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Errors in pronunciation of consonants by Indonesian, Gayo and Acehnese learners of English as a foreign language

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ERRORS IN PRONUNCIATION OF CONSONANTS BY INDONESIAN, GAYO AND ACEHNESE LEARNERS OF ENGLISH AS A FOREIGN LANGUAGE

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ABSTRACT

This thesis reports on research into consonantal phoneme pronunciation errors in the English of EFL learners from three different first language groups in the province of Aceh, northern Sumatra, Indonesia. It is a qualitative study, describing the errors found for each first language group. Error data was collected from each participant in the language laboratory using an aural discrimination test, a word repetition test and a reading passage test, and also from interviews with each participant which were recorded on audio cassettes. Analysis and explanation of the error data then followed. There were eight participants from each of the three first language groups, with equal numbers of male and female participants in each group. All were students at the State Islamic Institute or other universities in Banda Aceh, either in the English teacher training department or taking English as a compulsory subject in their degree program. At the time of the research they were aged between 19 and 25, and had all taken EFL as a subject for six years in high school. Where it was not their first language, the national language, Indonesian, was their second language. All had studied Arabic.

The findings indicate errors are largely limited to final stops and sibilants, and initial and final affricates and interdentals. This error data did not completely accord with previous findings. A transfer viewpoint offers an explanation as to why these particular sounds were found difficult for these three first language groups. Patterns in the error data showed that stops were mostly devoiced or ellipsed, and both of these processes are developmental. The affricates and interdentals were frequently generalized to a stop or sibilant found in the first language. Overgeneralization of these articulatorily difficult sounds is a common developmental process. Both transfer and developmental factors and their interaction appear to be at work in interlanguage and explain much of the error data, though other factors such as hypercorrection and spelling interference also seem to play a role. An implication of the study is that these systematic, specific errors, dependent on first language, should be taken into account when teaching pronunciation to English learners from these first language groups.

DECLARATION

I certify that this thesis does not, to the best of my knowledge and belief:

(i) incorporate without acknowledgement any material previously submitted for a degree or diploma in any institution of higher education;

(ii) contain any material previously published or written by another person except where due reference is made in the text; or

(iii) contain any defamatory material.

Signature .....

Date 9 June 1998

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CHAPTER 1 - INTRODUCTION

Background

The idea for this study has grown out of my teaching English as a Foreign Language (EFL) in the province of Aceh in the north of Sumatra in Indonesia. Teaching in Indonesia I have become aware of the lack of systematic, research-based, up-to-date materials covering the area of teaching English pronunciation to Indonesian speakers. EFL teachers in Indonesia have hunches about the English pronunciation errors being made, but no research on such errors has come to light. The acquisition of English phonetics and phonology by foreign language learners has not been studied specifically in relation to Indonesian speakers. This study attempts to make a beginning in this area.

The first step in overcoming pronunciation difficulties is determining what they actually are. The relevance of a formal study in this area has been highlighted by 'Asian Language Notes: some likely areas of difficulty for Asian learners of English. No.3. Indonesian/Malay' (2nd ed. 1983), which seems to be limited to a prediction of errors based on contrastive analysis. My teaching experience and informal observation has confirmed some of the 'areas of difficulty' mentioned in this publication, but has also revealed some different ones.

Some work has been done to compare the English and Indonesian phonological systems, notably in textbooks of the Indonesian language such as that one written by Macdonald and Soenjono (1967), and to predict where errors will be found for Indonesians in EFL, such as the 'Asian Language Notes: Indonesian/Malay' mentioned above, but the 'local languages' have hardly been examined in such terms.

English in Indonesia

English was one of the foreign languages taught in high schools to the elite during the period of Dutch colonialism in Indonesia Local teachers of English were trained by the Dutch in teacher training colleges in the main cities and towns of Indonesia. When English began being taught as the main foreign language in high schools after Indonesian Independence in 1945 the methods used continued to be grammar-translation, memorizing vocabulary and grammar drills, with reading skill as the focus. The teacher would give the class a reading passage in English and discuss some relevant grammatical points, after which each student would translate it into Indonesian, and this exercise would be followed by a class discussion. The aim was to enable students' access to information and the knowledge available in textbooks and other books written in English (Bakhrum Yunus, Luthfi Auni, Fatimah Hamzah, personal communication).

In the 1960s the Ford Foundation was invited by the Indonesian government to improve the English teaching in the whole country. It introduced the audio-lingual method, but this was largely a failure, for which lack of equipment was a major reason. The transition to the communicative approach began in 1975 and is now theoretically, but not in practice, holding sway in EFL classrooms (Bakhrum Yunus, personal communication).

As an English lecturer in Indonesia I have noticed that the reading/grammar-translation focus continues despite government rhetoric about the need for productive English language skills to equip Indonesians to take part in globalization. In observation of classes and curriculum it is apparent that the grammar-translation method is unwittingly still largely influencing language teaching in Indonesia. The current emphasis on communication in other parts of the world in both English as a Second Language (ESL) and EFL teaching has not yet significantly altered this picture, despite the fact that a sizeable number of local English lecturers in both government and

private universities are being sent overseas to upgrade their English teaching qualifications. Their overseas study and practice teaching emphasizes communicative methods (Lukmanul Hakim, personal communication).

One reason for this failure to adopt the communicative methodology is because EFL is only given two hours per week for the six years of high school. In addition, whilst teachers in English teaching training departments are taught a little theory about communicative teaching methods, they have not come to understand how to use them. Teaching pronunciation is all but ignored, especially where non-native English teachers lack confidence in their own speaking and pronunciation (Bakhrum Yunus, personal communication). As a result the area of pronunciation in Indonesia has been sadly neglected.

Pronunciation will be a vital key to enabling students to communicate in English, in the move towards communicative goals. Former generations of Indonesians could read English but not speak it; now the aim is that they will do both. The need to be accurate with sound is slowly coming to the fore. The possibility in EFL teaching of using a communicative approach is being discussed and communicative teaching methodology taught in teacher training courses and in-service seminars in Indonesia.

English is a compulsory subject at high school and in all further education institutions, and compulsory schooling to the end of the third year of high school is being introduced. The fact that such large numbers of English learners are involved should make it worthwhile for those teaching EFL in Indonesia to discover what the errors in pronunciation actually are in different parts of the country, that is for different first language groups, and suggest ways of overcoming such errors.

First languages

The main purpose of the study reported here was to discover the pronunciation errors in EFL of Indonesians as represented by students in Aceh. I sought to find out which sounds are found difficult to pronounce and which sounds are actually used.

Pronunciation errors have multiple origins, but there is little doubt that interference or transfer from the first language is one of them. Informal observations of EFL learners with different first languages in Indonesia show they have different pronunciation errors in English. At the outset I realized I would be dealing with more than one first language group. Indonesia has over 200 local languages, and a maximim of seventy percent of the population of over 200 million people speak one of these languages as their first language. This percentage is slowing falling, especially in cities where more parents are choosing to use Indonesian as the first language in the home. The Indonesian language, a form of the Malay lingua franca, officially came into being in 1928. It is estimated that seventy percent of Indonesians have Indonesian in their repertoire of languages (Moseley & Asher, 1994, p.95).

Of all the languages spoken as a first language in Aceh I limited this study to the three largest groups represented on university campuses in Banda Aceh; Acehnese first language speakers, Indonesian first language speakers, and Gayo first language speakers. Acehnese, Gayo and Indonesian belong to the Austronesian family of languages (language tree - see appendix A) and have rather similar phonological systems (see appendix B). The participants in this study all had Indonesian as either first or second language, and all had learnt some Arabic. This multi-lingual background means that the participants had more than just their first language sounds at their disposal as they came to learning English.

Justifications

There are at least two justifications for such a study of learners' errors. Firstly, the nature of the pronunciation errors for a particular groups of learners must be understood before a systematic means of tackling them can be found. When preparing English pronunciation courses for a specific first language group we have to first observe their pronunciation errors. Comprehensive, direct and systematic examination of English learner speech in Indonesia has not yet been undertaken. In my years of teaching English in Indonesia it has often been mentioned that there is a need for pronunciation materials specific to Indonesian learners. The 'Asian Language Notes: Indonesian/Malay' materials mentioned previously are not available in Indonesia, as this publication was written for government ESL teachers in Australia. To my knowledge the areas of difficulty in pronunciation of English for speakers of local languages has also not yet been addressed in the literature. Once the areas of difficulty or error have been identified, it would then be possible to prepare systematic teaching materials for pronunciation to address them. This study endeavours to be a first step towards development of such materials.

Secondly, 'a study of learners' errors is part of the systematic study of the learners' language which is itself necessary to an understanding of the process of SLA' (Corder, 1981, p.1). There is a need for both descriptions and explanations based on error analysis to contribute towards a theory of nonprimary language acquisition. Establishing the errors and their sources will help our understanding of the different processes contributing to SLA. This study contributes in a small way towards providing data for further analyses along such lines.

The research

This study was done in the context of an error analysis. It proposed to describe the systematic English pronunciation errors revealed in the interlanguage of each of the three groups of EFL learners. Phonological environment and task were taken into

account when tabulating the data. The error data were categorized, compared and contrasted across the first language groups and the different tests, and the possible sources of errors discussed.

Four tests were used. The first test was an aural discrimination test and the second was a repetition test. For these two tests a minimum of two out of three mis-hearings or mis-pronunciations constituted an error, given that a single miss could just be a lapse, but two would be said to represent a systematic error. The third test was a reading passage, and the fourth test an interview. The last three tests were audio-recorded to enable playing back and assessing the errors. Data from three tests were evaluated by the researcher, and from the repetition test by a native speaker who is not an English teacher.

Using a communicative teaching framework as a guideline, the participants' pronunciation was judged unacceptable if the phonetic realization of the target phoneme, in that position in the word, was the wrong English phoneme, for example [bet] when [bed] was the given word. Also a sound not found in that position in any natively-spoken form of English was judged an error, (Cichocki et al, 1993, pp.50-51), such as [be?] for [bek] .

It was necessary to limit the study to one part of the phonological system. Informal classroom observation during my time teaching in Indonesia has shown that errors with segmental phonemes are more pervasive than errors with suprasegmentals. Indonesians do not experience much difficulty with English intonation (Asian Language Notes: Indonesian/Malay, 1983, p.15). As Zaghlul Army (1987, MA thesis) has done a contrastive analysis of Acehnese and English vowel sounds, including some field work, this study concentrated on the pronunciation of English consonants.

An attempt has been made to observe, classify, summarize and account for the difficulties in learning the consonant system of English for the above-mentioned three first language groups. Only consonants in word-initial and word-final positions were researched, since in pilot tests word-medial errors were either the same as word-initial or word-final errors. Further, only single consonants were examined as mastery of consonant clusters implies previous mastery of single consonants (Lowes, 1990, p.54). A range of tasks was employed since task type has been shown to be an important variable in test outcome for pronunciation testing (Tarone, 1978, p.18).

Limitations

The study as a whole, but the repetition test in particular, seemed to be overly dependent on just one person's pronunciation - the researcher's Australian pronunciation of English used to produce the test master audio-cassettes. However as the production of the English vowels shows a greater variety in different accents than the consonant sounds, this should not limit the usefulness of the results. An American speaker of English scored the repetition tests to reduce any bias shown by the researcher and to partially redress this problem of a single model. Transcription of errors was in general limited to a broad phonetic analysis, although insights from a narrower analysis were used in some of the explanations of errors. Phonological environment in terms of preceding and following vowels was not adequately built into the tests, and therefore no conclusions on the effect of the different English vowels on the consonants tested for can be drawn. Likewise the inclusion of items containing consonant clusters would have provided a better database from which to draw conclusions in this study.

In order to avoid the 'test effect' found in language laboratory testing, the interview was not carried out in the language laboratory. The interview aimed at collecting more spontaneous data than was obtained from the other tests (Labov, 1970, p.182).

However the presence of the tape-recorder, and the fact that subjects knew they were being recorded, will have had some effect on the results.

Some of the errors found are common to the three first language groups and therefore might be expected to be found basically throughout a large part of Indonesia where other Austronesian languages are spoken. Each of the first language groups has some unique errors, and this information will only be relevant to English teachers in those areas or where such first language speakers are found.

This study is a descriptive study of errors made by eight participants from three first language groups. The samples are too small to generalize results to the whole population. There may also be some bias due to the fact that all the participants volunteered to take part in this study and were therefore more highly motivated and interested than the population from which they came. The results of this study are therefore limited, in that they are specific to certain kinds of students and specific testing situations (Ellis, 1994, p.68).

Summary

Larsen-Freeman and Long (1991, p.332) call for basic research in second and foreign language acquisition which includes 'a greater variety of first and second languages'. They also call for research which includes 'systems of language in addition to morphology and syntax' (Larsen-Freeman & Long, 1991, p.332). This study answers both those calls. Leather and James (1991, p.332) call for studies of interlanguage phonology in multilingual societies, seeing the insights to be provided by such studies as useful to the wider research community. The societies represented by the participants in this study are rather multilingual. It is hoped that this study will contribute to the ongoing development of a theory of second and foreign language acquisition.

CHAPTER 2 LITERATURE REVIEW

Pronunciation

While native-like pronunciation of a second language may not be possible on account of various hypothesized factors, such as identity (Schumann, 1978), articulatory habits (Corder, 1973, p.125), age (Sharwood Smith, 1994, pp.197-198), and fossilization (Ellis, 1994, p.353), there is general agreement that it is essential for language teachers to try to help EFL learners produce an adequate range of differentiable English phonemes, in order to avoid misunderstandings and irritation (Norrish, 1983, p.53; Standwell, 1978, p.142; Dutt, 1990, p.21; Harmer, 1991, p.21).

In considering the steps towards helping a certain group of EFL students towards pronouncing an adequate range of differentiable consonant phonemes, based on evidence of transfer the assumption has often been made that a homogenous group of first language speakers will experience similar difficulties in pronunciation (Odlin, 1989, p.4). Many researchers in Second Language Acquisition agree that first language (L1) plays some role in second language (L2) pronunciation. Eckman has tried to account for interlanguage errors using the Markedness Differential Hypothesis, which states that errors will occur when a phenomenon is more 'marked' in one language than in the other (Larsen-Freeman & Long, 1991, p.102), although Cichocki, House, Kinloch and Lister (1993, p.46) found that the Markedness Differential Hypothesis was not always successful for prediction. Some scholars have seen that there are certain developmental errors which are found in interlanguage regardless of first language (Pennington, 1994, p.8). However, overall it is widely agreed that speakers with the same first language will exhibit a similar phonological interlanguage (Cichocki et al, 1993, p.48; MacCarthy, 1978, p.31; Corder, 1981, p.20; Larsen-Freeman & Long, 1991, p.56).

There is little doubt that our speech organs are controlled by habits. Leather and James (1991, p.314) reported: 'That the established articulatory routines of L1 may play a part in the production of the sounds of an L2 is attested by universal informal evidence of "foreign accent", and has not yet been seriously questioned in the literature'. What is not so clear is why and how the articulatory routines 'persist and resist change' (Pennington, 1992, p.33). Articulation is habitual behaviour; in learning a new sound the speech organs are trained to adjust to a new configuration, new sequences of configurations and new movements, aided by tactile and aural feedback.

However the assumption that first language plays some vital role should not exclude the roles played by other attested intralingual developmental and general processes. These are discussed further in chapter three. Psychological and psycholinguistic factors such as use of production strategies, motivation, empathy with target language speakers and orthography are also involved (Tarone, 1978; Leather & James, 1991).

Recognizing that first language plays a role in the pronunciation of each successive language learned, the approaches written up in the literature available for discovering, describing and evaluating errors in pronunciation can be considered for the varying weight which they give to the role of the first language and the roles of other factors.

Contrastive Analysis

For a long time the Contrastive Analysis (CA) approach was highly favoured. Extensive contrastive analysis of languages was carried out with the aim of predicting where learners would make errors in a second language. Behaviourist views of learning supported the idea that differences between two languages accounted for 'the majority of an L2 learner's errors' (Dulay, Burt & Krashen, 1982, p.140).

However the theory did not fit with what was happening in classrooms. The predicted errors did not always occur; other errors, including intralingual ones, instead appeared.

Part of the demise of the 'a priori' version of the Contrastive Analaysis Hypothesis can be accounted for by the overthrow of the behaviourist theories from psychology in favour of mentalist theories in language acquisition research, including hypothesis formation and testing (Dulay, Burt & Krashen, 1982, p.140; Sharwood Smith, 1994, pp.199-200). Major, as discussed by Pennington (1994, pp.96-97), mentions the evidence of developmental errors across languages. Use of strategies such as overgeneralization, simplification and avoidance also needed to be taken into account when seeking to explain observed errors, including phonological ones (Tarone, Cohen & Dumas, 1983, p.6; Richards, 1974, p.71).

