] from a variationist, accent-neutral and international point of view, explicitly comparing the major varieties of English around the world and using a system of transcription which is relatively generic.” (Pennington, ‘96, p. xvi).

2.2.1. Kenworthy: Teaching English Pronunciation.

Kenworthy’s strategy for teaching the pronunciation of English is based on the notion of achieving “intelligibility”, rather than native-speaker like pronunciation. She claims that:

> “Speaking with a foreign accent is only a ‘problem’ if it leads to a breakdown in communication.” (Kenworthy, ‘87, p. 12),

and makes an attempt to grade pronunciation problems according to their severity. However, as we have already seen in section 1.4, this cannot necessarily be taken at face value. Her grades are “*high priority*” for problems that are “vital for intelligibility”, “*low priority*” for those that “do not affect intelligibility” and those that “can be given *optional attention*” (Kenworthy, ‘87, p.123). The latter are assumed not to cause problems because:

> “1 native listeners are generally used to these features of foreign accents, or
> 2 there are regional accents or varieties of English that use the particular feature so it is familiar to English ears, or
> 3 the feature is ‘close enough’ to the native feature ([...]), or
> 4 relatively few words are kept apart by the feature or sound.” (ibid.)

However, if we analyse or test her definitions for the different levels of priority with regard to their implications, a somewhat strange picture might arise. I shall perform this comparison based on Kenworthy’s list of features of problems for German learners, starting with some of the high priority problems in segmental productions.

One of the high priority issues according to Kenworthy is what we may call *final fortition* (Germ. *Auslautverhärtung*), a feature that is generally said to occur in final plosives in German, although, at least according to my experience and my own pronunciation, it may only occur in the standard and northern accents. Kenworthy claims that this is a problem in the pronunciation of words like *bag*, which may be realised by German speakers as [bQk]. Assuming that this could really lead to serious problems of misunderstanding, for example potentially in a phrase like "It's in the bag." vs. "It's in the back.", I would claim that this kind of problem will only ever occur in very few cases and then only at the end of a tone or utterance group. In other words, in relatively few cases would there actually be the potential for causing any misunderstandings at all and often the context will probably disambiguate this kind of mispronunciation anyway, so that we would actually end up with one of Kenworthy's optional attention features, rather than a high priority one. This claim can be further substantiated by the fact that final fortition, at least in non-final phrase/utterance position, does also occur in at least one native British accent, i.e. in Yorkshire English, in a phenomenon generally known as "Yorkshire assimilation" (Wells, '82, p. 366), where the final voiced plosive in a word is influenced by a following voiceless obstruent at the beginning of the next. This would then tie in with criterion number 2 for optional attention features, i.e. the occurrence of a particular feature in a variety of English.[7]

The same, only to a far larger extent, would then apply to the 'high priority problem' of there being no /Ã/ in German. If occurrence of a feature in a regional variant makes a feature an optional attention one, why should foreign learners have to learn how to produce this particular sound in the first place if a very high percentage of the British population uses an /U/ instead and does not have the /Ã/ in its inventory, either? Presu-

[7] A similar case might be made for the non-aspiration of otherwise voiceless initial plosives that may occur with my Franconian speakers, which is also found in some Yorkshire accents. However, the main difference between Franconian and Yorkshire here is that generally in Franconian voiced and voiceless/aspirated plosives tend to be confused, whereas in Yorkshire accents, non-aspiration is restricted to initial positions (c.f. Wells, '82, p. 370)

mably only if one strictly adhered to the ideology that the only form of representative British English is some form of Southern English.

Similar arguments would apply to most of the other vocalic features Kenworthy sees as high priority items, namely her claim that the diphthongs /eI/ and /oU/ (the latter presumably standing for RP /«U/) tend to be realised as long monophthongs, and that German speakers tend to confuse /a/ (presumably standing for RP /Q/) and /E/ (presumably standing for RP /e/). As far as the former is concerned, this would again have to be relegated to the level of *optional attention* as it is still a highly common feature in many Northern accents. The latter could well fall somewhere between categories 2 and 3 as younger British speakers, and especially those from the North-West, do often realise the /e/ phoneme with a very open quality [E] that could easily be confused with an [Q].

Bearing in mind that many of the problems on the segmental level mentioned by Kenworthy would – even according to her own classification scheme – not really present any problems, why is it then that we do get comments like the ones described in 1.4.3? The concept of similarity to a native accent on the segmental level, at least not with respect to most of the features she has isolated, clearly does not seem to be a very useful one.

A more useful way of approaching the problem would then be to think of it being either due to segmental level features Kenworthy did not identify because she possibly concentrated only on the most obvious ones, or to assume that suprasegmental features play a far greater role in the perception of an accent as being a foreign one. Kenworthy herself realises that:

> "In general, the areas of rhythm, word stress and sentence stress are *high priority* areas for *all learners.*" (Kenworthy, '87, 123),

but does not really want to commit herself to giving any priorities for intonation and consigns herself to pointing out "potential 'trouble spots'" (ibid) for learners of individual languages.

We shall see in the analysis sections further on whether the German speakers' pronunciation patterns actually exhibit any of the problem areas pointed out by Kenworthy in her section on German (Kenworthy, '87, pp. 136-138).

2.2.2. Pennington: Phonology in English Language Teaching.

In her introduction to the book, Pennington claims that:

> "The course examines phonology from a variationist, accent-neutral and international point of view, explicitly comparing the major varieties of English around the world and using as system of description and transcription which is relatively generic. The book is therefore usable in non-English speaking as well as English speaking countries." (Pennington, '96, p. xvi)

In reality, however, her approach cannot really be termed "variationist" because otherwise she would exhibit a better understanding of the situation regarding accents of English in Britain and other countries. This lack of knowledge is exemplified throughout the book, e.g. by her remarks on the prestige of accents:

> "Nowadays, a certain reverse-prestige or new prestige is coming to be associated with the non-RP accents of the major urban centers such as Liverpool and Manchester, which are establishing their own unique and positive identities at home and abroad." (Pennington, '96, p. 14)

While it is undoubtedly true that Scouse has become increasingly popular and accepted as a sort of quaint and funny accent that people on Brookside speak, one can clearly not speak of Manchester having a "unique" and "positive" identity, mainly because

there is no such thing as a uniform Manchester accent that could convey such an identity. Without some kind of in-depth knowledge of the particular accents represented in a particular country, it may therefore be regarded as slightly presumptuous to follow the variationist attitude.

This lack of intimate knowledge can also be seen in her remarks on l-vocalisation, where she describes Londoners (amongst others) saying [hEoUp|] for *help* and [sEoU] for *sell* respectively, and rather absurdly claims that the Bristol *l* may be a phenomenon that is possibly related to l-vocalisation. (Pennington, '96, p. 69)

Pennington also very laudably, but perhaps a touch unrealistically claims that "Consistent with the variationist philosophy of this book, it is advocated that learners be provided with multiple models of English phonology and that they be actively involved in deciding what they will learn and in developing their own learning process." (Pennington, '96, p. 17), but it is difficult to see how this can really be achieved by teachers who are largely untrained in recognising variation themselves, especially if even the author of the book that is supposed to teach them how to do this is not sufficiently qualified to understand the real difference between different variants.

A further minor factor demonstrating that the variationist approach may not be implemented quite as far as the author claims is the fact that she does not use the regular set of IPA symbols in her transcription, but rather an American set, including symbols such as [sɹ] for a voiceless palato-alveolar fricative. This already automatically makes the book less usable in an international context. The same problem applies to her general description of consonants, where she illustrates the potential complexity of consonant clusters using a host of rhotic examples that would not be applicable to

many accents of English at all, without duly pointing out the difference, but instead simply refers to them as "cluster types in English" (Pennington, '96, p.37).

A further claim made by Pennington about her textbook is:

> "The coverage of the book offers language teachers and other interested readers the background and experience necessary for:
> (a) assessing student's pronunciation and related aspects of listening proficiency […]" (Pennington, '96, p. xvii)

Whether a book like this can actually achieve this is questionable as, apart from the obvious problems Pennington has with describing the different types of English, her ability to make exact phonetic descriptions is also seriously lacking, as can be seen from the following passage discussing the assimilatory effects of the prefix *in-*:

> "In the case of words beginning with *m*, *r* and *l*, the initial sound of the adjective was fully matched, i.e. *assimilated*, by the prefix *in-*. In the case of words beginning with *p* or *b*, the *assimilation* – i.e. the match between the initial sound of the adjective and the final sound of the prefix – was only partial [sic]." (Pennington, '96, p. 27)

and also from her confusion of elision as a process that facilitates pronunciation with the complete elision (deletion) of whole words :

> "In fact, it is common in English to **elide** individual words, i.e. to run words together [sic], in casual, non-emphatic speech" (ibid.).

Even straightforward descriptions of some of the consonants of English are sometimes flawed to a certain degree. So, for example, she describes the sounds commonly referred to by their phonetic symbols as *eth* and *theta* as being interdental in English, whereas in most varieties they are actually realised as 'pure' dental consonants, i.e.

with the tongue against the back of the upper teeth, rather than between both rows of teeth.

She also tends to describe rather unusual phenomena as if they were regular features of varieties of English, such as for example *denasalisation*:

> "Under the influence of a following non-nasal consonant, a nasal may lose its nasal characteristic, i.e. be produced with a raised velum, so that air escapes through the mouth instead of the nose. When this happens, the nasal is said to undergo a process of **denasalization**, whereby, for example, *hand* and *had* become homophonous."
> (Pennington, '96, p. 55-56)

First of all, at least to my knowledge, this kind of denasalisation effect is not a general feature of any accent of English, but more commonly associated with the effects of a cold. Secondly, it is quite doubtful whether it may represent a coarticulatory effect at all because nasality in English tends to have a persistent effect, which seems to override oral articulation, rather than the other way round. In a book meant to provide teachers with elementary knowledge about the processes of connected speech for teaching purposes, such an isolated and rare phenomenon is therefore quite out of place and can potentially even be more confusing than useful. Furthermore, it actually seems to me that, judging from the example Pennington gives, she may simply be misinterpreting a realisation of *hand* where there is no separate nasal segment present, but instead the preceding vowel may be realised as a nasal vowel, i.e. [hQ̃d], a feature which is not uncommon in many American accents. There are also numerous further examples of this type of inaccuracy, but the ones I have given so far probably serve as sufficient example of the overall scholarly quality of the book.

The exercises she uses in order to improve "Breath control" (Pennington, '96, p. 33f) are at least partially of dubious value because some of them seem to assume that English is spoken either in longer "breath groups" or that its vowels and consonants have to be produced with greater clarity of enunciation than a speaker's L1. Rather than actually improving the student's pronunciation, these exercises seem to be designed to improve rhetorical skills, which is not necessarily the most important part of teaching the language.

Another reason why I believe that the textbook cannot achieve its explicit aim of providing the reader with the skill of "assessing student's pronunciation and related aspects of listening proficiency " is that Pennington herself does not provide any adequate methodology for even deciding what constitutes a foreign accent, but simply states that:

> "The difficulty of defining 'foreign accent' is an important point which has largely been overlooked by scholars and which is related to the difficulty of defining terms such as **language**, **dialect**, and the like. In spite of these problems of definition, we can see that a great variety of explanations for 'foreign accents' has been put forth in the literature on first and second language learning […]." (Pennington, '96, p. 7)

However, she herself makes no attempts at discussing the results of these explanations, let alone any attempt at setting up her own definition. In other words, she is working in a vacuum and what little guidelines she gives for a "Hierarchical analysis of student pronunciation" (Pennington, '96, p. 253ff) is relegated to an appendix which contains more commonplaces than actually useful suggestions as to how to determine and categorise pronunciation problems a learner might have. Instead, most of the book is dedicated to, as pointed out before, relatively unqualified and

potentially confusing discussions of supposed native speaker pronunciation phenomena.

2.3. Defining a More Realistic Norm.

2.3.1. General Criteria.

As far as more general criteria for the evaluation of spoken language performance are concerned, we need to distinguish between two different levels. These levels may also be interpreted as different levels of 'error gravity'.

The first, and more serious one, concerns those phenomena produced by the non-native speaker that can cause serious problems and may at its worst lead to or represent a breakdown in communication. This type of error can basically cause misunderstanding or misinterpretation of various degrees on the part of the listener because the speaker has mispronounced something.

The second, slightly less serious, level relates to those utterances of the speaker that may appear unnatural to the listener and thus cause irritation on his or her part. Although errors on this level undoubtedly do not normally lead to a breakdown in communication, it cannot be foreseen what kind of an effect it may have on the listener. In the worst case, however, this could lead to prejudice or non-acceptance of the speaker as already outlined in 1.4.2 above.

However, both types of error may produce similar effects in the listener, i.e. cause different degrees of non-acceptance towards the speaker, e.g. either an immediate refusal to communicate with the speaker if the listener considers him/her far too difficult to understand or a gradual distancing due to increasing annoyance or unwillingness to make an effort.

2.3.2. Specific Criteria.

On a more specific level, we can find certain error features like mispronunciation, ellipses, hesitation, etc., which I shall outline and explain in a little more detail in the following paragraphs.

a) Mispronunciation: Wrong realisation, erratic placement of stress or assimilation may create different meaning from the one intended by the speaker. In the worst case, this may lead to genuine misunderstanding, whereas in most cases the context will resolve phenomena like inappropriate placement of stress, e.g. using the stress pattern for a noun instead of a verb in those cases where nouns and verbs are homographs (e.g. *insult*, *export*, etc.). The latter is a very common error produced by all learners of foreign languages and thus represents one of the more obvious criteria to look for. However, this issue is often overrated and textbooks on EFL mostly tend to ignore the fact that within utterance chunks or phrases, especially as their complexity grows, stress may shift to accommodate to a more regularised pattern (cf. Knowles, 1987: p. 124 ff).

b) Epentheses: Vowels added at the end of words ending in consonants may give the impression of an indefinite article following the word where none would be expected. This phenomenon is very often caused by the learner's native language having a particular syllabic structure that does not allow for a syllable to end in a consonant, as in Japanese or Korean. When speakers of those or similar languages insert epenthetic vowels, this may create the impression of hesitation, even if none is present and thus 'disturb' speech rhythm/flow or make it difficult for the listener to follow the argument. However, it should not seriously hinder communication, and complete misunderstanding or actual breakdown of communication are unlikely to be caused by this phenomenon. Epenthetic vowels within the word may be more of a cause of misunderstan-

ding than word-final ones as they may actually turn one word into another. Cruttenden ([5]1994: p. 223) cites the example of *sport* being realised as [sˈpɔːt] and thus easily confused with *support*. In general though, epentheses represent a feature that is more common with speakers of romance languages within Europe, Arabic speakers and speakers of the aforementioned Asian languages, and therefore is fairly unlikely to affect any of my German informants.

c) Ellipses: dropping of final plural 's' may cause misunderstanding, but – on the other hand – is also very widespread amongst native speakers in certain contexts, e.g. in expressions of measurement, such as *three pound*, etc. where there is a certain degree of redundancy established by the number already expressing plurality.

Elision of single or multiple phonemes in other positions may change words, so that the overall utterance has a different meaning

d) Reduction of Vowels: normally unreduced vowels are reduced. Word stress may be lost and words may become unintelligible or difficult to understand

e) Non-reduction of Vowels: normally reduced vowels are unreduced. May lead to unnaturalness.

f) Hesitation: natural (native speaker-like) vs. unnatural (possibly caused by lack of appropriate vocabulary), e.g. pauses/fillers which do not serve the purpose of structuring the utterance

g) Rhythm: unnatural staccato caused by overabundance of stresses/failure to deaccentuate, thus possibly causing exaggerated emphasis and misleading focus (c.f. 3.1.2 below)

unnatural staccato caused by creating too many tone groups, thus possibly splitting units of sense

elision of too many phonemes, leading to 'overassimilation' and possible unintelligibility

h) Vowel quality: use of different vowel qualities in certain environments may cause some misunderstanding, e.g. failure to make a distinction between singular and plural in *man* vs. *men*, etc.

The difficulty still remains to rank these criteria in any specific order, e.g. to set up a scale of error gravity or unnaturalness, so that it will be possible to rate the performance of any given speaker as objectively as possible.

3. Previous Research in this Area.

In the following sections, I shall give an outline of some of the more scholarly research previously carried out in the area I am working in and which has given me some of the main ideas on how to establish the methodology used for my own research. Working in this field of research basically involves dealing with two separate disciplines, that of research into the second language (L2) acquisition of English by speakers/learners, in the case of my informants coming from a Germanic background, and that of general applied phonetics in English. I shall therefore first discuss those books and articles dealing with the issue of how research into the former can and has been carried out and then go on to describe some of the most recent approaches in phonetics. I will therein sometimes only give a brief sketch of some of the issues as many of them need to be discussed in more detail in conjunction with the actual methodology devised for my study, which will be outlined in chapter 4.

3.1. Previous Research in Second Language (L2) Acquisition of English by Speakers/Learners from a German-speaking Background.

In recent years, a major part of the empirically orientated studies into this area has been carried out by researchers at Austrian Universities. Below, I shall present some of those that have been of relevance to my own research, discussing the advantages and drawbacks of the methodologies devised and used by them, and trying to point out how they have influenced my own approach.

3.1.1. Wieden/Nemser: “Compiling a Database on Regional Features in Austrian-German English”.

The database set up by Wilfried Wieden and William Nemser is - to my knowledge - the first ever database to be created in order to analyse what mistakes non-native speakers of English from a specific country (/region within that country) make when trying

to speak[8] English. In contrast to the database I have set up, however, it is mainly geared towards analysing vowel and consonant qualities produced by the informants and not necessarily intonation or stress/deixis (, or fluency[9]), although according to the definition of the project, the latter aspects could well be included:

> "The aim of the project is first of all to test current hypotheses on second language (L2) phonological acquisition, e.g. the role of regional and social mother tongue (L1) varieties as transfer sources for Austrian learners of English, universal constraints, types of development, the role of such factors as motivation, aptitude, teaching methods, etc." (Wieden/Nemser, '91: p. 350)

Another major difference between the Austrian database approach and mine is the age and proficiency level of the informants involved in the experiment. This – of course – represents a reflection of the aim of the individual study. Whereas Wieden and Nemser choose to try and trace the progress Austrian schoolchildren make in their acquisition of English as a foreign language from when they first start learning English to their final year in secondary education (Wieden/Nemser, '91: p. 351), my German informants are all young adults who are or have been studying English at University level, most of them intending to become teachers[10].

Furthermore, there are also major differences between the 'Austrian database' and mine as far as their design and implementation are concerned. Wieden/Nemser use a non-relational (flatfile-/spreadsheet-like) database, based on the structural features of SPSS-X, running on the mainframe operating system VMS. My database, on the other

[8] Text corpora that aim to study the mistakes that foreign learners make in their writing have also recently come into existence. One of the most notable amongst them is the Learner Corpus that is currently being developed at the Université Catholique de Louvain, Belgium (see Granger, 1998).

[9] I here understand the term fluency as being able to verbally convey one's ideas in a coherent manner, i.e. pausing in the appropriate places to direct the listener's attention, making use of appropriate fillers where the speaker is searching for the right expressions and using intonational means to place emphasis on important aspects of the utterance.

[10] For some of the implications concerning the age of the learners, see chapter 4.

hand, is organised according to a relational system, which makes it easier to link information contained in different tables and at the same time reduces the kind of redundancy that sometimes occurs in a flatfile database.

Bearing in mind that the Austrian database project began in 1984, it is easy to understand why a mainframe-based analysis tool was chosen because at that time Windows systems were not reliable enough for this kind of analysis and the first version of SPSS for Windows did not appear on the market until sometime around 1989. Nowadays, however, it should no longer be necessary to have to rely on mainframe computers, which are, after all, much more complicated to operate and often require the help of 'expert computing people', which a) is sometimes not easy to get and b) does not allow the researcher to work independently.

One of the reasons for setting up my database under the *Windows 9x/NT* operating system(s) was not only to make my work as 'comfortable' as possible, but also to show that one does not have to rely on a Unix or mainframe environment in order to do efficient computing for linguistic and phonetic purposes. By using commonly accessible, 'everyday' programs like *Microsoft Access* or *Word*, one can achieve more or less the same kind of basic results that before could only be achieved by using highly specialised packages. Of course, more advanced data analysis may require more complex procedures and even some programming abilities, but in general, use of those basic tools can already provide much of the information needed to judge the usefulness of the collected data, etc., and allows the researcher to remain to some degree independent of specialists in computing and data analysis. I shall give some examples for this in the chapters/sections of this thesis that deal with the procedure for analysis, etc.

Furthermore, using an Access database also effectively creates a corpus resource. Not only because Access is widely available as part of the *Microsoft Office (Professional)* package in general, but also because it can be queried using programming langua-

ges such as *Visual Basic* and others, using the *DAO* (*Data Access Objects)* or *ADO (ActiveX Data Objects*) interfaces and *SQL (Structured Query Language)*.

Apart from its general availability, the other advantage of using *Access* is that because of the relational database approach it is using, one can easily correlate/compare 'plain text' variables, i.e. proper phonetic transcriptions including diacritics, which is a huge advantage in comparison with a highly complicated numerically encoded database like the Austrian one, which, because of this kind of encoding, is far more difficult to interpret and highly error-prone. The way phonetic segments are encoded in this database involves the use of eight digits, divided into two units of four digits respectively if they are either "phonetically" or "phonemically deviant" (Wieden/Nemser, '91: p. 354) or – in the simplest case – a 1 followed by seven 0s, if the segment has been uttered in an "RP-like" fashion (ibid.). An example cited (ibid.) of one of the realisations of the word *rubber*, which only consists of four segments, thus looks like this: "00004540000200001000000050020000".
Obviously, encoding all the data in such a fashion is not only extremely time-consuming and expensive, but one may also expect the 'transcribers' to make an indeterminable number of mistakes in inputting the data, which might later skew the results of the analysis. This is especially important, as sometimes current practice in research is to have a basic transcription undertaken by untrained clerical assistants, as for example in the transcription of the BNC. The 'plain text' approach thus helps to avoid unnecessary mistakes caused by numerical complex coding as will easily become apparent if the above example is 'translated' into a phonetic representation:

¨	Ã	b	«
00004540	00020000	10000000	50020000

Table 2: A coding example, adapted from the Austrian Learner database

Note that my 'translation' cannot be fully equivalent to the actual coding in the Wieden/Nemser database as I do not have access to all the coding information. I have

therefore given fully RP-compliant variants for each allophone, whereas in the original example, only the [b] is actually RP-conformant.

One of the major problems of the Wieden/Nemser study is that they do not give any explicit definition of what they understand by making reference to "RP" or how their reference standard/pronunciation has been established. According to them, their coding of the variables

> " [...] was based on mainly two types of auditory processing:
>
> a) a normative evaluation of pupil responses by native speakers of English (acceptability judgements);
>
> b) a normative descriptive account by a trained phonetician, where the target standard served as a reference norm for descriptive judgements (i.e. dimensional rather than absolute phonetic values were indicated)." (Wieden/Nemser, '91: p. 352).

First of all, there seems to be a contradiction in terms in this statement since "normative" and "descriptive" methods should be considered mutually exclusive. Any genuinely descriptive approach can by definition not be normative since having a norm implies the use of a rigid system that does not allow for a sufficient amount of deviation. Any natural language, however, always incurs a fair amount of variation, which, for purposes of description, has to be taken into account. As I shall describe later on (chapter 7 below), in my reference model I shall try to incorporate a certain margin for variation, based mainly on how my native speaker informants have actually realised instances of the same word(s) in the same context(s) in different ways.

Secondly, some problems arise from the fact that there was only one phonetician transcribing the utterances of the informants and that "acceptability judgements" were used in order to establish their 'correctness'. Concerning the first of those issues, simply no unbiased transcription can be established unless there are at least two independent transcribers present, so that transcriptions can be cross-checked if there are any doubts as to their correctness. According to my own experience in annotating my data,

it is extremely difficult to decide in which way exactly a word has been pronounced and many times when one listens to a recording again, one may actually perceive and be tempted to transcribe a different sound. Obviously this can also be considered one of the drawbacks of my own study, but for the scope of a PhD thesis is still justifiable, whereas for a large scale project it is not necessarily so. With regard to the latter, acceptability judgements should be considered as highly subjective statements, as acceptability for a given native speaker evaluator depends not only on the native speaker's own competence, but also to a large extent on his/her own speaking habits and/or (language) background, apart from the fact that one may easily become positively or negatively biased towards an individual speakers voice or speaking style and thus automatically assume that he or she is using the (in)correct pronunciation. Thus, for example, evaluators who belong to an older generation may regard at least some pronunciation phenomena of the younger generation (glottal stops, etc.) as incorrect and (possibly) vice versa. Therefore, it is important to find methods that 'objectify' transcription/evaluation as much as possible, such as the method I am using and shall describe in more detail in my chapter on methodology.

3.1.2. Grosser: "Aspects of Intonational L2 Acquisition".

In this article (Kettemann/Wieden, '93: pp. 81-92), Grosser describes four categories in which his informants make mistakes with regard to their uses of accentuation patterns:

a) cumulative accentuation:

is defined as the type of accentuation where more than the necessary number of words or syllables are accented without it being necessitated by the context in order to give special emphasis. In essence, this means that the learners have not yet learnt to make use of stress as a cohesive device. They overemphasise both known and unknown information and do not know how to deaccentuate or reduce vowels in unaccented words in order to produce appropriate weak forms.

b) alternating accentuation:

is characterised by "an over-abundance of tonal accents when compared to normal speech, but they are additionally structured by an alternating principle.", while "Items with lexical content tend to be tonally accented, the grammatical items, however, are not produced consistently without tonal accent." (Kettemann/Wieden, '93: p. 84). This implies that the learners are not familiar with the distinction between *form* and *function* words. They seem to be aware that stress can be used as a cohesive device, but they use it in a purely rhythmic, rather than 'semantic' way.

c) backshifting (final accentuation):

is a slightly misleading term, as "back-" - at least to me - seems to imply pointing back towards the beginning of an utterance, while what is actually meant by it here is a shift of accentuation towards the end of it. Grosser explains its effects and possible reasons as follows:

> "The learner utterances with their final accentuation invite a contrastive interpretation, which is inappropriate in the context given. The failure to shift the tonal accent from the final position, which is the unmarked position for English as well as German, to an item on the left is most probably to be attributed to a dominance of over-productivity of the final accentuation or end-focus rule." (Kettemann/Wieden, '93: p. 85)

d) fronting of accents:

this represents a phenomenon exactly opposite to the "backshifting" phenomenon, namely causing a word to the left of the actual word to be accented to receive prominence. This, according to Grosser, is "usually signalling 'marked focus'" on the word thus made prominent, "whereas the context would have required an accent further to the right" (Kettemann/Wieden, '93: p.85).

Grosser's first two categories seem to be fairly straightforward to me, although he does not try to explain them sufficiently. However, the definitions and explanations for

the latter two may raise some doubt. First of all, as already indicated above, the term for category c) is misleading and secondly the two should/need not necessarily be treated as two separate phenomena as they are both phenomena which equally cause a shift of focus to an otherwise unaccented syllable. In order to be able to explain them better, I will hereafter refer to as c) as 'right-shift' and d) as 'left-shift' respectively, as these provide a better way of describing positions relative to the word that should actually be accented, but at the same time avoiding the use of an ambiguous term like "backshifting".

If one can really make a distinction between the two different functions right- and left-shift seem to fulfil, they should rather be defined in exactly the opposite way to that in which Grosser defines them because in most of his examples it is the left-shift rather than the right-shift that fulfils a genuinely contrastive function, whereas the latter is actually responsible for what Grosser calls the "marked focus". To illustrate my point, I shall here give two of his examples and discuss them:

> "(16) (What's the time?) / It's FOUR o'clock /"
>
> "(12) (How far is the busstop?) / About a mile from HERE /" (Kettemann/Wieden, '93: p. 85)

For the type of response in Grosser's example (16) – with prominence on "*four*" rather than "*o'clock*" – one would usually presuppose a preceding question like *Is it three o'clock?* and the answer possibly to be prefixed by an 'antithetical' *No, ...* , which would clearly mark it as contrastive instead of purely giving focus. However, for example (12) a question that would render its function contrastive could not easily be found, so that it is safer to assume that it is just giving some kind of prominence which may not be categorised easily.

On the other hand, a left-shift need not always express a genuinely contrastive function, but may rather cause a pseudo-contrastive or pseudo-emphatic effect as can be seen in another one of Grosser's examples:

"(17) (Where is the poster?) / The POSTer is ON the wall /"

(Kettemann/Wieden, '93: p.86)

Here, the added focus on *on* simply cannot invite a contrastive interpretation as the semantic relation between *poster* and *wall* can only be idiomatically expressed by this one preposition and thus there can be no way of establishing a contrast. It would, for example, usually not make sense to say *The poster is in/over/above/behind/outside/ etc. the wall*. In other words, it is the absence of paradigmatic choices which makes the stress on the preposition appear 'deviant' in this case. On the phonetic level, this manifests itself in a difference of rhythm where the prepositional phrase appears more 'disjunct' than it would if it had normal stress, which is at least to some extent due to the fact that stress on the preposition tends to go along with a blocking of what I refer to as *perseverative nasal assimilation* (c.f. 8.1.2 below) between the otherwise unstressed preposition and the following article.

In part four of his article, Grosser describes the changes observed in the intonational behaviour of his informants at the end of their second year of learning. This, in itself, does not have much relevance to my study as his informants are schoolchildren between the ages of 10 and 12 years, whose intonational competence in their own mother tongue may not be fully developed yet, whereas my speakers are all adults and should therefore at least be able to master the intonational intricacies of their own L1. However, since Grosser here interprets phenomena similar to those that I had originally planned to analyse in my own study, I shall at this point take a brief look at some of his observations.

"In a structure of two syntactically co-ordinated parts the first member may be terminated by practically any tone type, whereas the second most frequently selects some kind of falling tone. […] It is a well-known fact that in the examples below a sequence of 'rising + falling' (a) signals greater cohesiveness than a sequence 'falling + falling' (b).

(a) / The lion was the king of the animals↑/ but he was old and weak↓/

(b) / The lion was the king of the animals↓/ but he was old and weak↓/ ”

(Kettemann/Wieden, ‘93: 87)

Here, Grosser makes a rather sweeping generalisation, perhaps because he himself is not sufficiently aware of the complex interplay between speaker’s intention, genre, grammatical structure or coherence and features of stress and intonation. He apparently views syntactic co-ordination as something that is always directly reflected on the intonational level, as his rather unfortunate example shows. He seems to attribute the cohesive effect between the two co-ordinated phrases as being based upon a rise in intonation at the end of the first one, while on the one hand underestimating the cohesive force of the adversative conjunction *but* and on the other hand the simple fact that the length of the pause between the two phrases, probably combined with the presence or absence of something similar to what Cruttenden (‘86: p24) refers to as anacrusis in the second phrase will probably be more effective in producing the ‘fairy tale effect’ he must have been thinking of when he chose this example.

He states that, as his learners progressed, their use of rising tones at the boundary between the two sentences increased significantly (Kettemann/Wieden, ‘93: p. 87) and concludes from this that:

> “Despite the obvious differences in syntactic and semantic complexity of the structures involved in L1 and L2 learning it might be plausible to assume a similar prosodic process which, in the initial stages of L2 acquisition, favours low ending tones with stretches of utterances which may be seen as semantically complete. The increase in high ending tones might then be seen as being due to a growing awareness of the various prosodic options the text offers beyond the basic distinction complete vs incomplete.” (Kettemann/Wieden, ‘93: p. 88),

but also remarks that

> "Further evidence from more advanced learners is needed in order to decide at which point accentual signalling of focus structure is fully developed."
>
> (Kettemann/Wieden, '93: p. 92)

However, some preliminary - but as yet still very superficial - auditory analysis of the data in my corpus would seem to contradict his hypothesis, as my German "more advanced learners" appear to make their distinctions between "complete vs incomplete" rather on the basis of punctuation than semantic content, especially in the case of longer, syntactically more complex sentences. As far as the problem of misplaced accentuation is concerned, Grosser may have made a good attempt to isolate which particular phenomena occur and to classify them, but his classifications are unfortunately only of an almost purely structural/syntactic kind and he does not make enough of an attempt to explain the reasons behind the informants' mistakes, and especially does not even attempt to find a solution to the problem. Thus he only talks briefly about "contrastive interpretation" or "marked focus", but does not explain whether they might be caused purely by the need to give emphasis or any kind of deictic (personal or local) functions as I shall attempt to do in my thesis. Overall, because of his apparent preoccupation with phenomena on the structural level, his way of analysing what the learners produced unfortunately seems more like a parse of a piece of written language than an analysis of spoken utterances.

3.1.3. Munder: "Is Intonation Teachable?".

Munder's article appeared in a collection of papers (edited by Halford/Pilch in 1994) presented at a symposium on intonation. In this paper, he argues for an approach towards teaching intonation to foreign learners of English which would be quite different from the 'traditional' methods of using pattern drills and teaching the students a complicated set of rules.

> "In other words, the teaching of intonation should not make the student learn fixed rules and patterns of intonation on the basis of isolated sample sentences. [...] Rather, it is necessary for the learner to be able to evaluate each communicative situation to the effect that he can always actively adapt his communicative behaviour on the basis of what he knows about the elements of intonation in the above-mentioned broad sense and their general functions, and above all of what he knows about the communicative setting and the interrelations between the ongoing communication process and this setting." (Halford/Pilch, '94: p. 146)

In view of the complexity of the phenomenon of intonation, Munder's proposal seems to make some sense. As I have already pointed out in my introduction, even native speakers cannot always tell what exactly is going on prosodically, so that reacting to and being able to use intonation efficiently seems to somehow rely on the speaker's ability to produce something *marked* with respect to a certain kind of *default intonation contour* (see e.g. Knowles, '87: p. 122 for a similar idea). However, the difficulty of the situation remains that this default seems to change according to the context and it may therefore be very difficult to come up with a set of 'intonational stereotypes' that may represent default cases. Furthermore, as features of intonation normally go hand in hand with other features of prominence, there is a need for a more basic approach to the teaching of prominence itself as a prerequisite for understanding and being able to use intonation more effectively.

3.2. Relevant Issues in Phonetics.

The basic theory behind phonetic analysis – unlike phonological theory – has not changed dramatically since the late 1940s, when machines such as the sound spectrograph were invented and made the visualisation of speech sounds possible. Indeed, some of the still universally accepted models for speech production, such as the source-filter theory, even go back to the 19th century (Lieberman/Blumstein, '88,: p. 1). However, no comprehensive account of all the developments since then (or even

before) seems to exist and this is a topic that would definitely merit investigation. However, a very useful account of the various aspects and principles of phonetics is Laver, '94, although this book seems at times less than well-structured.

Most of the advancements in phonetic research since the 1930s seem to have been made in the refinement of the methodologies and analysis algorithms used and are to a large proportion due to the availability of computer programs which make the analysis of the speech signal more accurate and easy. Thus significant advances have been made through analysis of spoken corpora on a larger and finer scale or speech recognition and modelling based on statistical/probabilistic concepts like HMMs (Hidden Markov models; cf. Knill/Young, '97).

Nevertheless, even with access to all the technological means of and tools for analysis, there remain a few problems in trying to describe the phonetic features of any natural language and establishing appropriate methods for teaching them, some of which I shall describe in the following sections.