Wardhaugh (1970, pp.124-126) differentiated between a strong form of the Contrastive Analysis Hypothesis, where two languages would first be contrasted and then errors in learning the second language predicted, and a weak form where learner errors would be explained where possible by the similarities and differences between the two languages. More recently the role assigned to contrastive theory is as 'an adjunct to general error analysis, as one of a number of means of accounting for the origin of the L2 sound forms observed' (Leather & James, 1991, p.321) and it is used in this form in this study.

Error Analysis

Chomsky's rejection of behaviourist habit theory in relation to language learning in the late 1950s led to more comprehensive analyses taking into account the various sources of errors, for example, including developmental errors. (Dulay et al, 1982, pp.140-141). Corder is credited with developing the terminology and tools with which to do Error Analysis (Sridhar, 1981, pp.224-225). Corder justifies its

existence as a useful input for syllabus designers (Corder, 1973, p.257). In error analysis the language a learner produces is compared with the target language and the errors analyzed. Ellis, discussing theoretical error analysis as part of applied linguistics, describes Corder's five steps of error analysis: collection of a sample of learner language; identification of errors; description of errors; explanation of errors; evaluating errors (Ellis, 1994, p.48-67).

Error analysis is a type of comparative linguistic study, comparing a learner's interlanguage at a certain point in time with the target language. It should ideally be carried out on a spontaneous speech sample (Corder, 1973, pp.269, 273). Error analysis does not provide all the answers (Larsen-Freeman & Long, 1991, p.61), but it 'can be characterized as an attempt to account for learner errors that could not be explained or predicted by CA or behaviourist theory, and to bring the field of applied linguistics into step with' the climate of second language acquisition theoretical opinion in the early 1980s (Dulay, Burt & Krashen, 1982, pp.140-141).

A theoretical function of error analysis is the investigation of the language learning process. Within mentalist or cognitivist theories of language acquisition the rationale for studying errors is based on the systematic nature of language learning. The systematic nature of language learning, seen for example in the use first and second language learners make of hypothesis-testing, has as a corollary that errors in a learner's interlanguage will also be systematic (Corder, 1973, p.270). These systematic 'errors are evidence about the nature of the process and of the rules and categories used by the learner at a certain stage' (Corder, 1973, p.293). Error analysis can help us discover what rules and categories are being used by a language learner or learners. In addition, a language learner is helped to discover the rules of the target language through feedback on his or her errors. (Ellis, 1994, p.48; Corder, 1981, p.45).

Language teachers probably all make use of some kind of error analysis, albeit informally, because of its 'feedback value in designing pedagogical materials and strategies' (Sridhar, 1981, p.221). Error analysis as used by teachers includes an additional classroom step. The six steps are collection of error data, identification of errors, classification of errors, calculating the relative frequency of errors, identifying the areas of difficulty and providing therapy (Sridhar, 1981, p.222).

The errors that are of interest to language teachers are those systematic errors found in a learner's transitional competence. Such errors show what still needs to be learnt, give insights as to how language is learnt, and provide input for the learner's own hypothesis testing as he or she acquires a language. Mistakes, or unsystematic errors of performance are excluded as not revealing useful information to teachers or learners (Corder, 1974, pp.24-25).

Errors made in realizing consonants may impede communication in English more than errors in realizing vowels. Eisenstein quotes Johansson, looking at different types of phonological errors, who 'found that mispronounced consonant errors were judged more serious by natives than vowel errors' (Eisenstein, 1983, p.164).

Interlanguage

A learner's transitional competence hopefully changes over time, with the desired goal being near-native or expert competence. From Richards' collection of papers by the pioneers in the field of learner language we see that Nemser uses the term 'approximate system' in this developmental sense to describe a 'deviant linguistic system' (Richards, 1974, pp.30, 55). Other researchers use the term 'interlanguage' (IL) to refer to these language systems used by language learners (Corder, 1981, p.53). Interlanguage, however, is a fairly fluid concept, used by different researchers to mean different things (Selinker, 1992, p.224). Selinker thinks of interlanguage as a

separate language system intermediate between the first language and the target language (Richards, 1974, pp.29, 35). Sharwood Smith (1994, p.7) says that 'IL most generally refers to the systematic linguistic behaviour of learners of a second or other language'. It is often found that learners from the same language background show a similar interlanguage (Selinker, 1992, p.239; Richards, 1974, p.56).

Factors in Interlanguage

There are a variety of processes shaping interlanguage phonology (Tarone, 1978, p.16). Transfer of linguistic items from first language to second language can be seen as one process involved in second language acquisition. Ellis quotes Selinker as saying it may also be 'responsible for fossilization' (Ellis, 1994, p. 309), in that certain L2 sounds are consistently replaced by a phonetically close L1 sound; the correct L2 sound is not incorporated into the interlanguage. Transfer is an important source of errors in second language, but not the only one, even though it is more obvious at the level of the sound system than at other levels of language. Not all errors originate from negative transfer or L1 interference. In accounting for pronunciation errors it has become common to consider not only transfer but also developmental and general processes and communicative strategies.

Many errors, including phonological ones, that were assumed to be transferred, or resulting from interference from first language, in later research in child language acquisition and second language acquisition have been shown to be developmental errors. The classic study often mentioned as the starting point for research taking the large proportion of developmental errors into consideration is the 1974 study of Spanish children acquiring English morphemes by Dulay and Burt (Ellis, 1994, pp.60-61, 308-9, 339). It has also been found that the acquisition sequence of English morphemes of groups of children and of adults from different first language backgrounds are very similar, thus showing the role of developmental processes.

However second language acquisition sequences are somewhat different from first language acquisition sequences (Dulay, Burt & Krashen, 1982, pp.202, 229).

There are different terminologies for and ways of classifying errors, but a simple and useful distinction is that between transfer and developmental errors. Developmental factors here refers to processes found in first language acquisition, such as final consonant devoicing, overgeneralization (where one target language sound is substituted for another), and approximation (Odlin, 1989, p.123; Tarone, 1978, pp.19-20). Errors not accounted for by contrastive analysis can sometimes be explained by looking at the errors made by children acquiring their first language and the processes they use. Ellis places explanations of error due to developmental processes before transfer processes (1994, p.339).

The description of factors influencing pronunciation does not finish with these two groups. Transfer and developmental factors interact also with universal characteristics of language. Interest in universal constraints on pronunciation has been renewed in the last 15 years in some of the literature on language universals focussed on language acquisition (Ellis, 1994, p.428). Some sounds in a target language may be inherently difficult, meaning they are found in relatively few of the the world's languages and/or are hard to articulate. Johansson, quoted in Tarone (1978, p.19), found a 'tendency [in substituting for target language sounds] to move from the extreme higher and lower positions in the articulation area toward the middle height, the tongue's rest position'. Cross linguistic facts can be used in the explanation of pronunciation errors. Odlin noticed some correlation between the rarity of a sound and its difficulty (Odlin, 1989, p.120). For consonants, Jakobson is described by Dreasher and Anderson-Hsieh as predicting that 'stops are acquired before nasals, followed by fricatives and then liquids', based on their frequency (Dreasher & Anderson-Hsieh, 1990, p.70). The same authors cite Sloat, Taylor and Hoard's finding

that voiced obstruents are less common, that is, more marked, than their voiceless counterparts (Dreasher & Anderson-Hsieh, 1990, pp. 70, 74).

Such universal features have also been studied for position in a word. Word-initial consonants are universally more common than word-final ones (Dreasher & Anderson-Hsieh, 1990, p.74). In relation to this study, Indonesian, Gayo and Acehnese have few final stops, and only Gayo has any final voiced stops, a rarely occurring [b] (see appendix B). Information on the frequency of each consonant phoneme in these three languages is not available.

Learners faced with a communicative task for which they do not yet have the phonological skills can use a range of strategies. Apart from transfer and overgeneralization as already mentioned, there are also the strategies of avoidance (use a different word), deletion or ellipsis, and epenthesis (Tarone, Cohen & Dumas, 1985, p.6-7). Other scholars writing about general learning processes seem to cover mostly the same area as these strategies.

In another publication Tarone (1978, p.18) reminds us that different tasks or tests provide different interlanguage data, making task type another factor in accounting for pronunciation errors. Corder (1973, pp.268-269) says subjects need to be able to 'choose freely' when being tested for errors, and that therefore data is needed from spontaneous samples. Kenworthy (1987, p.21) suggests 'a spontaneous speech sample, with a bit of reading aloud, mainly to provide the teacher with information of potential spelling interference problems'. The error data may be different for different tests, which will make the data 'richer'. The issue of task type is further discussed in chapter three.

Spelling interference as a factor influencing pronunciation has already been mentioned. Spelling interference is a natural corollory of the cognitivist theory; language learners use their knowledge of what sounds, in their previous experience, the English letters stand for. This can lead to mistakes, as many English letters represent different sounds in different environments (MacCarthy, 1978, p.52; Richards, 1974, p.9). Celce-Murcia and Goodwin say that learners of English as a Second Language 'are often so much more influenced by spelling than by actual aural input' (1991, p.138), and this would apply to EFL learners too. In English, where spelling is far from phonemic, this leads to a special group of spelling errors, commonly found in reading, but also carrying over into more spontaneous conversation as 'learned errors'.

Both the phonetic and the phonemic levels and their interaction need to be taken into account in analyzing error data. In discussing errors in pronunciation, a phonological rather than a narrow phonetic analysis can be used. Where the research is set within a communicative teaching framework, phonemic or meaning-bearing differences are considered to be of utmost relevance. Errors where radically different sounds are produced is the issue here. Often some of the testing therefore involves the use of minimal pairs. However some errors, for example problems arising from allophonic distribution, and final devoicing, are not phonemic but rather phonetic, (Dalton & Seidlhofer, 1994, p.72; Odlin, 1989, p.116). Not all researchers limit themselves to analysis at the phoneme level (Cichocki et al, 1993); for example Leather and James point out that some errors are only explainable by analysis taking into account the entire acoustic-phonetic spectrum (1991, pp.314-315). Errors may be sounds produced with one or two features different from the phone tested for. These errors do not give rise to different meanings but to a non-native accent. Analysis at the phonemic level necessarily entails some analysis at the phonetic level of the phones involved.

CHAPTER 3 PREVIOUS FINDINGS

Introduction

Researchers, in their analyses of second language pronunciation, have used a variety of methodologies to look at what errors appear for a certain population. They have also sought the reasons for these errors using the factors mentioned in the previous chapter. In addition some researchers have evaluated the predictive power of certain tools such as the Contrastive Analysis Hypothesis and Eckmann's Markedness Differential Hypothesis. Lastly there have been attempts to classify the errors according to their difficulty and acceptability, and to suggest how and in what sequence to overcome them.

Error Analyses

Nemser (1971a, p.119), describing the interlanguage of a Hungarian speaker learning English, found components of both Hungarian and English together with phonological structures not found in either language. Flege (1980, p.117) summarized the literature on such studies as 'in fact, language learners frequently produce a range of different phonetic variants (including the correct realization) for a single second language phoneme, ... some not typically found in either first language or second language'. While native speakers produce a range of correct realizations, of particular interest in interlanguage is that some variants produced are not clearly attributable to either the first or the second language. A great variety in interlanguage realizations may be an indication that fossilization has not yet taken place.

Analyses of communicative strategies in relation to error analysis or interlanguage have looked at the ways learners seek to communicate when they do not have expert command of the second language. Phonologically these strategies include deletions, simplifications and avoidance (Tarone, Cohen & Dumas, 1983, pp.6-7).

Flege and Davidian (1984, p.323), testing the hypothesis that developmental factors influence adults pronouncing the sounds of a foreign language, found that both transfer and developmental processes are at work in English foreign language pronunciation of final stops. Hecht and Mulford (1982, pp. 313, 326) accounted for one child's acquisition of the phonology of English as his second language as a 'systematic interaction between transfer from the first language and developmental processes'. They found that transfer could predict which phonological segments would be difficult, but that developmental hypothesis could predict which sound substitutions would be made.

Dutt in her Master's thesis discussing features of Malayali pronunciation of English as a second language presents a hierarchy of difficulty for the consonant phonemes, based on Hill's 1965 interpretation of Stockwell and Schacter's categories of levels of difficulty, from parallel through to new and split categories (Dutt, 1990, pp.75-76). Her theoretical approach uses a weak form of the contrastive analysis hypothesis and an error analysis. In addition to informal observations while teaching ESL she also collected data from two Malayali learners of English (Dutt, 1990, p.iii).

Petre Santry (MA thesis, 1992) likewise uses a weak contrastive analysis approach in her description of the way South Vietnamese pronounce English. The errors she found among her South Vietnamese participants in Melbourne were mostly able to be explained by the Contrastive Analysis Hypothesis.

Cichocki and associates (1993) used Eckman's Markedness Differential Hypothesis to try and explain error data from an interview, a reading passage and a list of 37 elicited words, as they formulated a scale of difficulty of French consonants for 6 Cantonese speakers in Hong Kong.

In contrast to earlier studies based on a strong form of the Contrastive Analysis Hypothesis, these studies have in common that the focus and bulk of each study is a description of observed errors, followed by the use of contrastive analysis, Markedness Differential or other hypotheses to help explain the data where possible.

Nemser (1971a), in an early study of Hungarian English, focussed on observed errors, and seeing Hungarian English phonology not as an entity in its own right, but as a sort of English phonology. It seems that where the orientation is towards teaching English, Nemser evaluated errors in the light of the English phonemic system. However in discussing approximative systems he includes reasons for studying such interlanguages in their own right (Nemser, 1971b). .

Error gravity

In the literature on error analysis there are various definitions of error, and within the error data not all errors are of the same gravity. In an error analysis of French consonants by Cantonese speakers in Hong Kong some variants were found more acceptable than others (Cichocki et al, 1993, p.52). An experiment by Johansson showed that phonemic errors were judged more serious than subphonemic errors by native speakers of English (1978, p.92).

Error gravity needs to be considered when planning the therapy stage in an error analysis. Lowes (MA TESOL, 1990), seeking a foundation on which to develop teaching materials, suggests an EFL pronunciation teaching order for Castillian Spanish speakers based on the frequency, functional load, difficulty and other factors of the phonemes of English. Lowes has taken into account both the role of first language and the relative importance of the different phonemes of English.

Indonesian EFL errors

There is very little material available on the EFL pronunciation errors of Indonesian or other first language speakers found in Indonesia. In his English teacher training textbook 'English Pronunciation: Theory and Practice' Anas Syafei (1988) has included the substitutions he has found Indonesians making when speaking English, gleaned from his 25 years informal observation as an English teacher. Unfortunately he does not support these observations with research or any type of contrastive or error analysis.

'Asian Language Notes: Indonesian/Malay' (1983) is not a study as such, but has been the starting-point for my present study. It is a set of notes to help teachers address the probable areas of difficulties in ESL/EFL of their Indonesian learners. The theory or research underlying the preparing of the notes is unfortunately not mentioned, neither is the method of determining the errors mentioned, although the approach appears to be a strong form of the Contrastive Analysis Hypothesis. The main weakness of the notes is that they do not seem to be based on observation of errors.

The research by Castro, Chair, Subongkotch and Ibe provides useful data with which to compare the results of this present work. Errors made by 11 Filipino, 14 Indonesian and 14 Thai English teachers in phoneme discrimination listening tests from the English Proficiency Test Battery were analyzed. Their data results were then explained by a weak form of the Contrastive Analysis Hypothesis (Castro et al, 1975, p.61).

Acehnese EFL errors

Two works provide some important information especially on the phonemes of Acehnese, although their usefulness is limited by their theoretical framework of contrastive analysis and the very small numbers of participants. Zaghlul Army (1987)

used a contrastive analysis approach to explain his data in his master's thesis on the pronunciation of English vowels by three Acehnese participants. A contrastive study on the Acehnese and English consonant phonemes by Wamad Abdullah (1973) is limited to the author's own pronunciation.

Methodology

The starting-point for any research into pronunciation is collection of data. There is considerable evidence that different tasks produce different results, i.e. a different phonological interlanguage (Tarone, 1978, p.18; Leather & James, 1991, p.329). Corder (1973, p.269) suggests that error analysis be performed on spontaneous data material whilst Ellis (1994, p.371) contends that 'natural language' is notoriously difficult to collect well. Added to this, spontaneous speech in the EFL situation is relatively rare. Applying Tarone's argument about L2 learner speech to the EFL situation, for a study to be generalizable the data sample should be drawn from situations similar to those actually faced by the population from which the participants are recruited (Tarone, 1978, p.18). There is thus some justification for analyzing data from elicited speech (Ellis, 1994, p.50).

Even if the language samples are limited to elicited speech, it is still important to include a variety of tasks. Different interlanguage phonology data for each task is to be expected. Each different task - for example, reading a list of words, reading a piece of continuous prose, repetition, etc. - will produce differing results: the nature of the task influences production (Tarone, 1978, p.18).

Labov isolated various contextual styles including a careful speech style found in interviews, a reading style and a yet more formal style when reading words in isolation. These styles cover a range of formal speech tasks. Casual style is difficult

to record, though it can be fished for in interviews by the use of 'danger-of-death' and similar questions (Labov, 1972, pp.79-86, 92-94).

Interlanguage phonology is variable for a number of reasons. Firstly, a learner's interlanguage is unstable, ideally changing over time as it approaches the target language (Corder, 1973, p.269). Secondly, as mentioned above, formal versus informal speech, reading wordlists versus longer utterances and elicited versus spontaneous speech all reveal systematic differences in interlanguage (Leather & James, 1991, p.329; Tarone, 1978, p.22). Some researchers speak of different interlanguages, and these can be related to the formality of the tasks. Amongst other characteristics of the formal task interlanguage is fewer errors (Nemser, 1971a). Patterns of production and perhaps perception should be looked for when analyzing the phonological interlanguage data (Tarone, 1978, p.22). There is often not a one-to-one correspondence between target language and interlanguage phonemes. Thirdly, different phonological environments constrain pronunciation in different ways (Cruttenden, 1994, p.45).

It is important to determine whether the pronunciation errors discovered are only production errors or are also aural discrimination errors. Some writers claim that aural discrimination is needed before oral discrimination can be made (Schneiderman, Bourdages & Champagne, 1988, pp.1-2), however work by Sheldon, and also by Border, Gerbert and Milsark, shows that 'a general claim that self-perception precedes production is unjustified' (Sheldon, 1985, p.108). All these authors agree that aural discrimination plays a certain role in improving pronunciation, although opinions vary as to whether aural discrimination comes before or after improved pronunciation.

CHAPTER 4 EXPERIMENTAL DESIGN

Sample

This study set out to describe the consonantal phoneme pronunciation errors of Indonesian, Acehnese and Gayo speakers of EFL. It was intended to also include Tamiang Melayu speakers, but not enough volunteers could be found with a similar level of exposure to English as the participants in the other three groups.

Eight volunteer participants from each of the three first language groups (Indonesian, Gayo and Acehnese) were recruited from among the researcher's students and their friends at the National Islamic Institute or Syiah Kuala University in Banda Aceh. All the participants had studied English as a Foreign Language for six years in high school and for between one and four years in university either as their major area of study or as a compulsory subject.

A notice was posted in the Education Faculty of the college where the researcher works, asking for English major students who were native speakers of Acehnese, Gayo, Tamiang Melayu or Indonesian, and who were interested in being volunteer participants in a study on pronunciation. It was indicated that they would need to be available for two afternoons to be involved in tests. Although up to 12 participants were chosen from each first language group not all of them turned up to the tests. In particular there were not enough Tamiang Melayu participants available in Banda Aceh who were able to reply in English to interview questions given in English, so this language group was not included in the study. One ethnic Tamiang participant was found during the interview to have Indonesian as her first language. After matching age, sex and formal study of English across the groups as much as possible, there were only eight participants who could be included in each first language group. The participants were asked to sign a consent form before the tests began (see appendix D).

The table below shows the matching of participants by age, sex and study major:

INDONESIAN				GAYO				ACEHNESE			
CODE	AGE	DEPT.	SEX	CODE	AGE	DEPT.	SEX	CODE	AGE	DEPT.	SEX
I2	20	English	F	G1	19	English	F	A2	19	English	F
I5	20	English	F	G5	20	English	F	A5	19	English	F
I4	21	English	F	G4	21	English	F	A1	20	English	F
T3	21	English	F	G3	22	English	F	A11	21	non-Eng.	F
I9	19	English	M	G6	19	non-Eng	M	A7	19	English	M
I8	20	non-Eng	M	G8	21	English	M	A8	20	English	M
I9	23	English	M	G9	22	English	M	A9	22	English	M
I10	24	English	M	G10	24	English	M	A10	25	English	M

Error definition

Adequate pronunciation is necessary within a communicative framework in order for speakers to be understood. In real communication the context provides clues to help disambiguate approximations in pronunciation. Notwithstanding this, in order to reduce the listening load on the other participants in the conversation, teachers aim to help language learners not only to produce realizations that are 'accessible' in that they can be acted upon (Dalton & Seidlhofer, 1994, p.10), but also to produce realizations that do not irritatingly draw attention to themselves (Dutt, 1990, p.21).

There are many definitions of error used by researchers in this field. The Longman Dictionary of Applied Linguistics defines phonological error as 'the use of a linguistic item ... in a way which a fluent or native speaker of the language regards as showing faulty or incomplete learning' (Richards, 1985, p.95). This is similar to Corder's statement that an error is where 'the learner's utterances ... differ from those of any native speaker' (Corder, 1983, p.260). The concept that error is 'deviation from the standard norm or target' is mentioned (Sharwood Smith, 1994, p.199). Acceptability is the issue for deciding what is an error or not (Cichocki et al, 1993, p.50). The phonological production of learners of English can be assessed in various ways with the most practical and real-to-life being to obtain feedback about pronunciation production from expert speakers of English (Kenworthy, 1987, p.20).

In this study an error was said to have occurred where the realization of a consonantal phoneme produced by a participant was not recognized by a native speaker as the phoneme that was supposed to have been produced. The recorded data from the interviews and reading passages tests were assessed by the researcher, with each instance of a non-native realization of a phoneme being counted as an error. The data from the pronunciation repetition test were assessed by a native speaker of English who is not a teacher. For the repetition test each phoneme was tested for three times. An error was said to have been made when two or three productions of each phoneme was not recognized as the phoneme being tested for by the native speaker scorer. The aural discrimination test was recorded by the researcher. Two or three mis-hearings of the three instances a particular phoneme was given, in a particular position in a word, constituted an error by that participant.

Tests

The study comprised four tests. The first three tests were carried out in the language laboratory using Sony LLC9000 equipment and BASF ferro extra audio-cassettes, whilst the fourth test was an interview recorded using a Sony portable audio-cassette player on BASF ferro extra audio-cassettes.

The four test tasks had differing levels of formality, with the interview being the least formal and the repetition test the most formal. Only initial and final positions for each of the consonants were tested, except for [ʒ] which most often occurs medially, as in pilot tests errors with consonants in medial position were found to be the same as errors in either initial or final position.

The first test was an aural discrimination test based on minimal pairs (see appendix C). The phonemes and position in word tested for were based on errors that appeared in pilot tests. Three words were heard, two of which were the same. There were three

different items to test discrimination of each minimal pair, either in word-initial or word-final position. Two c more 'mis-hearings' were deemed to constitute an error. An exception was made for the relatively rare medial/final sound [ʒ] where each one 'mis-hearing' was called an error, as there was only one item for each sound contrast. There were 158 randomized items audio-taped by the researcher.

In the language laboratory the participants were requested to circle the letter a, b or c showing whether they thought the first, second or third word was the different one. The answer sheets were collected and incorrect aural discrimination choices noted, for both phoneme and position. A wrong choice reveals a failure to perceive a contrast between two phonemes, but does not show which of the phonemes is perceived correctly and which one is undifferentiated. It is possible that both the phonemes are perceived as yet another phoneme, information not provided by this test.

The second test was a pronunciation repetition test. The consonantal phoneme being tested for was presented in three different words. The 78 test items were again randomized and read by the researcher on to a master audio-cassette. In the language laboratory the participants heard a word and were requested to repeat it in the following silence. Two or more mispronunciations among the three items provided to test one phoneme in word-initial or word-final position constituted an error. One item was lost from the master recording for initial [ð], therefore for this phoneme-position one or two mispronunciations of the two remaining items were considered an error. For each item a list of randomized words including the correct answer were provided for a native speaker of English to compare with the participants' responses, in order to aid transcription of the students' test responses (see appendix C). For every item the evaluater either circled the word that each response was closest to, or noted down where the response was something different. The responses to this second test

were also played back by the researcher, particularly to determine the sounds being substituted for the above-mentioned different answers. The words chosen contained the minimal pair substitutions that had turned up in the pilot tests. A native speaker of English was enlisted as evaluater for this part of the research, as it is too easy to 'anticipate' the errors one is testing for.

The third test was a reading test which each subject recorded onto an audio-cassette. Again the errors revealed in informal observations and pilot tests were the ones written into this test (see appendix C). The audio-cassettes were played back by the researcher and each individual error noted down. This test provided information on spelling interference and also on the influence of environment.

The interviews that formed the fourth test (see appendix C) were audio-recorded. Their main purpose was to collect more spontaneous data than was possible from the other, more formal, tests. The audio-cassettes were reviewed, the interviews transcribed by the researcher and correct and incorrect realizations of the phonemes being tested for were noted down. Place names were not included in the analysis, neither were the words 'Indonesia' and 'Indonesian' included.

Data collection

The first three tests were done in the language laboratory of the Islamic National Institute of Banda Aceh on a Saturday afternoon. Instructions were given in both English and Indonesian to ensure the participants knew what was expected of them in the tests, as almost all of the participants were unfamiliar with a language laboratory. The participants were scheduled to come to an office on another afternoon for individual interviews which were audio-taped.

The answer sheets that each participant filled in and the scoring forms for the tests were marked with a code, and the list matching participants' names with the codes has been kept secure by the researcher to preserve anonymity.

Analysis

The information from the eight participants in each first language group were first recorded in tables (see appendix E). This data was then collapsed for each first language group and presented in two more tables. Group data compared for each test is included in chapter 5, and appendix F shows each group's data across the tests. The findings are analyzed in chapter 5.

Summary

Four tests were developed taking into account that different tasks yield different pronunciations. An aural discrimination test, a repetition test and a reading passage were designed around those English consonantal phonemes showing non-native realizations of phonemes on pilot studies and informal observations. An interview allowed for more spontaneous data. These tests were administered to three groups of eight participants, each group speaking Indonesian, Gayo or Acehnese as their first language.

CHAPTER 5 DATA ANALYSIS

Description

Introduction

Although there were some common errors across the four tests for the three first language groups I will look at each test separately to start with. There were relatively fewer errors found in the aural discrimination test than the other three tests. The reading test reveals some errors that occurred because of spelling interference. The interview data has a smaller range of errors because sounds that occur relatively rarely in English did not appear in these examples of spontaneous speech. The reading and interview tests provided additional information on phonetic environment. which was then used in the analysis. In fact the four tests were designed with the knowledge that different types of tasks produce different interlanguages in mind (Tarone, 1978, p.18).

For each item a minimum of error by three participants out of the eight involved in each first language group is taken to indicate significant error. As the data was first analyzed a natural cut-off point between two and three out of the eight participants in each group was noticed. Upon reflection, as a teacher, given eight learners in a pronunciation class, sounds difficult for three or more of them would be worked on first. In the following description, as in the data tables, o indicates an absence of sound or ellipsis, and a superscript corner indicates an unreleased stop. \ indicates more than one answer from one participant. Where more than one realization is listed in the tables and in the discussion, the first one is the most common, continuing down to the least common realization. The data for each participant is given in appendix E, and the data arranged according to first language group is given in appendix F.

Aural discrimination test

	test 1	INDONESIAN	GAYO	ACEHNESE
1	initial p			
3	initial b		v	
5	initial v		b	
7	initial f			
13	initial z			
17	initial ʃ	s		
19	initial θ	s		
21	initial ð			
23	initial tʃ	dʒ	dʒ	dʒ dʒ
25	initial dʒ	tʃ	tʃ	tʃ tʃ
2	final p	o		
4	final b	o	v	
9	final t		θ	
10	final d		ð	
11	final k	tʃ		
12	final g	o		
6	final v	f f	f b	f f
8	final f	v v	v	v v
14	final z	s	s ð ð	s
15	final s	z θ	z θ	z
16	med\fi.ʒ	z z z z	z z\dz	ʃ ʃ ʃ ʃ
18	final ʃ			
20	final θ	s o	s\t	
22	final ð		z z\d	
24	final tʃ	dʒ dʒ\k o ts	ts ts ts ts	dʒ dʒ dʒ
26	final dʒ	tʃ tʃ\dz	dz dz	tʃ tʃ tʃ\dz

The Indonesian first language speakers showed difficulty in differentiating [ʒ] from [z]. Final [tʃ] was not differentiated from four different sounds - [dʒ], [ts], [k] and ellipsis (shown in the tables as [o]). No pattern to the distribution of this data was found. All errors, significant and otherwise, occurred with final sounds, except for one partipicant who did not differentiate between the initial affricates and another who heard both initial [ʃ] and [θ] as [s].

The Gayo participants confused final [tʃ] with [ts]. Final [z] was heard as [ð] or [s]. Again all of the difficulties, significant and less significant were with final sounds,

except for one participant who had difficulty differentiating the initial affricates and another who confused initial [v] and [b].

For the Acehnese, [ʒ] was heard as [ʃ]. Final affricates were not differentiated, with two participants also unable to differentiate the intitial affricates. These were the only initial sounds that were misheard.

There are some interesting differences between the three first language groups. Final [z] was only a significant problem for the Gayo, some of whom heard [z] as [ð] or [s]. The Indonesian first language speakers heard [ʒ] as [z], whereas the Acehnese heard it as [ʃ]. None of these three Austronesian languages has [ʒ]. Indonesian has a borrowed [z] used in many Arabic/religious words. However Acehnese pronounce those same borrowed words with a stop sound, [ḍ]. [ʃ] is also a sound from Arabic which the Acehnese use in many borrowed words. The error data for final [tʃ] were different for the three groups. The Gayo heard it as [ts], the Acehnese as [dʒ], and the Indonesian first language speakers heard it as both of these as well as other sounds. No reason for this difference is apparent. Final [dʒ] was only a significant problem for the Acehnese, who heard it as [tʃ] or [dz].

If we look at the aural discrimination test results across the three groups we see that significant error (errors made by nine or more of the twenty-four participants) was only made in discriminating [ʒ] from [z] and [ʃ], and final [tʃ] which was confused mostly with [ts] and [dʒ]. Errors, significant and otherwise, were predominantly with final sounds. It is worth noting here that the phonemes where aural discrimination errors occurred are sounds that are not found in the three first languages involved in this study, or are sounds that are only used in borrowed words. [ʒ] is a relatively rare sound in the languages of the world (Cruttenden, 1994, p.173). [tʃ] is a sound that is acquired rather late in first language acquisition (Cruttenden, 1994, p.162).

Repetition test

	test 2	INDONESIAN	GAYO	ACEHNESE
1	initial p		f f\t	
3	inital b		v	v
5	initial v			f
7	initial f		p\t	p\v
13	initial z		dʒ	tʃ\s ð\v
17	initial ʃ	s	s s	
19	initial θ	s t	s\s\f s\t s\t t\ʃ	s s\t\t f
21	initial ð	v d	d d	v\z v\z
23	initial tʃ	t\dʒ	t	
25	initial dʒ	d d	d	d
2	final p		f f f\k f\k	k\t
4	final b	p p\p\k p\v	v v v\v\f v\v\f	p k\v\o
9	final t			
10	final d	t t t t t t\o o	t t t t o o	t t t t t\z\o o
11	final k			
12	final g	k k k k k	k\o o	k k k\d k\p\o
6	final v	f\b		f f
8	final f			
14	final z	s s s\v s\v	s s\o\o	s s\o s\o v
15	final s	z		z
16	med\fi.ʒ	z	d\ʃ d\v\dʒ	d\z
18	final ʃ	s\z	s	s
20	final θ	s s\f t\f	s\t s\p	s\f s\f s\f\t t\f t\f s\ks
22	final ð	z z z\z\f z\z\k z\v z\v\t t\d	z z z\z\d v o	z z\v z\z\v z\o o
24	final tʃ	t t t\dʒ t\dʒ	t t t t t	t t t t t\dʒ
26	final dʒ	tʃ tʃ tʃ tʃ tʃ\tʃ\t tʃ\t tʃ\t\t	tʃ tʃ tʃ tʃ\t tʃ\t\t t\t\d	tʃ tʃ\ʃ tʃ\t t t t
		d\dz	t\t\dz dz\d	

The Indonesian first language speakers predominantly produced erroneous realizations of the final position phonemes. Final [b] was realized as [p], [v] or [k], for which no pattern of distribution can be discerned. Final [d] was realized mostly as [t] or ellipsed. Final [g] was realized as [k]. Final [z] was realized as [s] or [v]. [s], [t] and [f] were substituted for final [θ]. Likewise [z], [t], [v], [d], [f], and [k] were substituted for final [ð]. Final [tʃ] was realized as [t] or [dʒ]. Final [dʒ] was realized as [tʃ], [t], [dz] or [d].