3.2.1. Defining a Standard.

Most textbooks on the pronunciation of English that are supposed to help teaching foreign learners how to speak English correctly still adhere to the concept of Received Pronunciation (RP) as a teaching standard – at least if they want to teach them British English. They thereby completely disregard the fact that this is not necessarily a very practical concept, as the foreign learner will probably hardly ever get a chance to hear anybody speak using this particular accent outside the language classroom. On the contrary, most accents that the learner may be exposed to in Britain will be more or less non-standard and probably very difficult to understand if the learner expects to be presented with the kind of "careful colloquial style" (Gimson, '62: p. 278 & Ramsaran, '89: p. 306) or "relatively careful pronunciation" (Cruttenden, '94, p. 266) that textbooks like Gimson's *Introduction to the Pronunciation of English* propose as

a model for the learner to acquire. Even though in the fifth edition, slightly confusingly now called *Gimson's Pronunciation of English*, Cruttenden has reworded and possibly defused some of the rather biased-sounding terms like "rapid familiar" to "more colloquial", he is still using the same examples for illustration of the differences between careful and colloquial speech that had been used ever since the first edition, of which I shall here just present the beginning for illustrative purposes:

"A.	What	do you	think	we	should	do	this	evening?
	(1) hwÅt	dUjU	hTINk	wi(ù)	SUd	duù	DIs	iùvnIN
	(2) hwÅdZU		hTINk	wI	S«d	duù	D«s	iùvnIN
B.	How	many	of	us	will	there	be?	
	(1) haU	menI	Èv	«s	wIl	De«	biù	
	(2) haU	mnI	«v	«s	l	D«	biù[...]"	

(Cruttenden, '94: p. 266 f.)

This text seems to contradict some of the advice given in the preceding paragraph, mainly the one given to German speakers:

> "German speakers, in particular, should avoid an excess of pre-vocalic glottal stops"
>
> (Cruttenden, '94: p. 266)

The type of careful pronunciation shown above actually encourages the use of glottal stops in all prevocalic positions because it makes the speaker treat all words rather like individual, over-carefully enunciated units of the sentence, instead of treating them as part of the speech chain by assimilating or linking them in the natural way which is sometimes assumed to be more typical of spoken English than spoken German. Therefore a German speaker trying to adopt a rather careful pronunciation will automatically separate individual words more than any native speaker and by pausing – and thus creating a hiatus – increase the occurrence of glottal stops in prevocalic as well as other positions. For more on the differences in the usage of glottal

stops between the native and the German speakers in my analysis and the effects that they produce, see 8.1.9.

Furthermore, the mere fact that any one particular accent may have been or still is partly associated with a certain amount of prestige does not make this a reason for using it as a teaching standard. Even less so if only about 3% percent of the population use it (Hughes/Trudgill, '87: p. 3) and some of its features like the Ã-sound in words such as *butter* and *but* and the /Q/ in *bad* actually only are to be heard in maximally half of England, c.f. Wells, '82:

> "From a linguistic point of view, the population of England is about equally divided between the north and the south. If we exclude the small number of RP speakers (who are scattered throughout the whole country), about half of the English speak with some degree of northern accent." (Wells, '82: p. 349)

and according to Hughes/Trudgill, '87 (p. 30/31) occurrence of the latter is questionable in about another third of it. Of course, numbers like this can only give a very general picture of the actual situation, which is far more complex because even if the realisation of those vowels may be classified as being similar to the RP realisation, their actual phonetic quality is likely to vary considerably from one accent to another and their degree of similarity to RP may only be very superficial. On the basis of this kind of variability, however, it would be rather 'unfair', for example, to judge as incorrect a non-native speaker's pronunciation that might in many respects be close to that of a native speaker's speaking with a regional accent.

Furthermore, not only does RP differ from many non-standard accents on the segmental level, but also on the supra-segmental one:

> "A specific case in point is provided by the intonation typically used in statements in 'Urban North British' (UNB) English. UNB is the cover term proposed by Cruttenden (1994) for the varieties of English spoken in Belfast and Glasgow (and Northern

> Ireland and western Scotland generally), together with the varieties of several major English cities, in particular Birmingham, Liverpool, and Newcastle. Intonationally, the most conspicuous characteristic of these varieties is that the ordinary intonation on statements is rising or rising-falling." (Ladd, '96: p. 123).

This may easily lead to confusion and misunderstanding on the part of the learner trying to identify the intentions and cohesive strategies of many native speakers.

Therefore, I believe that there is a definite need for a redefinition of the current teaching standard, one that does not remain based on the old-fashioned elitist stereotype of the Cultured English Gentleman wearing his bowler hat and carrying his umbrella around the financial district of the City of London, making constant allusion to the works of William Shakespeare – an image that is still far too often to be found in textbooks.

3.2.2. Textbooks on Prosody.

As ultimately the main emphasis of the analysis has turned out to be on segmental aspects my data, this section only represents a rather impressionistic and superficial discussion of available textbooks on prosody, mainly pointing out some of the general approaches covered by them and the problems that exist with these approaches. I believe that an in-depth discussion would only have been practical had I been able to properly contrast my findings with these approaches and their findings.

While there are many established textbooks that deal with almost exclusively segmental aspects of the pronunciation of English, these days there are probably no officially recognised standard textbooks for prosody. It seems to be more or less universally acknowledged that drill books such as O'Connor/Arnold, '73 do not really capture the essence of intonational functions to an extent that would enable the learner to reach a suitable level of abstraction and understanding of everyday English intonation, a fact that comes as no surprise if one listens to the extremely artificial quality of

the accompanying recording. The same unfortunately goes for some of the more theoretical approaches, such as Cruttenden, ‘86, where the examples read by the author are often characterised by an unrealistically slow speed leading to an over-enunciated and unnaturally high number of tone groups.

Some of the main textbooks that currently exist are David Brazil’s *The Communicative Value of Intonation in English*, Alan Cruttenden’s *Intonation*, Elizabeth Couper-Kuhlen’s *An Introduction to English Prosody* and D. Robert Ladd’s *Intonational Phonology*. In general, there seems to be a division between books like Brazil, ‘97, which stress the communicative aspect of intonation, and those that treat intonation in a more scientific, phonological way, only partly incorporating the notion of communicative function. Another main difference between the individual textbooks is that most of them still work on often invented or at least only impressionistically transcribed data, rather than attempting a combined auditory and acoustic analysis. The main notable exception to this is Ladd, ‘96, whose approach of instrumental intonational phonology provides a more realistic description of the data he discusses. I believe that a mix of all three approaches is probably the most useful way of recording and describing the essential features of intonation, and trying to reduce them to something that may at the same time fulfil the criterion of being a scientific description, but yet explains the communicative side in terms that represent an abstraction that may also be applied in teaching.

4. The Methodology.

4.1. The Pilot.

Before the actual recordings for the data currently used for the study took place, a pilot study was conducted to find out in which areas major differences in pronunciation between native and non-native speakers may exist and which phenomena would be particularly worth looking into. For this purpose, 26 test sentences – taken from a list of sentences developed by W. Barry (Barry, ‘74: pp. 202-208) for his study of the pronunciation of English by German schoolchildren from different areas – were recorded. They were read by some of the non-native speaker informants who were later on going to take part in the main study and two native speakers who work as lectors at Würzburg University, teaching practical language classes, excluding pronunciation.

From this pilot study several conclusions were drawn. First of all, isolated test sentences could not produce any “natural” data as they are taken out of context and thus always appear somewhat artificial. Therefore, a text representing/creating a possibly more natural situation/environment was be needed.

In order to gather information about the use of intonation patterns, also a longer piece of text was necessary, which could then reflect different types of intonational behaviour placed in a context, especially since all of the test sentences had been statements only.

Thirdly, the speakers would have to be familiar with the text they were reading, as problems understanding the vocabulary could lead to “funny” intonation patterns. One speaker (G06) for example did not understand the word *tethered* in the test sentence *“The horse was tethered to a pine.”* and thus not only produced a very long pause between *tethered* and *to*, but also raised his pitch strongly towards the end of the sen-

tence so that his realisation of this sentence did no longer appear to be a statement, but rather sounded like a highly astonished question.

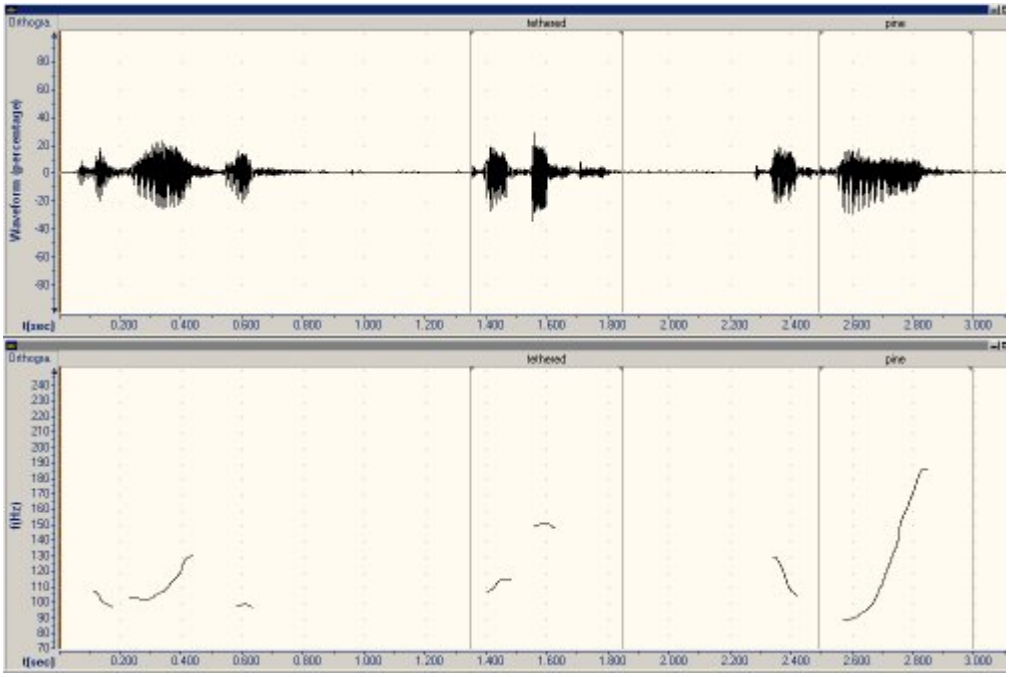

Figure 1 – Intonational effect caused by an unknown word in the pilot study.

Only by having the speakers go through the text to see whether they understood everything could therefore unanticipated parameters be avoided, which might otherwise skew the end result, or at least lead to unforeseen difficulties during the analysis.

4.1.1. Familiarity and Naturalness.

The above mentioned familiarity with the text is a factor of high importance, albeit not an indisputable one. I shall refer to some of its implications further down in my discussion of the advantages and disadvantages in using a dialogue as a means of data collection.

4.2. Informants.

4.2.1. The German Informants.

The 10 German speakers (seven female and 3 male) all came from or had lived in Franconia – an area at the northern edge of Bavaria – for a long time, as the original study had originally been geared towards finding out about how speaking with the particular accent from this area would affect the informants' pronunciation of English. Some of those features, as for example confusing voiced and voiceless consonants, can be expected to influence their pronunciation in a particular way. However, this is not only a feature of this particular German accent and as far as intonation is concerned, more general information about all German speakers' use of English can probably be drawn from the data, and conclusions about the accents of other learners of English should hopefully also be possible.

All of the informants studied or had studied English at the University of Würzburg, either to become teachers of English or to obtain an MA. Studying learners of this age group and trying to find ways of making it easier to teach pronunciation and intonation to them should prove more challenging than observing schoolchildren, especially since the former are at an age level where some people claim one can no longer learn a foreign language effectively. All of the learners had been studying English for at least seven years in school, and additionally another one to four years at university. During their time at university, they would have had to attend various practical language courses and most, if not all of them, would also have taken a theoretical course in phonetics. Eight of them had also been involved in activities of the University's English Drama Group and had a little bit of acting experience, which ought to have improved their accents and enunciation to some extent.

4.2.2. The Native Speaker Informants.

The native speaker informants (five female and two male) came from places all over England and one of them even from Singapore. This last speaker was selected as an informant because her accent is closer to RP than that of any of the other informants. This shows how misleading and erroneous it can be to interpret RP as the only proper English accent which should serve as ***the*** model for English language teaching.

Most of the informants had a teaching background as teachers of EFL and had spent some time abroad. All of them were either studying for an MA or PhD in the Department of Linguistics and Modern English Language at Lancaster at the time of recording.

4.3. The Dialogue.

The dialogue consists of 28 individual grammatical sentences of varying length and complexity, most of which represent a speaker's turn. Its subject represents an everyday situation, one person asking another for the way to the train station and a following description of how to get there.

It was written to include all the vowels occurring in the phonemic model of RP English, so that there could be as much of a basis for comparison as possible between the German and English speakers as far as the realisation of vowel qualities is concerned. Its design is therefore akin to using a *greedy algorithm* in research for language engineering, whereby a text is picked from newspaper or other corpus material on the basis of covering as many words illustrating the phonetic phenomena under investigation (c.f. Chollet et al, '98: p. 120). It also includes questions, answers and enumeration-like sentence patterns, allowing for comparison between the different intonational patterns used by native and non-native speakers. Analysis of these features was originally intended to represent one of the main parts of the overall analysis. The complete text is shown below:

Speaker 1: Excuse me, could you tell me the way to the train station?

Speaker 2: Oh, I'm not sure whether I can explain it from here. But look, there's a map of the area on that board over there. I might be able to show you more easily if we look at that. Do you have your car with you or are you on foot?

Speaker 1: I think I'll be walking since I don't have a car!

Speaker 2: Right, then! Go straight on until you get to the zebra crossing, then continue up to the town hall. You'll see a fountain in front of you and then bear right. That road will take you down past the library on the left and the Crucible Theatre. Look out for the underpass, go through it and head towards the University.

Speaker 1: Is that the big white building near the Odeon cinema?

Speaker 2: Yes, it is. From there you'll be able to see the station. It's at the very bottom of the hill. Is that okay or would you rather take a bus.

Speaker 1: That depends on how far it is. How long do you think it will take me?

Speaker 2: Well, I usually manage it in about 20 minutes, but you'll have to allow at least a quarter of an hour to buy a ticket. The queues are always very long.

Speaker 1: Oh, that won't be a problem. I already have my ticket.

Speaker 2: In that case I wouldn't bother taking the bus. The number 60 is very unreliable anyway.

Speaker 1: That sounds simple enough. Thank you for your help. I hope I haven't made you miss your bus now! Goodbye!

Speaker 2: Goodbye!

4.3.1. Advantages and Disadvantages of Using the Dialogue as a Means of Gathering Information on Spoken Language.

As I have already described above, the dialogue was designed to elicit certain aspects of pronunciation and prosody. In its design and consequent implementation, a compromise had to be made between collecting natural(ly) spoken data and a text read aloud. In the following, I shall attempt to explain why and where it is necessary to make this kind of compromise in general and to justify my decisions with regard to the aims of my analysis.

4.3.1.1. Analysability.

One of the main factors in analysing spoken data is the quality of the recordings. The degree of quality required depends, of course, on the type of analysis one wants to perform. If it is purely a matter of transcribing classroom or conversational data used for semantic, gender or discourse analysis, then the quality need in most cases only be high enough to understand what is being said, whereas for a 'full-blown' phonetic analysis it has to be as high as only possible. Everyone who has ever tried to transcribe a piece of spoken discourse from a tape even just orthographically knows that it can be very difficult to make out just what a speaker is actually saying. Background noise, loudness or clarity of enunciation can have a major influence on the listener's perception and therefore the quality of the transcription. In trying to produce a phonetic/phonemic transcription, this becomes even more difficult as one has to perceive not only **what** is said, but also, and especially, **how**. Having one's informants produce the same text makes the task of 'transcribing the what' a little easier by somewhat 'normalising' the output. However, even if one supposedly knows what the speakers are producing, one still has to allow for a certain variability on the part of each individual speaker. Thus a particular speaker may show a strong preference for certain fillers or produce a large amount of hesitation phenomena that also have to be faithfully included in the transcription as they will affect the overall speech rate and rhythm. Features like this have in the past sometimes tended to be

even 'more normalised' (i.e. deleted) because they often tended to be seen as redundant, i.e. not contributing to the meaning of utterances. They were thus often interpreted as unimportant, rather than interpreting them as strategies employed by the speaker to structure the text. This was due to the fact that corpora of spoken language have largely been interpreted in the same way as corpora of written language.

And those are only the problems the 'human interpreter' encounters when trying to analyse the data. Yet the problem of analysability is far greater for the non-human interpreter, i.e. the computer or rather those special programs that should enable the researcher to detect and isolate certain features of speech that a purely auditory analysis would fail to recognise. However, while the human listener is able to make a great deal of allowance for irregularities in speech and can on the basis of inference still determine the content of an utterance, computer programs usually need an extremely high quality input in order to be able to interpret and display the data correctly and may sometimes fail completely if they encounter a high degree of background noise:

> "The signal-to-noise ratio should be maximized. That is, the signal should be at least 20 dB above the level of background noise. In most cases analysis procedures will not work unless the voice of a single speaker can be recorded in a quiet environment. For example, pitch extractors that derive the fundamental frequency of phonation need a recorded signal that contains the speech signal of only one speaker. The pitch extractor cannot track the voice of one speaker when a second voice simultaneously occurs, as is often the case when one records a normal conversation. Nor will pitch extractors work when competing periodic noises occur, for example, when the tape recording contains the low frequency, low amplitude sounds produced by some central air-conditioning systems." (Lieberman/Blumstein, '88: p. 74)[11]

[11] For more information on the constraints imposed on the collection and analysis of spoken data see Gibbon et al., '98.

Therefore, although one might argue that the use of read material may lead to a kind of precision in the delivery of the informants that would not occur in natural unscripted speech, it is to a certain extent necessitated by the need for qualitatively analysable data. However, I believe that one can, and should always, try to alleviate the negative effect of scripting by making the scripted situation as natural and close to real life as only possible. After all, this also reflects the only way in which the teaching of spoken language can be achieved in the language classroom, by approximating or simulating situations as they may occur in real life situations the language learner may encounter.

4.3.1.2. Comparability.

A second major factor, especially in a contrastive analysis like mine, is the one of comparability. In order to be able to draw any valid conclusions from individual realisations of spoken material, its instances have to be as similar to one another as possible since, even more so than it is the case in written language, realisations in spoken language are highly context dependent. While in written language there is only a limited degree of variability as far as both (syntactic) context and realisation are concerned – usually words in written texts are delimited by spaces or punctuation marks and there are normally very few spelling variants, if any, for each word – in spoken language no word is ever pronounced exactly the same way twice even by the same speaker and there is a large amount of variability according to the speaker's regional and social background.

Using a prefabricated text to be produced by the informants can eliminate some of those problems by doing two closely related things. The first one is to impose at least a loose structure upon the utterance(s) of the speaker(s), so that relevant details may later be more easily compared and identified by the researcher. In the case of my data this is particularly important in order to be able to observe the (both native and non-native) speakers' turntaking behaviour and text comprehension abilities. The latter of the two is obviously more important as far as the non-native speakers are concerned,

but can also reveal specific strategies the native speaker may employ to convey different types of information.

The other aim is to be able to elicit specific types of more performance-related information like the pronunciation of individual words, features of assimilation, intonational structures, etc. In any non-scripted situation, eliciting this type of information would be rather difficult as there could only be very little direct control over which words the individual speaker would be using to describe a particular incident or situation and thus to create a comparable context. The only alternative way of eliciting this kind of information that I have come across so far is the one adopted in the HCRC Map Task Corpus project (cf. Thompson et al., '95), which constrains the speaker's situation and choice by giving the participants in a dialogue two slightly diverging maps with some common landmarks on the basis of which a route giver and a route follower have to establish the way to a target point in a way that is similar to *information gap* filling activities sometimes used in the language teaching classroom.

However, as convenient and necessary it may be to impose this kind of structure upon the data, there are some problems one constantly needs to bear in mind when analysing the material collected in this way later. For example, some of the phenomena that typically occur in natural nonscripted spoken language like hesitation phenomena may be governed by punctuation rather than the speaker's overall understanding of the text. The same may also be true of intonational contours. Apart from this, when creating such material, one always runs the risk of creating something 'constructed' or artificial that may not be used much in everyday spoken language, something similar to the degree of artificiality that is unfortunately to be found in most textbooks for foreign learners. Thus certain phrases or expression may end up being highly suitable for eliciting certain phonetic detail, but may sound rather odd to the native speaker's ear. This risk is especially high when the material is created by researchers who are non-native speakers themselves, as they may sometimes not possess enough knowledge of idiomaticity or current usage, especially if they

themselves have only/mainly learned their English from the aforementioned textbooks. In order to avoid any danger of this happening, I created the dialogue used for my study with the help of a native speaker friend of mine. However, even this did not prevent some strange reactions to parts of the dialogue by other native speakers, which seems to indicate that there is no absolutely foolproof way of creating any such material.

4.3.1.3. Familiarity.

The final important advantage in using prefabricated material is that the speakers can gain a certain degree of familiarity with the text they are later supposed to produce. Even though this might in the first instance rather seem like a disadvantage because it could lead to a high level of precision or a tendency for the informants to act out the text instead of producing it naturally, it may nevertheless be a necessity for both native and non-native speakers for two different reasons. The first of those is that the informants need to know what the situation is so that they can actually produce something natural since otherwise they would have to employ certain strategies for understanding the text in the first place, which would lead to a style of delivery that is closer to reading than to speaking, and may not use appropriate intonational structures because they have to process the content first. The second reason is more important for non-native speakers (although it could technically apply to native speakers as well) and relates to knowledge of the vocabulary used in the text. If an informant comes across a word he/she does not actually know or understand fully, this will not only introduce hesitation phenomena like extended pauses that will render the speech rhythm more unnatural, but may also lead to 'distorted' intonation patterns, for example when a given speaker starts 'questioning him/herself' and thus intonationally turns a statement into a question (c.f. my example in Section 4.1 above).

4.4. Recording and Recorded data.

4.4.1. Recording of the Dialogue.

Overall, 9 native and 10 non-native speakers were recorded. Of the nine native speakers, the two speakers used for the pilot study were excluded from the final study as they are of a different generation than all the other informants and therefore show a strong deviation as far as vowel qualities and manner of pronunciation are concerned. However, this may not only have been due to their being older than the rest of the speakers, but could also have been influenced by two more factors. For one, both of them had at the time of the recordings already been living in Germany for quite some time and therefore probably spent more time speaking German than their own mother tongue, which may have been an influence on the way they were speaking the latter. The other is that as they had both been in the language teaching profession for a fairly long time, they had apparently developed a kind of over-careful enunciation, which was not to be found with the younger native speaker informants, even if most of them were EFL teachers themselves.

Each informant was asked to read the dialogue on his/her own so that all the different sentence patterns described earlier would have to be realised by every one of them. Due to the time and resource constraints of a PhD thesis, this seemed the best way of eliciting the desired material, but has the disadvantage of making the dialogue situation less realistic than it could be if there were real interaction between two participants. For larger scale projects it is therefore definitely advisable to have the same kind of dialogue read in complementing pairs, where first one informant reads the first speaker's part and the second informant the second speaker's and then vice versa. This is the strategy adopted in the aforementioned Map Task Corpus.

Recording conditions for all the German speakers were the same; for the native speakers recordings sometimes took place in different rooms. By no means can those

recording conditions be called ideal as the recordings partly took place in offices, research rooms or once even in a computer lab, so that some degree of background noise was always present. However, great care was taken to pick, as far as possible, quiet rooms, but as no soundproof recording environment was available, this choice can only represent the best possible solution.

For all recordings the same equipment, a Sony Walkman Professional with an Aiwa microphone was used. To attain high quality recordings for spectrographic and fundamental frequency analysis, metal tapes were used because they allow for a very high recording level without the kind of distortion that could be expected from normal or chromium tapes. Again, the use of a cassette recorder does not represent the optimal solution, but due to financial constraints, use of a DAT recording device was not possible.

A very high recording level is sometimes needed, so that the programs used to manipulate and display the data can function accurately and produce the right kind of output. For example, in some of the data from the pilot study there appeared to be some pitch movement, which could be recognised auditorily and by looking at narrow-band spectrograms, but which the program used to extract the fundamental frequency information could not detect as the signal had not been strong enough.

4.4.2. Digitisation and Audio Data Formats.

From the outset, one of my aims in digitising the data, apart from simply making them usable on the computer, was to have them available in a variety of different audio formats, so that they could

a) be analysed using a variety of different signal processing applications, whichever one would offer the most accurate and convenient way of handling,

b) be used on different platforms, i.e. DOS, Windows 3.x/9x/NT and Unix,

c) possibly be set up as a small corpus resource for further analysis, either by myself or other interested parties.

4.4.2.1. Digitisation.

The first step in saving the data in usable formats was to digitise and store the complete recordings in worksheet files for use with the *LSI (Loughborough Sound Images) Speech Workstation*, a DOS based hard-/software solution for digital signal processing, which was initially the main instrument for analysing them. All recordings were digitised with a sampling rate of 16 kHz (16 bit quantisation) so that both vowel and consonant qualities could equally well be observed.

In order to facilitate comparison, the complete recordings were then 'cut up' into smaller units of the length of about 1.5 sentences each, which was at first only possible in binary format because the *Speech Workstation* has no facilities for saving parts of a file in its proprietary format. Those files then had to be transformed into WKS-format in order to be able to annotate them and make use of the *Speech Workstation's* functionality such as adjusting or filtering the display of the data, and to then store those settings permanently within the file. Additionally, a description of each worksheet was included, containing the filename and the orthographic transcription of the sentence displayed within the spectrogram – the way it was supposed to have been read by the speaker, rather than the actual realisation. This was done so as to be able to recognise quickly which file (or files, if two files were opened for comparison in two different windows) was open at the moment without having to play it back and to make it easier to identify and manage printouts.

Each filename represents a combination of the speaker identification, an underscore and the number of the sentence; the speaker identification consisting of a "language identifier" – E for native speakers of English and G for German speakers – and the

number of the individual speaker. Thus the first sentence read by the English speaker number 1 would be E1_1, the second E1_2, etc. and the complete recording E1a, where ‘a’ stands for ‘all’. For technical reasons like sorting files according to speakers, I later on changed the numbering for the complete files so that speakers with an ID of less than 10 had a 0 prefixed, thus yielding E01a for native speaker number 1, etc. All spectrogram files for use with the Speech Workstation have the default extension ‘.wks’.
The length of more than one sentence for the individual parts of the recording was determined by the fact that sometimes intonational phenomena extending over sentence boundaries would have to be observed.

4.4.2.2. Conversion to Binary and .wav Formats.

Next, the complete recordings had to be converted into binary format (file-extension ‘.raw’) and then both complete and partial recordings were again converted into Wave-files (file-extension ‘.wav’) for use with the *Spectrogram Analyser* (a small freeware program that allows the display of spectrograms) running on *Windows*. At the time, this program was the only available non-commercial product that allowed the display of spectrograms on the Windows platform, but unfortunately did not offer any facilities for annotation. However, this program has in the meantime been superseded by another freeware analysis program the *Speech Analyzer*, commissioned and made available by the Summer Institute for Linguistics (http://www.sil.org), which allows for both the display and playback of spectrograms, pitch contours, etc. and annotation of the signal on different levels.

Wave-files also offer the added advantage that they can (technically) be stored in or linked into the database and played back from there when auditory confirmation of some phenomenon occurring within the data is needed. Using the *Spectrogram Analyser* or the *Speech Analyzer* also makes it possible to save and store spectrograms as

Bitmap-files, picture files that can be read by any Windows-based drawing program and also be stored in the database for visual reference to the spectrogram if needed.

The other positive side effect of having stored all files in binary format before the conversion to Wave-files is that this should technically allow any other program for processing soundfiles (such as the *ESPS/Waves+* package) to read them in. However, as it later turned out, incompatibility between *Unix* and *DOS*-based systems extends further than I had anticipated and even affects the level of binary files insofar as the byte ordering within those files is concerned. It was therefore later necessary to write another conversion program that swaps higher and lower order bytes in the binary *DOS*-soundfiles in order to make them usable with the *Unix*-based *Waves+* package.

4.4.2.3. Retrieving and Converting the F_0-Data.

The following step consisted in running the F_0-Tracker program provided with the *Speech Workstation* package on the complete and partial recordings in order to extract the pitch contours. The resulting F_0-files (extension '.f0f') from both the complete and partial recordings were then in turn converted into text files (extension '.txt') containing time and F_0-values for use with the database. Unfortunately the *DOS*-based conversion program originally used was not able to read all the data correctly so that it had to be rewritten. However, rewriting the program also presented the opportunity to write it as a *Windows* program, which was much more convenient and easier to use and now allows the user to select and convert any number of files at the same time without having to manually restart the conversion program again and again, which would save a great amount of time for the conversion of any future recordings or re-digitisations of existing recordings, should they be necessary.

To some extent, however, extracting and converting this type of information in this way is no longer necessary now because the *Speech Analyzer* provides facilities for

exporting time-aligned information relating to f_0- and other values to textfiles, which can then be read into the database(s).

4.5. Statistics Employed in the Analysis

All the statistical analyses on the data were conducted in *MS Excel*, using *f*- and *t-tests*, in order to establish which, if any, differences between the speaker populations or parts of the populations might prove statistically significant.

However, *Excel's* built-in *f-test function* does not allow the user to quickly determine whether two populations have equal or unequal variances, but only offers this type of functionality through its *Analysis Toolpack*, which produces an unnecessarily verbose output and does not automatically recalculate this when the underlying data is changed. This is clearly an undesirable feature in an analysis of spoken language data where the data often has to be re-transcribed and updated, and it was therefore necessary to write a *user-defined function* in VBA that automatically recalculates each time the underlying data changes. Based upon the results of this *f-test*, a *t-test* assuming either equal or unequal variances was then performed in order to establish whether there were any tendencies amongst populations or whether any differences occurring were significant below the 5% or 1% level. Any levels of significance are indicated in the discussions of the individual features analysed further below and appear in round brackets.

4.6. The Databases.

Much of the information contained in the databases is in line with the types of information used in projects on speech assessment that have been or are currently being undertaken within the *speech community*. I here understand the term speech community as referring to those groups of people or institutions that are undertaking research into speech not on a purely academic level, but rather for the development of

computer applications that make use of spoken in- and output in a variety of forms such as speech recognition and speech synthesis for translation or telephony systems.

Projects in the speech community, such as the European Union funded ESPRIT Speech Assessment Methods (SAM) project (see Gibbon et al., '98: p. 6/7) or the German Verbmobil project (http://verbmobil.dfki.de) use multiple files (distinguishable by different extension) that contain various bits of information relating to recordings, speaker characteristics, etc. or containing orthographic/phonetic/prosodic transcription, that can be linked together (*aligned*) by the use of numerical codes within each file, so that different types of information can be related to one another as required. One advantage of this is that only those files that are actually needed for a specific type of analysis need to be distributed and may to a certain extent be used independently of a particular type of software, at the same time reducing the amount of redundant/unnecessary information stored in each file. The one disadvantage of this approach, however, is that one always has to write special software that can actually perform the alignment as and when needed.

As previously pointed out (see 3.1.1 above), one of my original intentions was to use relatively easy-to-use and widely available software packages in order to store and analyse my data. However, the more I developed my schemes for storing and comparing the data in *MS Access* databases, the more I realised that in order to increase the efficiency and maximise the capabilities of the databases as analysis tools, I had to develop solutions that went beyond the facilities offered by *MS Access* by default. I therefore decided to increase its functionality by writing programs that manipulated my data using VBA and gave me easier access to relevant parts of the information. In this way, what began as a 'simple' database implementation, soon turned into a powerful reusable and relatively easily extensible application for comparing different speaker populations and also changed the general direction of this thesis to a considerable extent. The following sections describe the various aspects and interfaces provided.

4.6.1. The Dialogues Database.

At the heart of my analysis/methodology is the "Dialogues" database. It consists of different tables containing information about the individual speakers, the dialogue itself, stored as one word per record, the punctuation marks and grammatical tags associated with the individual words of the dialogue, plus information about the individual sentences, pauses, etc., which shall be explained in more detail below. It is organised as a relational database so that the information from different tables can easily be linked and correlated by running the appropriate queries on the data. For example, by linking the tables containing the dialogue and the tagset, it is possible to produce a tagged version of the dialogue, which can then be exported into *Word* and converted from a vertical to a horizontal format by use of a macro in order to increase readability.

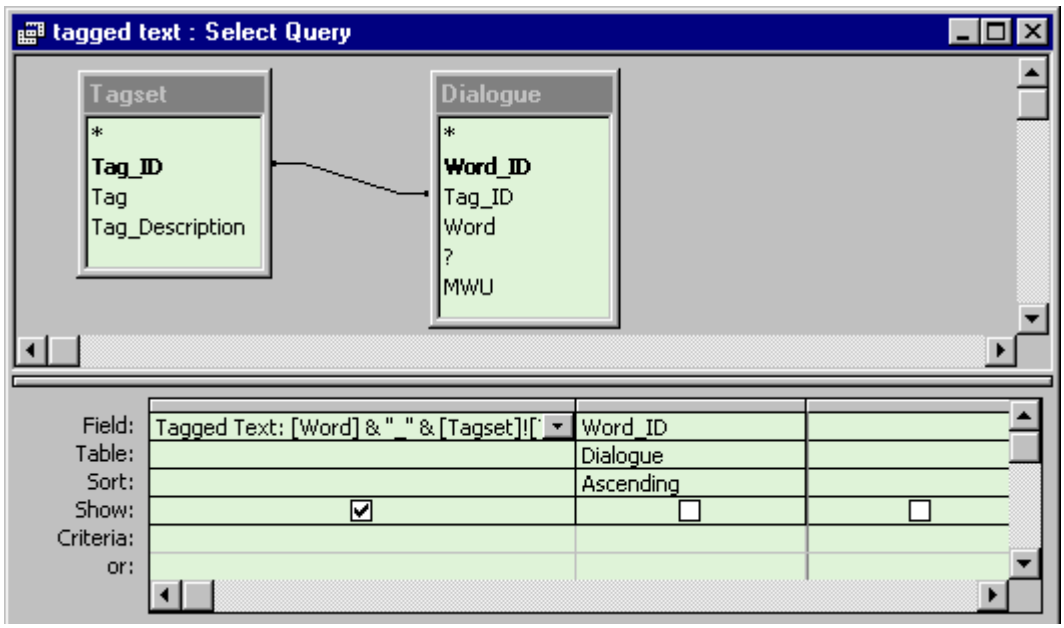

Figure 2 – Query for creating a tagged version of the dialogue.

As we shall see in later sections, being able to combine the information on tags with the orthographic or phonetic representations enables us to gain more detailed information on which word-classes are involved in phenomena such as complete elision (deletion) of words (8.1.8), or final release (8.1.9) as a potential marker of emphasis.

4.6.1.1. The Main Table Structure

The following section contains a description of the most important tables in the "Dialogues" database and explains how they are related to one another.