The Gayo only produced errors at a significant level for final sounds except for initial [θ] realized as [s], [f], [ʃ] or [t]. A notable difference from the Indonesian group was the Gayo realization of final [p] as [f] or [k]. Final [d] was realized as [t] or ellipsed. Final [b] was realized as [v] or [f]. In a similar way to the Indonesians, the Gayo realized final [ð] as [z], [v], ellipsed or [d]. Final [tʃ] was realized as [t] and final [dʒ] as [t], [tʃ], [dz] or [d].

Acehnese first language participants showed significant errors only with final sounds, except for initial [θ] which was realized as [t], [f] or [s]. Final [d] was realized as [t], ellipsed or realized as [z]. Final [g] was realized as [k], ellipsed or realized as [d]. Final [z] was realized as [s], ellipsed or substituted by [v]. Final [θ] was erroneously realized as [s], [t], [f] or [ks]. Final [ð] was realized as [z], ellipsed or realized as [v]. Final [tʃ] was realized as [t] or [dʒ]. Final [dʒ] was realized as [t], [tʃ] or as [ʃ].

There are quite a few differences between the significant errors made by the three groups. The Gayo made more errors with initial [θ] than the Acehnese, but the realizations were very similar. Some dialects of Acehnese have a laminal alveo-dental fricative with a wide channel area as an allophone of [s]. It is a sound between [s] and [θ] (Durie, 1985, p.12). It seems to enable some Acehnese to produce an acceptable [θ]. The tongue tip for Indonesian [t] is further forward than for English, and can even be made interdentally. This may help some Indonesians to find the correct place of articulation for [θ].

The Gayo realized final [p] as [f] or [k]. This may be due to hypercorrection which is discussed in the explanation section later in this chapter. In a similar fashion, Gayo speakers produced [v] or [f] for final [b] despite final [b] being available in Gayo phonology. The Indonesian first language speakers produced [p] for final [b] which is also what occurs in Indonesian; "written 'p' or 'b' at the end of a word are both

pronounced as [p] (unreleased)" (Asian Language Notes, 1983, p.6). Indonesian first language speakers produced the most erroneous realizations of final [g]. Together with the Acehnese they mostly substituted [k] for it.

Final [z] is not found in these three languages. The most common substitution for the Indonesian first language speakers was [s], and also for the Acehnese. Final [θ] was the sound where the most errors were found for the Acehnese speakers. It should be noted that [s], which in some dialects of Acehnese is pronounced as a sound much closer to [θ], is never found in final position. The substitutions were mostly [f], [s] and [t] and also for the Indonesian first language speakers. Final [ð] was difficult for the three groups, especially the Indonesian first language speakers, who realized it mostly as [z] and [v], as did the Gayo and Acehnese who also showed some ellipsis. Final [tʃ] for all the groups was realized as [t], but [dʒ] was also found for the Acehnese and Indonesian first language speakers. Final [dʒ] was realized as [tʃ] and [t] for the three groups and also [d] and [dz] for the Indonesian and Gayo first language speakers.

Summarizing cross-linguistically, looking at errors made by nine or more participants, final [b] was substituted mostly by [v] and [p]. Final [d], [g] and [z] were mostly devoiced or ellipsed. [θ] both initial and final was often erroneously realized as [s] or [t], although [f] showed up in final position also. Final [ð] was commonly realized as [z]. Final [tʃ] was realized as [t] or voiced. Final [dʒ] was mostly devoiced or realized as [t], and this was the phoneme that caused the most difficulty in this test. The three groups do basically make errors with the same phonemes, though sometimes realized differently. It appears that there is a greater variety of realizations for phonemes that are not found in the first language at all than for phonemes that exist in the first language but in a different position. The effect of the immediately preceding or following vowel is not clear. Only two or three different vowels were supplied in the

three test words for each phoneme, which is not enough to reveal such patterns of distribution of errors. The only pattern of interest is that some realizations after [ɔ:] were different than after other vowels, at least for the Acehnese and Indonesian first language speakers.

Reading passage test

	Test 3	INDONESIAN	GAYO	ACEHNESE
1	initial p	f f	f f f f \v	f
3	inital b		v v	
5	initial v			r
7	initial f			
13	initial z		ʒ ʒ dʒ dʒ dʒ	dz
17	initial ʃ			s
19	initial θ	t t	t t t t t s	t s
21	initial ð	d d d d	d d d d d d\z	d d d\dz d\z
23	initial tʃ	k k k	k k k k k k\s	k k k k\ʃ ʃ ʃ ʃ
25	initial dʒ			
2	final p	p˺ p˺ p˺ p˺ p˺ p˺ p˺ f	p˺ p˺ p˺ p˺ p˺ f f	p˺ p˺ p˺ p˺ p˺ p˺ p˺ o
4	final b		p˺	p˺
9	final t	t˺ t˺ t˺ t˺ t˺ t˺\o t˺\o	t˺ t˺\n\o o\t˺ o\t˺ o o	t˺ t˺ t˺ t˺ t˺
10	final d	o o o o o o\d˺ t˺\t	o o t\d˺ o\d˺ o\t o\t	o o t o\d˺\t˺ d˺\t d˺
11	final k	k˺ k˺ k˺ k˺ k˺ k˺ k˺ k˺	k˺ k˺ k˺ k˺ k˺\o k˺\o o	k˺ k˺ k˺ k˺ k˺\o
12	final g	g˺ g˺ g˺ k˺ k k k	k˺ k˺ k˺ o ʔ	k k k k˺
6	final v		o	
8	final f		o o o	v
14	final z	o o o	o o o o o s	o o o o
15	final s	ʃ	ʃ ʃ	ʃ
16	med\fi.ʒ	z z z ʃ	z z z	z z ʃ ʃ
18	final ʃ	s s s s s s	s s s s z ʒ	s s s
20	final θ		t t s	s
22	final ð	t t	t t	t d θ
24	final tʃ	θ		ʃ ʃ
26	final dʒ	t\d˺ t o o\tʃ g\tʃ	t t t t\z t\n g ʒ	tʃ tʃ\t t˺ g\ʒ dz k d

The Indonesian first language speakers only produced significant errors on final sounds except where initial [ð] was substituted for by [d], and [k] substituted for [tʃ]. Non utterance final [d], that is final [d] followed by a pause, was ellipsed or sometimes, before a consonant, realized as [t˺], [t] or [d˺]. Non utterance final [g] was realized as [g˺], [k] or [k˺]. Non utterance final voiceless stops were often

unreleased. Final [p] was realized as [p˺] or [f]. Final [t] was realized as [t˺] or ellipsed. Final [k] was realized as [k˺]. For the sibilants, final [z] was ellipsed, [ʒ] was realized as [z] and [ʃ], and final [ʃ] was realized as [s]. Final [dʒ] was realized as [t] or as [tʃ] when followed by a word beginning with a consonant, and as [g], [d˺], [t] or ellipsed when followed by a pause.

The Gayo participants showed a similar pattern of significant errors to the Indonesians except for more errors with initial consonants. Initial [p] was realized as [f] and sometimes when preceded by a consonant, as [v]. Initial [b] was realized as [v]. Initial [z] was realized as [dʒ] or [ʒ]. Initial [tʃ] was realized as [k] and [s]. There were also more errors with the labio-dental sounds. Final [f] was ellipsed. For the non utterance final voiced stops, [d] was ellipsed or realized as [t] or [d˺], final [g] was realized as [k˺], [ʔ] or ellipsed. Non utterance final voiceless stops were often unreleased. Final [p] was realized as [p˺] or [f]. Final [t] was ellipsed or realized as [t˺] or, in one case, as [n] before a word beginning with a consonant. Final [k] was substituted by [k˺] or ellipsed. For the sibilant sounds, [ʒ] was realized as [z] and final [ʃ] as [s], [z] or [ʒ]. Among the interdentals initial [ð] was realized as [d] or [z], and initial and final [θ] as [t] or [s]. Final [dʒ] was realized erroneously as [t] when followed by a word beginning with a consonant, but as [ʒ], [g], [n] and [z] before a pause.

In a similar fashion the Acehnese group showed significant errors in not releasing the non utterance final voiced stop phonemes and/or devoicing them or ellipsing them. Final [d] was ellipsed or realized as [d˺] or [t˺]. Final [g] was substituted by [k] or [k˺]. Among the non utterance final voiceless stops, [p] was realized as [p˺] or ellipsed, [t] as [t˺], and final [k] as [k˺] or ellipsed. Among the sibilants final [z] was ellipsed, [ʒ] was realized as [ʃ] or [z], [s] as [ʃ], and final [ʃ] as [s]. For the affricates initial [tʃ] was reduced to [ʃ] or sometimes when preceded by a word ending in a

consonant, realized as [k]. Final [dʒ] was realized as [tʃ], [t'] or [g] when followed by a word beginning with a consonant, but as [ʒ], [g], [k], [dz], [t], [d] and [tʃ] before a pause. The interdental [ð] was realized as [d], [dz] or [dz] in initial position, whereas in final position it was realized as [t], [d] or [θ].

Looking at the differences between the first language groups we see that only the Gayo group showed significant error with initial [p]. This is perhaps due to hypercorrection as mentioned elsewhere. Only the Gayo group realized initial [z] as [ʒ] or [dʒ] although all three groups have initial [z] as a borrowed sound. Only the Gayos showed significant errors in realizing initial [θ]. As mentioned previously there is an allophone of /s/ in some dialects of Acehnese which is between a [θ] and [s] sound and this may mean that participants who have Acehnese as a first or even as a second language, as some of the Indonesian first language speakers do, have less difficulty producing [θ]. Only the Acehnese first language speakers reduced initial [tʃ] to [ʃ], but all three groups substituted [k], which is mentioned in the explanation section.

For non utterance final sounds, all three groups realized [p] erroneously, mostly by lack of release, but the Gayo group in particular did this, also sometimes substituting [f]. Final [t] by all three groups was unreleased or ellipsed, and final [d] was ellipsed, unreleased, devoiced or both. Final [k] was mostly unreleased by the three groups, the Gayos also substituting [ʔ] which is a syllable final allophone of [k] in Gayo. The three groups showed significant error in realizing final [g]. The Indonesian first language speakers showed the most errors, and realizations were mostly unreleasing or devoicing. The Acehnese errors were mostly devoicing, but the most common error for the Gayo first language speakers was unreleasing and devoicing. No explanation for this difference is immediately apparent from the first language phonologies.

Only the Gayos produced significant error with final [f]. [ʒ] when erroneously realized became [z] for the three groups or [ʃ] for the Acehnese and Indonesian first language speakers. Only the Gayo group significantly realized final [θ] erroneously, which was commented on above. Only the Acehnese made significant errors with final [ð]. All three groups produced a significant number of erroneous realizations of final [dʒ]. The Gayos reduced [dʒ] to [t] before a word beginning with a consonant, but produced [ʒ], [g], [n] and [z] before a pause. The Indonesian first language speakers produced either [t] or devoiced the affricate before a word beginning with a consonant, but produced an ellipsis, [g], [dˇ] or [t] before a pause. The Acehnese likewise produced a voiceless affricate or [tˇ] or [g] before a word beginning with a consonant, but [ʒ], [g] [k] [dz] [t] [d] or [tʃ] before a pause. The wide variety of different realizations is discussed in the explanation section.

The combined results for all the participants, looking at errors made by nine or more, show that non utterance final [p], [t] and [k] were regularly unreleased. Final [d] was ellipsed, unreleased or devoiced. Final [g] was unreleased, devoiced, both of the latter, or ellipsed or glottalized. Final [z] was often ellipsed. [ʒ] was erroneously realized as [z] or [ʃ]. Final [ʃ] was most often realized as [s], and vice-versa. In this reading passage test difficulties in pronouncing interdentals showed up, with [t] often substituted for initial [θ] and final [ð] but [d] for initial [ð]. Initial [tʃ] was replaced by [k] and final [dʒ] was realized by a great number of different realizations, which will be discussed in relation to spelling interference in the explanation section.

Interview

	Test 4	INDONESIAN	GAYO	ACEHNESE
1	initial p			
3	inital b			
5	initial v			
7	initial f			
13	initial z			
17	initial ʃ			
19	initial θ		t t t\s	s\t
21	initial ð		d d d	d
23	initial tʃ			ʃ
25	initial dʒ			
2	final p			
4	final b			
9	final t	t˺ t˺ t˺\o\?\k t˺\?\tʃ	t˺\? t˺\? t˺\? t˺\o t˺\ks	t˺\? t˺\o t˺\o\tʃ t˺\o\tʃ\?\k˺\r
10	final d	d˺\t˺\o d˺\t\o t\o	t t\o t\d˺ t\d˺\o	d˺\t˺\?\o d˺\t˺\t\o d˺\t\?\o
		d˺\t\?	t\d˺\o	t\o\tʃ t\o
11	final k	k˺\? k˺\? k˺\?\o	k˺ k˺ k˺\ks\?	k˺ k˺\o k˺\?
12	final g			
6	final v			
8	final f			
14	final z			
15	final s			
16	med\fi.ʒ			
18	final ʃ	s s	s s s s	s s
20	final θ		t t\t˺	t\t˺
22	final ð			
24	final tʃ			
26	final dʒ	o\d˺	tʃ tʃ\o tʃ\o\z tʃ\o\z\dz\ʒ ʃ	o o\d˺ o\tʃ o\tʃ\ʒ tʃ

Taking 33% and 3 instances of error to be significant within each interview, and 3 out of 8 participants showing error in producing a phoneme to be significant for the group, the Indonesian first language speakers only showed significant errors for three final stops. Final [t] was mostly erroneously unreleased or realized as [ʔ]. Final [k] and [d] showed similar realizations, with the addition of ellipsis or [t] or [t˺] occurring in the error data for [d].

The pattern for Gayo first language speakers for these three common final stops is very similar; however without the glottal stop being substituted for final [d]. In addition

final [ʃ] was realized as [s], initial [θ] and [ð] as [t] and [d], and final [dʒ] variously realized, mostly as [tʃ].

Likewise the Acehnese participants showed the same pattern of final [t], [d] and [k] errors as the Indonesians. Final [dʒ] was erroneously realized mostly as [tʃ] or ellipsed.

Looking at the differences across the three languages it can be seen that only the Gayo group showed significant error with initial [θ] and [ð]. For an explanation for their difficulty with [θ] see the description of the reading test results above. The Gayo also showed more substitutions of [s] for final [ʃ], for which no obvious explanation can be found. The Gayo and Acehnese erroneously realized final [dʒ] a significant number of times, whereas the Indonesian first language speakers made very few errors.

The cross-linguistic data for this test, considering nine or more participants having errors to be significant, reveals final [t] was mostly unreleased, realized as glottal stop or ellipsed. Final [d] was treated in a similar fashion, in addition to realizations as [t] and [t̚]. Final [k] was unreleased or [ʔ]. Final [dʒ] was variously devoiced or ellipsed amongst other possibilities.

Indonesian first language group

To summarize for the Indonesian first-language speakers, looking at errors made by three or more out of eight participants, phonemes realized unacceptably:

	AD	Rep	RP	I	common error
final voiced		d	d	d	devoiced\ellipsed
stops		g	g		devoiced\unreleased
		b			devoiced
final voiceless			t	t	unreleased\ellipsed
stops			k	k	unreleased
			p		unreleased
final		z	z		devoiced\ellipsed
sibilants	ʒ		ʒ		alveolarized
			ʃ		alveolarized
initial affricates			tʃ		substituted by [k]
final	tʃ	tʃ			voiced\depalatalized
affricates		dʒ	dʒ		devoiced\depalatalized
initial interdentals			ð		stop
final		ð			sibilant
interdentals		θ			sibilant\labio-dental

AD is the aural discrimination test, Rep the repetition test, RP the reading passage and I the interview. The symbol \ means 'or'. Across the tests, the most common phoneme being realized erroneously was final [d], and the erroneous realization was mostly devoicing. It must be noted that each test supplied different information and therefore comparison across the tests is of limited relevance. For example the aural discrimination test was strictly limited to minimal pairs. The repetition test answers were assessed slightly more finely, in terms of English words, however they provided only utterance initial or utterance final information. Only in the reading passage test and the interview were more narrow phonetic detail such as phonetic environment and the ubiquitous lack of release assessed. The reading passage provided only one or more occurrence of each phoneme and position being tested for. Spelling interference may account for many differences between the data of the reading passage and the other three tests. The other tests were based on more than 33% incidence counted

being as error. Sounds found rarely in English simply did not show up in the interview, therefore the error data for the interviews clusters around very common sounds.

Taking the above into consideration we see that there were fewer errors on the aural discrimination test than the other tests. Aural discrimination therefore does not imply correct pronunciation. Final [d] was significantly erroneous on the three productive tests. Final [g] and [b] errors did not appear in the interview data as they are not very common sounds. The only instance of final [b] on the reading passage was in the name 'Rob Grease' where the following voiced sound perhaps helped participants to voice the [b]. Final voiceless stops were not realized erroneously on the repetition test, but voiced stops were. It should be borne in mind that in Indonesian final voiceless stops are not released, which would not show up in the repetition test, but final voiced stops are devoiced and unreleased, such devoicing showing up in the error data. Only on the reading passage test did any significant error with final [p] occur. This was found in the phrase 'cup of tea', where no similar phonetic environment for final [p] occurred in the interviews. Final 'z' was mostly devoiced in the repetition test, but ellipsed in the reading passage, for which no explanation is immediately apparent. [ʒ] was the only sound for this group to be heard incorrectly but mostly repeated correctly. However in the reading passage [ʒ] was again alveolarized, which could be due to interference from spelling. The pronunciation of 'leisure' was especially problematic perhaps because 's' in spelling can be pronounced [s], [z], [ʃ] or [ʒ] in different words. Final [ʃ] was only significantly erroneous in the reading passage, where the word was 'squash'. Likewise initial [tʃ] was only realized erroneously a significant number of times in the reading passage test where the word was 'chocolate'. This occurrence of this instance of spelling interference may be related to confusion between the digraph 'ch' and the more common English sound [k]. Final [tʃ] did not appear in the error data from the interview, and was not significantly erroneously

realized in the reading passage test where in both instances final [tʃ] was not utterance final. In the aural discrimination and repetition lists, where [tʃ] was utterance final, it was confused with [dʒ]. Final [tʃ] was also heard as various other sounds, and was reduced to the stop on the repetition test. Final [dʒ] was only significantly erroneously realized on the repetition and reading passage tests. It is not a very common sound, and therefore did not occur often in the interviews. In the reading passage the words were 'cadge', which was mostly realized correctly, and 'rage', which showed signs of spelling interference, being pronounced with a final [g]. Participants were obviously confused by the unfamiliar word 'rage', showing a variety of other substitutions including [d] and ellipsis.

Gayo first language group

The data is a little different for Gayo. Phonemes realized unacceptably by at least three out of the eight participants:

AD	Rep	RP	I	common error
final voiced	d	d	d	ellipsed\devoiced\unreleased
stops		g		devoiced+unreleased
final	p	p		labio-den\unreleased
voiceless stops		t	t	ellipsed\unreleased\glottal
		k	k	unreleased\glottal\ellipsed
initial voiceless stops		p		labio-dental
final fricatives		f		ellipsed
z	z	z		ellipsed\devoiced\interden.
		ʃ	ʃ	alveolarized
		ʒ		alveolarized
initial fricatives		z		palatalized\+affricated
initial affricates		tʃ		substituted by [k]
final tʃ	tʃ			stop\alveolar affricate
affricates	dʒ	dʒ	dʒ	devoiced\+stop\ellipsed
initial	θ	θ	θ	alveolar stop\sibilant
interdentals		ð	ð	alveolar stop
final		θ		alveolar stop
interdentals		ð		alveolar sibilant

Across the tests errors were most common for final [d] and [z], where the realizations were ellipsis or devoicing, with unreleasing also found for [d] and the interdental fricative sometimes substituting for [z]. Initial [θ] was replaced by a [t] or [s]. Final [dʒ] showed a great variety of errors including devoicing, reduction to [t] and ellipsis.

Looking at differences between the tests it can be seen that aural discrimination was much better than production. Final [d] showed similar erroneous realizations across the three production tests, taking into account that lack of release would not show up in the repetition test. Final [g] was only significant on the reading passage test where the phrase 'mug of coffee' appeared. No similar phonetic environment for final [g] turned up in the interviews. In the repetition test each final sound was also utterance final, therefore not making a neat comparison of errors possible in this case. Final [p] likewise did not show up in the aural discrimination or the interviews. Lack of release was the common realization in the reading passage test, followed by labio-dentalization to an [f], which seems to be the trademark of Gayo English. This also occurred in the repetition test, and, in addition, substitution by [k]. Again it must be noted that in the reading passage final [p] occurred in the phrase 'cup of tea' whereas in the repetition test it was utterance final. This probably accounts for differences in error realizations. Unlike the Indonesian first language data erroneous realizations of final [t] and [k] for the Gayos were not significant for the repetition test. Lack of release, ellipsis and glottalization were the erroneous realizations found in the reading passage and interview tests, and also some incidence of affrication in the interviews.

Initial [p] was only significantly erroneously realized in the reading passage test, where it was labio-dentalized. Later in this chapter substitution of [p] by [f] is explained as hypercorrection. However it is not clear why this should only occur at a significant level in the reading passage test. Final [f] on the reading passage test was ellipsed. Final [f] did not show up in the interview data as it is not a common sound. Perhaps a

difference in formality between the repetition and reading passage tests accounts for errors in the latter but not the former test.

Final [z] did not show up in the error data of the interview and this is discussed later in this chapter. Final [z] was erroneously heard as [ð] but ellipsed in production. It was also realized as [s] in these three tests. Final [ʃ] appeared in the reading passage word 'squash' and in the interview word 'English'. However in the more formal repetition test there were not a significant number of errors in producing final [ʃ]. [ʒ] in the reading passage word 'leisure' was produced erroneously as [z] which points to spelling interference. In the repetition test it was given a great variety of realizations. This would seem to indicate that fossilization of one substitution for this sound has not yet occurred. [ʒ] did not occur in the interviews as it is a very rare sound.

Initial [z] was only significantly erroneously realized in the reading passage where the word 'zany' gave rise to realizations with initial [dʒ] and [ʒ]. This would seem to be a case of spelling interference. In these three Austronesian languages [z] spelled as 'z', which exists only in borrowed words, can be pronounced as [ḍ] (see appendix B).

In a similar way initial [tʃ] was realized as [k] only in the reading passage test, as has been explained in the above section on the Indonesian first language speakers' error data. Final [tʃ] was not realized erroneously on the reading passage and interview tests where it was not utterance final. In the repetition test it was reduced to the stop, whereas in the aural discrimination test it was heard as a homorganic affricate. This substitution of a homorganic affricate is the other special mark of Gayo English, though no information on affricates in Gayo has been found. That the repetition test produced realizations of affricates as stops, whereas the affricates were heard as affricates in the aural discrimination test, is not surprising. Development processes show that language learners first produce affricates as a stop. Final [dʒ] was

significantly erroneously realized in the three productive tests. Most often it was devoiced or reduced to a stop. Some spelling interference is evident in the reading passage test where [g] was subsituted for [dʒ] in 'rage'.

Initial [θ] was mostly realized as [t] and [s] in the three productive tests, and initial [ð] as [d] on the reading passage and interview tests. There may be less errors in the repetition test as it is a more formal task. Final [θ] and [ð] are not common sounds, and not significant in the interview test. In the reading passage test final [θ] was realized as [t] or [s]. Final [ð] was erroneously realized in the repetition test as [z].

Acehnese first language group

For the Acehnese first-language speakers, phonemes realized unacceptably by at least three out of the eight participants:

	AD	Rep	RP	I	common error
final voiced stops		d	d	d	ellipsed\devoiced+\unrel. devoiced
		g	g		
final voiceless stops			t	t	unreleased
			p		unreleased
			k	k	unreleased
final sibilants	ʒ		ʒ		devoiced\alveolarized
		z	z		ellipsed\devoiced
			ʃ		alveolar
initial affricates			tʃ		sibilant \substitution by [k]
final affricates	tʃ	tʃ			stop\voiced
	dʒ	dʒ	dʒ	dʒ	devoiced\+stop\ellipsed
initial interdentals		θ			sibilant\stop
			ð		stop
final interdentals		θ			sibilant\labio-dental
		ð	ð		sibilant\other

Across the tests, errors were mostly produced for final [d], for which the erroneous realizations were absence of any phoneme at all or devoicing and/or lack of release,

and final [dʒ] for which there were a variety of erroneous realizations including devoicing or reduction to [t] and ellipsis.

In a similar fashion to the other two first language groups, the aural discrimination test produced the least error data, and the data from the three productive tests are rather different from each other. Final [d] was realized erroneously as ellipsis or devoicing on the three productive tests, and lack of release also showed up on the reading passage and interview tests. Final [g] did not show up in the interview. On the repetition and reading passage tests final [g] was mostly devoiced.

Final voiceless stops were not realized erroneously at a significant level on the repetition test, perhaps because it is the most formal of the tests and therefore participants are most careful. In addition, the error that mostly appeared on the reading passage and interview tests was lack of release and that would not have shown up on the repetition test. For comments on final [p] see the relevant section in the discussion on the errors of the Indonesian first language group above.

[ʒ] was heard as [ʃ] but realized as both [ʃ] and [z] in the reading passage word 'leisure'. Final [z] was ellipsed in both the repetition and reading passage tests, but also devoiced in the utterance final position in the repetition test. Final [ʃ] was realized as [s] in the three productive tests, but only at a significant level in the reading passage test. Initial [tʃ] was only significantly erroneous on the reading passage test where it was realized as [ʃ] in the word 'choose' and [k] in the word 'chocolate'. The latter would be due to spelling interference as mentioned for the other two first language groups. Final [tʃ] was heard as voiced in the aural discrimination test but mostly reduced to the stop in the repetition test. Final [dʒ] was realized erroneously at a significant level in all four tests, mostly devoiced, but reduction to [t] showed up on the repetition test and ellipsis in the interview.

Initial and final [θ] were only erroneous at a significant level in the repetition test, realized mostly as [s] and [t], but also as [f]. Initial [ð] however was erroneously realized mostly as [d] in the reading passage test. Final [ð] was realized as [z], [v] or ellipsed in the repetition test but realized as [t], [d] or devoiced on the reading passage test. The difference between realizations on the tests may be related to the phonetic environment, the repetition test words always being utterance final whereas the words in the reading passage may be influenced by the following word. Overall ellipsis was not as common in the repetition test, perhaps because participants were paying more attention to pronunciation in that more formal test.

Summary

Across the three first language groups it can be seen that certain patterns arise from the error data. When voiced final stops were realized unacceptably, they were mostly devoiced. Voiceless final stops were mostly unreleased in non utterance final position. Amongst the sibilants, for final [z], elision or devoicing predominated. For [ʒ] the Indonesian and Gayo groups favoured substituting with the alveolar sibilant [z], whereas the Acehnese group favoured devoicing. [ʃ] was largely replaced by the alveolar [s]. There was a variety of realizations for the two English affricates. In final position they were mostly either reduced to the stop or interchanged. Notably the Gayo group heard them as alveolar affricates, but produced them as stops. Only the Acehnese group revealed significant error with the initial affricates, reducing [tʃ] to a sibilant.

The interdental fricatives showed a large range of realizations which will be commented on later in this chapter. Mostly they were replaced with the equivalent alveolar stop or sibilant, though each first-language group showed a slightly different pattern.

If we look at each first language group separately, we see that there are a few noteworthy differences between the three groups. The Indonesian first language participants showed the most unreleasing and ellipsis of final stops. [ð] when erroneous was mostly realized as [d] if initial, but [z], [t], [v], [k] or [d] if final. [ʒ] was most often unacceptably realized as [z]. [ʒ] for the Acehnese was often realized by [ʃ] or [z]. The Gayo participants realized [ʒ] mostly as [z] but also produced a range of other realizations. They often produced labio-dentals in place of bilabial sounds. For the Gayo initial [z] was realized mostly as [dʒ]. Final [tʃ] was sometimes realized as the common word-final cluster [ts], and likewise [dʒ] as [dz].

If each test is looked at separately we note that in the aural discrimination test significant errors for the 3 first-language groups only occurred on 4 out of the 26 phoneme-positions tested, dominated by the affricates and [ʒ]. The repetition test data shows more error realizations, mostly devoicing of phonemes in final position, and reduction or interchanging of the affricates. The reading passage test data is dominated by unacceptable realizations of the final stops and spelling interference errors of the affricates. In the interviews significant errors were limited to 7 phoneme-positions, notably a great variety of erroneous realizations of the frequently-occurring final stops for the three groups, and of final [dʒ] for the Gayo and the Acehnese. In addition the Gayo showed significant errors with final [ʃ] and the initial interdentals.

Comparison with literature

Current research in language universals has revealed that voiced stops are less commonly found in the languages of the world than voiceless stops, and relatively few languages have final voiced stops (Jakobson, 1941, p.14; Dreasher & Anderson-Hsieh, 1990, p.74). The only final voiced stop in any of the three languages in this research is [b] in Gayo (see appendix B). The current study found many errors with final voiced stops. Interdental sounds are likewise limited to only a few languages in the

world, and in English acquired after the corresponding sibilant (Jakobson, 1941, p.61). This research found a large variety of erroneous realizations for the interdental sounds. Overall word-initial consonants are much more common than word-final consonants, and stops are more common across the world's languages than fricatives (Dreasher and Anderson-Hsieh, 1990, pp.70-75). In this study sibilants and affricates were often replaced with stops in all except the aural discrimination test. The substitution of [s] for other sibilants is the notable exception, explained by the fact that the most common fricative in the languages of the world is [s] (Jakobson, 1941, p.55).

Research on the developmental processes in language learning will probably shed useful light on the errors found in this study. Final stop devoicing is both a feature of languages world-wide and of a child's acquisition of language (Odlin, 1989, p.123). Certainly final stop devoicing is very apparent across the three language groups for the three production tests. Overgeneralization, where one sound is substituted for various difficult sounds is also an attested developmental process (Tarone, 1978, pp.18-19). The current study found [s] commonly substituted for the other sibilants and [θ].

In the literature on universal processes or strategies mention is made of reduction, simplification or elision. Richards says simplification "is one way in which speakers of different languages can make a new language easier to learn and use" (1974, p.71). Where a sound is found to be difficult to articulate, either because it is not in the first language or is rare in the languages of the world, it will be modified or reduced to ease articulation (Dreasher & Anderson-Hsieh, 1990, p.70). While it would be easy to explain the many examples of ellipsis of final stops and [z] in particular in the error data as interference from languages which have no final [z] and commonly have a glottal stop or unreleased voiceless stops in word final position, a universal developmental strategy of reduction would also explain these results.

Anas Syafei in his book 'English Pronunciation: Theory and Practice' presents the sounds most likely found difficult by Indonesian speakers, based on the most common mistakes he has come across in 25 years of teaching English as a foreign language. (1988, p.40). He mentions the need to aspirate initial voiceless stops in English but doesn't mention final stops (1988, p.70). This study found that initial stops were rarely erroneous, and the few errors made were not caused by misapplication of the feature of aspiration. Anas Syafei says [s] is usually substituted for [θ] and for [ʃ] , and [z] for [ð] and [ʒ] (1988, pp.73-39, 82-85). This is similar to the results of this research, except that [t] is also a common substitution for [θ]. He has found [f] and [v] confused (1988, p.80). This was found in the current study, but not at a significant level.

'Asian Language Notes. Some likely areas of difficulty for Asian learners of English. No.3 Indonesian/Malay', most probably written from a contrastive analysis position, includes the need to aspirate intitial voiceless stops in English and the need to release final stops (1983, pp.5-6). This latter point was clearly found in the current study, particularly in a speech stream, where final stops were not even audibly released before a following vowel. 'Asian Language Notes: Indonesian/Malay' says [f] is replaced by [p], which was not found in this study. In fact the opposite sometimes occurred which may be a case of hypercorrection as described in the explanation section below. The sibilants [z] and [ʃ] are replaced by [s] (1983, pp.6-7). This agrees with the error data for this study, except that final [z] as a plural marker was ellipsed. Final affricates will be reduced to [t] (1983, p.7). This current study found other realizations of final affricates also, notably [tʃ] and [dʒ] being substituted for each other. [θ] is commonly confused with [t] or [s], and [ð] is commonly confused with [d] or [z] (1983, p.8-9). This prediction was largely confirmed by the present study. Either [p], [b], [w] or [f] may be substituted for [v] (1983, p.9). This prediction was not confirmed, there being very few errors made for [v]. For [ʒ] 'Asian Language

Notes: Indonesian/Malay' said [ʃ] or [dʒ] may be found (1983, p.10). The current research found [z] also often being substituted for [ʒ], as well as [ʃ], but rarely [dʒ]. The results of this study probably differ from the contrastive analysis predictions of a work such as 'Asian Language Notes: Indonesian/Malay' because transfer is only one factor to be taken account of. The interaction of developmental with transfer factors better explains error data (Hecht & Mulford, 1982, p.323).