The "Speakers" table contains all the information relevant for the individual speaker. Some of the information is different for German and native speakers, as different factors, such as how long each learner has studied English for, etc., may be of interest:

Field Name	Data Type
Speaker_ID	Text
Firstname	Text
Surname	Text
Beg_Count	Number
Date_of_Birth	Date/Time
Semester	Number
Degree	Text
Time_of_study_Uni	Number
Time(s)_spent_abroad	Number
Place_of_Birth	Text
Place_of_Residence	Text
Telephone	Text
Transcription	Yes/No
Sex	Text

Table 3: Fields in the "Speakers" Table

The different fields and their uses are listed below and, where necessary, accompanied by detailed explanations as to their use.

1) The "Speaker_ID": This represents the *primary key* for the whole table by which it can be linked to other tables, e.g. in order to extract all the realisations for a particular speaker, etc. It contains a 'speaker identification' – as described earlier – consisting of the 'language identifier' and the number of the speaker.

2) "Firstname" & "Surname"

3) “Beg_Count”: This field contains information about where the beginning of the respective recording for each speaker can be found on the original tape.

4) “Date_of_Birth”: This information may be relevant to see whether speakers who differ (considerably) in age show different characteristics of pronunciation – e.g. in their use of glottal stops – or intonation and may thus be judged to belong to different speaker generations.

5) “Semester”: This is one of the fields that only applies to the German learners and contains information about how many semesters (years) they had been studying at the University.

6) “Degree”: This information may be relevant in different ways for English and German speakers. For the German speakers, having a degree may (should) be an indicator of a certain level of proficiency. For the native speakers, knowing where and when they took their first degree may be relevant as the time spent at a certain University may have influenced their accent to some degree. Knowing what the degree was in – English Language or Literature, any other language or something completely different – can provide some information as to whether they may have learned to be more ‘language-aware/conscious’ and thus more careful in the way they use (a) language.

7) “Time_of_study” & “Time_of_study_Uni”: Those fields are relevant only to the German speakers and were originally intended to show how many years the speakers had spent learning English overall and how many years at the University prior to the recording. Unfortunately, however, the information

was lost when I first started exporting it from Excel files to information stored in the database.

8) "Time(s)_spent_abroad": For the German speakers, this field provides information as to whether they had spent any longer period of time (not counting extended holidays) in an English-speaking country and if so, what they were doing there (studying at the University or working as an assistant teacher, etc.). For native speakers, knowing whether they have been in contact with a foreign language, for how long and how long ago may explain any possible deviation from patterns used by other native speakers.

9) "Place_of_Birth": May be relevant to identify a certain accent unless, of course, the informant has always been extremely mobile.

10) "Place_of_residence", "Telephone": Basic contact details.

11) "Transcription": Shows whether the speaker's recording has been transcribed completely or not. Keeping track of this can be important, especially if one decides to re-annotate speakers at a later date and may switch between different speakers for comparison purposes.

12) "Sex": This field may be used for statistical purposes, to establish whether there are any significant differences in male and female language use, apart from obvious factors such as different fundamental frequency levels/ranges.

These days, with the increasing importance of email, it would also be very useful to include the speakers' email addresses in their contact details, so that even if they may move a way, there may still be a further possibility for contacting them in case any additional information is required.

The “Dialogue” table contains four fields:

1) “Word_ID”: A numerical identifier for each word. Each identifier consists of the number indicating the position of the word in the dialogue, multiplied by 10 in order to enable/facilitate sorting. Multiplying the position of the word in the dialogue by 10 also allows the user to insert any extra words that have potentially been uttered by a particular speaker. This can be done by making use of the digits between 1 and 9 at the rightmost position of each ID, e.g. if there are any additional words between word IDs 10 and 20, they can range from 11-19, which yields enough extra positions for most purposes.

2) “Tag_ID”: A numerical identifier used to link each word to its associated tag from the “Tagset” table.

3) “Word”: This field contains the word itself.

4) “MWU”: A field that can be used to indicate whether a particular word is part of a “multi word unit”, which may affect features such as stress patterns in compounds, etc. If a word is designated as part of a multi word unit, it receives a number according to its position, i.e. the first word in a three-word multi word unit is number 1, the second one number 2 and the final one number 3.

In the original design of the database, I had also included punctuation marks in the “Dialogue” table, so that each punctuation mark counted ‘as a word’. However, I later decided that as punctuation marks or markers for speaker turns per se could not be seen as entities with a particular realisation, they should be taken out and moved into a separate “Punctuation” table. In this table, there are two

fields, a “Word_ID” field, which links each entry to the word it is associated within the dialogue, and a “Punct” field, which contains the ‘value’ of the punctuation mark or “-----” for a speaker turn. For information about speaker behaviour at phrase-, sentence- or turn-boundaries, this information can easily be combined with information about speaker realisations later.

The words in the “Dialogue” table are furthermore linked to the grammatical tags associated with them in the “Tagset” table. Table 4 below shows some examples from the CLAWS 7 tagset used to tag the data. For the full tagset, see Appendix A.

Tag_	Tag	Tag_Description
10	!	punctuation tag - exclamation mark
20	"	punctuation tag - quotes
30	(	punctuation tag - left bracket
40	)	punctuation tag - right bracket
50	,	punctuation tag - comma
60	-	punctuation tag - dash
70	-----	new sentence marker
80	.	punctuation tag - full-stop
90	...	punctuation tag - ellipsis
100	:	punctuation tag - colon
110	;	punctuation tag - semicolon
120	?	punctuation tag – question mark
130	APP	possessive pronoun, pre-nominal (e.g. my, your,
…	…	…

Table 4: The “Tagset” Table

The “Tagset” table itself contains the “Tag_ID”, used to link the tags to the words in the dialogue, the “Tag” itself and a “Tag_Description” field, which gives information about the grammatical category each word in the dialogue belongs to. The “Tag_ID”, just like the “Word_ID” in the “dialogue per word” table, is a numerical identifier multiplied by 10, which allows for insertion of extra numbers if additional special tags similar to those already existing should need to be created.

In the current implementation of the database, all the realisations for each individual word by each speaker are listed in a single table, called “Realisations”. As already pointed out in 4.3.1 above, not only do the transcription on the phonetic/phonological level have to include faithful reproductions of the speakers’ utterances of the words appearing in the dialogue, but also additional information about any fillers, hesitation phenomena or ‘dropped’ words. For this reason, when setting up the database table containing the native and non-native speaker realisations, I had to diverge slightly from the original conceptual design of a relational database, and implement the table in the style similar to a flatfile table, rather than having a separate table for recording the realisations of each speaker. This had to be done as it was the only convenient way of adding Word_IDs representing hesitation phenomena such as false starts, etc. to the realisations table and associating the IDs with the same phenomenon for different speakers. For example if two different speakers had a false start in the same place in the dialogue, but one of them would restart all the way from the beginning and the other one only from the point where the original utterance went wrong, the same words involved in the restart should be associated with the same IDs in order to determine how this may affect the rhetorical patterns and overall ‘fluency’ of native and non-native speakers.

For larger-scale implementations of my approach, however, this kind of design would become impractical as the resulting table would become too ‘unwieldy’ and it would therefore be better to have all the realisations for each speaker in a separate table. Identifying common disfluency features would then become more difficult, though.

Because of a technical limitation, *MS Access* cannot display two different fonts within a single table. This is why, originally, I had to use a pseudo transcription similar to SAMPA (Speech Assessment Methods Phonetic Alphabet; Wells et al., ‘92) because the IPA font does not contain enough numbers that could be used as field identifiers. However, I later on realised that it would be possible to use textboxes for displaying

the contents of the different fields on *Access* forms, and that this would allow me to assign different fonts to each field. This way, input and display of phonetic characters is possible using the form, while what is actually saved in the database table is the underlying character representation of each phonetic character.

Realisations : Table

Word_I	E03	E03Tran	E04	E04Tra	E05
11					
20	*kskjöz	nl	**skjIz	nl	**skji>z
30	mi>	nl	mI	fr	mI
50	k¬d	coa	kH¬d	coa	kIád
60	ZI	nl	Ziá	nl	Z*
70	tSEá*	e	tsE*	e	tHelò
80	mI	nl	mIá	nl	mIm
90	D«	nl	D«á	nl	D«á
100	weI	nl	weáI	nl	wE¼I
110	tHI	nl	tHIá	nl	tHIá
120	D«	nl	D«á	nl	D«á
121			steIS	nlsp	

Figure 3 – Snapshot of part of the “Realisations” table.

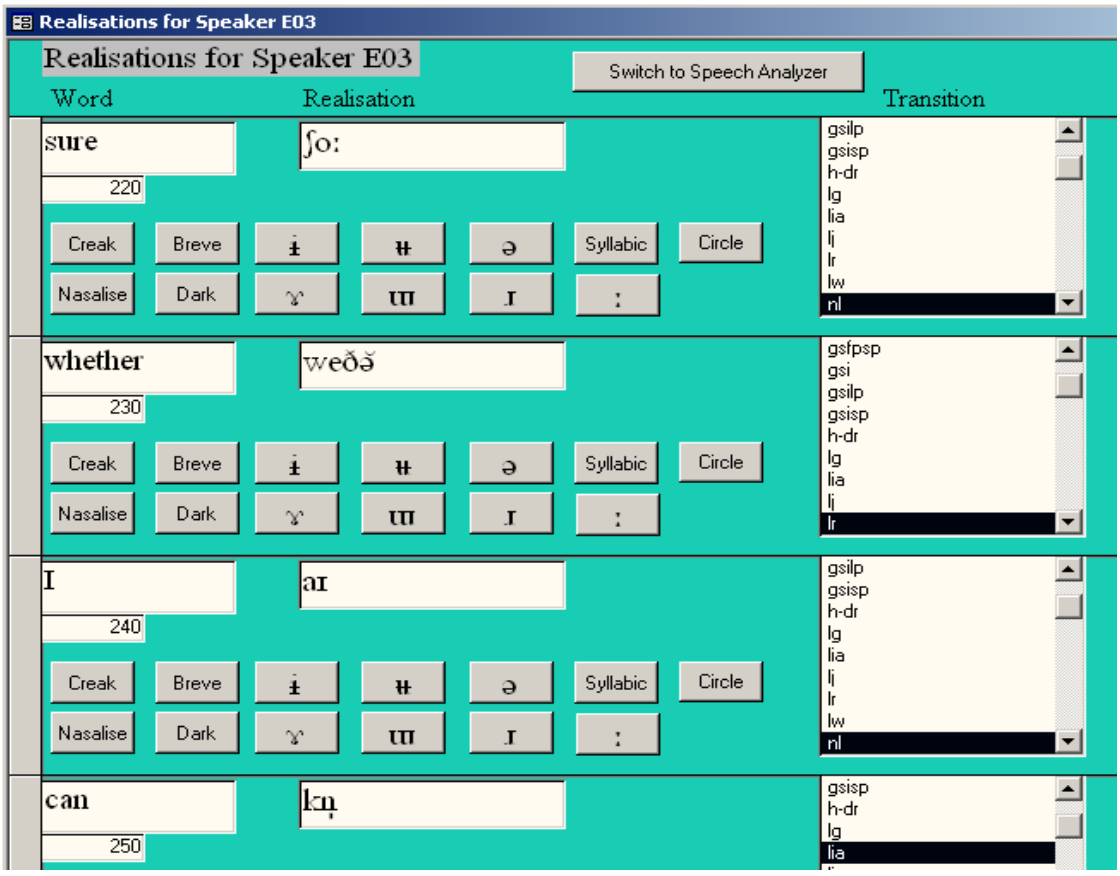

Figure 4 – An input form for editing speaker realisations.

This system not only makes it possible to use a much narrower transcription making full use of diacritics, but also still allows for performing searches based upon particular characters, such as extracting all words produced with e.g. creaky voice, nasalised vowels or glottal stops. There is one caveat in the current implementation of the database, though, that I only found out about towards the end of my analysis, at which time it was too late to make wholesale changes to the data. The problem lies in the fact that the font I am using maps certain phonetic characters onto uppercase letters and thus there is problem with some of the aggregate functions, such as counts, of some realisations because SQL is case-insensitive and therefore groups some of the realisations together when there should be a distinction between upper- and lowercase characters. In my case, this affects words where there may be a distinction between e.g. /ʊ/ and /u/[12] or /e/ and /ɛ/. This problem, however, only affects a rather small set of words and as long as the analyst is aware of the problem, will not lead to any grave errors. However, in a 'real' implementation of my methodology, this problem could be avoided by either using a *Unicode* font where the characters are mapped onto different codes for which case-folding is not implemented in SQL or by generating hexadecimal representations of each realisations and grouping the data according to these before performing aggregate counts. Yet another alternative would be to write customised routines that perform aggregate functions, but this approach would somewhat 'contravene' the idea behind a database approach as having access to SQL aggregate functions represents one of the major advantages of using a database in the first place.

As can also be seen in Figure 3 and Figure 4 above, each realisation of a word by a particular speaker is complemented by a field containing its corresponding transition. The different types of transition I originally identified and how I later on modified and refined these categories is explained in more detail in 7.2 below.

[12] In most cases these two will be disambiguated by the fact that /u/ is often accompanied by lengthmarks, anyway.

Within this first database, further refinements could still be undertaken, which would extend the coding of sentence and word level elements, possibly by adding utterance or phrase level coding on the structural annotation level, and by additional *dialogue act annotation* on the functional level. Especially the latter should make it easier to establish correspondences between the use of specific intonation contours and certain types of semantic/pragmatic utterance categories. For further information on dialogue act annotation, see Gibbon et al., '00: pp. 54-64.

4.6.1.2. The Database as an Application

The more I worked with the database, the more I realised that there were certain analysis features that were recurring and that I could simplify these by writing VBA routines that allowed me to set up one of the forms as a kind of 'control centre' for my application. This form originally evolved from a simple form containing only a single textbox using the phonetic font for testing/verifying realisations[13] taken straight from the "Realisations" table into a form that now provides access to much of the functionality needed for my analyses and whose functionality is continuously being expanded to incorporate access to further features when they turn out to be relevant.

As one of the most time-consuming parts of any phonetic research is the transcription and potentially rather frequent re-transcription of the data in the light of new findings, any facility for speeding up of this process and keeping track of which speaker the latest transcriptions were undertaken for will greatly simplify the task of the analyst. In order to achieve this, my database application contains various features for accessing and storing the relevant data and also provides a means for communicating to some extent with the *Speech Analyzer* tool used for making the transcriptions. Figure 5 below shows the various features that can be controlled from the "Phontest" form.

[13] hence the name of the form "Phontest"

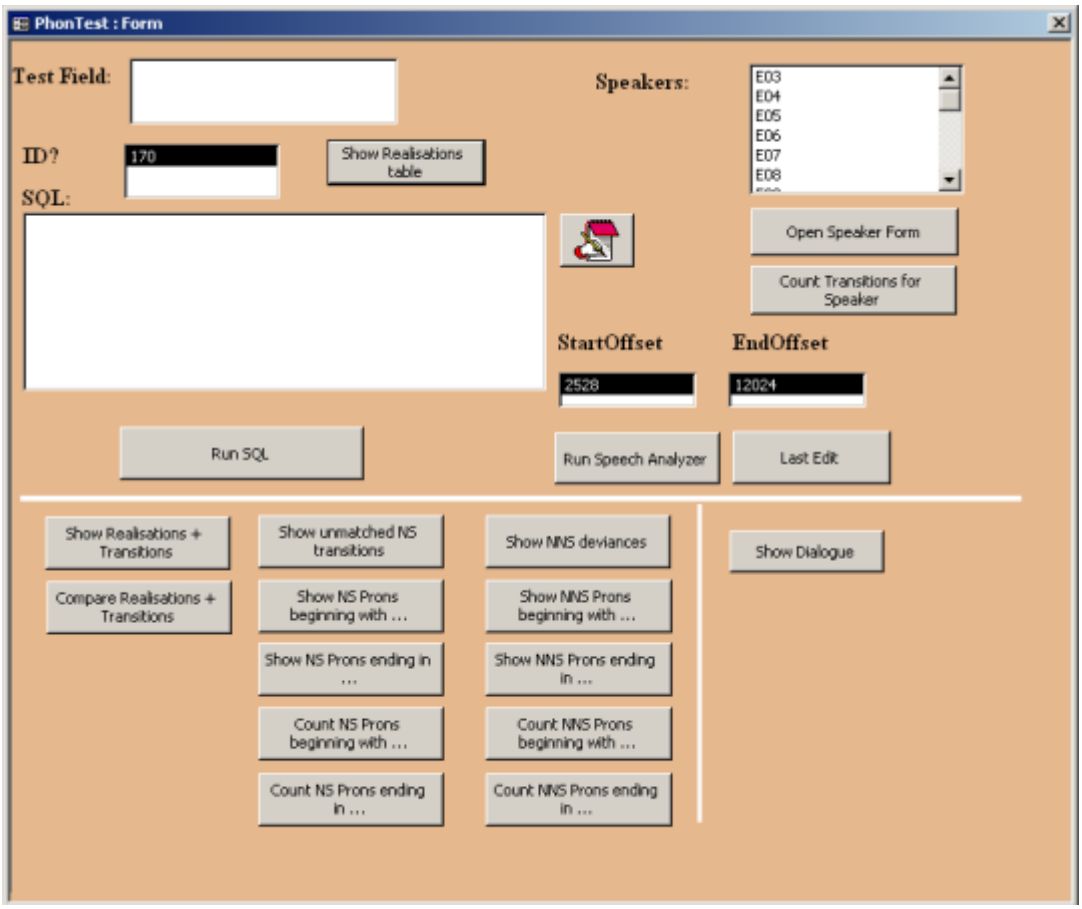

Figure 5 – The ‘control centre’ for the “Dialogues” database.

The listbox in the top right-hand corner of the form allows the user to select a speaker from the list (table) of speakers and, by clicking on the button immediately below it, open a form that displays all the realisations for this particular speaker. This way, not only can the same form be reused in order to keep the size of the database small and therefore the application more responsive, but it also saves the user from the task of having to find and open the appropriate form from within a potentially rather long list of speaker forms. One further feature is that if the “ID ?” field on the top left-hand side has also been clicked on, the form also opens displaying the word associated with this particular ID, which the user can designate in a table called “Last Edit”, which allows the user to store details of which speaker transcription has last been edited, apart from containing byte offsets into the soundfile associated with the last edit

position for this particular speaker. If the ID is not selected, the form simply opens displaying the first word for the speaker in the "Realisations" table.

Once a speaker has been selected on the main form and the two textboxes below the labels "StartOffset" and "EndOffset" have been clicked, clicking the "Run Speech Analyzer" button will start the *Speech Analyzer* program with the complete soundfile for the selected speaker, and zoom into the waveform at the point designated by the two offset values. This saves the user a few very time-consuming steps:

1) starting the *Speech Analyzer*,

2) opening the appropriate file,

3) finding the desired location and

4) zooming into the waveform.

Once the *Speech Analyzer* is running at the appropriate position and the Realisations form is opened for the speaker, the user can also edit the current realisation on the form and then switch back to the waveform by clicking the "Switch to Speech Analyzer" button (see Figure 4, top), which will activate the analysis application, automatically advance to the next annotated chunk and play it back.

The "Phontest" form also provides quick access to any ID in the "Realisations" table by selecting an ID in the "ID ?" field and clicking on the "Show Realisations table" button to the right of it. This is extremely useful if consecutive realisations for a particular speaker need to be extracted in order to find examples of special occurrences, or simply if one wants to gain quick access to all the realisations by all speakers without having to find the realisations through a form, e.g. when a feature such as a transition needs to be relabelled. The "Show Dialogue" button on the bottom right-hand side similarly gives quick access to the dialogue table, either showing the first occurrence of a particular word within the dialogue if the "Test Field" in the top left-hand corner

of the form contains a word, or simply showing the beginning of the table. This feature is sometimes useful if one wants to verify the context of a word quickly or simply count how often a word occurs in the dialogue, in which case the user needs to have the word in the “Test Field” box, open the “Dialogue” table displaying the word and then using the “Filter by selection” option for the field in the table, which will them only show occurrences of this particular word plus their corresponding IDs.

Most of the other functions accessible form the “PhonTest” form relate to displaying forms or running queries on the database in order to perform specific analysis tasks easily and are therefore best discussed in the appropriate analysis sections further below. The only other more general type of functionality provided by the form is the “SQL” textbox, which allows the user to type in or import an SQL query in order to test or modify it quickly. This is particularly useful for complex queries that need to be run repeatedly for different speaker populations or multiple speakers, in which case the textbox can be used to search and replace references to input fields or queries[14]. Below is an example of an SQL query that extracts and counts all the occurrences of words that have been deleted completely by the native speakers and also lists their associated tags:

```
SELECT [NS PronOccurrences].Word_ID, [NS PronOccurrences].Word, [NS
PronOccurrences].CountOfRealisation, Tagset.Tag
FROM [NS PronOccurrences] INNER JOIN (Tagset INNER JOIN Dialogue ON
Tagset.Tag_ID = Dialogue.Tag_ID) ON [NS PronOccurrences].Word_ID =
Dialogue.Word_ID
GROUP BY [NS PronOccurrences].Word_ID, [NS PronOccurrences].Word, [NS
PronOccurrences].Realisation, [NS PronOccurrences].CountOfRealisation,
Tagset.Tag
```

[14] Search and Replace is not available in the SQL view of a query in Access, so that the query can only be changed step by step by replacing each occurrence of the text to be replaced manually.

```
HAVING ((([NS PronOccurrences].Realisation) Like "[*]"))
ORDER BY Tagset.Tag;
```

By changing all references to the input query “[NS PronOccurrences]” to “[NNS PronOccurrences]” and clicking the “Run SQL” button, the same information can be extracted for all the non-native speakers. This mechanism is similar to the reuse of the “Realisations” form described earlier and again keeps the size of the database low, as well as saving the user from having to painstakingly recreate the new query. Clicking the “Run SQL” button simply takes the SQL text from the textbox and rewrites an existing query with it. In cases where one needs to repeat the same operation more often, though, and especially if it is possible to make use of an existing list, such as the one in the speaker listbox, it is generally advisable to allow the user to select an item from the list and then rewrite the query based upon that item. An example of this is the use of the button labelled “Count Transitions for Speaker” below the button that opens the speaker form.

4.6.2. The F_0-Database.

The second database contains information about the pitch patterns and ranges used by the individual speakers, plus information linked to prosodic speaker behaviour at sentence endings. Whereas the first type of information consists of numerical data that can be used for statistical purposes, the second type represents information based upon the visual observation of pitch contours. As pointed out earlier, though, due to limitations of time in the present study, no full-scale analysis of this part of the data was possible and the implementation of the database is not quite complete.

The F_0-file tables contain all the data for each individual speaker that were first successfully converted into textfiles from the binary files created by the *Speech Workstation’s F_0-Tracker*, and which were then imported into the database. The three fields they are made up of are ‘Sample’, representing the time at which the ‘F_0-value’ (se-

cond field) was read, the value of the fundamental frequency at this given time, and 'Frequency', representing the number of 5 msec intervals the sample value remained constant. Table 5 below gives an illustration of the data.

Sample	F0 value	Frequency
1	-1	20
21	285	2
23	296	5
28	-1	56
84	347	15
99	363	6
105	380	6
111	363	10
121	307	5
126	266	1
…	…	…

Table 5 – A sample extract from an F_0-frequency table.

The second record in the above table shows that this particular speaker's fundamental frequency at 110 msecs into the dialogue had the value of at 285 Hz, which remained steady for two sample intervals, i.e. 10 msecs, before rising to 296 Hz.

These tables can be used to establish a variety of statistics concerning the intonation of both native and non-native speakers, such as computing the overall pitch range of the individual speaker, finding out whether there is something like a "neutral pitch" region (similar to the concept of the "neutral vowel" /ɘ/) and whether there are major differences or similarities between native and non-native speaker pitch-range and -pattern usage.

So far, this information has only been used to run some limited statistical analyses, computing F_0 maxima and minima and overall pitch range for each individual speaker. However, a preliminary analysis using t-tests has already shown that the difference in overall pitch range between the native and non-native speakers is not significant (a. $p=0.391508$; b. $p=0.517730$). The results were computed on two different ranges, the first one excluding all frequency values below 70 Hz, because my original assumption was that all values below this threshold may represent artefacts of the F_0-extraction.

The second one was added later after I had discovered that both speaker populations use a considerable amount of creak in their realisations, so that values below the threshold may well be important. If we exclude the potential effects of creak and look at the filtered minima, there seems to be a slight tendency towards divergence in the frequency band between 70 and 90Hz, with the non-native speakers having slightly lower starting points. However, this still remains outside the 5% boundary for statistical significance (0.055970).

In order to verify exactly where the differences might lie, the tests were also performed individually for groups of male and female speakers. Regarding the filtered minima for the male speakers, there again seems to be a tendency towards statistical significance (0.068260). The same does not seem to apply to the female speakers, though, who instead show significant differences below the 5% level for both the filtered and full ranges (0.021333, 0.033556) and the unfiltered mean (0.033918). However, while this in general indicates an exploitation of a greater pitch range by the female non-native speakers, the main difference seems to be due to the their higher maxima, appearing rather uniformly at 400Hz, with only one speaker (G05) below this, at 380 Hz. This would therefore indicate that, at least as far as overall pitch range is concerned, it is more the female German speakers who ought to sound 'un-English' to some extent. Yet it remains to be seen from further analysis whether there may be significant differences in the way that the native and non-native speakers employ specific pitch ranges for specific purposes or whether the pitch movements employed by the German speakers show higher dynamics.

The database also contains a table with sentence definitions, which identify each sentence by its start and end points. In order to be able to verify which sentence is referred to by which ID, there is a "Sentence Definitions" form, with a "Show Sentence" button that, when clicked, runs a query that retrieves and displays all the words contained in the sentence from the "Dialogue" table. Further fields associated with each sentence ID are "Sentence category", which lists whether a particular sentence

contains a question, statement, etc., and “Pragmatic Force”, which shows which particular type of *dialogue act* (see Leech et al., 98: p. 57ff & Leech/Weisser, ‘01) is associated with the sentence, e.g. *request*, *reply*, etc.

The ID of each sentence is linked to tables for each individual speaker that contain information about the pitch contour at the end of the sentence. This was set up in order to be able to compare the use of pitch contours for different sentences and different speakers. The definitions for types of pitch contours are held in the “Contour categories” table. Essentially, this setup allows the user to run union queries for native and non-native speakers, just like in the “Dialogues” database and then perform comparisons between the populations. Due to a lack of time, though, this has not been implemented yet.

One further potential addition that could easily be implemented here is to link in the partial recordings for each sentence and speaker, so that they can either be played back from within the database or opened using the *Speech Analyzer* in order to verify contours.

5. Preliminary Indicators of Difference.

In the following section, I will present some of my preliminary observations, gleaned from superficial analyses of the data or observations made during transcription of the data. These are to form the basis of a series of research questions that I will try to elaborate on in later sections, after having performed more in-depth statistical and phonetic analyses.

5.1.1. Overall Length of Dialogues

One thing that is immediately obvious from looking at the overall length of the dialogues as realised by native and non-native speakers is that for the non-native speakers, the dialogue realisation is on average nearly 9 seconds longer.

a) non-native speakers: 85,672.20 msecs

b) native speakers: 76,938.00 msecs

While in everyday life terms 9 seconds may not actually amount to much, in terms of phonetic features it represents a rather long time span, in the case of the dialogue actually at least the length of about three sentences. This difference seems to be a very important distinguishing factor between native and non-native speakers, despite the fact that it is statistically not significant (p=0.081995) according to a t-test performed on both complete populations. However, this apparent paradox is easily explained when comparing the differences between the averages of the male and female sub-populations. Here, we can easily see that, on average, the female non-native speakers take about 15 seconds longer than the female native speakers, but that the situation is reversed for the male speakers, with the male non-native speakers being almost 7 seconds faster in their delivery. Overall, this seems to have a balancing effect on the total populations, which explains why the variances show no significant differences.

Looking again at the variances between the sub-populations, we can also see that the average 7 second difference in the male populations, perhaps surprisingly, is not sufficient to cause any statistical level of significance (p=0.397457), but that the average difference between the female populations is a highly significant one, approaching 1% (p=0.013121).

These observations raise the question of what this variability may be due to. It may intuitively be tempting to assume that the overall dialogue length for the female non-native speakers is higher because they would show more features of hesitation, i.e. have a higher incidence of repetitions, corrections and false starts, and that their speech generally exhibits longer pauses and in more places than that of the female native speakers. Conversely, we would then have to assume that the male non-native speakers may actually be more 'fluent' speakers. However, as far as the length and frequency of pauses is concerned, these assumption are potentially very dangerous and misleading ones, as they do not take into account the fact that pausing in the right places is actually a rhetorical skill. In other words, although we may easily be able to quantify both the numbers and the length of the individual pauses made by each speaker, it still remains a question of qualitative analysis to determine whether a pause in a particular position and of a specific duration can be regarded as a feature of 'disfluency' on the part of a non-native speaker or not. Conversely, it may actually be necessary to investigate whether the female native speakers do actually exhibit a higher level of rhetorical skill than the female non-native speakers, whether this is in any way essential to them in order to make themselves understood better and whether the male native speakers are then any more or less skilled because they take longer in their delivery.

Developing a better concept of the level of rhetorical skill that is indeed necessary to communicate in everyday-life situations is something that always seems to have been neglected in both language teaching and assessment (c.f. 2 above). Although the notion of *comfortable intelligibility* (c.f. Kenworthy, '87: p. 3) – albeit a still relatively

ill-defined one – seems to be becoming increasingly important in teaching circles, the criteria employed in language testing and assessment discussed in 2.1 still clearly reflect the idea that non-native speakers are expected to possess a comparatively strong rhetorical competence, which more or less seems to exclude any scope for disfluency features. What this means effectively is that non-native speakers are expected to be more skilful speakers than native speakers, who frequently show disfluency features, as demonstrated by various studies in the realm of Language Engineering that deal with issues of intelligibility for speech recognition systems. For example, research carried out on the ATIS (Airline Travel Information System) project by Wang and Hirschberg, who report that:

> "The quality of the ATIS corpus is extremely diverse. Speakers range in fluency from close to isolated-word speech to exceptional fluency. Many utterances contain hesitations and other disfluencies, as well as long pauses (greater than 3 sec. in some cases)." (Wang/Hirschberg, '92: p. 12).

This point about native speaker variability seems to be confirmed by the fact that variability amongst the native speakers in my data is greater than amongst the non-native speakers, which seems to indicate that the latter are actually more rhetorically skilled. This is rather surprising, considering the fact that most of my native speakers informants were actually teachers of English. Nevertheless, the difference in consistency is clearly reflected in the measures for standard deviation and it remains to be investigated why this is so:

- native speakers: 10,054.47 vs.
- non-native speakers: 8,558.94

However, should it turn out that the differences are not actually due to a difference in rhetorical skill, i.e. that a more qualitative analysis will reveal that both native speakers and non-native speakers use pauses of comparable length in the same places, then

this would point towards distinct differences on the segmental level, e.g. possibly the failure of non-native speakers to reduce unstressed syllables properly. Interestingly enough, though, preliminary observations based upon partial transcriptions show that the non-native speakers do use weak forms in most places where they would also be expected from native speakers and that one the main differences may actually lie in the fact that the native speakers' reductions are not only reductions in quality, but to a large extent also in segmental duration. In other words, the native speakers tend to produce weak forms that are relatively shorter than the weak forms of the non-native speakers, often to the point of (near-)elision of reduced vowels.

5.1.2. Setting

Another feature that became apparent during my transcriptions is that there is more evidence of creak or creaky voice in the non-native speaker realisations. This initially made me think that there may be a particular articulatory setting associated with non-native speaker productions, as there often seem to be a certain amount of tenseness in their voices, which, if I try to imitate it, automatically makes me constrict my pharynx. This would tie in with an observation made by Honikman, who, in her article on articulatory settings, points out:

> "With regard to the pharynx, this is generally relaxed in French and English, there being no contraction of the pharyngeal muscle, whereas in Arabic, and frequently in German (especially in men), pharyngeal contraction is usual." (Honikman, '64, p.79)

Wells, however, seems to interpret creaky voice as a laryngeal, rather than a pharyngeal setting:

> "Larynx settings can be divided into three groups: phonation types, pitch ranges, and loudness ranges. Among phonation types (Catford 1964), as well as the obvious 'voiced' and 'voiceless' states of the glottis, important possibilities include 'creak' (which can be combined with voice as 'creaky voice') and murmur (also termed

> 'breathy voice'). Obviously no variety of English uses either creaky voice or murmur to the exclusion of ordinary voice; but some accents do seem to tend to use particular special phonation types as frequent options, or in particular phonetic contexts (including their use as part of particular intonation patterns). Thus Norwich working-class speech has been described by Trudgill (1974a: 186) as having a tendency to use creaky voice, while Norwich middle-class speech shows no corresponding tendency; on the other hand it has often been pointed out that RP-speaking men tend to go into creak towards the end of an utterance spoken with a low fall nuclear tone." (Wells, '82, p. 92).

Whether the tenseness in the non-native speaker voices represents a pharyngeal or laryngeal setting, it is quite clear that the non-native speakers do something that is related to the back part of the oral tract. From Wells' description, it is also clear that this feature may be one that is sometimes associated with accents of lower social status, apart from the exceptional realisations in RP. If this were the case, then this would a) support my earlier assumption that often particular features of non-native speaker speech are similar to less-accepted features of native British accents and b) potentially represent a strong distinguishing feature between native and non-native speaker accents.

One possible explanation for this type of setting, if it can really be referred to as such, is that it may be due to insecurity or bad planning strategies, i.e. 'running out of steam' in longer utterances or a general nervousness of the non-native speakers.

6. Transcription of the Data.

After the digitisation of the recordings, the next step in the analysis was to produce transcriptions. As the databases are meant to incorporate both segmental and supra-segmental information, at this point it became important to decide which levels of transcription were to be included in the analysis and which degree of detail the individual transcription levels should incorporate. As a basic rule of thumb, one would probably assume that the analysis should incorporate as much detail as possible, bearing in mind that each further level of detail, while undoubtedly enriching the transcription, could also potentially distract the analyst from arriving at a suitable level of abstraction, apart from increasing the amount of time and effort to be spent on the analysis.

6.1. Transcription Issues.

The first question in dealing with levels of transcription is which levels are needed or desirable in order to perform an effective analysis. The basic design of the "dialogues" database already makes provisions for two of the possible levels of analysis by providing an orthographic representation of the dialogue in one table and associated grammatical tags in another, should it prove interesting to look at segmental and supra-segmental features occurring with specific types of words or in particular syntactic contexts. What therefore remained to be implemented were the phonetic/phonological and suprasegmental levels.

6.2. Phonetic vs. Phonemic Transcriptions.

On the phonetic/phonemic level, a decision had to be made on which level of detail should be included, and I originally began to transcribe the materials as a rough phonemic transcription, particularly because the original transcriptions were implemented using the DOS-based LSI Speech Workstation (see 4.4. above). When I later began re-

transcribing the data using the Windows-based Speech Analyzer, where I was able to use a phonetic font including diacritics, I decided to switch to an enriched, more phonetic type of transcription, which was later to be transferred into the database. This added information, however, necessitated the implementation of filtering mechanisms inside the database, so that the data could be displayed showing different levels of detail in order to be able to arrive at a basic set of rules for the patterns exhibited by both native and non-native speakers.

The use of the word *filtering* in this context may necessitate some explanation. In standard database terminology, a filter applied to some data is normally a mechanism whereby a *selection* can be made from the data in order to display only data that comply with certain *criteria*, such as all *records* that contain (or do not contain) a *field* with a certain value. This represents a convenient way of displaying only the information required at any given time and grouping it together. Most database management systems (DBMS), such as Microsoft Access, provide various user-friendly ways of selecting and sorting data in this way, either via built-in pre-defined routines accessible via mouse-clicks, when displaying data in form of single tables, or via queries that combine data from different tables. In general, this kind of filtering is achieved by the DBMS's retrieving and displaying the relevant records via SQL (Structured Query Language), thereby keeping the original values stored in the database intact and displaying a subset. My use of the word filtering above, though, relates to the action of creating copies of the original data, which can then be manipulated by *parsing* the data, removing unwanted symbols (mainly diacritics) and displaying the data in a form that represents a higher level of abstraction.

As the description of differences between two speaker populations, especially where one is a non-native one, automatically necessitates the use of a more complex set of symbols in order to be able to describe fine nuances, the more conventional set of phonemes generally used for the transcription of RP was clearly not sufficient. I therefore had to make recourse to symbols from the full IPA character set, which I have – to

some extent – also had to refine/redefine, in order to be able to describe the differences between the populations. Thus, for instance, I use the symbol for the central vowel [̈] to represent a quality, mainly produced by the non-native speakers, which is more close and front than a shwa, in other words closer towards cardinal 10 [ɵ]. Another symbol that is sometimes used in an unconventional way is the diacritic that is commonly used to indicate devoicing [̥] to indicate a weakening of a glottal onset in word-initial positions.

7. The 'Reference Model'.

The following section discusses the details of the 'reference model', i.e. describes the features an ideal model/methodology for assessing speaker performance needs to include and how they can be implemented in a database structure.

Obviously, such a reference model would have to be a multi-tier one, incorporating a number of different features, both on the segmental and supra-segmental level, as concentrating on purely segmental features would completely miss out on features of rhythm, stress and intonation that may affect the rules of production on the segmental level. In other words, ignoring suprasegmentals is most likely to lead to incomplete explanations.

An 'old-fashioned' segmental way would probably have been to simply use a general pronouncing dictionary and compare the pronunciations of the non-native speakers to the relevant entries in this dictionary in order to find any deviances. This could easily be achieved by setting up a dictionary table in the database, linking it to the non-native speaker realisations via the words in the dialogue and then running a program that compares each native speaker realisation to the relevant entries in the dictionary and flags all deviant forms. However, although this could certainly be part of a valid solution towards establishing deviant realisations, there are various problems with this approach. General pronouncing dictionaries, i.e. those generated for non-Language Engineering purposes,

a) tend to be based upon established pronunciation models, such as RP or GenAm, which may only reflect the pronunciation of a minority of native speakers, although they may additionally contain some accepted regional forms (cf. Wells, '90, viii).

b) seldom contain any kind of information about contextualised forms, apart from possibly including such features as assimilation in compounds (c.f. Wells, '90, ix).

A good starting point would therefore be to find a way to quickly and reliably compare the two sets of pronunciations as generated by both native speakers and non-native speakers in order to detect specific recurring features in the speech behaviour of the non-native speakers that are in some way deviant from those of the native speakers, as well as identifying specific tendencies in native speaker pronunciations that might indicate deviation from established (teaching) norms.

7.1. Setting Up a 'Pronouncing Dictionary'

The first step in setting up a list of realisations by the native speakers would be to generate a list of all the realisations for a given word in the dialogue. Using a relational database, this is relatively simple task that can be achieved by extracting the relevant data via queries and producing lists of realisations that can then be linked to the orthographic word forms in the "Dialogue" table. This way, we arrive at a list of different realisations for each word in the dialogue. This list can then be filtered[15] again, depending on whether one might want to see all realisations of a particular word at once or only those realisations occurring in particular context, i.e. in a particular position in the dialogue. Frequency counts on the realisations in general and in specific environments in particular can then be used as indicators towards certain patterns exhibited by the native speakers. Using a 'live list', as it were, provides far better options for analysis than simply using a dictionary compiled from the native speaker realisations as not all the context forms have to be listed for all environments, but rather are available whenever a comparison is made, thus simplifying the list of realisations by reducing their number according to the context.

[15] in the traditional database sense discussed in 6.2.

This method of creating a reference pronunciation provides a far more objective alternative to the common ‘tradition’ of referring to a rather abstract and unnatural entity termed “RP”, as was for example done by Wieden/Nemser in their study, which I discussed in my chapter on previous research. I am hereby of course not referring to RP as it is described and defined by Wells (1982), but rather to the non-existent standard taught to learners of English. This is loosely based on RP, but with the modification that it also seems to incorporate the avoidance of all the pitfalls foreign learners might be subject to if they do not respect the principles Gimson (1962 and later) puts forth in his *Introduction to the Pronunciation of English* in the sections called “Advice to Foreign Learners” discussed above.

The list of native speaker realisations was obtained by extracting all their realisations from the ‘flatfile’ table mentioned above by using an SQL Union Query. SQL Union Queries are normally used to combine data from different tables, but in this case provided the only solution to retrieving similar data from the same table, including duplicate Word_IDs. Shown below is the syntax for the Union Query used to extract the native speaker data:

```
SELECT [Word_ID], [E03] AS [Realisation]
 FROM [Realisations]
 UNION ALL SELECT [Word_ID], [E04]
 FROM [Realisations]
 UNION ALL SELECT ALL [Word_ID], [E05]
 FROM [Realisations]
 UNION ALL SELECT ALL [Word_ID], [E06]
 FROM [Realisations]
 UNION ALL SELECT ALL [Word_ID], [E07]
 FROM [Realisations]
 UNION ALL SELECT ALL [Word_ID], [E08]
 FROM [Realisations]
```

```
UNION ALL SELECT ALL[Word_ID], [E09]
FROM [Realisations];
```

Having extracted all the realisations, I was then able to set up aggregate queries allowing me to count the different realisations for each word automatically.

7.2. Handling Context & Weak Forms

One of the advantages of not simply comparing data to a general pronouncing dictionary is that weak forms are not actually an issue at all, as most of them will be clearly observable from the realisations of the native speakers. In other words, when comparing native and non-native speakers, the weak forms produced by the native speakers will in most cases be an indicator as to which weak forms those non-native speakers who want to achieve near-native-speaker competence should be aiming for.

In a similar – though not quite as straightforward – way, phonological context forms, i.e. those produced due to coarticulation, can also be handled. With phonological context forms, it depends on whether the features causing the differences occur at the beginning or end of the affected syllables, i.e. at the boundaries (such as assimilation and elision), or whether they occur in between the words, i.e. as linking elements (such as *r*s or glides), or produce the opposite effect, i.e. a hiatus (as glottal stops or pauses). The difference thus consists not in the way of comparing, but in the way of recording phenomena. Whereas weak forms will always be observable from within the realisation of the word itself in the database table, contextual forms may be recorded in either the realisation or the transition from one word to the next. Comparing context forms will then often mean that the realisations will have to be filtered as to individual occurrences, rather than looking at all the possible realisations, which makes more sense for weak forms. Figure 6 below provides an illustration of how native speaker realisations and their associated transition values can be compared to non-native

speaker realisations, at the same time identifying tendencies for both populations in the data.

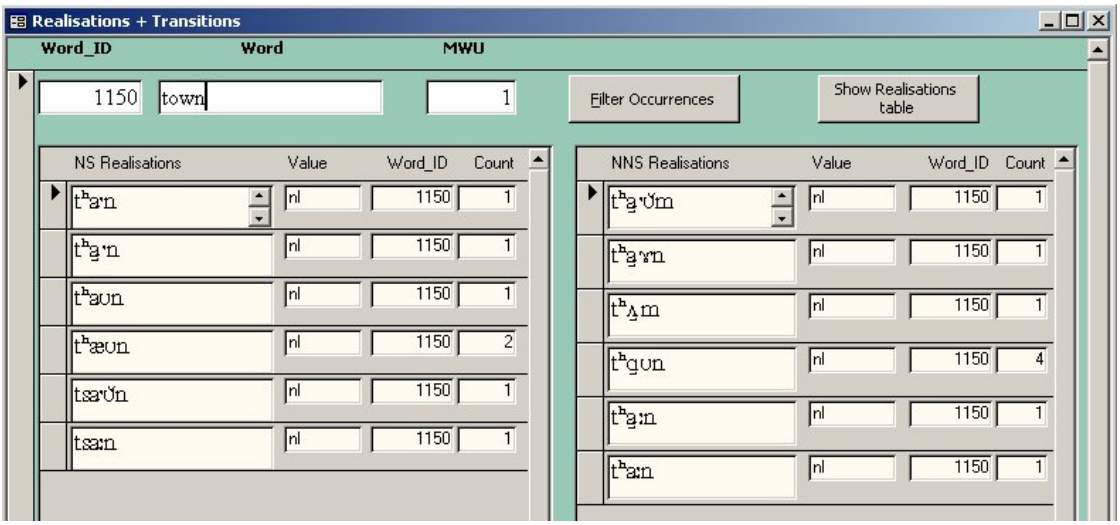

Figure 6 – A comparison of native and non-native speaker realisations for the word *town*.

In order to verify or correct 'global' details about the realisations, such as inserting additional markup, it is possible to switch to the "Realisations" table at the current "Word_ID" by clicking on the "Show Realisations table" button in the top right-hand corner. As the data displayed on this form is based on the respective Union queries that combine all speakers of a population and therefore does not show any details as to which speaker has realised a particular realisation, double-clicking on a particular realisation in either the NS or NNS speakers subform not only opens the "Realisations" table, but also finds the first occurrence of that particular realisation for that particular ID, which makes it easier to identify which speaker(s) use this pronunciation. If more than one speaker has used the same pronunciation, it can easily be copied from the first realisation and searched for using Access' *Find* functionality.

When first setting up categories for transitions between the words of the dialogue, I started out with a rather limited set of options. The original list of values is shown in the table immediately below:

Transition_ID	Value
0	none

Transition_ID	Value
1	short pause
2	medium pause
3	long pause
4	linking r
5	linking other
6	linking w
7	linking j

Table 6 – The initial set of transition values.

As can be seen from Table 6, my original concept of transitions included three different types of boundaries, apart from a relatively small set of only five simple transitional possibilities describing different options for linking or the complete absence of any linking whatsoever.

During the course of the analysis, I also expanded the set of ‘genuine’ transitional categories in order to accommodate the phenomena I observed from the transcriptions. The resulting set of transitional categories thus represents an empirically motivated refinement. In refining the set of options, I have also as far as possible tried to progress from a simple, more phonologically motivated set of categories to a more and more accurate set of descriptive phonetic categories.

Transition_ID	Value	Description
3	a+e	assimilation + elision
2	aa	anticipatory assimilation
32	aav	anticipatory voicing assimilation
11	apn	perseverative nasal assimilation
16	apo	perseverative oral assimilation
31	apv	perseverative voicing assimilation
10	coa	coalescence
14	contr	contraction
8	e	elision
30	e+l	elision facilitating liaison
29	elp	elision + long pause
28	esp	elision + short pause
33	evr	extreme vowel reduction
12	fcl	final consonant lengthening

Transition_ID	Value	Description
22	fcllp	final consonant lengthening + long pause
23	fclsp	final consonant lengthening + short pause
13	fr	final release
20	frlp	final release + long pause
21	frsp	final release + short pause
9	gsfp	glottal stop replacing final plosive
27	gsfplp	glottal stop replacing final plosive + long pause
26	gsfpsp	glottal stop replacing final plosive + short pause
17	gsi	glottal stop intrusive
24	gsilp	glottal stop intrusive + long pause
25	gsisp	glottal stop intrusive + short pause
15	h-dr	h-dropping
5	lg	linking glide
1	lia	liaison
7	lj	linking j
4	lr	linking r
6	lw	linking w
0	nl	no linking
18	nllp	no linking + long pause
19	nlsp	no linking + short pause

Table 7 – The final set of transitional categories.

Most of the categories in the final table should be self-evident, but those that may not be are discussed and clarified in the relevant sections in chapter 8 below. The one thing that should be noted, however, is that that absence of linking (category *none*) is also included as a type of transition, which strongly affects the overall calculations of transitions occurring in the data. One further feature that distinguishes the transitions in Table 7 from those in Table 6 is that part of the expansion of categories is due to the splitting-up of those categories that may potentially be followed by a pause into three sub-categories, transitions followed by no pause, by a short pause or by a long one (discussed further below).

7.3. Discourse Structuring & Cohesion.

Suprasegmental features can be compared inside the database in a similar way to segmental features, once they have been recorded as clearly being associated with a certain position inside a word or sentence. For example, stress patterns for polysyllabic words could be indicated in an additional field for each realisation that lists the number of the syllable on which the (primary) stress occurs, and potential pitch movements could be recorded in a similar way by having a field that holds a code for the direction of the movement. Issues of discourse structuring, in turn, can be analysed by comparing suprasegmental features and segmental phenomena at certain points within the dialogue, such as at sentence endings, as provided for in the F_0 Database.

7.3.1. Pauses.

The "Dialogues" database makes no assumptions about where individual pauses are realised by a particular speaker. Instead, pauses are incorporated into all those types of transitions that are not specifically linking transitions. In other words, it makes sense to assume that a transition that e.g. links two words to each other via linking glides or assimilation can by default not be followed by a pause, whereas a position where two words abut onto each other may or may not be followed by a pause. Counts of all transitions containing pauses can then easily be conducted in order to establish differences in the 'fluency' of delivery or discourse strategies.

Among the pauses, a distinction is made between short and long pauses. Short pauses correspond to minor (ˇ) tone group boundaries and are < 300 msecs, whereas long ones correspond to major (') tone group boundaries and are > 300 msecs. Pauses in general represent a potential analysis problem as they can easily be confused with closure phases for initial plosives:

> "A **silent pause** within a speaking turn can be operationally defined as any silence which is 200 msec or more in duration. The reason for setting a minimum threshold to the duration of a silent pause is that the silence associated with the closure phase of a voiceless stop can sometimes last up to 180 msec or so, depending on the overall rate of speech." (Laver, '94, p. 536)

Thus my short pauses include those parts of the speech signal that are approximately 100 msecs longer than the closure phases of plosives on their own, but may incorporate them, and long pauses represent any absence of a signal that is above the length of a short pause.

7.3.2. Final Release & Lengthening.

In the phonetics literature, sometimes the term *final aspiration* can be encountered, referring to the release of a consonant in word- or – even more generally – utterance-final position. However, agreeing with Laver, '94 (p. 348 ff.), I prefer to use the term *final release*, restricting the use of the term *aspiration* to mean a delay in voice-onset time between the end of a consonant and a following vowel, which is obviously not applicable in utterance-final position. In addition to its application to utterance-final consonants, I also use the term to refer to a kind of whispery offset to relatively short vowels.

Final release in my transcriptions is either indicated as a transition of a word on its own, or at the end of a phrase or sentence. This makes sense because it can usually be seen as a special transition into a pause/tone group boundary, i.e. akin to final lengthening in general, or as a feature that attracts attention to a word, so as to make it stand out from all the other words around it. In this latter case, it may signal a special emphasis on this particular word and also give the auditory impression of a prosodic break despite the fact that there is a continuous, uninterrupted speech signal present.

Although final release may seem a very simple phenomenon to identify, both auditorily and instrumentally, it can nevertheless easily be confused during segmentation of the speech signal as it may introduce a kind of auditory clipping effect. This effect may make it appear similar to utterance-final stød (c.f.8.1.6 below), or even a full glottal stop, especially if the final element is a vowel with either creaky or whispery quality.

Final lengthening, on the other hand, may take one or more forms, only one of which is actually marked as a transition category. This explicit category is the category of final consonant lengthening, whereas final vowel lengthening – i.e. final lengthening in the more traditional sense – can so far only partially be recovered if phrase or word-final elements have been transcribed including lengthmarks. Should this feature turn out to be a relevant analysis point, additional fields in an extra table could be associated with all such final elements and also be used to indicate whether there may be final lengthening perceptually although the use of lengthmarks is not yet warranted.

7.3.3. Pitch and Turn-taking/Dialogue Strategies.

Apart from the general F_0-measurements stored in the F0 database, it is intended to include stylised transcriptions of pitch derived from the F_0-curves, at first only taking account of sentence endings. This should allow for identification of turn-taking or continuation strategies used by the native speakers and the detection of discrepancies in the turn-taking behaviour of non-native speakers.

In a similar way to the “Realisations” table in the “Dialogues” database, though, it would also be possible to associate potential pitch movements with all individual words in the dialogue for each individual speaker, in order to investigate the intra-turn behaviour of a speaker, i.e. in order to see which strategies a speaker employs e.g. for representing lists and other cohesive structures.

7.3.4. Stress, Accent and Prominence.

Stress on words in the "Dialogues" database is indicated in the form of the more traditional stress mark systems used to identify word stress, where [i]ndicates primary and [s]econdary stress on lexically and acoustically prominent syllables. As marking stress for all words in the dialogue would be extremely time-consuming, stress-marks could only be incorporated for some words that may form a part of multi-word units, such as compound nouns and set phrases, and for selected deictica where it is interesting to observe patterns of accentuation and de-accentuation on the word- and sentence level.

Stress patterning may be an important feature distinguishing native from non-native speakers, as the latter are still often unaware especially of patterns of de-accentuation in English because these do not normally form part of the language-learning curriculum. Instead, non-native speakers are generally drilled far too much to 'respect' correct word stress in order to distinguish word classes from one another, and are only taught about sentence stress according to examples like the following from Kenworthy, '87:

> "A: There's plenty of salt.
>
> B: There isn't any salt on the table." (p. 11)

After citing the example, she then goes on to describe the phenomenon in the following way:

> "Speakers often decide that they want to give more prominence to a particular word. A word may be given less weight because it has been said already, or it may be given more weight because the speaker wants to highlight it. In the above conversation, B would probably give extra stress to 'table', meaning: 'There may well be salt, but I want to point out to you that there isn't any in a particular place – on the table.' This aspect of pronunciation is called s*entence stress*." (ibid)

Apart from being a somewhat odd example as stress on "table" would be extremely unnatural without at least having 'sentence stress' on "isn't" as well, Kenworthy's description is rather to narrow and simplistic because it

a) does not point out any correlation between word and sentence stress,

b) seems to imply that sentence stress can be applied almost randomly to any item that the speaker wishes to give prominence to and thus 'downgrading' all other elements in the sentence, and

c) conversely seems to imply that the kind of de-accentuation Kenworthy refers to as "given less weight because it has been referred to already" also seems to occur in isolation, rather than being governed by contextual possibilities.

Especially point b) is very reminiscent of previously discussed (see 3.1.2) slightly misguided descriptions on focussing.

Confusions of the issue of prominence on word and sentence level may stem from the fact that in much of the teaching literature to date, too much emphasis has always been placed on the notion of word stress referred to above, without trying to come to terms with the real issues involved in identifying the reasons for prominence, i.e. that it is generally governed by a complex interplay of structural possibilities with regard to syntactic constraints and 'pragmatic foregroundability', issues of cohesion and intentionality on the part of the speaker.

However, apart from the general issues of which parts of a sentence can actually legally be given prominence in English, there is still the issue to consider, whether the non-native speakers may not actually either be introducing additional patterns based on L1 interference or on some kind of learner intra-language.

Most books that deal with prominence, probably with the notable exception of Ladd, '96 and some others, deal with stress-related prominence in only a more theoretical

fashion, a way that relies more on the perception and intuition of the authors, rather than paying attention to any actual phonetic features. However, for a proper analysis one would also need to investigate physiological correlates, such as amplitude, magnitude[16] and sonority to try and identify elements that are given prominence in the sentences of the dialogue. Once points of prominence have been identified this way, they can be compared to points of accentuation, i.e. those points in the sentence where the speakers actually realise a pitch accent.

7.3.5. Cohesion and Prominence.

This part of a potential analysis relates to patterns of accentuation vs. de-accentuation as already referred to above and aims to investigate whether both native and non-native speakers consistently de-accentuate previously mentioned items or other items that do not represent focal points in the sentence. The comparison between native and non-native speakers should then help to identify deviant and potentially misleading patterns used by the non-native speakers.

[16] Sometimes also referred to as *RMS amplitude*. I am using this term here because it corresponds to the relevant plot produced by the Speech Analyzer software. It is described in its help file as follows: "The MAGNITUDE plot shows the contour of the absolute amplitude of the Waveform. The Amplitude plot is sometimes mistakenly called the Loudness plot. Loudness, however, is a perception of the physical amplitude of a wave form. This plot is smoothed so as to take out some of the noise in the Waveform."

8. Analysis: A Revised Evaluation Model.

In this chapter I will present part of the originally intended analysis, focussing mainly on the analysis of features on the segmental level. The starting point for the analysis will in most cases be a discussion of tendencies observed from the realisations of the native speakers. Those tendencies are then contrasted with the tendencies discovered in the realisations as produced by the non-native speakers and any discrepancies and possible solutions as to how non-native speakers could be taught to avoid them – should it be necessary to do so – pointed out.

8.1. Segmental Features

At the segmental level, the first step in the analysis is to evaluate the productions by the native speakers in the light of established teaching models and representations in pronouncing dictionaries. The native speaker tendencies observed from this analysis may then be used to establish a realistic teaching model which may be deemed representative of native speakers of a particular educational and age background with respect to overall pronunciation features. Such a model also has the advantage of being more or less free of any ideological bias about which particular accent should be taught to foreign learners and which features of real, i.e. non-rhetorical, speech should be permissible for both native and non-native speakers. Having established such a model, the realisations by the non-native speakers can then be compared to it to see whether the latter are markedly different in some respects and whether the differences may serve to explain what constitutes any particular accent the non-native speakers may be exhibiting.

I will begin my attempt at developing a reference model for the segmental level by looking at issues affecting the realisation of consonants in context.

As far as consonant-related features are concerned, we can distinguish between two different categories of phenomena,

a) those phenomena that are generally regarded as 'non-standard' usage and therefore often stigmatised, such as h-dropping, the use of glottal stops, etc. and

b) those phenomena that are deemed acceptable features of connected speech, such as assimilation, elision, etc.

As already pointed out in 7.2 above, on the segmental level, there are basically two different types of data to analyse, data related to phenomena occurring within words, where I will concentrate on the following features

a) weak forms & peripheral qualities

b) triphthongs, diphthongs & monophthongs

c) Unusual or old-fashioned qualities,

and to phenomena occurring between words, i.e. relating to transitional effects[17]

a) h-dropping

b) assimilation

c) coalescence

d) liaison

e) linking- & intrusive-r

f) (avoiding the) hiatus

g) contraction

[17] obviously, many of the effects listed here can also apply within words, so that the boundary between them and transitional features as I discuss them is not absolutely clear-cut.

h) elision/deletion

i) non-linking transitions

j) l-vocalisation or -elision

k) syllabic consonants

l) rhoticity.

For consonants, most of the relevant phenomena belong to the latter type and that is why the main part of my analysis concentrates on them.

In analysing transitions, we are concerned with two different types of results:

a) to establish the features occurring as transitional effects and their raw frequencies for both groups of speakers in order to determine whether the native and non-native speakers employ different sets of rules affecting their realisations

b) to what extent the transitions used by both groups of speakers represent indicators of potential differences in the levels of (dis-)continuity and what effect these might have as to the perception of 'nativeness'.

Regarding b), it is especially important to realise that – at least in ordinary speech – in categorising transitions, we are not necessarily dealing with absolutely discrete categories, but rather phenomena that represent a gradual continuum from a maximum discontinuity, such as in full pauses, to the kind of maximum continuity achieved by linking processes such as liaison or assimilation. Furthermore, it is also necessary to realise that there need not be a one-to-one mapping between the type of transition and its effect on continuity, as we shall see in the discussion of elision (see 8.1.8 below).

Throughout my discussion of transitional phenomena, I will to some extent support the tendencies I have observed by some rough percentage figures drawn from aggre-

gate sums of my annotation of transitional features. However, the reader should always bear in mind that these figures can only be seen to describe tendencies as the overall number of speakers does not allow for any statistically valid conclusions to be drawn and also because some of the transitional categories may potentially still be improved upon. Graphs detailing the percentages for all the individual transition categories and combined/grouped categories respectively are given in Appendices B and C.

8.1.1. H-dropping.

H-dropping, although relatively frequent in more informal speaking styles and widespread throughout almost all regions of England (cf. Hughes/Trudgill, '87 & Wells, '82 Vol. 2), is still considered one of the great shibboleths in language teaching and only considered acceptable in unaccented positions and mainly for function words:

> "In many types of popular regional speech in England and Wales, and in Australia, /h/ is lost, so that no distinction is made between such RP minimal pairs as *hill, ill; high, eye; hair, air*. […] Such loss of /h/ is usually considered characteristic of uneducated speech, but certain function words (especially *have, has, had*, pronouns and prono-minal adjectives) frequently lose /h/ in RP in unaccented, non-initial [sic?], situations in connected speech […]." (Cruttenden, '94, p. 174)

It is therefore interesting to observe whether especially the native speakers do stick to this 'rule' or may actually deviate from it in some way. As h-dropping is defined as one of the transitional categories, it is relatively straightforward in the database to count all its occurrences, although some forms of elision of /h/ may be obscured by other phenomena, such as perseverative nasal assimilation after elision, such as in *don't have* (ID 870-890) being realised as [d, Unn«v] [18] by speaker E07. Problems of

[18] the [,] represents the quality referred to in 6.2, which in general tends to be more characteristic of non-native speakers.

this kind could, however, be avoided if the transition categories were constantly refined to incorporate a higher level of detail, and thus only represent problems related to the particular state of implementation of my methodology for this thesis.

Possible candidates for h-dropping in the dialogue are the words listed in the table below, together with their overall occurrence in the dialogue and the number of realisations by native (NS) and non-native speakers (NNS). Actual occurrences of h-dropping are listed in the relevant columns, with the number of potential realisations indicated after the forward slash. Cases of 'h-dropping' that occur as part of other phonological processes, such as contractions or perseverative nasal assimilation (see 8.1.2 below for the definition), are indicated in round brackets.

Word	frequ. in dialogue	NS	NNS
hall	1	0	0
have	5	4/35 (1x perseverative nasal assimilation, 1x contraction)	0
head	1	0	0
help	1	0	0
here	1	0	0
hill	1	0	0
hope	1	3/7	0
how	2	0	0

Table 8 – Potential candidate words for h-dropping

As is immediately obvious from the above table, both native and non-native speakers generally avoid h-dropping, although there is some incidence among the native speakers, especially for the high-frequency word *have*. What is interesting about this frequency list, however, and possibly also conclusive, is that the native speakers make a relatively clear distinction between the use of the word *have* as an auxiliary, i.e. a function word, and as a main verb. As *have* in the dialogue is in most cases used as a

main verb, there seems to be less of a tendency to reduce it, including the elision of the initial *h*, which conforms with the general textbook view.

The second word in which h-dropping occurs, on the other hand, does contradict the textbook view in that the verb *hope* is certainly not a function word and also would hardly be unstressed in the syntactic combination *I hope I*. Furthermore, both cases were even produced by native speakers who are actually teachers of English by profession and would therefore probably a) be considered more educated than many other native speakers and b) generally exhibit a more careful style of speaking due to their occupation.

8.1.2. Assimilation.

As far as features of assimilation are concerned, we need to distinguish between the two different major categories anticipatory and perseverative. English is often assumed to be a language that mainly favours the first category:

> "The mutual influence of contiguous phonemes in English functions predominantly in a REGRESSIVE or ANTICIPATORY direction, i.e. features of one phoneme are anticipated in the articulation of the preceding phoneme; […]" (Cruttenden, '94, p.255)

or

> "In **perseverative coarticulation**, some aspect of the production of a sound is carried over into the production of a later sound, causing a **progressive** type of ("left-to-right") **assimilation**. Such assimilations are not very common in English, where the regressive type, resulting from anticipatory ("right-to-left") coarticulation, is much more usual" (Pennington, '96, p. 57).

This may be a common assumption because, as far as types[19] are concerned, most assimilatory processes are anticipatory. However, according to my data the importance of the types seems less significant than that of the tokens, and as far as tokens are concerned, the native speakers produce a slightly higher amount of perseverative assimilations than anticipatory ones, with a ratio of 3.89% to 3.24% of transitions. The figure for anticipatory assimilation here includes both cases of 'pure' assimilation and those cases where either elision forms the basis for assimilation or occurs after it.

What I refer to as perseverative assimilation is a type of assimilation that is by no means as clear in its realisation as most cases of anticipatory assimilation. It often involves cases where the second segment involved in the process seems to be so weakly articulated that it becomes 'distorted' or 'subdued' by the other, which often makes it very difficult to recognise. I distinguish two different sub-types:

a) perseverative oral assimilation, where a following dental fricative is assimilated to a preceding alveolar (oral) one in combinations like *is that* /Izzat/[20] and *past the*[21] /pasz«/, etc.

This type is described in Cruttenden's edition of *Gimson's Pronunciation of English* as follows:

> "[…] word-initial /D/ – especially in the article *the* – may assimilate to /s, z/ following /s, z/, e.g. *What's the time?* /ÈwÂts ze tÆm/, *Has the post come?* /ÈhQz z« ,p«Us kÃm/, in very rapid speech." (Cruttenden, '94, p. 260)

[19] As opposed to tokens.

[20] In my transcriptions, I will generally use the Northern vowel phoneme /a/, where RP would have /Q/ or /Aù/ as this reflects the realisations of my native speakers better.

[21] Cases of perseverative assimilation, where there is elision involved such as in this one are not counted separately for simplicity's sake.

Cruttenden here makes it sound as if it this phenomenon were almost exclusively restricted to the definite article, which in fact it isn't, as it can just as well apply to the pronoun *that* and indeed probably any word beginning in a /D/. It may even to some extent apply to completely different transitions between words that would normally contain a combination of final fricative and initial semi-vowel, such as in *if we* [Iffl]ä[22] (ID 580-590), as realised by speaker E07, where there seems to be some degree of labialisation occurring that does not appear to have the type of lip-rounding associated with it that one would normally expect from a /w/. We therefore seem to encounter a process of assimilation of manner, place and voicing in this example.

He also claims that the phenomenon may (only) occur "in very rapid speech", which is probably a statement based more on an idealised view of speech as rhetoric, rather than any physical facts. What I mean by this is that the relevant phonetics literature, such as *Gimson's Pronunciation*, has for a long time referred to and often still keeps on referring to naturally occurring speech as *(very) rapid* or frequently also as *colloquial*. These labels seem to be based on the ideology of regarding only the kind of enunciation encountered in rather careful and often prepared speech as 'proper' and worth learning for foreign learners. In reality, however, the native speakers in my recordings, whose realisations cannot even be seen as fully natural or conversational because of the circumstances of the recordings, tend to produce mostly these assimilated forms in the appropriate conditions and most of them speak by no means rapidly, as the text they are performing is of an explanatory nature. The overall number of cases of perseverative oral assimilation for native speakers amounts to 1.72%, which demonstrates that this feature is definitely not an uncommon one.

Furthermore, it is also interesting to note that perseverative oral assimilation is responsible for realisations by the native speakers that are deemed high priority

[22] The symbol used here for the assimilated segment only reflects an approximation, rather than an exact value.

problems by textbooks like Kenworthy, '87 (p.137), who fail to see that in specific cases alveolar fricatives replacing dental ones represent a very natural phenomenon:

> "Learners who substitute /s/, /z/, /t/, /d/ for 'th' may be helped by being told to position the gum [sic] on the roof of the mouth immediately behind the upper front teeth; […] One strategy is to tell learners to pause before any noun, adjective or verb, i.e. any content word, and concentrate on getting the 'th' right. They shouldn't worry about 'th' in words like 'the', 'this', 'that', 'there', etc. When students begin to improve on content words (which will usually be stressed and crucial for meaning) they can extend their concentration to 'then, this, that, these and those' (which are also usually in stressed position [sic]), and finally to 'the'." (Kenworthy, '87, p. 75).

Although she realises correctly that the 'correct' realisation of the function words is not as important to overall intelligibility, she nevertheless insists on non-native speakers' learning how to produce forms that would often be unnatural for native speakers.

As similar thing is true for the second type of perseverative assimilation I distinguish.

b) perseverative nasal assimilation, where a following dental fricative is assimilated to a preceding alveolar nasal in combinations like *in the* /Inn«/ and *in that* /Innat/.

Descriptions of this type of perseverative assimilation are even harder to find in the literature, with the notable exception of Roach, '91:

> "In one particular case, we find progressive assimilation of manner, when a word-initial Dfollows a plosive or nasal at the end of a preceding word: it is very common that to find that the C^i becomes identical in manner to the C^f but with dental place of articulation. For example (the arrow symbol means "becomes"):
>
> 'in the' In D« → Inn00" (Roach, '91, p. 125)

One other way of seeing this type of assimilation is to assume that it may also be a specific type of coalescence involving the masking of an initial eth by the simultaneous pronunciation of the final [n], where the masking is due to the relative weakness of the former. In this case, the phenomenon could also be referred to as *nasal coalescence*.

Despite the fact that most textbooks do not even deem this phenomenon worth mentioning, it accounts for an even higher number of all transitions in my corpus than perseverative oral assimilation, namely 2.17%.

The combinations it occurs in often include the definite article or pronouns as in *on the* /□nn«/ (ID 1430-1440), *and the* /«nn«/ (ID 1460-1470), *taking the* [tHeIkInn«] (ID 1330-1340), *in that* [Innaʔ] (ID 2070-2980), mainly in conjunction with such high-frequency function words as prepositions and the conjunction *and*, and also generally when the second word in the combination starts in /D/, as pointed out by Roach in the quotation above, such as in *and then* /«nn«n/ (ID 1280-1290; after elision of the final /d/) and *from there* /f¨□mne«/ (ID 1860-1870). The latter type is even realised with this type of assimilation by all but one of the native speakers. However, it does also seem to occur in positions where initial /h/ can assimilate after processes of elision, such as in *don't have* [d, Unnev] (ID 870-890). In this case, this may easily be mistaken for h-dropping (c.f. 8.1.1 above) – i.e. a form of elision, rather than a case of replacement of one segment by another –, when actually assimilation of the initial /h/ leads to ambisyllabic gemination of the final nasal. One further interesting feature is that perseverative nasal assimilation by the native speakers also seems to be possible across a phrase boundary as in [NNaʔ] (ID 2790-2810) as a somewhat odd and licentious realisation of the *Oh, that* occurring in the text.

It remains difficult to generalise about which words or segments may be involved in perseverative assimilation, but as we have seen above and was pointed out by Roach, there seems to be a clear favour for words beginning in /D/. As far as types of words

are concerned, however, it certainly appears as if it is generally combinations of mono-syllabic, high-frequency and mainly closed-class words that are involved, which would also account for the relatively high occurrence of tokens present in my data.