Castro, Chair, Subongkotch, and Ibe found that their participants made more than 75% erroneous responses in aurally discriminating final [ʃ], [tʃ] and [dʒ], none of which occur in final position in Indonesian (Castro et al, 1975, p.65). The results of the listening test in this current study show errors in discrimination between the final affricates. Castro et al found that initial [θ], [t] and [d] were misheard at a similarly high level, and also final [ʃ], [t] and [θs], where the absence of [θ] in Indonesian caused difficulty in differentiating these sounds (Castro et al, 1975, p.64). The current study found few errors confusing these sounds aurally. In fact overall aural discrimination was better than oral production. Adequate aural discrimination does not guarantee adequate pronunciation.

Wamad Abdullah in his 'Contrastive study of Achehnese and English Consonant Phonemes' predicted that Acehnese first language speakers would realize English [θ] as [s], and [ð] as [d] (1973, p.44). These were the common substitutions found in the current study, but not the only ones, as [f] and [t] for [θ], and [v] and [z] for [ð] were other substitutions made. He also claimed that initial [v] would be replaced by [p] (1973, p.44). This result was not confirmed. He suggested that final [k] and [g] would be replaced by a glottal stop (1973, p.46). This study found these stops more often unreleased or ellipsed. However it is quite possible that what the evaluater for the repetition test recorded as ellipsis was in some cases a glottal stop. Wamad predicted that final affricates would be reduced to the relevant stop (1973, p.46). The

current study found such results among other realizations. He expected that final [d] and [b] would be devoiced (1973, p.12). This result is confirmed as one possible substitution for final [d] by the current study, but very few errors were found for final [b].

There is no material available on Gayo speakers' errors in pronunciation of English.

Explanation

Common errors

Since many errors were common across the three first language groups, these will be looked at first. Final voiced stops were commonly devoiced, unreleased or ellipsed. Final stop devoicing is a developmental process in first language acquisition (Hecht & Mulford, 1982, p.324). Ellipsis of final stops is found in child acquisition of English (Cruttenden, 1994, p.144). Voiced stops are not found word final in these three languages, except [b] in Gayo, which was however sometimes realised as a labio-dental sound by this group. A simplification or reduction strategy would also account for the ellipsis.

Final voiceless stops were often unreleased on the reading and interview tests, even in connected speech before a following vowel. Lack of release of final voiceless stops is a very common feature of these Austronesian languages. In English, lack of release before a pause, for example final stops in words in a list as in the repetition test, is quite common (Cruttenden, 1994, p.145).

The interdentals were generally substituted by alveolar stops or sibilants. As has already been mentioned, interdental sounds are relatively rare in the world's languages. They are not found in these Austronesian languages, except Acehnese which has [θ] as

an allophone of /s/. It is no surprise that the error data revealed that these participants had difficulties articulating them. The strategy of overgeneralization would explain why the high-frequency and articulatorily close alveolar stops and sibilant fricatives were substituted for them.

[z] is only found in borrowed words and [ʒ] is not found at all in the three first languages under study here. [ʃ] is available in Indonesian and Gayo only in borrowed words. The substitution by [s] can be explained as over-generalization. [ʒ] is interesting in that there were a variety of sibilants, all borrowings, and even stops substituted for it. This data seems to point to a large variety of substitutions where the phoneme is unavailable in the first language, compared to more consistent substitutions where the phoneme is more familiar. There are many more different realizations of [θ] and [ð] compared to the realizations of the stops. It should be noted that all the sounds borrowed into the three languages which featured in this research, are frequently substituted by first language sounds. For example, of the approximately 50 words in Indonesian often spelt 'sy' which can be pronounced [ʃ], a pronunciation with [s] is very common and never leads to misunderstandings; in this sense [s] and [ʃ] are allomorphic for foreign words. Participant G4 21Ef said that [z] in Indonesian is very hard to pronounce, and Acehnese speakers in particular substitute [d̥] for [z].

As articulatorily difficult and unfamiliar phonemes, the affricates revealed the expected reduction to a stop phoneme. Contrastive analysis suggests that the affricates will be error-prone, as they are not found in any of the three first languages. The nearest sounds phonetically in Indonesian, Gayo and Acehnese are the voiced and voiceless alveopalatal stops (see appendix B). Developmental processes agree that affricates will be substituted for by universally common stops. No explanation has yet been found for the confusion between the voiced and voiceless affricate.

Errors by test type

Spelling interference is shown in some of the differences between the error data from the reading passage test and the other three tests. Spelling interference comes from at least two places: various English sounds are spelled with the same letters, and a first language sound is spelled with a letter that stands for a different sound in English. Some participants produced a final [g] or [k] for 'rage'. Most participants substituted [k] for the initial [tʃ] in realizing 'chocolate'. Digraphs are used much more widely in English than in Indonesian and seemed especially difficult for the participants to pronounce. The role of 'h' in 'ch' and 'sh' and 'th' in indicating a different phoneme may not have been apparent to the participants. In fact Acehnese orthography uses an 'h' after any consonant to indicate aspiration. In 'chocolate' many participants realized the remaining 'c' as [k]. Likewise in 'seethe' the interdental was realized as [t] by some participants. 'Squash' was realized as [skwɒs], which shows that the 'sh' spelling for [ʃ] has probably not registered, but is also how this English word has been borrowed into Indonesian. In the other tests [s] was also often substituted for [ʃ], and would be explained as a developmental factor, where the universal [s] is substituted for other sibiliants. An obvious case of spelling interference was the very common production of some other sibilant in the place of [ʒ] in 'leisure', where in other words 's' stands for [z], [s] or [ʃ]. The [z] in 'zany' was replaced with [ʒ] or [dʒ]. As mentioned above, [z] in Acehnese is often pronounced [ḑ] which is phonetically close to [dʒ]. 'Grease' was pronounced with a final [s] or [z]; both pronunciations were accepted. Final [z] in words denoting plural were mostly ellipsed. Spelling would clearly point to the production of an alveolar sibilant. However the three Austronesian languages in question do not use a grammatical marker for plural, and both a reduction strategy and developmental factors would account for simplification of the plural form to the singular.

The interview provided some information on environment and lexical and grammatical factors which may have influenced the pronunciation of certain phonemes. Some participants who ellipsed final [d] in fact consistently failed to mark the past tense endings on regular verbs. There may be a number of factors at work here: absence of final [d] in first language, absence of tense markers in first language, delayed acquisition of past tense morpheme as well as developmental factors. In fact, tense suffixes often occur in consonant clusters, which did not form part of this study. Other participants only ellipsed or did not release final [d] in very common words. They were perhaps more careful with less familiar words. One participant did not release the final [d] of words he repeated after the interviewer. Yet another participant did release final [d] if the following word began with [b]. The word 'eight' was sometimes produced with a final [k]. This would seem to reflect a combination of factors. Transfer could account for the ellipsis of the final [t], spelling interference may play a role, as mentioned above, and transfer would explains the devoicing of the remaining [g]. Similarly 'taught' was realized with a final [tʃ], which may be accounted for by interference from the pronunciation of the present tense form 'teach'. The words 'English' and 'language' were over-represented in the data and account for almost all of the final [ʃ] and [dʒ] errors. 'English' was realized with a final [s] which is similar to its Indonesianized form - 'Inggeris'. The final sound of 'language' produced a great variety of realizations, and simplification strategies and spelling interference both seem to account for most of them. Initial [ð] realized as [d] was self-corrected by some participants.

The aural discrimination test showed the least incidence of error. It seems that although participants heard the differences between certain sounds they could not necessarily produce such a difference. Both the aural discrimination and the repetition tests limited the error data to phonemes found in English, as the test items were English words. Test three and in particular test four have error data which is

influenced by the relative frequency of sounds in English. In these two tests first language interference was more noticeable as the research design allowed for transcription including non-English phones. Therefore lack of release of final stops and use of the glottal stop showed up in the data from these latter two tests, but would not have been picked up on the repetition test, or would have been analyzed as ellipsis.

Errors unique to each first language group.

The preponderance of errors in realizations of consonant phonemes for the Indonesian group in final position is not surprising. Of the phonemes in this study only [p], [t], [k], [f] and [s] can appear word final in Indonesian (See appendix B). It is suggested in 'Asian Language Notes', which uses contrastive analysis to seek to explain errors found in the English of Indonesian/Malay speakers, that errors occur with voiced stops because 'no voiced stops occur finally in BI [Bahasa Indonesia/Indonesian language]' (Asian Language Notes: Indonesian/Malay, 1983, p.6). Indonesian stops in final position are unreleased and voiceless (Asian Language Notes: Indonesian/Malay, 1983, p.6) and this is also what shows up in this data. It may also be noted from appendix B that [ʒ], [θ], [ð], [tʃ] and [dʒ] are not found in Indonesian at all, and there were significant errors found in at least one test for each of these sounds. In Indonesian [f] is a borrowed sound but now interchangeable with [p] (see appendix B). Likewise the borrowed [v] is frequently interchanged with [f] and [p] (see appendix B). This explains some of the non-significant errors made in producing the labial sounds. Borrowed [ʃ] is interchangeable with [s] in Indonesian (see appendix B).

From appendix B we see that Gayo has [f] only as a borrowed sound and no [v]. Yet, [f] and [v] were often substituted for [p] and [b]. Hypercorrection may be one explanation for this. In addition it may be that fricatized allophones of the phonemes [p] and [b] cause no problem in Gayo where there are no labial fricatives, and this has been carried over into English (Jakobson, 1941, pp.51-52). No complete allophonic

information on Gayo is available. [z] and [ʃ] are available in Gayo in words borrowed from Arabic. Like Indonesian, Gayo has no [θ], [ð], [ʒ], [tʃ] and [dʒ], and the data shows the Gayo first language speakers made errors with both these groups of sounds. The subsitution of homorganic affricates by the Gayo for the final affricates cannot be explained by any phonological difference between Gayo and Indonesian or Acehnese. With regard to dropping final phonemes, Gayo has no final [d] and [g], and this may be the explanation as to why [d] was deleted or devoiced and [g] sometimes reduced to an unreleased [k]. In Gayo final [k] can be realized as glottal stop, and in a similar fashion to Indonesian final voiceless stops are not released, which would seem to account for the error data of these sounds.

Unlike Indonesian and Gayo, Acehnese does have [ʃ] in its phonemic inventory, hence this was the most common substitution for [ʒ] and on the reading passage test for [tʃ]. The Acehnese participants more often realized [θ] as [s] than the other two groups. This may have occurred because some dialects of Acehnese have a sound articulatorily close to [θ] as an allophone of [s]. Acehnese has no [ð] or affricates and there were significant errors found for each of these sounds. Acehnese has a [z] found initially and medially in words borrowed from Arabic. In the error data final [z] was a plural marker and ellipsed in the reading passage, but sometimes devoiced on the repetition test. Devoicing of final fricatives is also a developmental process (Hecht & Mulford, 1982, p.322). Realization of the final stops and [dʒ] can be accounted for in a similar manner to the error data of the Indonesian first language speakers.

It is worth mentioning in passing that some errors which could have been anticipated on the basis of the contrastive analysis hypothesis did not turn up in the present study, and unanticipated errors did turn up, which serves to highlight a possible weakness in that hypothesis. For example, Gayo speakers often realized [p] as [f] despite having [p] in their phonemic system but only a borrowed [f]. After the data was taken one

Gayo participant, G9 22Em, mentioned that he feels this has come about because learners of English are introduced to important common words in English like 'fine' that begin with [f] and correct pronunciation of the [f] is stressed. When they come across a [p], which in Indonesian has [f] as an allophone, they assume it is the [f] phoneme that has been drilled. This would seem to be a case of two phonemes in English, one in Gayo, and two allophones in Indonesian. Where we would expect the L1 available phoneme [p] to be generalized to the two English phonemes, the L2 new phoneme [f] is often, but not consistently generalized across the two English phonemes. In this way this error could be explained as hypercorrection. He also said that a similar hypercorrection pattern occurs when Gayo people learn Arabic. In seeking to explain error data, the fact that most of the participants have two of the three languages forming part of this study in their repertoire, needs to be kept in mind. Transfer can come from any of the languages they speak, or the interaction of these languages.

English teachers in Indonesia in general and Aceh in particular comment that final [s] and [z] are often not produced in suffixes, in consonant clusters and on their own. This noteworthy feature of Acehnese English did not show up in the data. Acehnese phonology does not allow for [s] in final position, thus the Indonesian word 'es' becomes [ɛh] and a colleague named Des ([dɛs]) is called [dɛh]. In addition, Acehnese and also Gayo and Indonesian have neither a method of marking plural forms on nouns nor of marking person on verbs. My colleagues, native-speakers of Indonesian, Gayo and Acehnese, who have studied contrastive analysis, tell me that this is why I notice a lack of final [s] and [z] in their speech. In pilot tests using only non-English department students the non-production of final [s] and [z] appeared as a notable characteristic of Acehnese English in particular. Non-production of final [s] did not show up in this data analysis, for which there are many possible explanations: amongst others; some weakness in the tests; the participants have been taught to

pronounce final [s]; all the participants have Indonesian as either first or second language and Indonesian does have a final [s]. An extra repetition test using nonsense words given to two men and two women from each of the three first language groups likewise did not reveal significant levels of ellipsed final [s] and [z].

The Indonesian participants showed most errors with final [d] and [z] which were often devoiced or ellipsed. These errors can be accounted for both as a transfer and a developmental process. Gayo participants more often ellipsed final [d] and [z] and initial [θ] was reduced to the alveolar stop or sibilant. Ellipsis of final consonants is a developmental process, and it occurs in these particular sounds which are not found in final position in all three first languages in the study. Overgeneralization of the articulatorily difficult [θ] with [t] or [s] is commonly found in child language. Again final [d] featured for the Acehnese participants, ellipsed or devoiced. Final [dʒ] was devoiced or reduced to the devoiced stop. Reduction to the related stop is a common developmental process, however [d] is not available in the first language in final position which perhaps accounts for the combination of devoicing and reduction.

Summary

The data in this error analysis shows differences between the tests and the first language groups. These differences point to the roles played by transfer, developmental factors, spelling interference, hypercorrection, task type and formality.

CHAPTER 6 IMPLICATIONS

Practical

All the phonemes tested for showed at least one subject produced an unacceptable realization of that phoneme on at least one test. A teaching program covering these phoneme plus position items could be used for these three first-language groups. However as time is usually very limited EFL teachers of pronunciation would probably concentrate on the phonemes showing unacceptable realizations for a particular first-language group, especially in homogeneous classes. In such a case Gayo speakers would need help to produce initial [p] but all three first-language groups would need to be taught to release final [d], especially in connected speech where a vowel or semi-vowel follows.

A teaching program for the pronunciation of consonant phonemes in English for these three first-language groups could order the items to be included based on the frequency of errors as shown in the data presented here. The number of participants who realized each target phoneme erroneously could be used as an indication of difficulty, the more common errors being addressed first. However the functional load and frequency of such consonants in English, as described by Catford (1987, pp.88-89) and their articulatory difficulty should also be considered, so that a lot of time would not be spent on rarely-occurring sounds. In fact the error data from the interview test was influenced by the frequency of the consonants in free speech; only sounds that are both common in English speech and realized erroneously a third of the time showed up. Lowes is an example of taking all this information into account in deciding on a teaching order (Lowes, 1990, pp.53-55). Allocation of pronunciation teaching time should be based on the frequency of errors, information on which would be provided by error analyses such as this one. In addition the relative importance of each

phoneme should be taken into account, that is the number of times each phoneme occurs in a thousand words of English text and the number of words in which it occurs in the lexicon (Catford, 1987, p.88).

The findings from the different tests show that even when sounds can be differentiated by the ear they are not necessarily differentiated in speaking, and vice-versa. Teaching pronunciation should include both aural and oral practice, expecting increased perception of differences between the phonemes of English to go hand in hand with production of adequately different realizations of them. The repetition test could be said to provide data on decontextualized words. There are sounds that are adequately realized in the contextualized speech of the reading and interview tests but not clearly differentiated from other English phonemes when said alone. One implication of this is that teachers need to be aware that learners will probably have adequate pronunciation for functioning in conversation, where redundancy in the flow of speech provides clues to meaning even when pronunciation is poor, before their English is error-free for tasks such as reading out lists. A needs analysis for the learners would show what the learners need English for and how accurately they need to speak English. Teachers could use the error data from the task that is most relevant to their students to plan pronunciation teaching.