Compared to the cases of perseverative assimilation produced by the native speakers, the number of occurrences produced by the non-native speakers is considerably lower, only amounting to overall 1.98% of all transitions. T-tests for perseverative oral and nasal assimilation show that differences for both of these transition categories between native and non-native speakers are statistically significant, weighted towards the native speakers. For oral perseverative assimilation, the significance is below the 5% level (p=0.038) and for nasal assimilation even below the 1% level (p=0.003). What is also quite remarkable is that the balance between the oral and the nasal type seems to have shifted. Whereas the ratio of oral to nasal assimilation for the native speakers was 1.72% to 2.17% – app. 1.3 occurrences of nasal for each case of oral assimilation –, for the non-native speakers it seems reversed at 1.17% (oral) to 0.81% (nasal), app. 1.5 to 1 in favour of oral assimilations. The statistical significance and the reversal of the ratios seem to indicate that not only are these two transition categories important markers of difference between the two speaker populations, but also that the non-native speakers seem to be less aware of the legality of perseverative nasal assimilation in English or – if they are aware of it – possibly associate a loss of distinctiveness with its use. As all of the German speakers are originally from the South of Germany, or have at least been living there for some time, they are quite likely to be using this type of assimilation themselves in their L1 in realisations of such common expressions as [ge:(m)m«] (*gehen wir*) or [k (m)m«] (*kommen wir*), or would at the very least be familiar with them.

Apart from a few exceptional realisations, such as [?B¼vö] (ID 580-590) for *if we* and [Ã¼tH«1¼ö] for *until*[23] *you* (ID 1020-1030; both speaker G06), the non-native speakers on average produce the same kind of types of perseverative assimilation as the native speakers. Speaker G09 even once produces an interesting example of perseverative nasal assimilation after elision of a final nasal [tHe1¼k**n,] (for *taking the*), thus demonstrating that not only does he seem to be aware that native speakers do tend to assimilate in this way, but also that because of this knowledge, he has adjusted his articulatory posture accordingly, even though the final nasal seems to be elided[24].

Some other cases, such as the voicing assimilation in *of you* [ðfC¬≯Cu≯] (ID 1260-1270; speakers G05 & G03), seem rather more typical of German learners than of native speakers, although differences in voicing assimilation in general between native and non-native speakers prove to be statistically insignificant, due to its extremely low frequency of occurrence, only amounting to 0.10% (ns) and 0.18% (nns) respectively. However, features like assimilation of place in [D«td«]a (*that the*, ID 1690-1700; G05), although they do not occur in the data in the corpus, would not be unthinkable of in native speaker realisations either (cf. Roach, '91, p. 125).

Moving on to anticipatory assimilation, we find again that the percentage of native speaker realisations is considerably higher – at 2.88%[25] – than that of the non-native speakers – at 1.52%[26]. Apart from the obvious differences in the percentages, T-tests show that the difference between the number of 'pure' anticipatory elisions is statistically significant ($p=0.018$), whereas the difference in assimilations plus elisions is only marginally so ($p=0.044$).

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[23] this type of assimilation would, however, not be unusual for some native speakers, either.

[24] One minor difference here, though, is that the initial nasal does not actually become dentalised, which may actually support the assumption that there is coalescence.

[25] including cases of assimilation + elision at 0.35%

[26] again including cases of assimilation + elision at 0.07%.

Table 9 below shows all actually occurring combinations of words in the dialogue where either pure anticipatory assimilation (a) or anticipatory assimilation + elision (a+e) may occur and which processes are involved[27]:

Ex.	Transition	Words	Process(es)	NS count	NNS count
1	a	that board	t#b → p#b	7	8
2	a	might be	t#b → p#b	6	6
3	a	that case	t#k → k#k	6	0
4	a	on foot	n#f → M#f	3	0
5	a	then continue	n#k → N#k	4	3
6	a	then bear	n##b → m##b	3	1
7	a(+e)	won't be	nt#b → m#b[28] nt#b → mp#b	2 (a+e) 5 (a)	1 (a+e) 8 (a)
8	a+e	haven't made	nt#m → m#m	4	1

Table 9 – Word combinations involved in anticipatory assimilation.

Examples number 1 & 2 in Table 9 indicate that as far as combinations of final alveolar plosive and initial bilabial plosive are concerned, most native and non-native speakers do share the same set of rules stating that the final alveolar plosive may be assimilated to a bilabial one, but that they may not always be willing to actually apply it in all cases. The following table gives a breakdown of the actual transitions occurring:

	NS	NNS
that board	7x anticipatory assimilation	8x anticipatory assimilation 1x none 1x final release
might be	6x anticipatory assimilation 1x glottal stop	6x anticipatory assimilation 2x none 2x final release

Table 10 – Breakdown for assimilation examples 1 & 2.

Table 10 suggests that, as far as the non-native speakers are concerned, any avoidance of assimilation may possibly be due to some speakers' attempts at placing

[27] The numbers in the first column are used for convenient reference.

[28] in cases like this, there is nevertheless still a shortening effect of the elided consonant on the preceding vowel present, so that we end up with realisations like [wˑmp] (E03, E04).

higher emphasis on the deictic *that* in ex. 1 or the modal *might* in ex. 2, as signalled by the occurrence of final release, rather than just the absence of linking. This assumption would also explain why none of the non-native speakers assimilate example 3, but instead we find 4 cases of final release and 6 of no linking. Of course, one might equally well argue that the non-native speakers just do not consider assimilating an alveolar plosive to a velar one an option, but the fact that, again, this type of assimilation does also occur in German could be taken in favour of the assumption that the non-native speakers are simply trying to generate a higher level of explicitness.

Examples 4-8 all involve cases where there is a (pre-)final nasal potentially involved in anticipatory assimilation. Example 4 is a case of assimilation where an alveolar nasal assimilates to a labio-dental fricative, thereby turning into the labio-dental nasal /M/. This type of assimilation is generally only described in any detail in textbooks on phonetics when it occurs across syllable boundaries within the same word:

> "In English, a labiodental nasal, /M/, may occur when /m/ occurs before /f/, as in 'emphasis' or 'symphony.'" (Ladefoged, '93, p.158).

One other 'classic' example recurs annually on British television news when all the major political parties meet for their annual [pAUi k□Mf¨«ns] in one of the seaside resorts. Occurrence across word boundaries, however, is often only listed very briefly, such as in Cruttenden, '94, p. 255, who cites as examples "*ten forks*" and "*come for me*". The brevity of discussion of this feature is probably also responsible for the fact that this kind of assimilation is, to my knowledge, not explicitly taught to foreign learners as being a potential feature of spoken English, which is why it is rather unsurprising that none of the non-native speakers produce it. However, the fact that less than half of the native speakers realise an [M] in this position shows that it clearly represents an optional type of assimilation and thus one that would not necessarily have to be learnt by the non-native speakers.

Example 5 (*then continue*) seems to indicate that the native speakers see a choice to assimilate when an alveolar nasal is followed by a velar plosive, but with a tendency in favour of assimilation, whereas only three of the non-native speakers do seem to realise the potential for assimilation. Example 6 (*then bear*), although it involves the same word on the left-hand side, seems to contradict the native speaker tendency for assimilations. However, upon closer inspection, it turns out that at least 1 of the native speakers realises a short pause after the first word and one shows a clear case of final consonant lengthening, which makes it likely that the native speakers might see at least a potential for a prosodic break at this point – possibly for stylistic purposes or purposes of clarity –, and this break may be causing a suppression of the tendency to assimilate. In example 5, on the other hand, it is extremely unlikely for a prosodic break to occur at this point as it immediately follows one, which 5 native speakers realise as a long pause and 2 as a short one.

The final two examples are those where elision of a final /t/ may provide the basis for following assimilation. In both cases, the first word already represents a case of contraction (*won't, haven't*). The clear tendency by both native and non-native speakers to assimilate so readily in example 7 without many exceptions may to some extent be due this combination being one that should occur with relatively high frequency in spoken language and therefore have a higher degree of redundancy than the combination *haven't made*, which would explain two separate facts, a) that there is possibly greater reluctance by the native speakers to assimilate the second combination, although all of them elide the final /t/, and b) also why the non-native speakers tend to have a higher degree of assimilation for the first combination – because they have simply heard it more often from native speakers –, whereas they tend to avoid assimilation in the second combination completely and only choose to perform elision (at 80%).

As far as I can tell after repeatedly annotating and checking my categories, the counts of the phenomena discussed above are correct, but in analysing phenomena

such as assimilation, elision and glottal stops, it is extremely easy to be misled by preconceived assumptions. This is partly due to the fact that, on a purely auditory basis, it may be extremely difficult to tell the different phenomena apart, especially elisions and (word-)final glottal stops. This problem is furthermore compounded by the difficulty for the inexperienced waveform/spectrogram reader in recognising the separate consonants involved. This is especially true for plosives, which represent the majority of consonants involved in processes of assimilation or elision. The way that plosives are generally discussed in the relevant literature, one may well gain the impression that the most characteristic features of plosives are their stop gaps, followed by relatively distinct release bursts. This assumption, though, can easily become misleading if one starts looking out for two closure phases and release bursts in a row when segmenting an utterance.

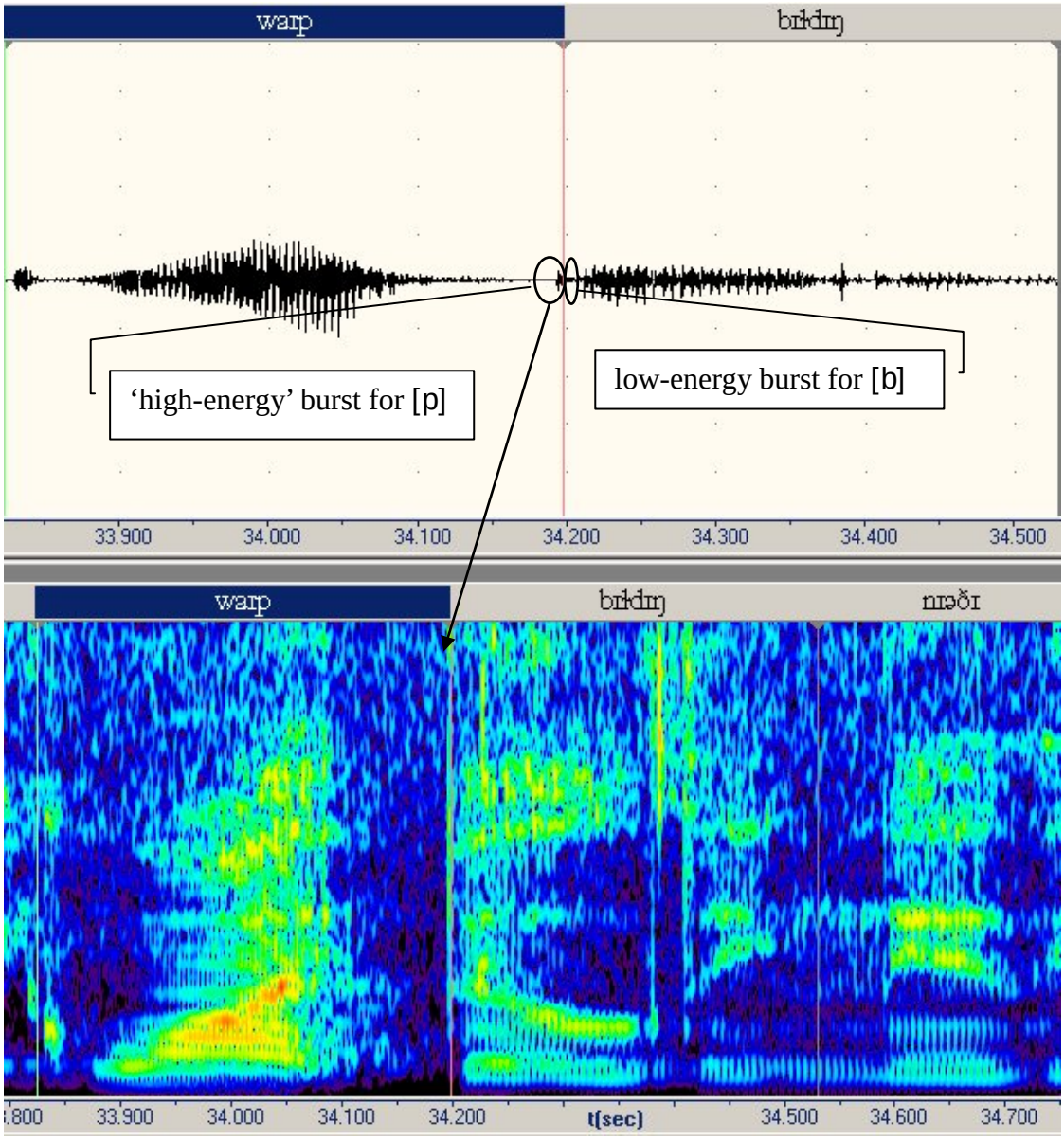

Figure 7 – An example of anticipatory assimilation

Figure 7 above illustrates part of the problem. Whereas there is a very distinct burst for the final [p] to be seen in both the spectrogram and the waveform, the burst for the initial [b] is almost impossible to detect in the spectrogram and rather indistinct in the waveform, so that the inexperienced segmenter may easily assume that there is only one burst present and hence that the final consonant of *white* is elided, rather than assimilated[29]. A further problem at the auditory level may be that sometimes the final

[29] This example, however, is not a prototypical one because in general a plosive in this position would not be released if it is involved in an assimilatory process.

consonant may be unreleased, in which case the only way to recognise the assimilation should be because of the formant transitions leading into the plosive. However, this may also present a problem, as in the case of an assimilated unreleased plosive the transitions might equally well be due to either of the two plosives, whereas only in the case of non-assimilation should there be two different transitions present. And yet further difficulties may be introduced by the artificial clipping effects that are artefacts of the segmentation itself and may sometimes make final elided plosives sound like glottal stops. In order to distinguish between true glottal stops and elisions, it may sometimes be necessary to zoom into the waveform for an extremely close analysis, which may not always be possible if the overall amount of data to be segmented is very high. Further details of this problem will be presented in 8.1.9 in conjunction with the discussion of glottal stops.

8.1.3. Coalescence.

Coalescence, i.e. the process whereby two (consonant) segments mutually influence each other, accounts for 1.57% of the native speaker transitions and only 0.81% of all non-native speaker transitions. In general, when textbooks talk about coalescence, they often refer to only one type of it, that where a plosive or fricative is followed by the semi-vowel /j/ to yield forms like /wUdZU/ or /TaNkCU/, etc. This phenomenon is sometimes also referred to as "yod-coalescence" (Wells, '82, p. 247). I shall, however, make a distinction between yod-coalescence and the type of coalescence that may occur between /t/ and /¨/, discussed in Cruttenden, '94 (p. 157ff) under the heading of affricates, which I shall refer to as *tr-coalescence*.[30] The two cases are actually quite distinct in the way they operate, as yod-coalescence is responsible for a kind of transition between words whereby the final and initial segment of both words fuse, which in turn creates the linking effect. Tr-coalescence, on the other hand, does not

[30] As we have seen earlier in 8.1.2, what I have termed perseverative nasal assimilation may potentially constitute a third type.

necessarily have to involve both the final and the initial segment as such, but may actually occur because of a reduction of the final syllable of the first word, thereby creating the necessary condition for liaison with a second word beginning in a vowel. There is only one example of this in my data, realised by two of the native speakers in the sequence *a quarter of an hour* (ID 2600-2640), where *quarter of* is realised as [kw□ːtSəv] by speaker E03 and as [kHɔːtSəv] by speaker E07. This odd effect is actually created by the devoicing of the initial /¨/ as it assimilates in voicing to the final /t/. Interestingly, though, also one of the non-native speakers, speaker G02, produces a form of coalescence, but at the same time voicing the segments in question, so that it no longer sounds native speaker-like ([kw□ːdZµ v]). Overall, this probably represents a phenomenon of relatively low frequency in any spoken corpus, but on the other hand, it may be exactly one of those features which, when one ‘adds up’ all the detail, makes up part of the difference between native and non-native speakers.

As far as the more common phenomenon of yod-coalescence between words is concerned, Table 11 below gives an indication where it occurs and how many times each potential occurrence has been realised by both native and non-native speakers.

Ex.	Combination	NS	NNS
1	could you	3/7	2/10
2	do you	6/14	0/20
3	take you	1/7	3/10
4	would you	7/7	8/10
5	but you	1/7	1/10
6	thank you	3/7	3/10
7	made you	6/7	2/10

Table 11 – Occurrences of yod-coalescence.

Table 11 seems to indicate that native speakers have a (sometimes far) higher preference for using coalescence in cases where the final segment of first word is a voiced alveolar plosive (Ex. 1, 4, 7), but seem to be more reluctant in cases where the final element is either a voiceless velar plosive (Ex 3, 6) or a voiceless alveolar

plosive (Ex. 5). The latter is relatively easily explained by the fact that in Ex. 3, the native speakers exhibit a rather high tendency (6x) to replace the final segment by a glottal stop, thus removing the precondition(s) for coalescence. In Ex. 2[31], there also seems to be some slight reluctance towards performing coalescence, possibly due to the necessity of having to reduce the vowel of the first word extremely. In general, something that is reminiscent of the parameters influencing assimilation as discussed in 8.1.2 above is that it seems that there are mainly high-frequency function words involved in the process.

Regarding the non-native speakers, there seems to be little discrimination between final voiced and voiceless segments. The number of occurrences of coalescence is relatively low throughout (0.81%), although at least the combination *would you* (Ex. 4, 8 occurrences) seems to trigger coalescence, possibly because it represents a high-frequency combination, although the same should normally at least be equally true for *could you*, (Ex. 1, with only 2 occurrences). The fact that the non-native speakers seem to be reluctant to coalesce *do you* is – in my opinion – not very surprising, as it first requires the deletion of the vowel in *do*, a phenomenon which they would probably associate more with a strongly 'colloquial' style. The combination *but you* (Ex. 5) is interesting because there is only one occurrence by one non-native speaker. Again, this may be due to the non-native speakers' trying to place a kind of special emphasis on the adversative *but*, an assumption that is supported by the fact that amongst all the other realisations there are at least one case of final lengthening and 4 cases of non-linking.

When coalescence occurs across word-boundaries, as in all the examples occurring in my data, it invariably seems to lead to what could from a phonological point of view be referred to as a 'resyllabication' of the final plosive of the first word, thus

[31] In this case, obviously a precondition for coalescence is the elision of the vowel in the first word, so that this might also count as an example of either elision or contraction, which demonstrates that some transitions could be 'multi-valued'.

yielding forms like /kU#dZU/ or /wU#dZU/, which represent complex forms of liaison (see 8.1.4 below). On the phonetic level, this phenomenon seems to express itself in the speed of transition between the two words involved. In case of a 'resyllabication', the final vowel of the first word does not appear to be shortened by the effect of the following plosive, whereas in the case of 'non-resyllabication' it would have to be. This seems to be supported by the fact that whenever non-native speakers seem to 'avoid' coalescence, they nevertheless show a distinct tendency towards simple liaison instead, thus producing /kU#djU/, without coalescing the plosive and the fricative, simply 'resyllabifying' the final plosive to augment the onset of the second word.

In general the difference between native and non-native speakers in their use of coalescence is statistically significant below the 1% level (p=0.004), so that this feature certainly represents a distinguishing factor.

8.1.4. Liaison.

My use of the term liaison differs somewhat from the way it is defined in Cruttenden, '94 (p. 262ff.), who discusses many different types of linking under the same heading. I discuss some of those features separately below and limit my use of the term to those occurrences where a final consonant other than /¨/ is resyllabified, thereby turning into the onset of the following word. According to Cruttenden, liaison is a feature that should be very uncommon in English:

> "As regards boundaries where a consonant precedes a vowel, it is unusual for a word-final consonant to be carried over as initial in a word beginning with an accented vowel, the identity of the words being retained ([…]). Thus, *run off, give in, less often,* are rarely /rÃ n™□f, gI v™In, le s™□fn/; more particularly, the voiceless plosives do not acquire aspiration, such as would accompany their shift to an accented syllable-initial position, e.g. *get up, look out, stop arguing,* are not [ge t™HÃp, lU k™HaUt, st□ p™HAùgjUIN]. One or two phrases in common use do, however,

> show such transference, e.g. *at home*, *not at all*, often pronounced [« tΗ«Um, n□t « tΗ□l]; they may be considered as constituting, in effect, composite word forms.” (Cruttenden, ‘94, p. 264)

However, this seems to be completely contradicted by my data, where liaison accounts for 11.73% of all native speaker transitions, thus representing one of the major means employed to achieve ‘fluency’. That liaison does indeed also happens in naturally occurring speech and may present a major problem for non-native speakers in understanding native speakers is confirmed by an anecdotal experience of mine. A few years ago, when I was sharing a flat in postgraduate university accommodation with students from different nationalities, an English flatmate of mine one day came into the kitchen and said that had to “get up at eight o’clock” ([getΗ«pΗ«tΗeltΗ«kl□k]) the next day, whereupon a Greek flatmate astonishedly asked him what a “potato clock” was.

As liaison is such a common feature amongst the native speakers, it is perhaps unsurprising that the non-native speakers also seem to be well aware of it and attempt to ‘imitate’ it. Thus liaison represents the third-most common type of transition category produced by the non-native speakers, with a percentage that is remarkably close to that exhibited by the native speakers, namely of 10.97%. A T-test also shows that there is no significant difference between the two populations (p=0.331). These findings contradict textbooks such as Kenworthy, ‘87, who claims:

> “There is one problem area. In English there is a smooth link between a final consonant in one word and an initial vowel in the next word, as in ‘fullʃup’. But in German, words beginning in vowels have a preceding glottal stop (a kind of catch in the throat). If this native language habit is carried over into English , the effect will be of too many ‘jerks’ or slight pauses between words.” (Kenworthy, ‘87: p.136)

However, it has to be remembered that liaison as performed by the non-native speakers does to some extent subsume cases where the native speakers would be using

coalescence, so that the difference in usage rises somewhat if we look at the combined percentages for coalescence and liaison of 13.30% (NS) and 11.79% (NNS), although this difference still does not yet prove statistically significant (p=0.062), despite showing a tendency. This finding also clearly illustrates another important point, namely that if one were to rely purely on an automatic analysis of such data, connections such as these would probably easily be missed.

8.1.5. Linking- & Intrusive-r.

Cruttenden, '94 classifies the phenomenon of linking-r as a type of liaison (p. 262ff.), together with other linking features that help to avoid a *hiatus* between words that – at least in all non-rhotic accents of English – generally end and begin in a vowel respectively (cf. Knowles, '87, p. 132ff.). However, from a learner's perspective, general liaison, i.e. in cases where there is a final consonant that can be resyllabified is present, should be considered in a different way from introducing linking elements that are not necessarily encountered in the written forms primarily encountered by learners.

Amongst those semi-vowels or glides used to avoid the hiatus, again, *r*s may be seen to have a special status, which is why I discuss them in a section separate from the general section on avoiding the hiatus. The reason why they need to be handled separately is partly that they may have two different realisations, as genuine *linking-r*s or as intrusive ones. As far as genuine linking-rs are concerned, they may represent a problem for learners, as even though they are linking elements that are actually represented in spelling, most learners who have been taught RP or any other non-rhotic accent of English will have been drilled not to produce word-final or post-vocalic *r*s to the extent that they may have become reluctant to reintroduce them even if the following word begins in a vowel. This seems to be to some extent exemplified by the data in Table 12, where the only major exception is the combination *far it*, where nearly all non-native speakers do produce a linking-r.

	Realisation	Word_ID	NS	NNS
1	whether I	230	7	1
2	there's	350	0	1
3	area[r] on	410	4	0
4	more easily	560	7	0
5	or are	720	5	1
6	(are) you[r] on	740	1	0
7	far it (is)	2250	7	9
8	quarter of	2610	0	3
9	are always	2730	5	3

Table 12 – Potential r-linking candidates ([r] signifies intrusive r) and number of realisations.

However, simply to assume that the absence of linking *r*s by the non-native speakers is due to their efforts to produce strictly non-rhotic forms may be somewhat misleading as some of them do actually produce rhotic variants of Examples 4 (4x), 5 (1x) and 8 (1x), which block the linking process. For the German speakers, these rhotic forms may possibly be due to inconsistent teaching though, as in many German schools it depends on the teacher which model of English is actually taught.

Example 2 is interesting in the sense that here we find a case of a linking-r realised by a non-native speaker that would be highly unlikely to have been produced by a native speaker, as the combination *there is* would almost automatically undergo contraction, unless of course it would be used as an emphatic confirmation or answer to a question. For this example, we again find 2 rhotic realisations, but in this case as parts of contractions, again demonstrating the slight inconsistency among the non-native speakers.

With regard to intrusive-*r*s, i.e. *r*s that do not appear in the spelling, we can only find two combinations realised by native speakers, Examples 3 *area on* and 6 *(are) you on*. More than half the native speakers (4) produce Example 3, whereas only one speaker uses the intrusive-r in Example 6. This may potentially indicate a tendency amongst

native speakers to insert intrusive-*r*s between words after a final shwa, but to employ either other means of linking – such as /J/s or /W/s – after less central vowel qualities, or be replaced by an even more extreme form of linking, which I have termed *extreme vowel reduction*. This form of linking will be discussed further below in section 8.1.8 when I discuss aspects of *elision.* Regarding the non-native speakers, though, there seems to be a general reluctance towards using any intrusive-*r*s at all, which also manifests itself in a difference between the two speaker populations that is highly significant (p=0.00004).

8.1.6. Avoiding the Hiatus.

In this section, I will discuss the occurrence of the two other segments that may be used in order to avoid a hiatus, the two semi-vowels /J/ and /W/. Often, these two 'bridging segments' are described as representing something equivalent to forms of perseverative assimilation on the consonant level as it is generally assumed that final high front vowels in the first word trigger the insertion of a /J/, whereas back vowels cause the insertion of a /W/. This is also often reflected in conventional phonemic transcription practice. However, at least one of my examples contradicts this assumption and suggests that there may well be the possibility of an anticipatory, rather than a perseverative, process occurring. Speaker E06 produces this form of linking after a front vowel in the combination *(with) you or (are you on foot?)*, realised phonetically as [ji WWA] (ID 700-730), where the linking process even occurs across a phrase boundary. However, as the symbol for creaky voice[32] ( ) in the transcription indicates, there seems to be some kind of activity going on in the larynx which may cause at least a slight velarisation of the front vowel and would thus potentially explain the preference for /W/ as a linking element in this position.

[32] I have used the diacritic for creaky voice throughout my transcriptions to indicate an auditory impression that may represent either true creaky voice or some degree of tenseness in the larynx.

As far as the usage of the two linking elements is concerned, there is a distinct difference between native and non-native speakers, in that the latter show a far greater reluctance to use /J/s (with 2.16% as opposed to 3.84% NS). This difference proves to be a marker of high statistical significance, at p=0.00005. On the other hand, the non-native speakers seem to have a slight preference for /W/s (1.35% as opposed to 1.31% NS). The difference in usage, however, seems to generally be more one of tokens than of types in my data, as there are only two combinations where the native speakers use linking *w*s that are avoided by the non-native speakers, *continue up (to the town hall)* (2x) and *unreliable anyway* (1x). Both occurrences are probably easily explainable, the first by the fact that German speakers often seem to have a tendency to stress deictica and may therefore prefer the hiatus to add emphasis to the preposition, and the second that the basis for inserting the linking *w* in this case was actually provided by the particular native speaker vocalising the final /l/ of the first word. Regarding j-linking we have a similar situation, with the four separate types listed immediately below:

	Word_ID	Combination	Count
1	740	you on (foot)	1
2	1900	be able	7
3	3100	60 is	1
4	3120	very unreliable	7

Table 13 – NS cases of j-linking unmatched by NNS.

Out of these four types, Examples 1 & 3 represent ‘one-offs’ by native speakers, in Ex. 1 speaker E07 contracts the phrase *or are you on (foot)* to [Î*iɘ□m], where the asterisk represents the complete elision (deletion) of the word *are*, and in Ex. 3 speaker E03 fails to produce the contraction that almost all other native speakers make. Examples 2 & 4, though, seem to be more symptomatic of the difference between native and non-native speakers, as all native speakers perform the linking in these cases, while the non-native speakers avoid it. As a result of the non-native

speakers' avoidance of linking, they tend to produce a very specific form of hiatus, which is discussed further below in section 8.1.9.

8.1.7. Contraction.

Contractions represent a very interesting transitional category to investigate, for various reasons. The first is that, while other phenomena of spoken language such as assimilation and elision rarely get taught at the less advanced levels in the language classroom, contractions are introduced at a very early stage. It should therefore be expected that the number of non-native speakers realisations would be very close to that of the contractions made by the native speakers. We shall see further on below to which extent this is true and whether there are any difference in the way contractions are handled and perceived as necessary by both sets of speakers.

The second reason why contractions represent an interesting category is because they represent a phenomenon that is not easily defined. Although they are often subsumed under the heading of elision, this is by no means an unquestionable categorisation as Roach points out:

> "It is difficult to know whether **contractions** of grammatical words should be regarded as examples of elision or not." (Roach, '91, p.127)

I see contractions as definitely representing a category that is different from pure elision because elision usually only involves the loss of one or more intermediate segments, whereas contraction can be seen as arising from a combination of two processes, the reduction and consequent elision of one or more reduced or unstressed segments. One of the best examples for illustrating this concept is probably the contraction of *I have* /aɪhav/ to *I've,* which can be described in the following steps:

[alhav] → [alɹav] (elision of initial h)

→ [alɹəv] (vowel reduction)[33]

→ [alv] (elision of reduced vowel)

As pointed out above, technically there should not be too much of a difference between the usages of native and non-native speakers, but surprisingly, the percentage of contractions is actually slightly higher at 3.93% for the latter, whereas for the former it is only 3.79%. This difference, however, proves to be of no statistical significance. Below is a table of candidate word combinations, which, upon closer examination, will help to explain why there is such a difference.

	Word_ID	Word	NS	NNS
1	3100	60(‘s)	5	7
2	870	do(n’t)	7	10
3	3330	have(n’t)	7	10
4	190	I(‘m)	7	10
5	810	I(‘ll)	1	7
6	1980	It(’s)	7	10
7	2350	it (will)	2	0
8	1350	road (will)	2	0
9	350	there(‘s)	7	9
10	2820	wo(n’t)	7	10
11	3000	would(n’t)	7	10
12	1190	You(‘ll)	4	7
13	1880	you(‘ll)	1	9
14	2530	you(‘ll)	2	8

Table 14 – Candidate word combinations for contraction.

The clue to the main differences seems to lie in examples 5, and 12 through 14, i.e. those combinations where the second element represents a reduced form of the auxiliary *will*. Table 14 may at first glance suggest that the native speakers here avoid making any contractions altogether, but in reality they actually reduce the auxiliary to such an extent that it becomes non-existent and the first word ends rather abruptly.

[33] Alternatively, of course, the first two steps could be seen as co-occurring.

This tendency ties in well with other phenomena that lead to abrupt breaks between words, such as l-vocalisation. Examples 7 & 8 are also very interesting as they demonstrate the naturalness of the dialogue situation for at least some of the native speakers, as they produce a contracted form where the dialogue text has the full form of the auxiliary, whereas the non-native speakers clearly show that they are concentrating more on a faithful rendition of the text.

8.1.8. Elision.

Elision as a transitional category represents a problem of categorisation as it may lead to two different types of effect. When there is pure elision, i.e. when one or more segments get dropped without this having a linking effect, then we get the effect of some kind of discontinuity. This is especially true if we end up with a combination of two plosives, i.e. two complete closures with a stop gap between them. Examples of this would be combinations like *kept quiet* becoming /kepkwal«t/ (Knowles, '87, 129) or in my data the realisation of the phrase *be able to see* (ID 1900-1930) as [blJEb*[34]tHUsi:] by speaker E08. At the less extreme end of the scale, we find examples like the combination *and then* (ID 1280-1290), realised as [«n*D«n], where the combination of final nasal and initial fricative may well cause a lesser effect of discontinuity.

However, in cases where elision facilitates the linking process, it has to be categorised along the same lines as liaison, for example in *get to the* (ID 1040-1060), realised as [get®*D«] where the final /t/ of *get* may be elided along with the reduced shwa of *to* in order to avoid a gemination of the left-over plosive, thereby facilitating the articulation of an otherwise very difficult cluster.

Traditionally, elision is also often described as a phenomenon that affects either consonants – when difficult clusters get simplified – or vowels – when they are re-

[34] The asterisk is used to denote the element that is elided.

duced to such an extent that there is little or no trace left of them, as in *police* being realised as [pliùs]. However, rarely is it described as a feature that may be a pre-stage to liaison, in a similar way as it may provide the basis for assimilation. If it acts in such a capacity, it not only simplifies the complexity of segment combinations and thus makes them easier to pronounce, but also seems to have an effect on the overall rhythm by establishing the conditions for heightened continuity through setting up a CV(C) structure across word boundaries, at the same time potentially 'compressing' reduced syllables and words so as to make them less prominent. Examples of this in my data are [klRǎ] (E08) or [k¬dlǎ] (E09) for *could you* (ID 50-60), where the speakers choose not to coalescence, but instead to delete the glide at the onset of the following word, thereby effectively replacing it by the coda of the preceding one[35], and such cases where (at least) the final vowel of the initial word is elided in order to avoid a hiatus, as in *do you* realised as [d*j«] (ID 650-660; E04), *you on* as [j*□)m] (ID 740-750; E05[36]), *for your* as [f*j,] (ID 3250-3260; E04, E06, E08, E09) and *easily if* (ID 570-580) as [i≥z*l*lf] or [i≥zll*lf]. This final example is even realised in either of the two ways by all native speakers.

The second type seems to be by far the more common one and in comparing native and non-native speakers, it is interesting that the latter show a slight preference (3x) in the combination *you on* to retain the vowel of the pronoun and elide the one in the preposition, thus producing forms like [j¬*n] or [jµ *n], which may indicate that they perceive the pronoun as more important and therefore at least not completely reducible, whereas they readily reduce the preposition *on*, which is generally not reduced in the varieties of English spoken in England, although speaker E04 actually does it once (ID 1430). A similar tendency may be seen in realisations of the combination *to*

[35] An alternative interpretation would be to say that elision actually occurs on the vowel of the second word and that the glide at the onset of the second word is only modified. In this case, it could obviously not count as an elision in the sense discussed above, but nevertheless, the amount of elisions occurring in the data would remain the same.

[36] with perseverative assimilation occurring on the nasal in *on*.

allow (ID 2560-2570), where again three non-native speakers produce more of a strong form, this time for the preposition, rather than reducing and eliding the vowel.

Another type of elision, favoured solely by the native speakers, only involves compression of reduced words, namely with the preposition *to* as the first element in the combination. It occurs in such combinations as *to show* [t*ʃəʊ], *to the* [t*ðə], *to see* [t*siː] and *to buy* [t*baɪ] and is labelled in the database as transition type *evr* (extreme vowel reduction). I use the label extreme vowel reduction for this category because in many cases it is not absolutely clear whether the vowel has disappeared to 100%, in which case there should be no trace of it in the spectrogram, either, or whether it has simply been reduced so that it becomes almost imperceptible. Table 15 below gives a breakdown of all the occurrences:

Word_ID	Word	Count
2650	to buy	4
1920	to see	2
530	to show	5
110	to the	3
1050	to the	5
1130	to the	4

Table 15 – Extreme vowel reduction (evr) in *to*

The first three examples have *to* as an infinitive marker, rather than a preposition. The combination *to buy* is especially interesting as it produces an abutment, which would normally have the effect of blocking the linking process, while in this case, it is almost reminiscent of coalescence. The preference amongst the affricates resulting from the extreme vowel reduction may be due to the fact that the combination /t/ + /s/ is generally not to be found in word-initial position in isolated words in English, whereas /t/ + /ʃ/ has a wider distribution.