Theoretical

In seeking to account for the error data it is quite clear that a contrastive analysis approach does not explain all the errors found, neither does a developmental approach. A theoretical implication arising out of this study is that error analyses need to consider the roles played by transfer, developmental and other factors, and their interaction.

CHAPTER 7 CONCLUSIONS

Summary

The error analysis carried out in this present study revealed patterns of errors in the realizations of certain English phonemes. When voiced final stops were realized unacceptably, they were mostly devoiced. This can be accounted for as both a transfer and a developmental process. Voiceless final stops were mostly unreleased, which is the case in the phonology of the three first languages involved. For the sibilant, final [z], elision or devoicing predominated. For [ʒ] the Indonesian and Gayo groups favoured substituting with the alveolar sibilant [z], whereas the Acehnese group favoured devoicing. [ʃ] was largely replaced by the alveolar [s]. In looking for explanations of these results, transfer and developmental factors, spelling interference, strategies of learning and of communication, and the interaction of these factors all appear to be involved. There were a variety of realizations for the two English affricates. In final position they were mostly either reduced to the stop or interchanged. The Gayo group heard them as alveolar. Only the Acehnese group revealed significant error with the initial affricates, reducing [tʃ] to a sibilant. The interdental fricatives were mostly replaced with the equivalent alveolar stop or sibilant, though each first-language group showed a slightly different picture.

The error data shows significant similarity across the three first language groups. This is probably caused by the fact that the languages are fairly closely related, and that all the participants had Indonesian as their second if not first language. It also points to some influence by universal developmental processes, which affect second language pronunciation as they do first language acquisition. The differences in error data can possibly be explained as due to transfer processes.

Each of the four tests, as expected, also produced different error data, because tasks and levels of formality affect pronunciation differently.

Limitations

Some limitations in this study need to be mentioned. The three first language group samples were not as large as one would want, thus reducing the possibility of generalizing the results to the populations from which they came. By using a language laboratory and audio-recording equipment, information about realizations of the phonemes tested for has been limited to the aural. Video-recording would have given useful visual information about how and what phonemes were realized. The Acehnese and Gayo participants data may include interference from Indonesian, which is their second language. Many of the Indonesian first language speakers had either Acehnese or Gayo as their second language, and vice-versa, but this was not taken into account in the analysis of errors. The master recordings for tests one and two were made by the researcher, an Australian, and therefore were biased against participants who are more used to an American or local English speaking model. A thorough attempt has not been made to account for the 'extensive individual variation' (Hecht & Mulford, 1982, pp.325-326) found within the different tests for each participant. The study did not look at medial sounds, or at consonant clusters, and vowel environment was not built into the tests.

Further research

This present study is a first step towards describing and accounting for the pronunciation errors of consonant phonemes of a few first language communities found in Indonesia. Errors in realizing English vowels, intonation and stress are all important issues which need to be further researched, to fill out the Indonesian EFL picture. In terms of depth, studies of Indonesian EFL using narrow phonetic transcription would shed more light on pronunciation errors. In order to improve

EFL pronunciation teaching in Indonesia, error analyses such as the one carried out in this present study need to be followed up by research into a suggested teaching order.

Interlanguage phonology in multilingual communities is very complex. Error analysis in this area needs to consider not only the various factors such as transfer, development and use of strategies but also the interaction of the various languages that the learners bring to the task of learning the target language. Some research has been done to isolate these factors and analyze their effects and interaction, but is contradictory (Hecht & Mulford; Dreasher & Anderson-Hsieh). More research needs to be carried out and it is hoped that the present study could be a starting point for such research involving the languages of Indonesia.

BIBLIOGRAPHY

Acton, W. (1984). Changing fossilized pronunciation. *TESOL Quarterly, Vol.18*, 71-85.

Allen, H. & Valette, R. (1977). *Classroom techniques: FL and ESL.* New York: Harcourt, Brace and Jovanovich.

Altenberg, E. P. & Vago, R. M. (1983). Theoretical implications of an error analysis of second language phonology production. *Language learning, Vol.33*, 427-447.

Anas Syafei. (1988). *English pronunciation: theory and practice.* Jakarta: DPK.

Ard, J. (1989). A constructivist perspective on non-native phonology. In S. M. Gass & J. Schachter (Eds.), *Linguistic perspectives on second language acquisition*, pp. 243-259. Cambridge: Cambridge University Press.

Asian Language Notes. No.3. (1983) Canberra. Australian Government Publications Service. *Asian languages notes... some likely areas of difficulty for Asian learners of English. No. 3. Indonesian/Malay.* 2nd edition. Canberra: AGPS.

Bachman, L. (1990). *Fundamental considerations in language testing.* Oxford: Oxford University Press.

Baihaqi, A. K. et al. (1977). *Struktur bahasa Gayo.*[The structure of the Gayo language.] Banda Aceh: IAIN Jami'ah Ar-Raniri and Universitas Syiah Kuala.

Basbøll, H. (1988). Phonological theory. In F. Newmeyer (Ed.), *Linguistics: the Cambridge survey. Vol.1*, (pp.192-215). Cambridge: Cambridge University Press.

Bell, R. (1981). *An introduction to applied linguistics.* London: Batsford Academic.

Border, G., Gerber, A., & Milsark, G. (1985). Improvement in the production of the /r/-/l/ contrast is accompanied by improvement in the ability to judge one's own speech: a response from Border, Gerbert, Milsark. *Language learning, Vol. 35*, 115-119.

Bowen, J. R. (1984). *The history and structure of Gayo society.* Chicago: University of Chicago.

Bradley, D. & Bradley, M. (1984). *Problems of Asian students in Australia.* Canberra: AGPS.

Brière, E. (1966). An investigation of phonological interference. *Language, Vol. 42*, 768-795.

Broselow, E. (1987). An investigation of transfer in second language phonology. *Interlanguage studies, Vol. vii*, 77-93.

Brown, G. (1974). Practical phonetics and phonology. In J.P.B. Allen & S. Pit Corder (Eds.), *Techniques in Applied Linguistics, Vol.* 3 (pp. 24-57). Oxford: Oxford University Press.

Castro, C., Miroezam, T., Subongkotch, T. & Ibe, M. (1975). Filipino, Indonesian and Thai listening test errors. *RELC Journal, Vol.* 6 no.1, 61-72.

Catford, J. (1987). Phonetics and the teaching of pronunciation: a systematic description of English phonology. In J. Morley (Ed.), *Current perspectives on pronunciation: practices anchored in theory* (pp. 83-100). Washington DC: TESOL.

Celce-Murcia, M. (1987). Teaching pronunciation as communication. In J. Morley (Ed.) *Current perspectives on pronunciation: practices anchored in theory*, (pp. 1-12). Washington DC:TESOL.

Celce-Murcia, M. & Goodwin, J. (1991). Teaching pronunciation. In M. Celce-Murcia (Ed.), *Teaching English as a second language* (pp. 136-153). New York: Newbury House.

Chun, J. (1980). A survey of research in second language acquisition. *The modern language journal, Vol. 64, no.3*, 287-296.

Cichocki, W., House, A. B., Kinloch, A. M. & Lister, A. C. (1993). Cantonese speakers and the acquisition of French consonants. *Language learning, Vol. 43*, 44-62.

Comrie, B. (ed.). (1989). *The world's major languages.* London: Croom Helm Kent.

Corder, S. Pit. (1973). *Introducing applied linguistics.* Harmondsworth: Penguin.

Corder, S. Pit. (1981). *Error analysis and interlanguage.* Oxford: Oxford University Press.

Corder, S. Pit. (1983). Strategies of communication. In C. Færch & G. Kasper (Eds.). *Stategies in interlanguage communication* pp.15-19. London: Longman.

Coulthard, M. (Ed.). (1992). *Advances in spoken discourse analysis.* London: Routledge.

Cruttenden, A. (1994). *Gimson's pronunciation of English.* London: Edward Arnold.

Crystal, D. (Ed.). (1992). *An encyclopedic dictionary of language and languages.* Oxford: Blackwell.

Dalton, C. & Seidlhofer, B. (1994). *Pronunciation.* Oxford: Oxford University Press.

Denham, P. A. (1985). *Assessment of English language proficiency of Indonesians.* Canberra: IDPAUC.

Dreasher, L. & Anderson-Hsieh, J. (1990). Universals in interlanguage phonology: the case of Brazilian ESL learners. *Papers and studies in contrastive linguistics, Vol.26,* 69-92.

Dulay, M., Burt, H. & Krashen, S. (1982). *Language two.* New York: Oxford University Press.

Durie, M. (1985). *A grammar of Acehnese on the basis of a dialect of North Aceh.* Dordrecht: Foris.

Durie, M. (1987). The orthographic representation of nasal vowels in Acehnese. In P. A. Luelsdorff (Ed.). *Orthography and phonology* (pp. 131-150). Amsterdam: John Benjamins Publishing Co.

Durie, M. & Bukhari. (Undated). Acehnese glossary. Photocopied handout.

Dutt, M. (1990). *Bridging the gulf: some features of Malayali pronunciation of English.* Unpublished Master's Thesis, Institute of Education, University of London, London.

Eckman, F. (1977). Markedness and the contrastive analysis hypothesis. *Language learning, Vol.27,* 315-330.

Eisenstein, M. (1983). Native reactions to non-native speech: a review of empirical research. *Studies in second language acquisition, Vol.5, Issue 2,* pp.160-176.

Ellis, R. (1985). *Understanding second language acquisition.* Oxford: Oxford University Press.

Ellis, R. (1994). *The study of second language acquisition.* Oxford: Oxford University Press.

Færch, C. & Kasper, G. (Eds.). (1983). *Strategies in interlanguage communication.* London: Longman.

Flege, J. (1980). Phonetic approximation in second language acquisition. *Language learning, Vol. 30,* 117-134.

Flege, J. & Davidian, R. (1984). Transfer and developmental processes in adult foreign language speech production. *Applied Psycholinguistics, Vol.* 5, 323-347.

Flege, J. & Hammond, R. (1982). Mimicry of non-distinctive phonetice difference between language varieties. *Studies in second language acquisition, Issue* 5, 1-17.

Gass, S. & Selinker L. (1994). *Second language acquisition.* Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Goodmin, J., Brinton, D. & Celce-Murcia, M. (1994). Pronunciation assesment in the ESL/EFL curriculum. In J. Morley (Ed.) *Pronunciation pedagogy and theory*, pp. 3-16. Washington DC: TESOL.

Grimes, B.F. (ed.) (1988). *Ethnologue languages of the world.* Dallas: Summer Institute of Linguistics.

Hammerly, H. (1982). Contrastive phonology and error analysis. *International review of applied linguistics, Vol.20,* 17-32.

Harmer, J. (1991). *The practice of English language teaching.* London: Longman.

Hatch, E. & Farhady, H . (1982). *Research design and statistics.* Cambridge, Massachusetts: Newbury House.

Hatch, E. & Lazaraton, A. (1991). *The research manual.* New York: Newbury House.

Hecht, B. & Mulford, R. (1982). The acquisition of a second language phonology: Interaction of transfer and developmental factors. *Applied Psycholinguistics, Vol.* 3, 313-328.

Hewings, M. (1993). *Pronunciation tasks.* Cambridge: Cambridge University Press.

Honey, J. (1989). *Does accent matter?* London: Faber & Faber.

Hornby, A.S. (Ed.). *Oxford advanced learner's dictionary of current English* (1987 impression). Oxford: Oxford University Press.

Hubbard, P., Jones, H., Thornton, B. & Wheeler, R. (1983). *A training course for TEFL.* Oxford: Oxford University Press.

Hughes, A. (1989). *Testing for language teachers.* Cambridge: Cambridge University Press.

Hulstijn, J. (1985). Testing SL proficiency with direct procedures. A comment on Ingram. In K. Hyltenstam & M. Pienemann (Eds.), *Modelling and assessing second language acquisition*, (pp. 277-281). Clevedon, Avon: Multilingual Matters.

Hunt, S. (1990). *The effect of verbo-tonal pronunciation training on intelligibility.* Master's thesis, University of Melbourne, Melbourne.

Ibrahim Makam. (1985). *Kata tugas bahasa Gayo* [Gayo command forms]. Jakarta: PPPBPDK.

Jain, M. P. (1974). Error analysis: source, cause and significance. In J. Richards (Ed.), *Error analysis* (pp. 189-215). London: Longman.

Jakobson, R. (1941). *Child language aphasia and phonological universals* (A R Keiler, Trans.).

Janicki, K. (1985). *The foreigner's language: a sociolinguistic perspective.* Oxford: Pergamon.

Johansson, S. (1978). *Studies of error gravity.* Goteborg: Gothenburg studies in English no.44.

Katzner, K. (1986). *The languages of the world* (rev. ed). London: Routledge, Kegan & Paul.

Keating, P. (1988). The phonology-phonetics interface. In F. Newmeyer (Ed.) *Linguistics: The Cambridge survey*, (pp. 281-302). Cambridge: Cambridge University Press.

Kenworthy, J. (1987). *Teaching English pronunciation.* London: Longman.

Keraf, G. (1984). *Linguistik bandingan historis* [Historical comparative linguistics]. Jakarta: Gramedia.

Kopczyński, A. (1977). *Polish and American English consonant phonemes.* Warsaw: Państwowe Wydawnictwo Naukowe.

Labov, W. (1970). The study of language in its social context. In J. B. Pride & J. Holmes (Eds.) *Sociolinguistics*, (pp. 180-202). Harmondsworth: Penguin.

Labov, W. (1972). *Sociolinguistic patterns.* Oxford: Blackwell.

Ladefoged, P. (1975). *A course in phonetics.* New York: Harcourt, Brace and Jovanovich.

Lado, R. (1957). *Linguistics across cultures.* Ann Arbor: University of Michigan Press.

Lado, R.(1964). *Language teaching.* New York: McGraw-Hill.

Larsen-Freeman, D. & Long, M. (1991). *An introduction to second language acquisition research.* London: Longman.

Leahy, R. (1980). A practical approach for teaching ESL pronunciation based on distinctive feature analysis. *TESOL quarterly, Vol.14,* 209-219.

Leather, J. & James, A. (1991). The acquisition of second language speech. *Studies in second language acquisition, Vol. 13,* 305-341.

Lee, M. (1988). Language, perception and the world. In J Hawkins (Ed.) *Explaining language universals* pp. 211-246. Oxford: Basil Blackwell.

Lettinga, F. (1954). *English phonetics.* Surabaya: B-1 English courses in Indonesia materials.

Littlewood, W. (1984). *Foreign and second language learning.* Cambridge: Cambridge University Press.

Loeb, E. M. (1935). *Sumatra: its history and people.* Reprinted in English in 1972. Kuala Lumpur: Oxford University Press.

Lowes, R. (1990). *Towards a rationale for the development of materials for the teaching of pronunciation to speakers of Castillian Spanish.* Unpublished Master's Thesis, Institute of Education, University of London, London.

Lyons, J. (Ed.) (1970). *New horizons in linguistics.* Harmondsworth: Penguin.

McLaughlin, B. (1987). *Theories of second-language learning.* London: Edward Arnold.

MacCarthy, P. (1976). Auditory and articulatory training for the language teacher and learner. In A. Brown (Ed.), *Teaching English pronunciation* (1991) (pp. 209-307). London: Routledge.

MacCarthy, P. (1978). *The teaching of pronunciation.* Cambridge: Cambridge University Press.

Macdonald, R. & Soenjono. (1967). *Indonesian reference grammar.* Washington DC: Georgetown University Press.

Major, R. (1987). A model for interlanguage phonology. In G. Ioup & S. Weinberger (Eds.), *Interlanguage phonology: the acquisition of a second language sound system,* (pp. 101-124). Rowley, Massachusetts: Newbury House.

Marthandan, C. R. (1988). *Say it from spelling.* Singapore: Thinker's Library.

Melalatoa et al. (1983). *Kamus Bahasa Gayo-Indonesia* [Gayo-Indonesian Dictionary]. Jakarta: PPPBPDK.

Morley, J. (Ed.) (1987). *Current perspectives on pronunciation: practices anchored in theory.* Washington DC: TESOL.

Morley, J. (Ed.) (1994). *Pronunciation pedagogy and theory.* Washington DC: TESOL.