The final three examples, of the combination preposition + definite article, account for more than 50% of all the realisations of this combination (12 out of 21). Again, we

end up with a combination of plosive + fricative, but one that would probably be completely alien to most non-native speakers, apart from the fact that at least German speakers tend to place more emphasis on prepositions, etc. and would therefore possibly never reduce this preposition to such an extent, anyway. The number of occurrences of extreme vowel reduction in my data shows that this kind of reduction is not only confined to particular accents of British English, such as the Yorkshire and Lancashire accents, as is sometimes stereotypically assumed, but rather represents a general distinguishing feature between native and non-native speakers. Although it only accounts for 2.33% of native speaker transitions, the difference between the two populations is statistically highly significant well beyond the 1% level (p=0.0005).

Another type that greatly contributes to the overall amount of elisions by the native speakers is that of complete elisions (deletions). Overall, there are 50 instances of varying grammatical categories in my data. A list of all deletions plus the relevant word categories can be obtained by running a query that searches for all occurrences of the elision marker *, linked to the grammatical tags[37]. Table 16 below shows all native speaker occurrences:

Word_ID	Count	Word	Tag
1640	1	the	AT
2710	2	The	AT
2600	1	a	AT1
2670	4	a	AT1
720	1	or	CC
2230	1	on	II
2020	1	very	JJ
130	1	train	NN1
190	1	I	PPIS1
790	1	I	PPIS1

[37] SELECT [NS PronOccurrences].Word_ID, [NS PronOccurrences].Word, [NS PronOccurrences].CountOfRealisation, Tagset.Tag
FROM [NS PronOccurrences] INNER JOIN (Tagset INNER JOIN Dialogue ON Tagset.Tag_ID = Dialogue.Tag_ID) ON [NS PronOccurrences].Word_ID = Dialogue.Word_ID
GROUP BY [NS PronOccurrences].Word_ID, [NS PronOccurrences].Word, [NS PronOccurrences].Realisation, [NS PronOccurrences].CountOfRealisation, Tagset.Tag
HAVING ((([NS PronOccurrences].Realisation) Like "[*]"))
ORDER BY Tagset.Tag;

Word_ID	Count	Word	Tag
2890	1	I	PPIS1
3320	3	I	PPIS1
1030	1	you	PPY
3240	1	you	PPY
3400	1	now	RT
1100	1	then	RT
170	1	Oh	UH
730	1	are	VBR
2730	4	are	VBR
820	6	'll	VM
1200	3	'll	VM
1890	7	'll	VM
2540	5	'll	VM
880	1	n't	XX

Table 16 – NS complete elisions (deletions)

If we compare these occurrences to the ones produced by the non-native speakers, we find that not only do the non-native speakers produce far fewer complete word elisions, but also that the ones they produce are limited to only a few grammatical categories, as can be seen in Table 17 below.

Word_ID	Count	Word	Tag
120	1	the	AT
1640	1	the	AT
370	1	a	AT1
2850	1	a	AT1
580	1	if	CS
2460	1	it	PPH1
3320	1	I	PPIS1
660	1	you	PPY
820	3	'll	VM
1200	3	'll	VM
1890	1	'll	VM
2540	2	'll	VM

Table 17 – NNS complete elisions

Both native and non-native speakers do elide articles or reduce the contracted form of the auxiliary to such an extent that it is completely lost, but the native speakers also

delete a much larger number of pronouns and even some types of content words whose absence does not impede understanding, such as *train* from the combination *train station*, when the word *station* on its own is sufficient to understand which location is in question.

The final two types of elision discussed above make up for a large part of elisions by the native speakers and the reluctance to produce extreme reductions on the part of the non-native speakers explains why there is such a considerable difference in the total percentages for elision[38] between native (3.44%) and non-native speakers (2.65%). However, while these two types do not necessarily have an influence on the segmental (dis-)continuity of the dialogue, they will certainly have an influence on the overall length and also on the cohesive structure. The type that facilitates liaison, though, enhances continuity and is often used by the native speakers as an alternative to those linking elements that help to avoid hiatus.

In determining elision, however there is one inherent problem. Where final plosives are concerned, it may sometimes be rather difficult to determine whether there is actually a case of elision occurring, whether the plosive may simply be unreleased and therefore difficult to detect, or whether it may simply have been replaced by a glottal stop. This problem will be discussed in more detail in the following section on non-linking transitions.

8.1.9. Non-linking Transitions.

One of the basic assumptions in analysing the non-native speaker realisations was that the German speakers would in general use fewer cohesive features, such as assimilation and elision, etc., and that this would manifest itself in the fact that there would be a far higher incidence of (prevocalic) glottal stops occurring between

[38] including contractions

words[39], which would make them 'non-native'. However, even though the total number of glottal stops realised by the native speakers is higher, with a percentage of 8.54%, the difference to those realised by non-native speakers, at 7.86%, is relatively small, so that this feature on its own should hardly have a huge impact on the perceived difference between native and non-native speakers. A T-test performed on the two data-sets also shows that the difference between the two samples is statistically not significant (p=0.558).

Before we actually look in detail at why this may be the case, it is important to discuss how the distinction between transitions manifested as glottal stops and other phenomena is handled in my data. As already pointed out above, it may for example sometimes be very difficult to distinguish between the elision of final plosives and glottal stops. Figure 8 below shows examples of first the elision of a final plosive, followed by a final plosive being replaced by a glottal stop in the next word.

[39] c.f. Cruttenden, '94, p. 266, quoted in 3.2.1

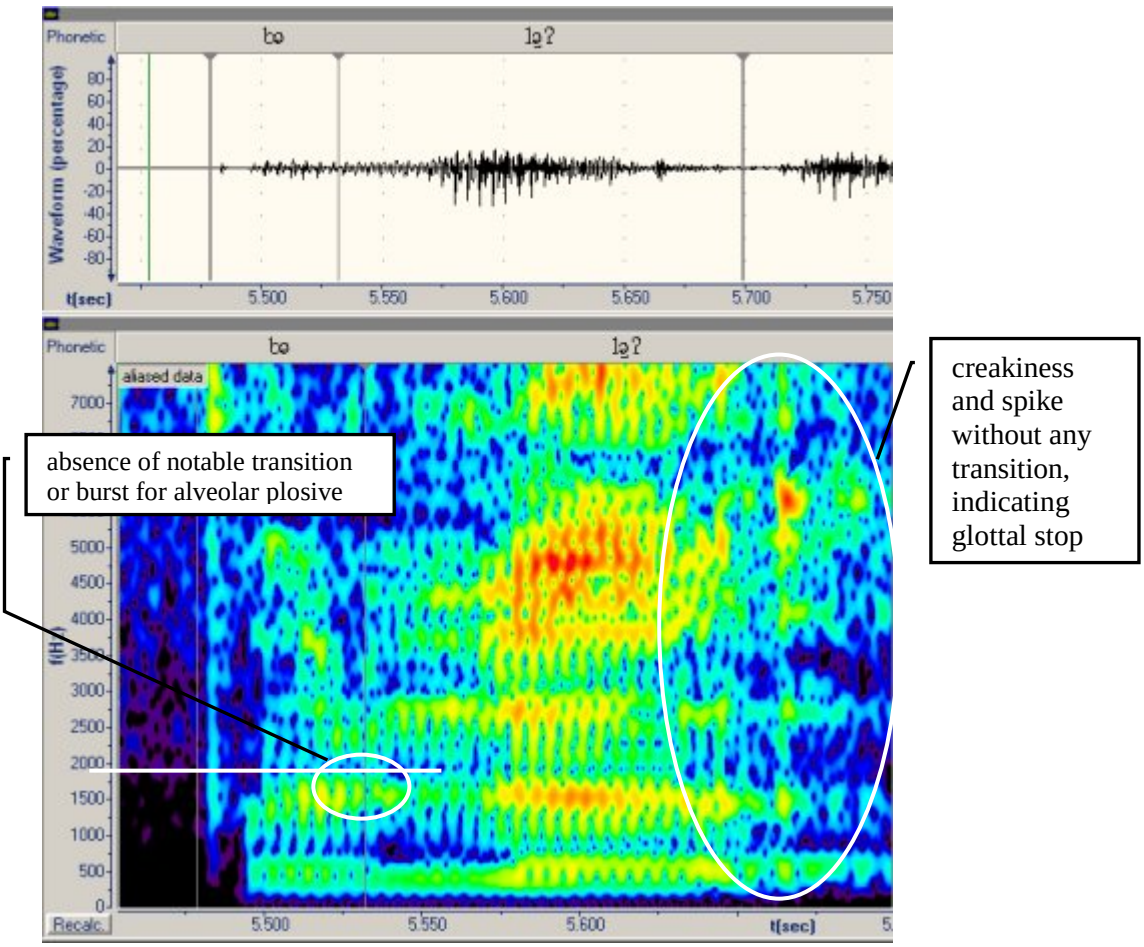

Figure 8 – Plosive elision vs. glottal stop (E07).

The fact that the final plosive in *but* in the combination *but look* is elided can be seen in the notable absence of any F_1-transition within the spectrogram, which, for an alveolar plosive, should be towards 1800 Hz. Instead, we can clearly see that the steady state of the shwa moves straight into the initial lateral of the second word. The absence of a burst in the waveform also confirms this. In contrast, the realisation of the final consonant in the second word as a glottal stop is characterised by a strong spacing out of the vertical striations of the final vowel, indicating a creakiness that often accompanies final glottal stops, plus a kind of spike that looks like a release burst, but has no correspondence in the waveform.

The same thing may to some extent apply to weakly articulated final plosives in geminations resulting from assimilatory processes or unreleased plosives in general, so

that it may occasionally be almost impossible to detect whether there is a final consonant present or not.

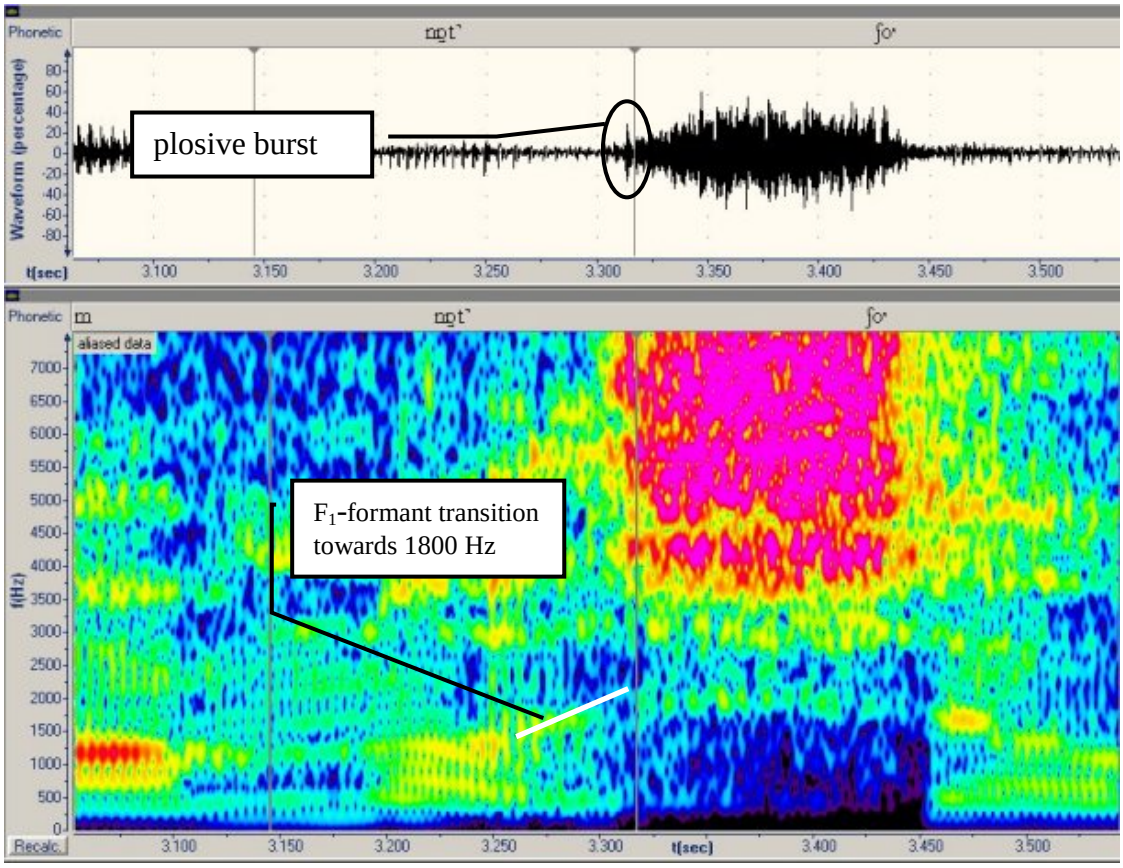

Figure 9 – Unreleased final plosive (E07).

Figure 9 depicts a case where there is auditorily no final plosive to be recognised, while the waveform clearly shows a release burst and the spectrogram indicates at least a vague transition towards 1800 Hz indicating an alveolar place of articulation.

This can easily present a problem in an analysis like mine that has to rely to a large extent on auditory analysis because of the size of the data to be analysed.

The features I will discuss in this section are classified into the following sub-categories, with their corresponding abbreviations used in the Realisations table given in parentheses:

a) None or no special linking (nl):

   if the final segment is consonantal, there is more or less complete closure, with absence of any linking features, such as liaison, assimilation, etc., or if the final segment is a vowel or diphthong, then there must be a gradual, rather than abrupt, decay. This gradual decay, however, should not take the form of a final release.

b) glottal stop replacing final plosives (gsfp):

   this category incorporates only word-final glottal stops that are replacing plosives and is the one commonly associated with urban accents, such as Cockney.

c) intrusive glottal stop (gsi)

   this category is named in analogy to intrusive *r*s. It encompasses mainly glottal stops that mark a hiatus if the affected word ends in a vowel, but to some extent also some that follow a final plosive. In both cases, they are usually also followed by a glottal onset to the next word.

d) final release (fr):

   the audible release of a plosive in phrase- or sentence-final position, indicating a prosodic break or special emphasis.

e) final consonant lengthening (fcl):

   similar to d), an indicator of a prosodic break or special emphasis, often when there is hesitation on the part of the speaker.

From the above list, we can see that there are more features than just glottal stops that we need to take into account if we assume that the number of breaks between words will somehow have an effect on the perceived ‘fluency’ and ‘nativeness’ of the

speakers[40]. For the most part, these features will be features belonging to 'pure' inter-word categories a), b) and c), but to some extent categories d) and e) will also play a role if they occur frequently at phrase, rather than at sentence ends. In order to be able to determine in which context exactly certain features occurred, all of the 5 categories were split into three subcategories each, one for the feature occurring without a following pause, one for occurrences preceding a short pause and one preceding a long pause.

In my data, category e), total final consonant lengthening, shows a difference between non-native speakers at 0.71% and native ones at 1.16%, which proves to be statistically insignificant (above the 20% level). None of the three sub-categories on their own exhibit any statistically significant difference, either. Some instances, though, may convey the impression of an unusually high degree of emphasis, such as in the *is* in the combinations *how far it is* (ID 2240-2270; realised by speaker G06), where the final consonant lengthening on *is* seems to be used as an idiosyncratic marker of finality preceding a short pause.

Incidence of final release, on the other hand, is somewhat higher at 6.12% for the non-native speakers, while for the native speakers, it amounts only to 5.01%. Even though the T-test shows no significant difference, comparing the occurrences for native and non-native speakers, it becomes apparent that there seems to be a tendency among the latter to often use this feature not only as a conscious indicator for a prosodic (final) boundary, but rather to express a certain degree of emphasis or contrast on individual words. This tendency manifests itself primarily in the higher incidence of final release on such word-classes as determiners, personal pronouns and locative expressions (such as *here* and *there*), i.e. deictica, although items from other word classes, such as the adversative conjunction *but* and the adverb *least* (in *at least*) or the

[40] An additional way of indicating perceived 'fluency' would be to add fields containing ToBI break indices (cf. Leech et al., 98: p. 43).

modal auxiliary *might* may also be receive special emphasis in this way. Features like this can be revealed by running queries on the database that combine information about the grammatical categories of the words in the dialogue and the realisations of transitions. Such a query for example showed that the singular determiner[41] *that* was overemphasised by some non-native speakers to the extent that it sounded contrastive in the following examples:

a) *on that board…*

b) *Oh, that won't…*

c) *In that case, …*

The number of tokens in each case is generally not very high, but if we assume that the overall effect of non-nativeness is triggered by a combination of 'little oddities', such cohesive features realised in a counter-intuitive way should certainly have an effect on the native listener.

The next category to be discussed here is that of glottal stops that replace final plosives. We have already seen earlier how difficult it may sometimes be to distinguish these from final elisions or unreleased plosives. However, as we have seen in Figure 8 above, what is generally perceived as glottal stops is often an abrupt closure, accompanied or indicated by a period of creakiness in the preceding vowel. Ladefoged/Maddieson, '96 describe the characteristics of glottal stop articulations thus:

> "In the great majority of languages we have heard, glottal stops are apt to fall short of a complete closure, especially in intervocalic positions. In place of a true stop, a very

[41] for most descriptive purposes, I will use the grammatical terms defined in the CLAWS7 tagset, which was used to tag my data.

> compressed form of creaky voice or some less extreme form of stiff phonation may be superimposed on the vocalic stream." (Ladefoged/Maddieson, '96: p.75)

This description is very similar to what Laver, '94 refers to under the topic of *laryngealisation* (p. 330):

> "This is a process where the primary supralaryngeal articulation is accompanied by a secondary stricture at the glottal level. This consists of an articulatory tendency to create a glottal constriction, which normally fails nevertheless to reach the maximum stricture of a full glottal stop." (ibid.)

If the first quote above holds true for English, it is thus quite likely that what is commonly referred to as glottal stops in textbooks are actually often not real glottal stops, but represent a phenomenon similar to elision, only with accompanying creakiness on the preceding vowel. This would also contradict textbooks such as Cruttenden, '94 that claim that:

> "[…] there is no acoustic manifestation of the glottal plosive other than the abrupt cessation or onset of adjacent sounds." (Cruttenden, '94: p. 155)

As far as the native speakers are concerned, the majority of tokens of this transition type occur when there is no break following the first word, accounting for 4.20% of all transitions. Another 0.91% of transitions realised as glottal stops replacing final plosives occur before long pauses, i.e. either before phrase, sentence or turn breaks, but only a negligible amount preceding short pauses (3x; 0.15%). However, this may well be due to the fact that overall, the native speakers produce a far lower amount of transitions before short pauses (2.78%) than before long pauses (9.91%), possibly indicating a tendency to either produce no pauses at all or only rather distinctive ones and hence to indicate phrase-boundaries primarily by other means, e.g. by pitch or simply by an absence of linking.

Due to the low amount of these glottal stops before short pauses by the native speakers and their complete absence amongst the non-native speakers, it is not surprising that they do not represent a statistically significant marker between the two populations. However, both of the other two subcategories prove significant, glottal stops replacing final plosives without a following break highly (p=0.0002; 4.20% NS vs. only 0.28% NNS) and those preceding a long break still well below the 5% level (p=0.023; 0.91% NS vs. 0.11% NNS). Consequently, they have to seen as significant markers distinguishing native and non-native speaker speech, clearly identifying the native speakers.

The second main category of glottal stops occurring in my data represents those glottal stops that do not replace a final plosive and that I have therefore termed *intrusive*. They can technically occur not only at the end of a word, where they are solely marked as transitions in the transition field, but also as glottal onsets to words beginning in a vowel. In the latter case, they are represented by a symbol for a glottal stop in the transcription. Just like the type discussed above, they need not represent full glottal occlusions, but are more often marked by strong transitional creakiness on the preceding or following vowels. In the case of final intrusive glottal stops, my observations closely match descriptions of *stød* in Danish, such as the one by Fischer-Jørgensen, quoted in Laver, '94:

> "The Danish stød is a prosodic phenomenon connected with certain syllables. It generally shows up as a decrease in intensity and (often) pitch, in distinct speech ending in irregular vibrations (creaky voice), in very emphatic speech probably sometimes in a glottal closure. A distinction is often made between 'stød in the vowel' and 'stød in the consonant'. But the stød is not, primarily, connected with specific segments. The irregularities (or dip of the F_0- or intensity curves) are generally found about 10-15 cs after the start of the vowel: therefore, if the vowel is long they will coincide with the end of the vowel, and if the vowel is short with the

beginning of the following sonorant consonant. The stød therefore requires for its manifestation a certain stretch of voicing" (Laver, '94: pp. 330-331)

Creakiness in the vowel and – to a minor extent – drops in intensity are also observable in my data and in most cases the creakiness in the vowel certainly does not extend over the whole of the segment. However, in general, I have not been able to observe any strong drops in F_0. Figure 10 below illustrates both creakiness and drops/-rises in magnitude for intrusive glottal stops both at on- and offsets.

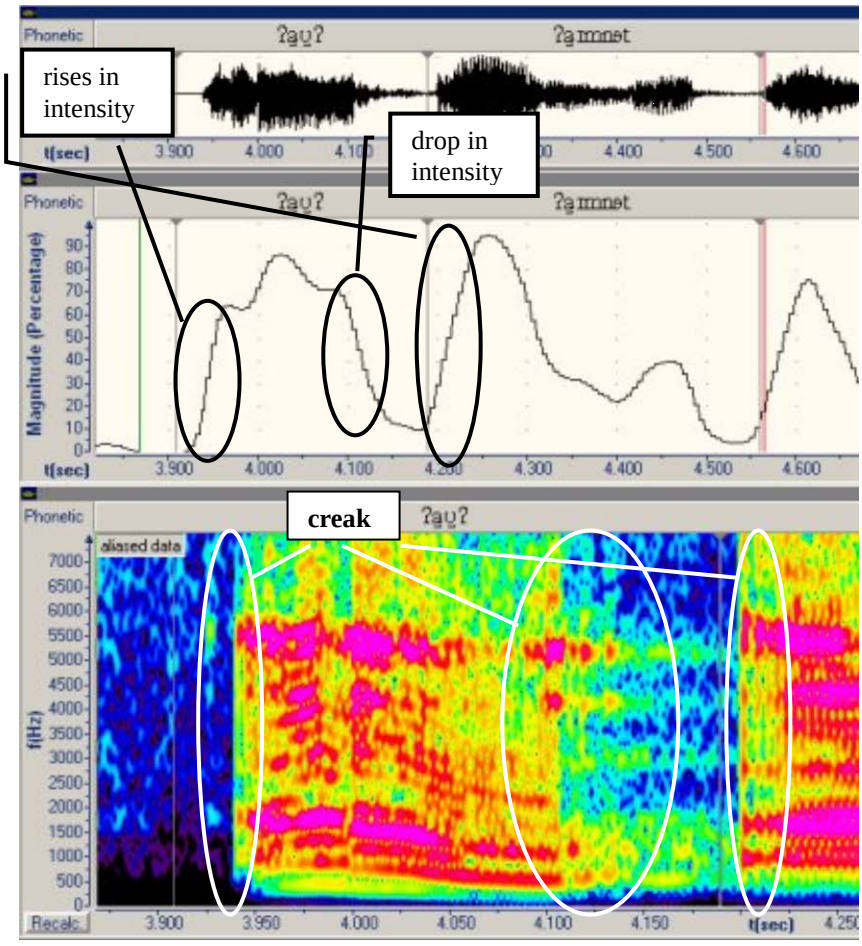

Figure 10 – Intrusive glottal stops (G01).

The clear drops and rises in magnitude visible in the waveform and the extreme vertical striations notable in the spectrogram in Figure 10 represent an extreme example of this phenomenon produced by a non-native speaker, but often the situation is not as

clear-cut. Figure 11 below shows a rather less distinct example, this time produced by a native speaker.

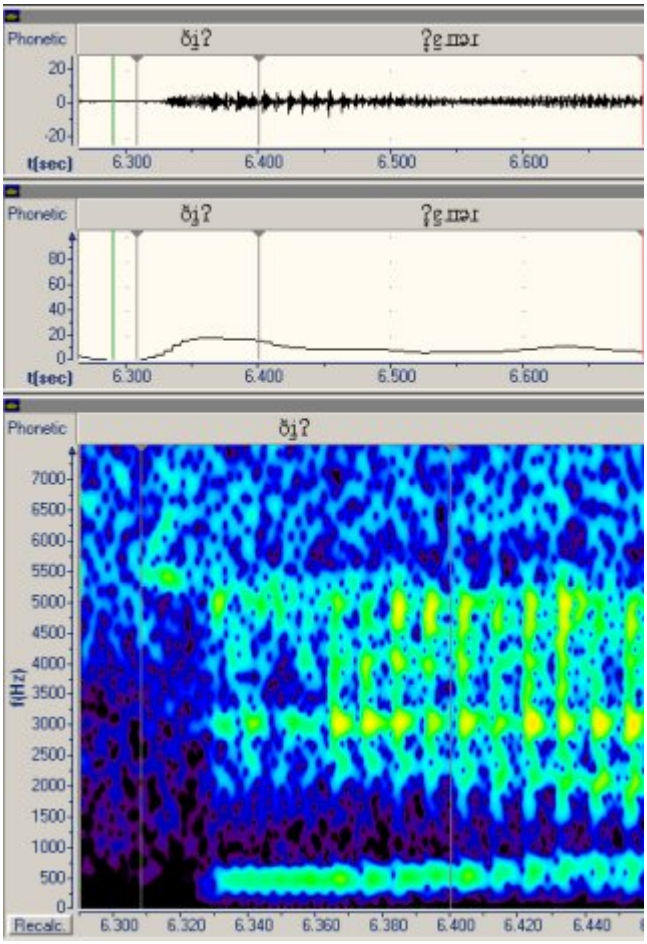

Figure 11 – A less obvious example of intrusive 'glottal stops' (E05).

The only thing identifying this example as one pertaining to the same category as the earlier one is the fact that the vertical striations here are very wide, relative to the ones in the remaining part of the spectrogram[42], and thus indicate creaky voice accompanying a clearly audible hiatus. The magnitude curve, on the other hand, shows no steep drops or rises at all.

At the lowest level, what I have termed an intrusive glottal stop therefore simply represents a form of hiatus, i.e. an absence of any other form of linking between two

[42] not visible in this illustration.

words where the first one often ends in a vowel and the second one begins with a vowel, characterised by at least strong creakiness in the voice and, in its strongest form, also the presence of one or two glottal stops and strong drops or rises in intensity. In most cases, the final versions of intrusive glottal stops occur indeed on vowels, but in some rare cases, they may also take on the form of a glottal stop after[43] a final plosive[44], which is, again, slightly reminiscent of stød in Danish, apart from the fact that the consonants involved in stød in Danish are only nasals or laterals.

Whereas final intrusive glottal stops mainly occur in positions where there is a hiatus, initial glottal onsets appear both in sentence-initial position or in conjunction with a hiatus. In my transcriptions, they appear not only marked with the symbol for a glottal stop, but may also additionally be marked by the symbol that is conventionally used for marking voicelessness (c.f. the transcription of the word *area* in Figure 11). The reason for this is that I realised I needed to make a distinction between strong glottal onsets and weak ones in order to be able to distinguish better between native and non-native speaker realisations of this phenomenon. Additionally, a weak glottal onset may also sometimes be accompanied by breathiness, rather than creak, in which case the following vowel would also be marked with a breathiness symbol, rather than the underscore tilde that I have otherwise used almost by default[45] to mark a vowel following a hard glottal onset. We therefore end up with a three-way distinction for glottal onsets,

a) strong glottal onsets, followed by creak in the vowel,

b) weak glottal onsets, also followed by creak in the vowel, and

[43] at least auditorily they seem to me to be occurring after the final plosive, rather than representing cases of glottal reinforcement/ pre-glottalisation, but this may be very difficult to establish exactly without the aid of a laryngograph.

[44] in which case they are also marked by a glottal stop symbol in the transcription.

[45] there are some rare cases where I have marked a strong onset, followed by whispery voice.

c) breathy weak glottal onsets, followed by breathy vowels.

Intrusive final glottal stops are not uncommon amongst the native speakers. Overall, they account for 3.29% of all transitions, 2.78% without a following pause, 0.46% followed by a long pause and 0.05% by a short one.

Whereas Kenworthy mistakenly attributes glottal onsets produced by German speakers to the supposed absence of "linkage", for which there is no evidence in my data (cf. 8.1.4 above), they do occur with high frequency in conjunction with hiatus or as glottal onsets at phrase or sentence beginnings. Overall, the non-native speakers produce 387 glottal onsets, while the native speakers only realise 152, a ratio of 2.5:1. A comparison of all the different realisations is given in Table 18.

NNS	NS	Count
387	152	total[46]
296	52	strong
288	48	+ creak
0	2	+ whisper
91	98	weak
77	73	weak + creak
10	18	weak + whisper

Table 18 – Glottal onsets.

Table 18 also shows that weak glottal onsets account for 64% of all native speaker glottal onsets, whereas they make up for only 23% of the ones realised by non-native speakers. The situation is reversed for the strong onsets, making up for only 34% of native speaker realisations and instead 76% by the non-native speakers.

The distinction between strong and weak glottal onsets is not an easy one to make because very often there are no clear-cut indicators, at least in those cases, where there is no whispery voice on the following vowel. Often, strong onsets do tend to have a steeper rise in the magnitude curve, but in other cases they do not and then it seems to be their magnitude relative to the rest of the utterance which gives the auditory clue.

[46] includes some non-prevocalic ones, which is why the numbers do not seem to quite add up.

Returning to the other type of intrusive glottal stops, i.e. those occurring at the end of a word, we can see that just like glottal stops replacing final plosives were a marker for 'nativeness', this type of glottal stop is a clear marker of 'non-nativeness'. It constitutes overall 7.47% of all non-native speaker realisations, while it only accounts for 3.29% of native speaker ones, which is statistically significant well below the 1% level (p=0.0006). Looking at the three sub-groups, we find that the assumption that the non-native speakers use most intrusive glottal stops in conjunction with hiatus supported by the fact that most of them (6.23%) do occur without any pause following or (0.67%) before short pauses only, and only a relatively small amount (0.57%) followed by a long pause. In other words, when the non-native speakers create a hiatus, they may or may not introduce a short pause between the two words concerned, whereas at sentence boundaries, they tend not to have many glottal stops at all. Compared to this, the native speakers produce 2.78% without any following pause, 0.46% followed by a short pause and a mere 0.05% preceding a long pause, altogether still far less than even the ones without following pause produced by the non-native speakers. Both the sub-groups that proved most relevant as markers for 'non-nativeness' also prove to be statistically significant (p=0.001 for gsi & p=0.018 for gsisp).

Finally, transition category a), none or no special linking, shows that even though English is a language that uses linking transitions to a large extent, the largest part of transitions is still realised without linking, even for the native speakers (42.47%). Even excluding the categories that are most likely to represent those points in the dialogue where there are prosodic breaks or punctuation marks, categories nlsp (1.62%) and nllp (4.25%), we still end up with 36.60% of all transitions. These of course are partly made up of cases where there is a deliberate prosodic break on the part of the speaker, i.e. a suppressed choice of using any of the linking categories and partly of cases where there is an abutment of consonants that cannot be avoided or modified by assimilation or elision.

Regarding the non-native speakers, we still find significant differences for the categories nl (p=0.000003; 45.73%) and nllp (p=0.023; 5.91%), while the category preceding a short pause is only insignificantly higher with 2.62% of all transitions. The overall percentage of the combined category of non-linking amounts to 54.27% , which makes it statistically significant far below the 1% level (p=0.000004) and therefore represents a useful marker between the populations.

8.1.10. L-vocalisation & -clipping.

L-vocalisation itself cannot necessarily be considered a transitional feature, which is why I have not included it in my list of transitions in the database. However, the effect of vocalising a final /l/ is that liaison with the next word is no longer an option, so that this will directly affect the type of transition possible. In most cases, if there is a linking transition possible, this will be a linking /W/, due to the fact that the /l/ vocalises to a back vowel.

L-vocalisation is a stigmatised phenomenon in British English (cf. Wells, '82, p. 314), which is rare in RP, but does frequently occur in other accents:

> "Vocalization of dark /l/ […] is occasionally met with in RP, particularly in the environment of a preceding labial, as *careful* [kEfUl], *table* [teIbU]. On the whole, though, L Vocalization must be considered only Near-RP or non-RP […]." (Wells, '82, p. 295).

Nevertheless, Wells also already accepts that l-vocalisation in British English in general is clearly on the increase:

> "From its putative origins in the local accent of London and the surrounding counties, L Vocalization is now beginning to seep into RP. It seems likely that it will become entirely standard over the course of the next century." (ibid, p. 259)

From a historical point of view, Wells' statement about the "origins in the Local accent of London" seems to be slightly dubious, though, because traces of l-vocalisation can even be found at least as far back as the 19th century in the writings of Tim Bobbin (aka John Collier), a Lancashire author from Rochdale, such as in the example "Theaw'rt aw on a Swat, I think; for theaw looks primely." (Bobbin, 1894: p.41), where we find vocalisation on the word *all* as represented as *aw*.

According to my data, for native speakers the back vowel that /l/ vocalises to tends to predominantly have unrounded qualities, so that the two common realisations are either [ɰ] or [ɯ]. This is slightly different from Wells' account of l-vocalisation in London English, an accent that is often seen as the prototypical example for urban l-vocalisation and which is in many respects close to Estuary English.

> "It seems most commonly to be rounded, although some investigators report unrounded [ɰ] after front vowels, as [fɪɰ] *fill*. L Vocalization is a sound change still very much in progress; speakers are by no means consistent." (ibid, p. 313)

However, according to my data, this inconsistency does not only affect vocalisation, but it is actually necessary to distinguish two different phenomena regarding the potential modification of final /l/, vocalisation and an ill-definable transition (c.f. Figure 12 & Figure 13 below) where there is no distinct /l/ present between a final vowel and the beginning of the next word. In case of vocalisation, we either end up with a diphthong, which has a central to back vowel as its second element, or with a single, relatively open vowel due to the jaw being held more open in anticipation of an l-like quality, e.g. [tʰɛɰ] (vocalisation → diphthong) vs. [tsa*] for *tell* (ID 70 in *tell me*; Figure 12) or [aʊ̯*] for *I'll* (ID 810-820; Figure 13). In the latter case, it almost appears as if the /l/ has been elided, but without any indication of this or any transitions indicating a lateral in the spectrogram, as can be seen in the two figures below. I will refer to this latter phenomenon as *l-clipping* because auditorily, it seems to cut short the word containing the final /l/. If /l/ follows a front vowel and that vowel becomes backer with

the /l/ being lost, then we can assume that /l/ has been subsumed into this vowel, e.g. [wµ *] (ID 1360) for *will* or [jF*¼] for *you'll* (ID 1190-1200).

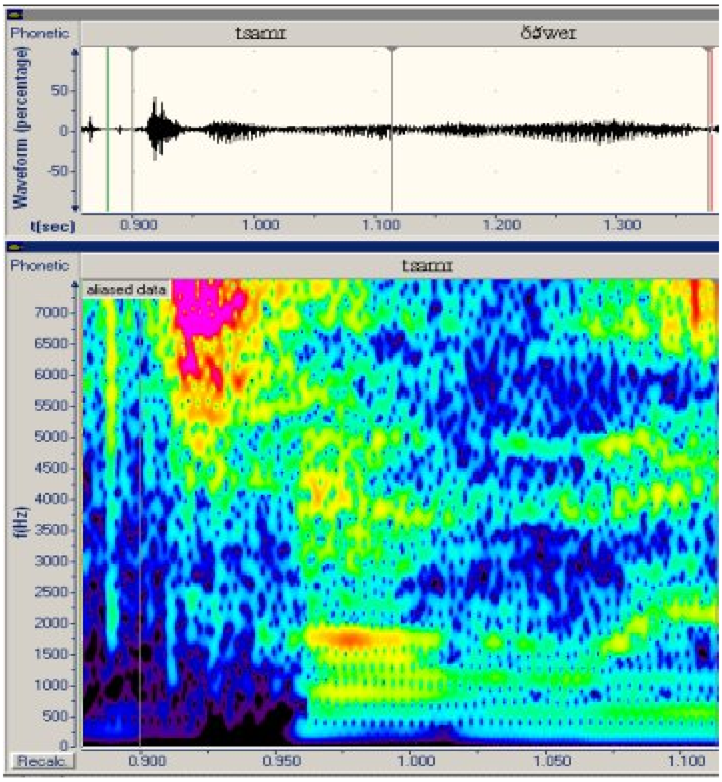

Figure 12 – *l-clipping* between *tell* and *me*.

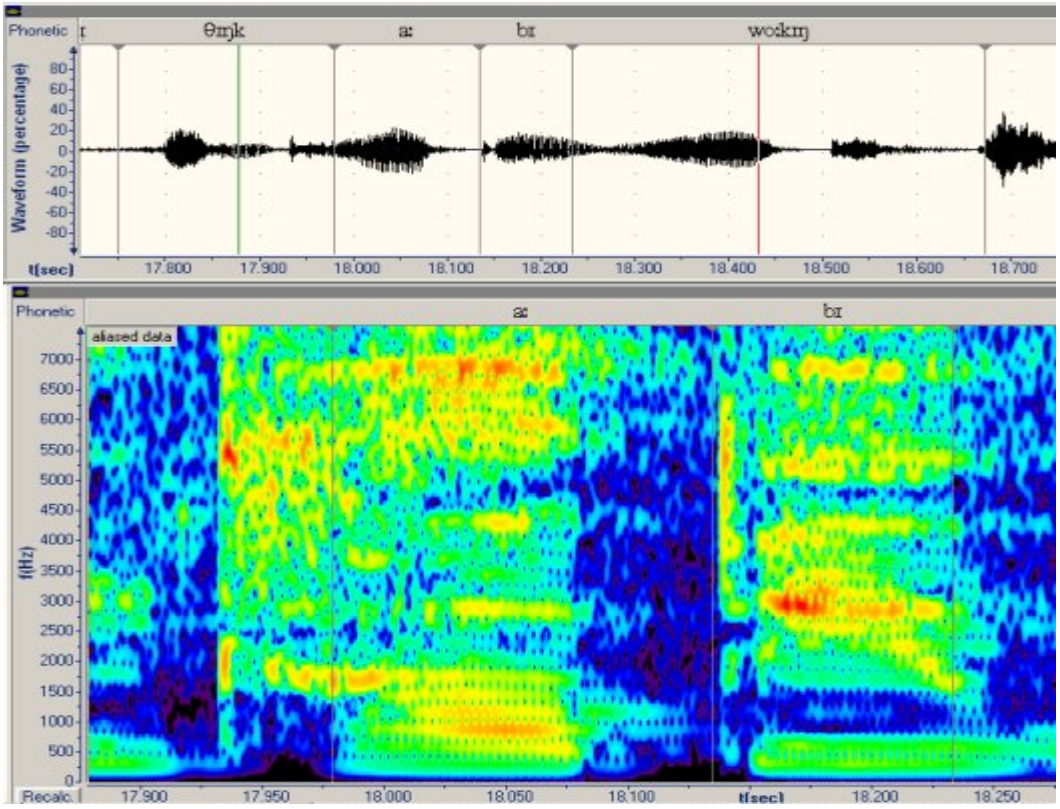

Figure 13 – *l-clipping* between *I* and *be* representing *'ll*.

Potential candidates for l-vocalisation in the corpus can be retrieved by extracting all words that end either in *–l* or *–le*. They are listed in Table 19, together with frequencies for l-vocalisation and -clipping.

ID	Word	NS voc.	NS cl.	NNS voc.	NNS cl.
70	tell	1	4	1	2
820	‘ll	0	6	0	3
1200		1	0	2	1
1890		5	0	1	0
2540		3	0	2	0
1360	will	3	0	0	2
2360		2		0	0
1020	until	0	2	0	0
1160	hall	0	0	1	0
2060	hill	7	0	5	0
2410	Well	0	0	1	0
520	able	7	0	4	0
1910		4	0[47]	9	
1480	Crucible	6	0	7	0
3130	unreliable	0	0	5	0

[47] 2x complete elision without any vocalic element whatsoever.

ID	Word	NS voc.	NS cl.	NNS voc.	NNS cl.
3190	simple	0	0	2	0

Table 19 – Potential candidates for l-vocalisation in the corpus.

Table 19 shows that for the native speakers, l-vocalisation accounts for 34.8% (39x) of all realisations of final /l/. This figure clearly indicates that the trend towards increasing l-vocalisation predicted by John Wells in 1982, if we can actually talk about such a trend in the light of my earlier comment, has fully established itself. However, the fact that clipping makes up for a further 10.7% (12x) may indicate that there could even be a general tendency towards l-loss in final position, similar to the loss of rhotic *r*. Again, this is phenomenon already pointed out in Wells, '82, but only with respect to vocalisation:

> "Just as it was R Dropping which assured phonemic status for the diphthongs /I«, E«, □«, U«/, so L Vocalization offers the prospect of eventual phonemic status for new diphthongs such as /IU/ (*milk*), /EU/ (*shelf*), etc. […] It will also, incidentally, simplify the foreign learner's task: most will find [bIldo] a good deal easier than the laterally released [d] plus dark [l] of [bIldl]." (Wells, '82, p. 259).

The similarity with the loss of final *r* becomes even more apparent when considering those cases in my data where final /l/ is not vocalised or clipped at all, such as for the combinations *unreliable anyway* and *simple enough*. In these cases the /l/ becomes involved in liaison (see 8.1.4 above) and thus acts as a linking element, just like a *linking r*.

As far as the non-native speakers are concerned, we encounter relatively far fewer vocalisations (40x; 25%) and clippings (8x; 5%). The vowel qualities exhibited are in many cases similar to those of the native speakers, but also include more qualities that are less rounded and more front, such as in [?eIbo¬] (*able*) and [wö*] (*will*), whereas the native speakers are relatively consistent in their use of [µ] and [F].

8.1.11. Rhoticity

A very interesting feature that only occurs with the non-native speakers is word-final rhoticity. Out 28 potential tokens for this type of realisation, there are only 8 in which one or more non-native speakers pronounce a final *r*. All the occurrences, along with their frequencies, are listed in Table 20 below.

Word_ID	Word	Count
350	there	2
460	there	2
560	more	4
720	or	1
910	car	4
1490	Theatre	2
2610	quarter	1
3090	number	1

Table 20 – Rhotic realisations by the non-native speakers.

Upon first inspection, I initially assumed that the non-native speakers were using rhoticity as a marker of finality, but only three tokens occur in sentence-final positions, followed by a relatively long pause. As most of the occurrences are restricted to only three speakers, though (G01: 7x; G07: 3x; G10: 3x), it is relatively fair to assume that rhoticity in this case is either due to inconsistent teaching, with some teachers of my informants possibly favouring an American accent over a British one and vice versa or to more exposure to American accents outside the classroom, as for speaker G07, who has spent a year living in the US. In general, it is not unlikely for speakers from Franconia to be exposed to American accents, due to the continuing presence of American forces there. As far as the effect of this feature is concerned, apart from giving me an impression of overall inconsistency, in conjunction with increased occurrence of hiatus, it also creates the impression of increased hesitation and unnecessary emphasis, which untrained observers may well interpret as a lack of ‘fluency’. However, in this case, they would probably also have to categorise many American speakers as less ‘fluent’ than British ones.

8.1.12. 'Syllabic' Consonants.

When foreign learners are being taught English, one of the features that they are often particularly drilled on is the use of syllabic consonants in words such as *button* and *bottle*. Realisations that do not have a syllabic consonant are sometimes seen as pertaining to 'non-standard' accents that are to be avoided:

> "In the case of words such as 'bottle', 'muddle', 'struggle', which are quite common, it would be a mispronunciation to insert a vowel between the l and the preceding consonant. There are a few accents of English which may do this, so that, for example, 'cattle' is pronounced kQt«l, but it is not the case in RP." (Roach, '91: p. 79)

However, in recent years, and particularly with the development of Estuary English, realisations with reduced vowels + non-syllabic consonants seem to have become more common and just not to have found their way into the textbooks yet. Realisations of this type should not be surprising if we look at descriptions of how syllabic consonants may be analysed in terms of their underlying representation:

> "[…] An example is the syllabic [n] which most accents have in words like *hidden* [-dn]. There are compelling reasons for regarding this [n] as the realization of underlying /«n/. These include the morphological fact that the *–en* suffix is pronounced [«n] in other environments (*swollen*); possible free variation between [n] and [«n] in some other environments (*station*); the possibility in some accents of getting [n] as the realization of a /«/ and a /n/ which belong to different words in the sentence ([hQdnàIs Èdel] *had a nice day*); the extreme difficulty experienced by many native speakers of English, including some of those undergoing training in phonetics, in perceiving the difference between [n] and [«n]." (Wells, '82: p. 55).

Wells here even points out that there may be what he refers to as "free variation", which is yet another indicator of the fact that it is not easy to determine for native speakers, either, whether to produce a reduced vowel or not and that there may be an

element of choice. Despite the somewhat normative comment quoted earlier on, Roach also gives many examples of potential syllabic consonants other than /l/, where there is considerable choice for variation, and at the end of his discussion points out that:

> "I feel that the subject of syllabic consonants is an area that we need to know more about, and that there has not yet been enough discussion of the problems found in their analysis" (Roach, '91: 83).

This latter is one of the points that this part of my analysis is trying to address by looking at all the realisations for word-final syllabic consonants occurring in my corpus and discussing potential explanations for them. Table 21 below lists all occurrences of syllabic consonants for both native and non-native speakers, comparing them to occurrences where a reduced vowel + non-syllabic consonant occurs.

ID	Word	NS syll.	NS red.	NNS syll.	NNS red.
140; 1950	station	3 2	4 5	6 5	4 5
1230	fountain	0	6	4	6
250	can	5	2	1	2
2630	an	0	7	1	9
280; 1860	from	3 2	3 4	0	7 4
2030	bottom	4	3	1	9
2860	problem	1	6	0	10
3030	taking	3	4	2	7
520 1910	able	0 1	0 1	3 0	2 0
1480	Crucible	1	0	0	3
3130	unreliable	6	1	3	2
3190	simple	7	0	7	0

Table 21 – Potential candidates for word-final syllabic consonants.

Column 4 in Table 21 indicates that there is a relatively clear, albeit sometimes only slight, preference by the native speakers to use a reduced vowel + non-syllabic consonant, rather than to produce a syllabic consonant. The only main exceptions to this are

the words ending in *le*, which show a preference for neither of the two options, but instead have more instances of l-vocalisation (c.f. 8.1.10 above) if they appear before a word that begins in a consonant. As we have already seen above, if the following word begins in a vowel, though, as in the case of *unreliable* and *simple*, the /l/ is mostly realised, but loses its syllabicity because it is 'resyllabified' through liaison (c.f. 8.1.4 above), becoming the onset of the next syllable/word. Overall, it therefore seems that there is a general tendency amongst the native speakers away from realising syllabic consonants and replacing them with phonologically 'more complete' syllables or vocalisations that completely exclude the consonants, unless there is also the option to 'resyllabify' through liaison.

The non-native speakers also show a marked preference for forms without a syllabic consonant (70x; 46.7%), as opposed to those with syllabic consonants (33x; 22%). However, the fact that the percentage for the former type of realisations is higher is partly due to the non-native speakers' reluctance to produce mono-syllabic words such as *can, an* and *from* to the same extent as the native speakers, so that often they hardly seem to see a choice for producing syllabic consonants in this environment. The same seems to hold true for some di-syllabic words like *bottom*, *problem* and *taking*. Words like *station* and *fountain*, on the other hand seem to be slightly 'favoured' with respect to pronouncing syllabic consonants, which, particularly for the latter, appears slightly unusual in comparison to native speaker pronunciation, where, according to Roach, '91, "clusters formed by nasal + plosive + syllabic nasal are very unusual" (p. 80).

Overall, though, the non-native speakers seem to be making relatively similar choices to the native speakers, apart from the absence of syllabic consonants in certain types of reduced syllables, and in particular for words ending in /l/, at least where they avoid a hiatus.

8.1.13. Weak Forms.

One of the most common features of non-native speaker speech is that they often fail to produce weak forms in their appropriate contexts. This may thus give the impression that they are stressing too many words, which tends to sound odd to native speaker ears:

> "[…], most native speakers of English find an 'all-strong-form' pronunciation unnatural and foreign-sounding, something that most learners would wish to avoid." (Roach, '91: p. 102).

This is often not the fault of the learners, who are frequently taught a kind of language that is supposedly more formal and pertaining to a higher register and therefore emphasises a kind of clear enunciation that is not appropriate to most situations. However, as Brown points out, even in slightly less than formal situations, a great number of reductions are performed by native speakers:

> "In a stressed syllable the initial consonant(s) and the vowel will be comparatively clearly enunciated whereas in an unstressed syllable the consonants may be very weakly enunciated and the vowel very obscure. It is important to realize that this is a feature of slow colloquial speech just as much as it is of informal speech." (Brown, '90, p. 46).

As my non-native speaker informants are already very proficient speakers, it should therefore be even more interesting to see whether they a) do use weak forms in the appropriate contexts and b) when they do, whether the weak forms they use correspond to those used by the native speakers.

In the teaching literature it is often assumed – maybe for the sake of convenience – that reduced vowels, which form a central part of most weak forms, are reduced to a shwa or [ɪ]-type vowel. However, according to Brown:

> "The 'same' vowels in unstressed syllables will be more obscure in quality, 'round' vowels will not have lip rounding and diphthongs will not be diphthongized. […] It should be clear from this description that that it is not sufficient simply to describe unstressed syllables in terms of the shwa vowel /ɘ/ and the 'reduced' vowel [ɪ] as it is sometimes done. Not all unstressed vowels are reduced to these vowels […]"
> (Brown, '90, p. 47)

This statement enforces the point that it is not quite as easy as one might initially assume to even identify weak forms as opposed to their corresponding strong forms because there may well be a gradation from strong to weak with a potentially somewhat arbitrary cut-off point between them. Furthermore, it is often assumed that weak forms are categorised as forms that contain weak vowels, but, as I will try to show, this is too limited a view. Wherever necessary I will therefore include details about my choice of categorisation in my discussions of the weak forms occurring in my data.

Table 22 lists some of the potential weak forms, adapted from the list of weak form options listed in Roach, '91 (p. 108-109).

word	NS weak forms	Perc.	NNS weak forms	Perc.
and (3x)	16	76%	26	76%
but (2x)	13	93%	14	70%
your (3x)	16	76%	22[48]	79%
we	5	71%	8	80%
at (3x)	21	100%	27	90%
for (2x)	14	100%	18	70%
from (2x)	13	93%	12	60%
of (4x)	27	96%	21	53%
to (7x)	48	98%	68	97%
there (2x)	6	43%	4	20%
can	7	100%	2	20%
could	7	100%	9	90%
have (5x)	21	60%	5	10%
do (2x)	14	100%	18	90%
Total:	228		214	

[48] 2x replaced by what seems to be an indefinite article, rather than possessive. This also affects the overall percentages.

Percent:	86%	59%

Table 22 – Some potential weak forms

As we can see, the non-native speakers use fewer weak forms than the native speakers. They realise only 71% of all possible weak forms as opposed to 86%, but in order to really understand why and where there is a difference, we need to look at the individual occurrences or clusters of word categories.

Although the percentages of weak forms for the conjunction *and* for both speaker populations are the same, there is a clear difference in the 'degree of weakening' as the non-native speakers are more reluctant to elide final /d/ (9x), a feature that is universally present for the native speakers. The reluctance on the part of the non-native speakers is particularly strong before *head*, where six speakers out of ten do not elide the final plosive, and out of those four also show instances of final fortition.

A similar thing applies to *but*, where the native speakers show a strong tendency (12x out of 14) towards a glottal stop or elision, whereas non-native speakers always have a final consonant. The fact that the percentage of non-native speaker weak forms is also lower (at only 70%) seems to indicate a slight reluctance to reduce this word due to its adversative character. In other words, the non-native speakers may be stressing it more because they want to establish a stronger contrast with what has been said before.

As far as the possessive pronoun *your* is concerned, the non-native speakers actually show a slightly higher percentage of weak forms than the native speakers. It may be intuitively tempting at first to attribute this to the fact that six non-native speakers fail to see that the word in this context (ID 3380) is quite likely to receive contrastive stress, but the fact that also four native speakers do the same thing seems to invalidate this simple explanation. An alternative interpretation of the native speakers' reluctance to produce a weak form is that their pronunciation is actually relatively close to RP, where the weak form /jʊ/ is "unusual" (Wells, '90: p. 798), although Roach, '91 (p.

104) lists it as a possibility. The non-native speaker realisations also exhibit a higher degree of variation, with a preference for [,] (c.f. 6.2 above) (9x), which is used only once by one native speaker.

With regard to the prepositions *at*, *for*, *from*, *of* and *to*[49], we can see that the native speakers universally or almost universally produce weak forms, while the non-native speakers again seem to be reluctant to do so, with the exception of *to*. There may thus be a general tendency on the part of the non-native speakers to 'over-stress' prepositions, thereby making them almost seem contrastive (c.f. 3.1.2 above). As far as the native speakers are concerned, we again continue to find additional reduced forms, different from those reductions that just affect the vowel. For *at*, this expresses itself in the tendency to replace the final plosive by a glottal stop (x13) or once even complete deletion of the word. In *for*, 8 out of the total 14 occurrences show evidence of what I have earlier termed *extreme vowel reduction*, i.e. a reduction to the point of disappearance of the vowel (see 8.1.8 above), and in *from* we find 7 occurrences of /r/-less forms and a further 5 of vowel + /r/-less form, i.e. with only initial fricative + syllabic /m/ (c.f. 8.1.12 above). Loss of /r/ in *from* only occurs for one non-native speaker once and in general this population shows some reluctance (40%) to produce weak forms at all, something that is even more applicable to the word *for*, unless the occurrence of a C13-like quality [□] (15x) can be counted as such. The native speakers also have additional options for *of*, where they seem to have a choice either eliding the initial vowel (6x) or the final consonant (2x), whereas the non-native speakers have almost to 50% strong forms and elide neither vowel nor consonant.

To represents the most complex case of all the prepositions, as can be seen in the summary in Table 23:

reduction-type	ns count	nns count
evr	23	2
[ɑ]-like	8	9

[49] n.b. none of these prepositions appear in final positions where they could not be reduced.

[,]-like	0	1
[ʊ]-like	8	21
[¬]-like	1	20
[ɪ]-like	6	12
[ə̯]-like	2	3
total:	48	68

Table 23 – Types of reduced vowel in the preposition *to*.

As *to* occurs 7 times in the data and there are no deletions of the word, we can see that nearly all speakers reduce it. The native speakers again show a clear preference for extreme vowel reduction, whereas the non-native speakers tend to opt for qualities closer to the strong form, but with some tendency for unrounding or fronting the vowel, i.e. tending more towards 'peripheral' rather than central qualities.

In *there*, the main distinction between strong and weak form is between whether the realisation consists of a diphthong or long monophthong versus a relatively short monophthong. For the non-native speakers, we find nearly half (10/21) of the forms produced as a diphthong and another three as long monophthongs. However, it can clearly be seen that the tendency towards longer elements is restricted to certain 'final' environments, i.e. the occurrence being either at a potential prosodic break point such as in *From there (, you'll be able)* (ID 1860-1870) or the end of a sentence as in *(on that board) over there* (ID 450-460) where we might possibly expect final lengthening, anyway. On the other hand, the reduced form tends to predominantly occur in (phrase-)initial or non-final position, such as in *there's a map…* (ID 350). For the non-native speakers, however, there seems to be a high degree of reluctance to reduce the non-final occurrences, apart from the fact that they sometimes even produce rhotic forms, which even heighten the effect of discontinuity/emphasis that is normally created through the use of longer or diphthongal qualities.

The next group of words comprises the auxiliaries *can*, *could*, *have* and *do*. For *can*, the native speakers again show a clear tendency towards extreme vowel reduction (6x) while the non-native speakers tend to use a fuller vowel quality often closer to C2 [e]

than a shwa. In *could*, both native (4x) and non-native speakers (8x) show a preference for an unrounded quality close to C18 [¬]. The native speakers seem to have the additional option of using a fronter vowel of the [ɪ] (2x) or C17 [ʊ̟]-type (1x), but show no central, shwa-type realisation, whereas at least one of the non-native speakers has a shwa-like realisation.

For *have*, the native speakers show a distinct preference (15x/35) for a more 'northern' type pronunciation, closer to C4, which I have transcribed as [a]. As this realisation is characteristically rather short, it is often difficult to determine whether it represents a strong or a weak form, even though in the North of England it can certainly act as one. It may thus be the case that the more 'northern' the type of pronunciation gets, the more the distinction between strong and weak forms for this word disappears. As far as the non-native speakers are concerned, though, the majority (42x/55) of realisations consists of strong, more RP-like [ɒ] forms, with only a limited number of reduced forms.

The auxiliary *do* occurs twice in the dialogue[50] and we thus have 14 tokens for the native and 20 for the non-native speakers. Each time, it is followed by the pronoun *you*, which makes the combination a likely candidate for contraction. This is definitely the case for the native speakers, where we again encounter a strong preference for extreme reduction of the vowel (9x) resulting in the contraction, whereas the non-native speakers avoid it almost completely. In all twenty possible realisations we only find one 'pseudo case' where speaker G02 begins to produce a contraction, but then nevertheless follows it by the complete pronoun, thus yielding [dʒ¬jʉ]. In producing the full form of the auxiliary, there is also a clear tendency towards anticipatory fronting and unrounding noticeable for most non-native speakers in the majority of realisations (13x), thereby producing a C18-like quality.

[50] excluding where it forms the first part of *don't*.

Throughout the preceding discussion on weak forms, it has become apparent that, although the non-native speakers may overall produce a lower number of weak forms, in most cases the main difference between native and non-native speaker realisations does not lie in the number of weak forms used, but in the degree of weakening. In other words, the native speakers tend to reduce their weak forms not just so that they produce weak vowels in function words, but often reduce their vowels to such an extent that they disappear completely, which results in additional weak forms that often do not contain any vowels at all.

8.1.14. Central vs. Peripheral Qualities.

In the context of the weak forms described above, a certain tendency on the part of both native and non-native speakers towards the use of more peripheral vowel qualities, i.e. productions located away from the centre of the vowel space and towards its edges, has been apparent. However, my data also contains some peripheral qualities that are mainly observable for the non-native speakers and therefore represent potential identifying markers that distinguish the two populations from one another. These peripheral qualities are observable in positions where one would generally expect to find a shwa-like realisation, either as a single vowel or as the second part of a centring diphthong, such as in *Theatre* or *here*. The additional types of realisations we see for the non-native speakers are final [Œ] and [,], both qualities that are clearly less central than a shwa, with the latter being somewhere between cardinals 10 and 11. They also both occur with or without creak and seem to represent extreme points of a continuum of possible vowel qualities in word-final position ranging from close and front via central to open and back.

Final [Œ] is a realisation that is not uncommon for urban British accents, such as Cockney (c.f. Wells, ‘82, p. 305) or Brummy, but only occurs 10 times with my native speakers, six times in *Theatre* and twice in *cinema*, once as a realisation of *are* (fol-

lowed by a glottal stop) and once as part of a filled pause. For the non-native speakers, however, it occurs 31 times and with the following words:

Word	Count
*car	1
*continue	1
*tell (l-voc)	1
*unreliable (l-voc)	1
area	3
cinema	6
here	1
or	2
Theatre	3
there	4
whether	2
zebra	6

Table 24 – NNS occurrences of final [ɪə].

The starred forms at the top of Table 24 represent unusual and probably more idiosyncratic and context-governed realisations, rather than systematic variations. Thus there may be an 'r-reflex' left in the realisation of *car* as [kʰaɪə], i.e. the speaker (G03) may be aiming for a long monophthong, but is nevertheless possibly still influenced by the spelling. In *continue*, the influence clearly comes from the following word *up*, where the speaker (G07) anticipates an initial [ʌ]. For *tell* and *unreliable*, we see odd forms of l-vocalisation. As far as most of the other words are concerned, those might well be forms that could be realised with a final [ɪə] in the urban accents mentioned before, which demonstrates the point made earlier in 1.4.3 above that often non-native speaker speech shows similar characteristics to native accents deemed as having low acceptability by some native speakers.

For final [ɪ], we find even more occurrences, 44 altogether. The fact that we find some of the same words we just encountered in Table 24 with final [ɪə] shows that in many cases the non-native speakers see the two realisations as straightforward alternatives for unstressed vowels in final syllables.

Word	Count
a	4
area	1
continue	2
for	1
go	2
here	2
hour	2
near	1
number	2
over	1
the	5
Theatre	4
ticket	1
to	1
you	4
your	9

Table 25 – NNS realisations ending in [,].

As I know of no British accent that has any comparable realisation in final position, I would assume that the use of final [,] certainly represents a better marker of non-nativeness than the final [ɹ], which is at least attested for some British accents.

8.1.15. Triphthongs, Diphthongs & Monophthongs.

Whereas so far we have mainly discussed the realisation of vowels in unstressed positions, we can now direct our attention towards the realisations of full vowels and trace the differences between the two speaker populations. As previously pointed out, foreign learners are often taught a far more careful and often also somewhat old-fashioned style of pronunciation. For example, most textbooks for British English still teach learners to use the /ʊə/-diphthong for words like *poor* and *sure*, while there has already been a longstanding and increasing tendency in many British accents to use a monophthong, often assumed to be /□ː/, instead:

> "The diphthong Uk« is included, but this is not used as much as the others – many English speakers use ùin words like 'moor', 'mourn', 'tour'. However, I feel that it is preferable for foreign learners to learn this diphthong to ensure the maximum distinctiveness of words in pairs like 'moor' and 'more', 'poor' and 'paw'." (Roach, '91, p. 24)

Even though Roach's point may be right from a pedagogic point of view, it is nevertheless doubtful whether native speakers would actually attempt to achieve "maximum distinctiveness" in this way in those cases where it is actually needed, even if they needed to disambiguate one of the two words in a pair. In this section, we will therefore attempt to paint a realistic picture of native speaker behaviour and see how this relates to what the non-native speakers have learned.

Regarding the use and potential modification of triphthongs through smoothing (c.f. Wells, '82, p. 328ff.), there is very little data in my corpus of recordings. In fact, a triphthong would only be possible in two words in the whole dialogue, *unreliable* (ID 3130) and *hour* (ID 2640). However, *unreliable* shows a relatively clear distinction between the native and non-native speakers in that the former seem to have a three-way system that allows them options from the original triphthongal /aI«/ (1x) to monophthongal realisations (2x), with the main preference being in the middle, i.e. for diphthongs (4x), while the latter group of speakers seems to have only a two-way system that excludes 'smoothing down' to the level of monophthongs, and where the choices are completely balanced between triphthongs and diphthongs. In other words, the non-native speakers do realise that there is an option of smoothing, but not that there are actually two possible degrees of it.

In *hour*, where the middle element of the original triphthong /aUk/ is a back, rather than a front vowel, we again see a distinct preference of the native speakers for diphthongs (6x), but this time there is not a single triphthong to be found among all the realisations, and only one single monophthong. It therefore seems as if the native

speakers may be showing a greater readiness to smooth this type of triphthong, but not to the same degree as the earlier one with the front vowel as a middle element. In contrast to this, the non-native speakers seem to be reluctant to apply any smoothing as only one single speaker even produces a diphthong.

In other words that contain an /aʊ/-diphthong, we can see that both native and non-native speakers show some degree of smoothing, but again with a distinct preference for diphthongal realisations:

Word_ID	Word	NS mono	NS diph	NNS mono	NNS diph
1230	fountain	2	5	5	5
1530	out	2	5	2	8
2480	about	3	4	3	7
3180	sounds	4	3	4	6

Table 26 – Smoothing of the [aʊ]-diphthong.

While there is little remarkable about the extent of smoothing in native speaker realisations, the relatively high number of monophthong realisations by non-native speakers in the words *fountain* and *sounds* clearly shows that most of them are aware of the option of smoothing in these cases.

When teaching undergraduate native speakers about accents of English, one question I have often encountered is how to transcribe the vowel in words like *no* and *go*. Many of them are quite puzzled when they are told that they are supposed to use the /«ʊ/ diphthong, as they do not perceive themselves as using either a diphthong[51] or if they do, as having a central vowel as its first element. At least some of them thought that this type of realisation sounded more posh than the one they use. Upon first transcribing my data, I also had the impression that somehow the realisations of my non-native speakers were sometimes too extreme to be natural and thought that this may be a case of what Roach describes as follows:

[51] most of the students in Lancaster tend to be from the 'North'.

> "The other diphthong that requires comment is «U. English speakers seem to be especially sensitive to the quality of this diphthong, particularly the first part. It often happens that foreign learners, having understood that the first part of the diphthong is not a back vowel, exaggerate this by using a vowel that is too front, producing a diphthong like [eU]; unfortunately this gives the impression of a 'posh' accent – it sounds like someone trying to copy an upper-class pronunciation, since [eU] for «U is very noticeable in the speech of the Royal Family." (Roach, '91, p. 24-25).

Rather than assuming a pronunciation of the first element that is closer to C2 /e/ though, as the one that Roach describes, I have transcribed this realisation as [, U] (c.f. 6.2 above), thus ending up with a three-way distinction between the former, the quality with the central starting point [«U] and realisations a back vowel in initial position, [oU].

In extracting occurrences of the three diphthong types from my data, it was important to remember that each of the diphthong element may also be realised with creaky voicing and therefore such occurrences are subsumed in the table below.

Word_ID	Word	NS [«U]	NS [oU]	NS [, U]	NNS [«U]	NNS [oU]	NNS [, U]
870-80	don't	4	0	1	4	2	3
990; 1580	go	7	0	3	6	3	3
3310	hope	3	1	2	3	4	2
1760	Odeon	4	2	0	2	4	0
2790	Oh	1	1	0	0	5	4
2110	okay	6	0	0	2	0	2
450	over	7	0	1	3	4	1
1350	road	5	1	1	1	6	3
540	show	1	0	0	2	5	0
2820-30	won't	1	0	0	0	0	0
	total:	39	5	8	23	33	18

Table 27 – [«U] vs. [oU] vs. [, U].

Table 27 suggests that despite the intuitions of my undergraduate students, native speakers show a clear preference for [«U] realisations. The other two types of realisa-

tion are far lower and therefore seem to be relatively insignificant. However it also has to be borne in mind that in general, only 52 out of the 77 possible forms were actually realised as diphthongs by the native speakers and 74 out of 110 by the non-native speakers, so that there is also still a fair number of monophthongal realisations occurring.

The situation is different for the non-native speakers. We can see some preference for the realisation with the back vowel as first element, but it does not appear to be as clear a choice as for the native speakers. With regard to the 'posher' [, ʊ]-form, we not only find my initial impression confirmed, but also, perhaps surprisingly, that there are even 8 occurrences of it by native speakers (mainly by E04 & E06, who are both more 'Southern' speakers).

As already mentioned earlier, it is often assumed that the /ʊə/ diphthong these days tends to be replaced by a C6-like pronunciation /□ʊ̯. However, according to my personal observation, this seems to imply far too open a quality of the vowel than many speakers would actually use in this context. In have encountered this vowel quality more with speakers that come from the Northwest or North of England. For most other accents of English English at least, and including RP, the quality seems to be far closer, more towards C7 /oʊ̯. The same applies to many other words that, according to textbooks and pronouncing dictionaries, are supposed to be pronounced with /□ʊ̯.

Table 28 lists all the candidate words for this type of pronunciation and compares their realisations, including C13-like ones that seem to be relatively common for the non-native speakers.

Word_ID	Word	NS C6	NS C7	NS C13	NNS C6	NNS C7	NNS C13
220	sure		5			1	
3260; 3380	your	1; 1	3		1		1
440	board	1	6		4/2	1/3	
560	more	4	2	1	4/1[52]	0/1[53]	1/2[54]
720; 2120	or	3	5	3	3	4/2	9/1
840	walking	1	6		9		
1160	hall	4	1	2	7/1[55]		1
1630	towards	2	5		1		8
2610	quarter	2	5		6	1[56]	3
2740	always		6/1		6/1	1/1	1
2900	already	1	3/1[57]	1	4	1	5

Table 28 – C6 vs. C7 vs. C13 by words.

Table 28 includes both purely monophthongal realisations and also some where the relevant vowel represents the first vowel in diphthongs or is r-coloured. Slashes separate pure monophthong realisations from the other types.

As we can see by looking at the top two rows of words in the table, for those words where there used to be an /ʊə/-diphthong present, the native speakers at least show a tendency towards C7. In *sure*, this tendency is very strong, whereas in *your* it seems to be less so. However, this may be due to a general confusion on the part of both native and non-native speakers to realise that this word was originally meant to be contrastive in the position with ID 3380 in the dialogue, in which case it should be realised as

[52] 1x followed by rhotic *r*.

[53] 1x followed by rhotic *r*.

[54] followed by rhotic *r*.

[55] resulting from l-vocalisation

[56] 3x [□].

[57] second element [ɐ].

a strong form, but not necessarily otherwise. The native speakers, on the other hand, show tendencies to either produce realisations closer to the original /ʊɤ/-diphthong or different types of weak forms for both words.

Apart from in the words *more* and *hall*, the native speakers again show a rather distinct preference for qualities closer to C7, complemented mainly by a more limited number of C6-like qualities. Occurrence of C13 is highly restricted and overall not very prominent. In contrast, the non-native speakers clearly favour C6-like qualities, followed by C13-like ones. The number of C7-like vowels is relatively limited, however. Table 29 summarises the differences in numbers.

	C6	C6+	C7	C7+	C13	C13+	total	other
ns	20	0	47	2	7	0	76	15
nns	45	5	9	7	29	3	98	32

Table 29 – C6 vs. C7 vs. C13 counts of overall occurrences.

The relatively strong inclination on the part of the non-native speakers may be tentatively explained by the fact that the learners have probably been taught to realise the vowel in these words with a very open quality to distinguish them from a closer quality deemed to be more German, used in such words *Boot* (*boat)*, and hence unacceptable according to what the learners have been taught in school. Interestingly enough, though, realising words like *towards* (ID 1630) (8x), *quarter* (3x) and *already* (5x) with an /□/-like quality creates exactly the opposite effect, i.e. to make them sound far more non-native. According to Kenworthy, ‘87, the /□/ vowel also represents a special problem sound for German learners that needs special consideration, a claim that is easily refuted by the fact that my speakers actually over-use it.

8.1.16. Unusual or Old-Fashioned Qualities

Under the heading of unusual or old-fashioned qualities, I want to discuss all those vowel qualities produced by the non-native speakers that are different from the ones used by the native speakers and have not already been included in the previous two

sections above. The first of these qualities is the one that typically occurs in Southern English or RP realisations of words such as *but* and *butter*. My non-native speakers only use it in an unusual way in the relatively small group of words listed immediately below:

Word_ID	Realisation	Count	Word	Speaker(s)
1080	k¨ÃsIN	2	crossing	G03, G05
1150	tHÃʷ[58]	1	town	G06
1250	f¨Ãnt¤	1	front	G03
1390	dÃʷn (p…)	1	down	G06
2030	bÃtHán	1	bottom	G01
2030	bÃtH«án	1	bottom	G03
3020	bÃD«	2	bother	G01, G04
3020	bÃʷD«á	1	bother	G10

Table 30 – Unusual occurrence of [Ã].

Except for in the words *town*, and *down*, it appears as if the speakers are possibly trying to imitate an American accent, but instead produce a shorter, more close and back pronunciation than the intended [Aʊ]. For the other two words, it appears as if the speaker (G06 in both cases) is attempting to perform some type of smoothing, but with a more or less similar effect as in the other group of words. If the reason for most of these realisations should not be that the speakers are trying imitate an American accent, then there could be two other possible explanations. They may either be producing these forms as a type of analogy to other words that contain an <o> in their spelling, such as *one*, *son*, *nothing*, etc. or have been exposed to some by now rather old-fashioned 50/60ies style TV acting pronunciations by their teachers. This style of pronunciation is not generally documented in the textbooks on phonetics, but I managed to find a few examples in a 1962 episode of the television series *The Saint*, uttered by various actors: [SÃpIN, dZÃn, gÃt, kÃfi, wÃn, pÃsIbl] for *shopping*, *John*, *got*, *coffee*,

[58] This realisation is not only odd because of the vowel quality used by the speaker, but also because the following word is *hall* and therefore the [m] at the end of *town* cannot be due to assimilation, such as in *down* further on in the table.

one and *possible*. Out of these examples, of course *one* in RP is still officially pronounced with an /Ã/ (i.e. /wÃn/) just as is *front* in my dialogue. However, at least the latter can probably, at least judging by the realisations of the majority of my speakers, be seen as somewhat old-fashioned or distinctly regional. As a regional phenomenon, replacing /□/ by /Ã/ is only mentioned in one textbook on English pronunciation, which is Ward, '45, who states:

> "In some dialects □ is replaced by Ã: e.g. *not* is pronounced nÃt, *was* wÃz." (Ward, '45, p. 94).

Judging by the fact that this textbook is already more than half a century old and none of the later textbooks refer to this feature, it is probably fair to assume that this pronunciation is not only a regional, but also by now very old-fashioned one.

Another pronunciation that I originally assumed to be either an extremely old-fashioned[59] one, perhaps even going back to the 18th or 19th Centuries, or a more regional feature, is the occurrence of the somewhat shwa-like, but more front realisation that I have transcribed as [,] in the words listed in the table below.

Word_ID	Word	NS Count	NNS Count
2480	about	0	1
2570	allow	3	4
2000; 2580	at	2	6
2180; 3390	bus	2	0
2520	but	0	1
280; 1860	from	1	1
1250	front	1	0
210	not	0	2
3090	number	1	0
390; 1260	of	1	6
750; 1430; 2230	on	0	3
2860	problem	0	4

[59] This notion is based on the fact that some older German speakers are still using the pronunciation [k, t] for a type of frock that has dove-tails in the back and which reflects an old-fashioned type of pronunciation taught to them.

Word_ID	Word	NS Count	NNS Count
140; 1950	station	3	3
430; 2100; 2810	that	0	4
2680; 2930	ticket	0	4
1560	underpass	0	3
1120	up	1	0
2020; 2750; 3120	very	2	11

Table 31 – Some non-final and non-diphthong occurrences of [,].

The table above only represents an excerpt of the most frequent or unusual occurrences and also excludes those realisations already discussed above as final realisations and in diphthongs. Overall, the non-native speakers have 78 occurrences of [,], while the native speakers only have 24. For the native speakers, occurrences of this form seem indeed to represent a regionally restricted (and rather limited) feature as almost all occurrences are produced by – in order of frequency – E06, E04 and E07, who could all be characterised as more 'Southern' speakers. As the feature occurs in various positions inside mono- and polysyllabic words and seems to be used rather indiscriminately, it is extremely difficult to identify any underlying patterns of occurrence for any of the two populations.

8.1.17. Aspiration or Strong Final Release.

A further distinguishing feature between the two populations is the strength of aspiration following initial and non-initial voiceless plosives. Overall, noticeably strong aspiration is not a highly frequent feature for either of the two populations, but some of the limited occurrences can be rather striking. In initial position, it occurs in the words *tell, train, town, take, to ticket, taking, 20, quarter* and *crossing* for the native speakers, but only in *tell, town, ticket, could, 20* and *quarter* for the non-native speakers. If we tentatively posit a hierarchy of strength[60], starting from the weakest, of [h]

[60] Some scholars may refer to this as sonority, but I have found this to be a rather ill-defined concept and prefer to talk about the relative strength of segments in context.

→ [ú] → [ʧ] → [X] → [ʂ] → [s], we can see the following distribution for initial aspiration:

	C	X	S	s
ns	3	1	3	18
nns	6	0	1	3

Most of the time, the aspiration for the native speakers is produced more or less homorganically, for [s][61] in words starting with [t] and for [ʧ] in words with initial [k]. The same does not hold true for the non-native speakers, as 4 out of the 6 occurrences of [ʧ] are actually realised in the word *twenty*. The non-native speakers therefore seem to be opting for the weaker type of aspiration, instead of preferring the more homorganic realisation.

For medial aspiration, we find occurrences produced by the native speakers in the words *walking, taking, until, Theatre* and *bottom*, and only in *walking* for the non-native speakers:

	C	s
ns	3	4
nns	2	0

The two occurrences of [ʧ] actually occur without a preceding full plosive and are therefore similar to the type of 'undershoot' often encountered in Scouse (c.f. Wells, '82, p. 371).

Final strong release by native speakers occurs in *look* and *front*, and in *University* by the non-native speakers:

	C	ú	s
ns	1	0	1
nns	0	1	0

Even though the overall number of realisations of noticeably strong aspiration/ release is relatively low, we can nevertheless clearly see that the native speakers in general have more variability in the strength of their aspiration and produce more

[61] n.b. none of the speakers is a Scouser.

strongly aspirated forms in potentially all positions, whereas the non-native speakers seem to have a tendency to avoid very strong aspiration/release.

8.1.18. 'Urban' Features

As already pointed out earlier in 1.4.3 above, foreign and native urban accents may sometimes share certain similarities that may contribute to the 'stigma' attached to them. I will here only mention some examples of similarities that have come up in my data.

The first one is one that we have already discussed in conjunction with peripheral qualities occurring in unstressed final vowels (c.f. 8.1.14 above). It is the use of final [ɑɪ] in words like *Theatre, here, there, etc.*, which occurs in urban accents such as Brummy and Cockney, two of the accents that have an extremely low social acceptability in the eyes of many British native speakers.

The other one is the use of a labio-dental fricative /f/ or /v/ instead of dental /T/ or /D/ in positions where this is not due to assimilation, a feature that has originally always been attributed to Cockney, but is claimed to be spreading with the increased expansion of Estuary English these days. There are altogether four occurrences of this phenomenon in my non-native speaker data, three for the word *Theatre* (1490) and one for *through* (1590), realised as [fVu]. The latter realisation incidentally contains another, possibly more urban, regional feature which I would associate with an area somewhere around London and extending west towards and including Reading[62], the use of the approximant [V] instead of /ɹ/.

One explanation for the occurrence of such phenomena may be that they often represent simplifications of originally more difficult pronunciations, which is why they can also often be found in particular stages of child language acquisition. On the other

[62] This assumption, however, is only based upon one speaker I know who comes from there.

hand, however, the use of such pronunciations by my non-native speakers may also indicate that they have adopted native speaker simplification processes through exposure to native accents, rather than to resort to L1 simplification processes any longer. Maybe this is also the reason why only one of my non-native speakers only once produces the form [sINk] for *think*, while most textbooks on teaching the pronunciation of English to foreign learners like Kenworthy, '87 (p. 136) still see this as a high priority area for 'remedial' teaching for German learners.

8.2. Discourse Structuring & Cohesion.

Despite the fact that I have not been able to conduct a full-scale supra-segmental analysis of my data including intonation, some results or insights about the prosodic behaviour of my informants have come to light in the context of the segmental analysis described before. I will summarise and discuss these below.

8.2.1. Pauses.

As we had noted in chapter 5 above, there is a statistically significant difference in the overall length of the dialogues between female native and non-native speakers, which could potentially be due to a difference in the use of long or short pauses by the female non-native speakers. T-tests performed on both the male, female and combined native and non-native speaker populations show that there is a significant difference in the amount of short pauses produced by the female speakers ($p=0.049$), due to the female non-native speakers' producing on average 11 short pauses, while the female native speakers only produce 6. For long pauses the situation with regard to gender seems to be almost reversed, with the t-test showing a difference that is approaching the 5% significance level ($p=0.52$), with the non-native speaker males having a slightly higher average than the native speakers. These results, however, would still seem to indicate that it is not only the amount of pauses that actually affects the overall length of the dialogue as such, but that it is actually more likely to be

segmental effects, such as reductions, at least as far as the male non-native speakers are concerned, since, despite having more long pauses than the male native speakers, their average length of dialogue is still shorter than that of the latter. In order to determine precisely where the difference lies, however, one would probably have to measure the exact length of all the pauses.

8.2.2. Stress & Rhythm.

That the non-native speakers sometimes place unusual stress on specific words has already become apparent throughout the segmental analysis and during the first part of this section, I will summarise all the different reasons why such an effect may be created and which word-classes may be particularly affected.

According to my observations, it seems to be in general word classes that would usually be counted among the function words, such as prepositions, demonstrative determiners, locative adverbs, modal auxiliaries, adversative conjunctions and intensifiers, that often appear to be given an unusual degree of stress in non-native speaker realisations. For native speakers, on the other hand, these word classes belong to categories that are in most cases only stressed if they are either used contrastively or emphatically, and are in general also realised not only without stress, but also as weak forms.

Amongst these categories, we can group prepositions, demonstrative determiners and locative adverbs together and label them with the umbrella term *deictic items*. In my corpus, the impression of stress on this type of word is often caused by a failure to assimilate (c.f. 8.1.2 on non-assimilation), such as between *that* and *board* in the phrase *that board over there* or to avoid a hiatus, such as between *you* and *on* in *or are you on foot* when they appear in non-final position in the phrase or sentence. When members of this group of words appear in phrase- or sentence-final position, this effect – or at least the impression of some kind of prominence – may also be created

through final release (8.1.9) or rhoticity (8.1.11), e.g. in the locatives *here* and *there* in *explain it from here* and *on that board over there*. For demonstrative determiners in non-final position, final release (8.1.9) may effectively make them appear phrase-final and thus 'stressed' because they appear to be in a separate tone group from the rest of the noun phrase they belong to. The latter may then of course also represent a case of non-assimilation in positions where assimilation would be possible. In general, many of these features go hand in hand with a slight reluctance to produce weak forms (c.f. 8.1.13), too.

What these deictic items have in common and what may ultimately be the reason for the non-native speakers to make them relatively more prominent, is that they all fulfil a 'pointing function', i.e. they seem to single out certain items from their context. What the non-native speakers do not seem to be aware of, though, is that this does not necessarily trigger stress on these word categories in English.

For the other three categories, modal auxiliaries, adversative conjunctions and intensifiers, the semantic content may also trigger the tendency to over-stress them. For modal auxiliaries, such as in *I might be able to*, it may be the hypothetical content expressed, for adversative conjunctions, such as *but*, the adversative character, and for intensifiers, such as *least* in *at least a quarter of an hour*, the intensification itself. Unsurprisingly, we again find the same segmental features also triggering the stress-effect as with the deictic items. However, for purposes of teaching non-native speaker learners how to avoid overstressing these I believe that the two groupings I have established may be useful to retain.

It is not very difficult to see that the features discussed above in relation to stress will also have a significant effect on the overall difference in rhythm between native and non-native speaker utterances. In particular, it is probably features such as not avoiding to produce a hiatus and with this the occurrence of an abundance of intrusive glottal stops, apart from failure to assimilate, overuse of final release, as well as the

effect of occasional rhoticity (c.f. my comment in 8.1.11) that gives non-native speaker utterances a slower, possibly somewhat harsher and more hesitant 'appearance'.

On the other hand, native speakers not only tend to use more weak forms in general 86%[63] (as opposed to 71% used by the non-native speakers), but also to shorten their segments even more through extreme vowel reduction (8.1.8 above), l-clipping (8.1.10) and a higher incidence of smoothing (8.1.15). These features, which seem to create the 'particularly native' effect and are never taught to learners are features that the latter will simply not be aware of, so that unless they are exposed to native speaker language quite often, they will never even have a chance to try and imitate them.

[63] out of all possible tokens discussed in my analysis.

9. Conclusion

As I hope to have demonstrated in this thesis, the methodology I have developed for comparing and evaluating different accents can provide a convenient, extensible and relatively straightforward way to identify major features of a particular accent, at the same time allowing the researcher to compare and establish the salient differences between two different accents.

Based on the case-study of my two speaker populations, I believe it is possible to identify important tendencies within these populations, despite the fact that the relatively small number of speakers analysed in my study does not permit the claim that the results of my analyses are statistically valid. As far as the native speakers are concerned, we can posit that, apart from the general features of 'nativeness' and 'fluency' discussed in phonetics and EFL textbooks on English, there are also three features that contribute in a distinctive manner to the impression of a native, educated and mildly, but not completely, informal accent. These features are extreme vowel reduction, as a feature affecting both transitions between words and weak forms, the relatively high number of glottal stops replacing final plosives, and the tendency to perform liaison between words where the final consonant can be 'resyllabified' (8.1.4). The latter is particularly interesting because even widely acknowledged standard textbooks such as Cruttenden, '94 claim that this is not a common feature of English, while the fact that it amounts to 11.73% of all native speaker transitions in my corpus clearly seems to disprove this assumption.

Further characteristic features appear to be a (perhaps growing) tendency towards l-vocalisation and –clipping (8.1.10), a relatively strong dis-preference for the use of syllabic consonants, apart from in constructions where there is the option for liaison (8.1.12), and a clear preference for a more close, C7-like [o]-realisation in words like *more* and *sure*, rather than the often generally assumed more open, C6-like [ ]. As far as the realisation of plosives is concerned, there also appears to be a slight tendency

towards using an unusually high degree of aspiration, a feature which one would perhaps more stereotypically associate with a Scouse or Irish accent.

Even in a language like English, where speech is often seen as far 'more connected' than in German, the most frequent transition category is still that of no linking. However, the level of difference between native and non-native speakers with respect to non-linking is still striking and also statistically highly significant (8.1.9) well beyond the 1% mark. But, as we have seen during the course of the segmental analysis, the tendency to produce non-linking effects such as creating a hiatus by producing what I have termed *intrusive glottal stops* or a failure to use certain types of – especially perseverative – assimilation (8.1.2) or coalescence (8.1.3) consistently enhances the impression of somewhat decreased 'fluency', despite the fact that the non-native speakers 'score' almost equally high as the native speakers in the category of liaison.

In general, although there is of course a high amount of variation amongst the native speakers, we also encounter a higher degree of inconsistency for the non-native speakers. This encompasses features such as occasional rhoticity (8.1.11), higher variability in the use of vowels in general, and some unusual or old-fashioned vocalic qualities (8.1.16). Other prominent features seem to be due less to inconsistency, but to represent more genuinely non-native realisation types. Amongst these, we can observe the use of a relatively high number of C13-like qualities where the native speakers prefer C7- or to some extent C6-like qualities, some specific occurrences of syllabic consonants, in particular combinations of nasal + plosive +syllabic nasal, e.g. in words like *fountain*, and the more frequent and stronger use of glottal onsets. Yet other features, such as certain more peripheral qualities, are often closer to potentially less-accepted urban native accents (8.1.18) and may trigger a certain degree of prejudice in some native listeners.

Overall though, one of the most striking characteristics – apart from the previously mentioned lower incidence of linking features – is that the non-native speakers also

produce fewer and often less extreme weak forms, avoiding phenomena such as extreme vowel reduction or the deletion of word-internal consonants in weak forms (8.1.13). This, however, does not necessarily mean that their pronunciation and style of delivery is very remote from the teaching aims expressed in EFL textbooks, such as Kenworthy, '87 or Pennington, '96, who do not tend to promote what some people may consider 'sloppy' language, such as the use of extreme vowel reduction, and often remain on far too general and simplistic a level in their descriptions to be useful for the advanced learner of English.

As pointed out earlier, the findings summarised above can only represent observations of general tendencies amongst the two populations, even though they may already serve as the basis for implementing new teaching approaches to the pronunciation of English that place more emphasis on aspects of real-life connected speech than most established textbooks. However, if the methodology outlined and partially implemented in this thesis could be implemented on a large scale as a research project, it could provide the basis for statistically valid research on real everyday spoken English along the lines of a modernised Survey of English Dialects. For such an implementation, I would suggest setting up and recording dialogues with two participants in order to achieve information on more genuine interaction than the one-speaker dialogues I have used. As far as the type of vocabulary and pronunciation of individual segments is concerned, a slightly improved approach compared to the one I have used would be to create other real-life situations, but including as much as possible words that comply with the criteria for *lexical sets* as established by Wells, '82. (p. 117ff.). Ideally, such an implementation would also include a full implementation of suprasegmental part, including intonation and thereby present a rounded picture of modern-day British English. A database thus established would then not only provide an extremely useful tool and reference for continuing work in dialectology, but also provide a solid foundation for improving Language Engineering technology, such as speech recognition and spoken dialogue systems.

As far as the assessment of non-native speakers is concerned, my methodology could provide a basis for developing a reliable and valid way of ranking 'nativeness' features and therefore ultimately lead to a fair and more objectified evaluation of individual non-native speakers by looking at transitions, weak forms, stress, intonation etc., as well as the more usual aspects of general pronunciation. Furthermore, it could also provide a means of developing better and possibly also more realistic teaching materials based on natural corpus data that can be adapted to the level of specific groups or nationalities of students.

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11. Appendix A: The CLAWS 7 Tagset

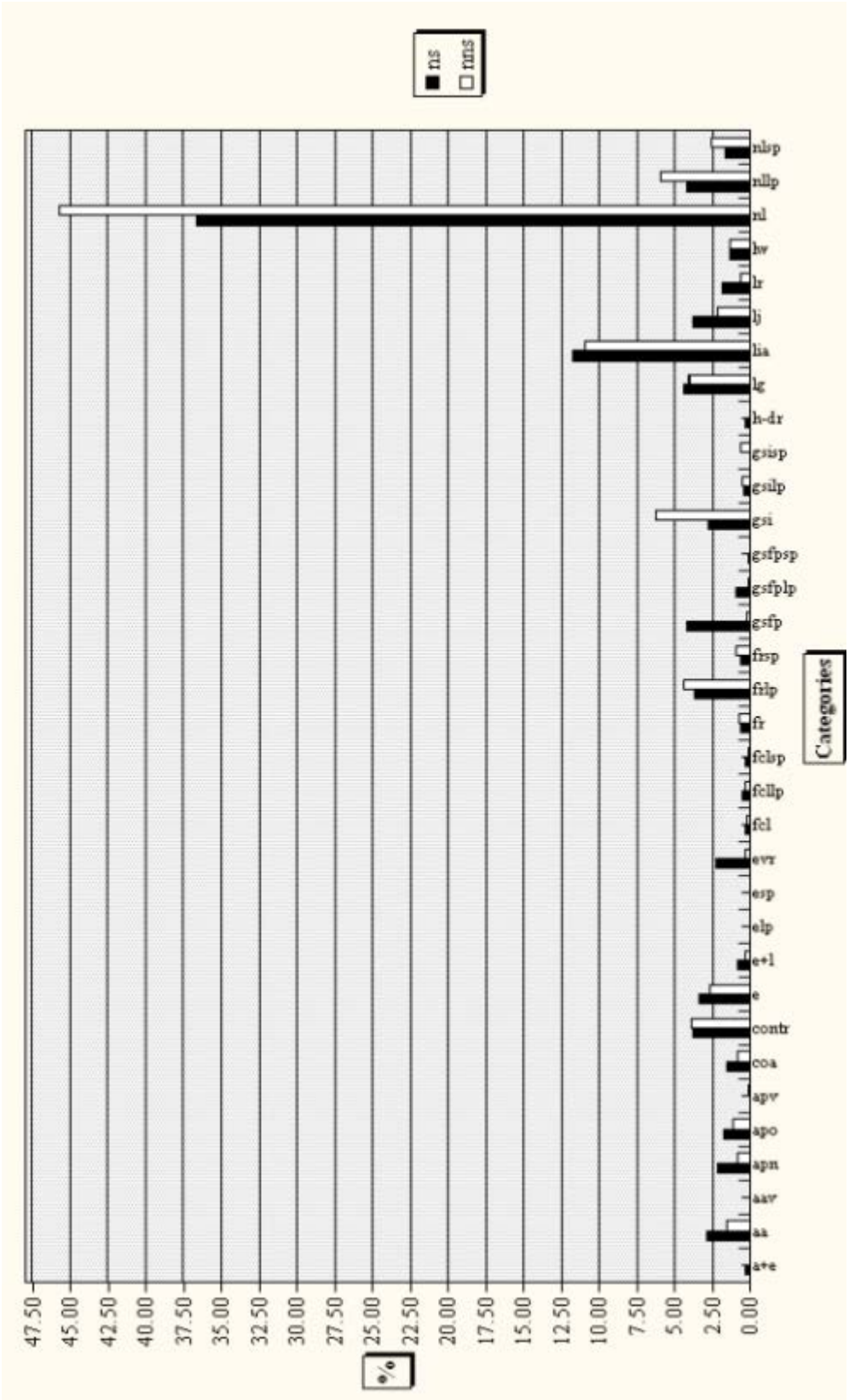
Tag_ID	Tag	Tag_Description
10	!	punctuation tag - exclamation mark
20	"	punctuation tag - quotes
30	(	punctuation tag - left bracket
40	)	punctuation tag - right bracket
50	,	punctuation tag - comma
60	-	punctuation tag - dash
70	-----	new sentence marker
80	.	punctuation tag - full-stop
90	...	punctuation tag - ellipsis
100	:	punctuation tag - colon
110	;	punctuation tag - semicolon
120	?	punctuation tag - questionmark
130	APPGE	possessive pronoun, pre-nominal (e.g. my, your, our)
140	AT	article (e.g. the, no)
150	AT1	singular article (e.g. a, an, every)
160	BCL	before - clause marker (e.g. inorder (that), inorder (to))
170	CC	coordinating conjunction (e.g. and, or)
180	CCB	adversative coordinating conjunction (but)
190	CS	subordinating conjunction (e.g. if, because, unless, so, for)
200	CSA	as (as conjunction)
210	CSN	than (as conjunction)
220	CST	that (as conjunction)
230	CSW	whether (as conjunction)
240	DA	after-determiner or post-determiner capable of pronominal function (e.g. such, former, same)
250	DA1	singular after-determiner (e.g. little, much)
260	DA2	plural after-determiner (e.g. few, several, many)
270	DAR	comparative after-determiner (e.g. more, less, fewer)
280	DAT	superlative after-determiner (e.g. most, least, fewest)
290	DB	before determiner or pre-determiner capable of pronominal function (all, half)
300	DB2	plural before-determiner (both)
310	DD	determiner (capable of pronominal function) (e.g. any, some)
320	DD1	singular determiner (e.g. this, that, another)
330	DD2	plural determiner (these, those)
340	DDQ	wh-determiner (which, what)
350	DDQGE	wh-determiner, genitive (whose)
360	DDQV	wh-ever determiner, (whichever, whatever)

Tag_ID	Tag	Tag_Description
370	EX	existential there
380	FO	formula
390	FU	unclassified word
400	FW	foreign word
410	GE	germanic genitive marker - ('or's)
420	IF	for (as preposition)
430	II	general preposition
440	IO	of (as preposition)
450	IW	with, without (as prepositions)
460	JJ	general adjective
470	JJR	general comparative adjective (e.g. older, better, stronger)
480	JJT	general superlative adjective (e.g. oldest, best, strongest)
490	JK	catenative adjective (able in be able to, willing in bewilling to)
500	MC	cardinal number, neutral for number (two, three ..)
510	MC1	singular cardinal number (one)
520	MC2	plural cardinal number (e.g. sixes, sevens)
530	MCGE	genitive cardinal number, neutral for number (two's, 100's)
540	MCMC	hyphenated number (40-50, 1770-1827)
550	MD	ordinal number (e.g.first, second, next, last)
560	MF	fraction, neutral for number(e.g. quarters, two-thirds)
570	ND1	singular noun of direction (e.g. north, southeast)
580	NN	common noun, neutral for number (e.g. sheep, cod, headquarters)
590	NN1	singular common noun (e.g. book, girl)
600	NN2	plural common noun (e.g. books, girls)
610	NNA	following noun of title (e.g. M.A.)
620	NNB	preceding noun of title(e.g. Mr., Prof.)
630	NNJ	organization noun, neutral for number (e.g. council, department)
640	NNJ2	organization noun, plural (e.g. governments, committees)
650	NNL1	singular locative noun (e.g. island, street)
660	NNL2	plural locative noun (e.g. islands, streets)
670	NNO	numeral noun, neutral for number (e.g. dozen, hundred)
680	NNO2	numeral noun,plural (e.g. hundreds, thousands)
690	NNT1	temporal noun, singular (e.g. day, week, year)
700	NNT2	temporal noun, plural (e.g. days, weeks, years)
710	NNU	unit of measurement, neutral for number (e.g. in, cc)
720	NNU1	singular unit of measurement (e.g. inch, centimetre)
730	NNU2	plural unit of measurement (e.g. ins., feet)
740	NP	proper noun, neutral for number (e.g. IBM, Andes)
750	NP1	singular proper noun (e.g. London, Jane, Frederick)
760	NP2	plural proper noun (e.g. Browns, Reagans, Koreas)

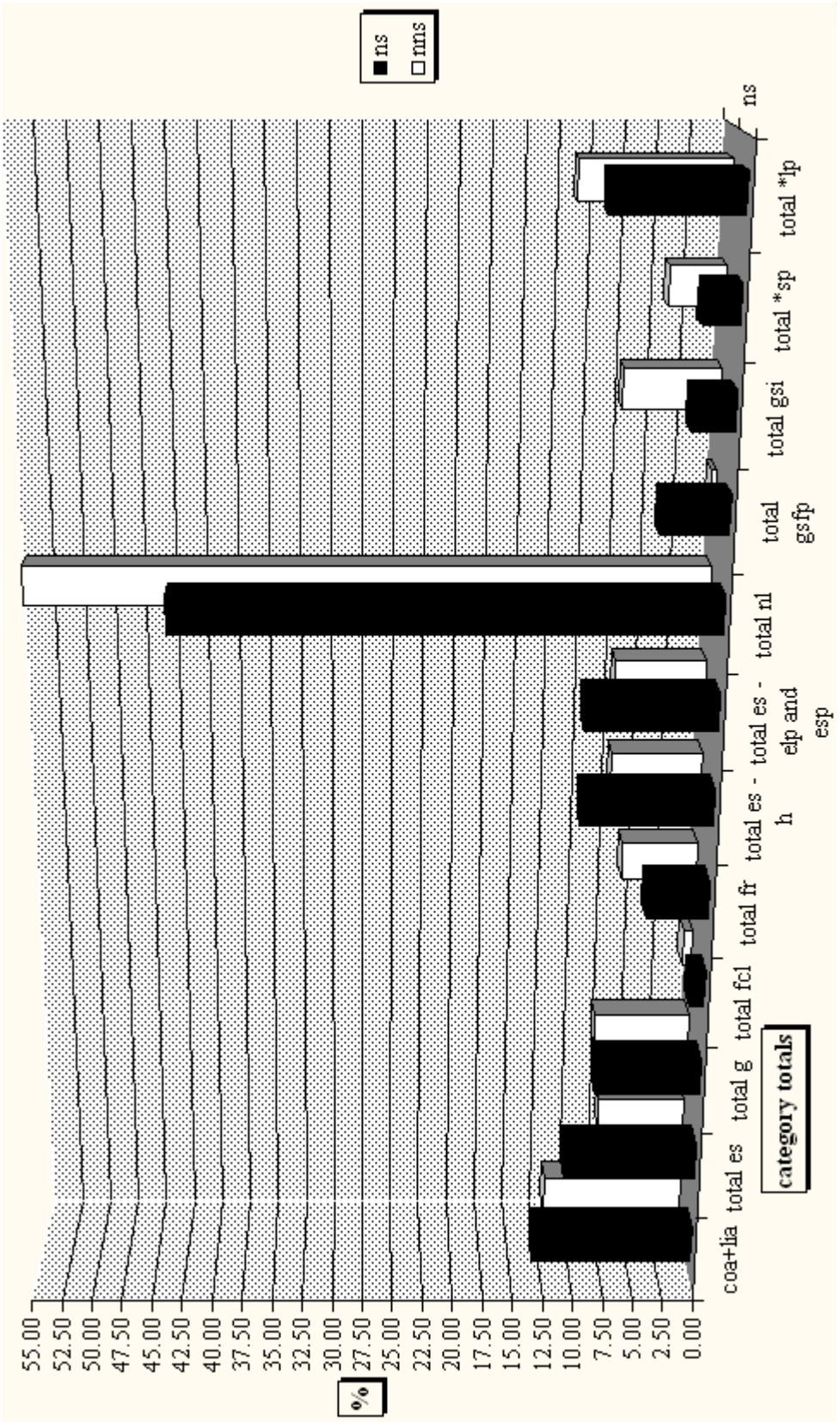
Tag_ID	Tag	Tag_Description
770	NPD1	singular weekday noun (e.g. Sunday)
780	NPD2	plural weekday noun (e.g. Sundays)
790	NPM1	singular month noun (e.g. October)
800	NPM2	plural month noun (e.g. Octobers)
810	NULL	the nulltag, for words which receive no tag
820	PN	indefinite pronoun, neutral for number (none)
830	PN1	indefinite pronoun, singular (e.g. anyone, everything, nobody, one)
840	PNQO	objective wh-pronoun (whom)
850	PNQS	subjective wh-pronoun (who)
860	PNQV	wh-ever pronoun (whoever)
870	PNX1	reflexive indefinite pronoun (oneself)
880	PPGE	nominal possessive personal pronoun (e.g. mine, yours)
890	PPH1	3rd person sing. neuter personal pronoun (it)
900	PPHO1	3rd person sing. objective personal pronoun (him, her)
910	PPHO2	3rd person plural objective personal pronoun (them)
920	PPHS1	3rd person sing. subjective personal pronoun (he, she)
930	PPHS2	3rd person plural subjective personal pronoun (they)
940	PPIO1	1st person sing. objective personal pronoun (me)
950	PPIO2	1st person plural objective personal pronoun (us)
960	PPIS1	1st person sing. subjective personal pronoun (I)
970	PPIS2	1st person plural subjective personal pronoun (we)
980	PPX1	singular reflexive personal pronoun (e.g. yourself, itself)
990	PPX2	plural reflexive personal pronoun (e.g. yourselves, themselves)
1000	PPY	2nd person personal pronoun (you)
1010	RA	adverb, after nominal head (e.g. else, galore)
1020	REX	adverb introducing appositional constructions (namely, e.g.)
1030	RG	degree adverb (very, so, too)
1040	RGQ	wh-degree adverb (how)
1050	RGQV	wh-ever degree adverb (however)
1060	RGR	comparative degree adverb (more, less)
1070	RGT	superlative degree adverb (most, least)
1080	RL	locative adverb (e.g. alongside, forward)
1090	RP	prep. adverb, particle (e.g about, in)
1100	RPK	prep. adv., catenative (about in be about to)
1110	RR	general adverb
1120	RRQ	wh-general adverb (where, when, why, how)
1130	RRQV	wh-ever general adverb (wherever, whenever)
1140	RRR	comparative general adverb (e.g. better, longer)
1150	RRT	superlative general adverb (e.g. best, longest)
1160	RT	quasi-nominal adverb of time (e.g. now, tomorrow)

Tag_ID	Tag	Tag_Description
1170	TO	infinitive marker (to)
1180	UH	interjection (e.g. oh, yes, um)
1190	VB0	be base form (finite i.e. imperative, subjunctive)
1200	VBDR	were
1210	VBDZ	was
1220	VBG	being
1230	VBI	be infinitive (To be or not... It will be..)
1240	VBM	am
1250	VBN	been
1260	VBR	are
1270	VBZ	is
1280	VD0	do base form (finite)
1290	VDD	did
1300	VDG	doing
1310	VDI	do infinitive (I may do... To do...)
1320	VDN	done
1330	VDZ	does
1340	VH0	have base form (finite)
1350	VHD	had (past tense)
1360	VHG	having
1370	VHI	have infinitive
1380	VHN	had (past participle)
1390	VHZ	has
1400	VM	modal auxiliary (can, will, would, etc.)
1410	VMK	modal catenative (ought, used)
1420	VV0	base form of lexical verb (e.g. give, work)
1430	VVD	past tense of lexical verb (e.g. gave, worked)
1440	VVG	-ing participle of lexical verb (e.g. giving, working)
1450	VVGK	-ing participle catenative (going in be going to)
1460	VVI	infinitive (e.g. to give... It will work...)
1470	VVN	past participle of lexical verb (e.g. given, worked)
1480	VVNK	past participle catenative (e.g. bound in be bound to)
1490	VVZ	-s form of lexical verb (e.g. gives, works)
1500	XX	not, n't
1510	ZZ1	singular letter of the alphabet (e.g. A,b)
1520	ZZ2	plural letter of the alphabet (e.g. A's, b's)

12. Appendix B: Percentages of Individual Transition Categories



13. Appendix C: Combined Transition Categories



14. Appendix D: Data CD & Online Version of Thesis

The accompanying CD-ROM contains two folders, one called “mw” and one “speechtools”. The first one contains the online copy of the thesis in Word 2000 format with linked-in soundfiles of the sample spectrograms included in the thesis. Thes soundfiles can be played back by clicking on the respective images. The folder furthermore contains a copy of an Excel 2000 file containing some of the statistics, which is linked to the Word document. In order to make proper use of the online version, the folder must be copied to a local machine with the destination path “C:\mw”. After copying the folder, the “Read-only” file attributes for the Word document and the “dialogues” database should be switched off, so that the Word document can be refreshed from the linked spreadsheet and the VBA routines in the database can be run. All the speaker data in the database have been anonymised.

In order to be able to call the Speech Analyzer program from within the “dialogues” database, the freeware Speech Tools in the “speechtools” folder on the CD should be installed in the destination folder “C:\asap”, so that the database application can run the Speech Analyzer program with one of the appropriate soundfiles contained in “C:\mw\data”. To do this, please follow the instructions in 4.6.1.2 closely. After installing the Speech Tools, it is strongly advisable to reboot the computer because otherwise there may be problems with the display of the phonetic font provided with the Speech Tools and which I have also used for both the “dialogues” database and the annotations contained in the soundfiles. Without installing the Speech Tools, the transcriptions in the database will not display properly!