Moseley, C. & Asher, R. E. (Eds.) (1994). *Atlas of the world's languages.* London: Routledge reference.

Nemser, W. (1971a). *An experimental study of phonological interference in the English of Hungarians.* Bloomington: Indiana University Publications.

Nemser, W. (1971b). Approximative systems of foreign language learners. *International review of applied linguistics, Vol. 9,* 115-123.

Nemser, W. (1974). Approximative systems of foreign language learners. In J. Richards (Ed.), *Error analysis* (pp. 55-63). London: Longman.

Newmark, L. (1990). Changing student pronunciation. Getting people to eat worms. In . Scarcella et al (Ed.), *Developing communicative competence in a second language* (pp. 329-335). Rowley, Mass.: Newbury House.

Norell, P. (1991). *Native-speaker reactions to Swedish pronunciation errors in English: recognition, intelligibility and attitude.* Stockholm: Almqvist & Wiksell International.

Norrish, J. (1983). *Language learners and their errors.* London: Macmillan.

Nunan, D. (1989). *Designing tasks for the communicative classroom.* Cambridge: Cambridge University Press.

Nunan, D. (1992). *Research methods in language learning.* Cambridge: Cambridge University Press.

Odlin, T. (1989). *Language transfer.* Cambridge: Cambridge University Press.

Pemetaan Bahasa Aceh, Gayo dan Alas. [Acehnese, Gayo and Alas language map]. (1985). Jakarta: PPPBPDK.

Pennington, M. (1994). Recent research in L2 phonology: implications for practice. In J. Morley (Ed.) *Pronunciation pedagogy and theory* (pp. 92-108). Washington DC: TESOL.

Richards, J. (Ed.) (1974). *Error analysis.* London: Longman.

Richards, J., Platt, J. & Platt, H. (Eds.) (1992). *Longman dictionary of language teaching and applied linguistics.* Harlow: Longman.

Santry, P. (1992). *The way South Vietnamese pronounce English.* Unpublished Master's thesis, Victoria University, Melbourne.

Schneiderman, E., Bourdages, J. & Champagne, C. (1988). Second-language accent: the relationship between discrimination and perception in acquisition. *Language learning, Vol.38,* 1-19.

Schumann, J. H. (1978). *The pidginization process: a model for second language acquisition.* Rowley: Newbury House.

Seliger, H. & Shohamy, E. (1989). *Second language research methods.* Oxford: Oxford University Press.

Selinker, R. (1974). Interlanguage. In J. Richards (Ed.), *Error analysis* (pp. 31-54). London: Longman.

Selinker, R. (1992). *Rediscovering interlanguage.* London: Longman.

Sharwood Smith, M. (1994). *Second language learning: theoretical foundations.* London: Longman.

Sheldon, A. (1985). The relationship between production and perception of the /r/-/l/ contrast in Korean adults learning English: a reply to Border, Gerber & Milsark. *Language learning, Vol. 35,* 107-113.

Smelt, E. (1983). *Complete guide to English spelling: a new approach.* Melbourne: Longman Cheshire.

Soravia, G. (1984). *A sketch of the Gayo language.* Unpublished manuscript, Gruppo Linguistico Catanese, Catania.

Sridhar, S. N. (1981). Contrastive analysis, error analysis and interlanguage; three phases of one goal. In J. Fisiak (Ed.), *Contrastive linguistics and the language teacher* (pp. 207-241). Oxford: Pergamon.

Standwell, G. (1978). The phoneme, a red herring for language teaching. In A. Brown (Ed.) *Teaching English pronunciation.* (1991). (pp. 139-145). London: Routledge.

Stevick, E. (1982). *Teaching and learning languages.* Cambridge: Cambridge University Press.

Sudlow, M.F. (1986). *Exercises in American English pronunciation*. Salt Lake City: Excellence in education.

Swan, M. & Smith, B. (Eds). (1987). *Learner English: a teacher's guide to interference and other problems.* Cambridge: Cambridge University Press.

Tarone, E. (1978). The phonology of interlanguage. In J. Richards (Ed.), *Understanding second and foreign language learning* (pp. 15-33). Rowley, Mass.: Newbury House.

Tarone, E. (1982). Systematicity and attention in interlanguage. *Language learning Vol. 32*, 69-84.

Tarone, E., Cohen, A. & Dumas, G. (1983). A closer look at some interlanguage terminology. In C. Færch & G. Kasper (Eds.), *Strategies in interlanguage communication* (pp. 4-14). London: Longman.

Temperley, M. (1987). Linking and deletion in final consonant clusters. In J. Morley (Ed.), *Current perspectives on pronunciation: practices anchored in theory* (pp. 59-82). Washington DC: TESOL.

Valette, R. (1977). *Modern language testing.* New York: Harcourt Brace Jovanovich.

Wamad Abdullah. (1973). *A contrastive study of Achehnese and English consonant phonemes.* Singapore: paper for 9th 4-month course.

Wardhaugh, R. (1970). The Contrastive Analysis Hypothesis. *TESOL Quarterly, Vol.4*, 123-130.

Whorf, B J. *Language, thought and reality.* (Carroll, J. Ed. 1956). Cambridge, Mass.: Massachusetts Institute of Technology.

Widdowson, H. (1978). *Teaching language as communication.* Oxford: Oxford University Press.

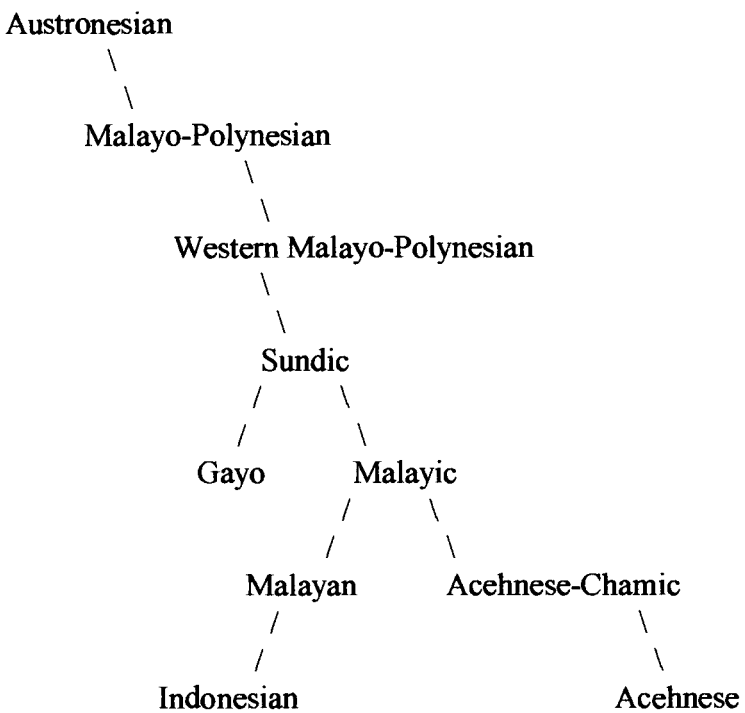
Wode, H. (1981). *Learning a second language*. Tubingen: Gunter Narr Verlag.

Wong, R. (1987). Learner variables and prepronunciation considerations in teaching pronunciation. In J. Morley (Ed.) *Current perspectives on pronunciation: practices anchored in theory* (pp. 13-28). Washington DC: TESOL.

Zaghlul Army. (1987). *A contrastive analysis of Achehnese and English vowel sounds and its implications in teaching the English vowel sounds to Achehnese learners of English.* Unpublished Master's thesis, University of Kansas, Kansas.

APPENDIX A

Part of Austronesian language tree



(Grimes, 1988)

APPENDIX B - CONSONANT PHONEME CHARTS

PHONEMIC KEY for English consonants

p	as pronounced in	pen, nap
b		book, nib
t		tea, eat
d		day, paid
k		key, took
g		go, rag
f		for, laugh
v		vee, wave
θ		thing, truth
ð		that, writhe
s		soon, hiss
z		zero, as
ʃ		shoot, hush
ʒ		pleasure, garage
h		hot
tʃ		chop, catch
dʒ		jump, edge
m		move, sum
n		new, soon
ŋ		song
l		look, kill
w		wet
j		you
ɹ		red

CONSONANT PHONEME INVENTORY						
	bilabial	labio-dental	dental alveolar	post-alveolar palatal	velar	glottal
stop E	p b		t d		k g	
I	p b		t d	t̥ d̥	k g	ʔ
A	p b		t d	t̥ d̥	k g	ʔ
G	p b		t d	t̥ d̥	k g	
fricative E		f v	θ ð s z	ʃ ʒ		h
I		[f] [v]	s [z]	[ʃ]	[x]	h
A		[f]	s̥ [z]	ʃ	[x]	h
G		[f]	s [z]	[ʃ]	[x]	h
affricate E				tʃ dʒ		
nasal E	m		n		ŋ	
I	m		n	ɲ	ŋ	
A	m		n	ɲ	ŋ	
G	m m̰		n n̰	ɲ ɲ̰	ŋ ŋ̰	
lateral E			l			
I			l			
A			l			
G			l			
continuant E	w		ɹ	j		
I	w			j		
A	w			j		
G	[w]			j	w	
trill/flap E						
I			r			
A			r			
G			r			

E(nglish) - no final w, j, ɹ, h

I(ndonesian) - no final b, d, g, t̥, d̥, ɲ, [v], [x], [z], [ʃ]

A(cehnese) - no final b, d, k, g, t̥, d̥, ɲ, w [x], l, r, s [z], ʃ

G(ayo) - no final d, g, t̥, d̥, ɲ, w, j [x], [z], [ʃ], weak nasals

key n̰ = weak nasal (not as strongly nasal as an ordinary one)

t̥ = laminal and affricated t

[ ] = borrowed from Arabic or Dutch

Allophones

Indonesian - mostly found in borrowed sounds

/f/: [f] interchangeable with [p]

/v/: [v] [f] and [p]

/z/: [z] [d̥] and [d]

/ʃ/: [ʃ] [s]

/w/: [w] [w] and [β]

Gayo /k/: [k], syllable final [ʔ]

Acehnese All stops, /l/ and /r/ have aspirated variants

The nasals have a set of incomplete variants in some dialects

/h/ has a voiced variant

In some dialects: /r/: [r] [ɾ] [ʁ] and /s/: [s] [s̥] [θ]

(Macdonald & Soenjono, Durie, Wamad Abdullah, Soravia, Baihaqi)

APPENDIX C TEST 1
Recorded by researcher on a master audio-cassette

1	a	aids	b	age	c	age	46	a	chill	b	chill	c	kill
2	a	age	b	ate	c	age	47	a	bow	b	bow	c	both
3	a	pour	b	porch	c	pour	48	a	chew	b	Jew	c	chew
4	a	zip	b	sip	c	sip	49	a	sip	b	ship	c	sip
5	a	sot	b	sot	c	shot	50	a	bays	b	bathe	c	bathe
6	a	lip	b	live	c	lip	51	a	v	b	v	c	bee
7	a	grow	b	growth	c	growth	52	a	aitch	b	age	c	aitch
8	a	nigh	b	night	c	nigh	53	a	rave	b	rape	c	rave
9	a	thigh	b	thy	c	thy	54	a	tick	b	tick	c	thick
10	a	suit	b	soothe	c	soothe	55	a	vow	b	bow	c	bow
11	a	measures	b	measures	c	meshes	56	a	bile	b	pile	c	bile
12	a	grief	b	grief	c	grieve	57	a	vole	b	bole	c	vole
13	a	march	b	march	c	mark	58	a	ache	b	aitch	c	ache
14	a	loath	b	low	c	loath	59	a	zap	b	sap	c	zap
15	a	mass	b	mass	c	mash	60	a	car	b	char	c	char
16	a	Ruth	b	roof	c	Ruth	61	a	dog	b	dock	c	dock
17	a	verve	b	verb	c	verb	62	a	thin	b	fin	c	fin
18	a	age	b	aid	c	aid	63	a	till	b	till	c	chill
19	a	roof	b	rue	c	rue	64	a	harp	b	half	c	harp
20	a	thick	b	sick	c	sick	65	a	heap	b	heap	c	heave
21	a	thawed	b	ford	c	thawed	66	a	lib	b	live	c	live
22	a	leave	b	leaf	c	leaf	67	a	bats	b	batch	c	bats
23	a	rids	b	ridge	c	rids	68	a	badge	b	bad	c	bad
24	a	though	b	though	c	dough	69	a	door	b	thaw	c	door
25	a	kin	b	chin	c	kin	70	a	mouth	b	mouse	c	mouth
26	a	Jock	b	Jock	c	chock	71	a	chew	b	too	c	chew
27	a	perch	b	purr	c	purr	72	a	math	b	math	c	massed
28	a	fan	b	pan	c	pan	73	a	beg	b	peg	c	peg
29	a	vole	b	vole	c	foal	74	a	lass	b	lash	c	lass
30	a	graze	b	grace	c	grace	75	a	viper	b	viper	c	piper
31	a	shoe	b	shoe	c	chew	76	a	had	b	had	c	hat
32	a	Asia	b	Ada	c	Ada	77	a	leaf	b	leap	c	leap
33	a	life	b	lie	c	life	78	a	rack	b	rag	c	rack
34	a	chin	b	shin	c	shin	79	a	door	b	jaw	c	door
35	a	lop	b	lop	c	lock	80	a	seize	b	cease	c	seize
36	a	poo	b	poo	c	pooch	81	a	pea	b	peak	c	pea
37	a	robe	b	robe	c	rove	82	a	hock	b	hop	c	hock
38	a	goad	b	goat	c	goat	83	a	leisure	b	ledger	c	leisure
39	a	bilge	b	builds	c	bilge	84	a	thy	b	die	c	die
40	a	feel	b	veal	c	veal	85	a	high	b	high	c	hide
41	a	ridge	b	rich	c	rich	86	a	goes	b	goes	c	go
42	a	fie	b	thigh	c	fie	87	a	push	b	puss	c	puss
43	a	char	b	tar	c	tar	88	a	know	b	knows	c	knows
44	a	Joyce	b	joys	c	joys	89	a	vile	b	file	c	vile
45	a	writ	b	rich	c	writ	90	a	lop	b	lob	c	lob

91	a	pat	b	pat	c	fat	139	a	lea	b	leaf	c	lea
92	a	thigh	b	tie	c	tie	140	a	each	b	eats	c	eats
93	a	shock	b	shock	c	sock	141	a	growth	b	grossed	c	grossed
94	a	tight	b	tight	c	tie	142	a	batch	b	batch	c	bat
95	a	miff	b	myth	c	myth	143	a	badge	b	bat	c	bat
96	a	Joyce	b	choice	c	choice	144	a	rogue	b	row	c	row
97	a	boo	b	boob	c	boo	145	a	babe	b	babe	c	bay
98	a	cat	b	catch	c	catch	146	a	toe	b	toed	c	toe
99	a	lab	b	lab	c	lap	147	a	aye	b	ape	c	ape
100	a	hark	b	harp	c	harp	148	a	pert	b	purge	c	purge
101	a	thigh	b	die	c	die	149	a	gross	b	growth	c	growth
102	a	tab	b	tap	c	tap	150	a	catch	b	cadge	c	catch
103	a	late	b	lay	c	lay	151	a	jay	b	day	c	day
104	a	laid	b	lathe	c	laid	152	a	writhe	b	writhe	c	ride
105	a	lobe	b	low	c	lobe	153	a	tin	b	thin	c	thin
106	a	chore	b	shore	c	chore	154	a	live	b	life	c	live
107	a	pain	b	vain	c	pain	155	a	tag	b	tag	c	tack
108	a	pate	b	fate	c	pate	156	a	hath	b	hath	c	hat
109	a	thin	b	thin	c	din	157	a	size	b	scythe	c	size
110	a	baa	b	bag	c	baa	158	a	cup	b	cup	c	cuff
111	a	thin	b	sin	c	sin							
112	a	myth	b	mist	c	myth							
113	a	row	b	row	c	rope							
114	a	myth	b	miss	c	miss							
115	a	perk	b	perk	c	perch							
116	a	thigh	b	sigh	c	thigh							
117	a	see	b	sees	c	see							
118	a	Sue	b	zoo	c	zoo							
119	a	writhe	b	write	c	writhe							
120	a	oak	b	oh	c	oak							
121	a	note	b	node	c	note							
122	a	Bro	b	brogue	c	brogue							
123	a	rid	b	ridge	c	ridge							
124	a	see	b	seek	c	seek							
125	a	dare	b	there	c	dare							
126	a	hope	b	hoe	c	hoe							
127	a	loaf	b	loath	c	loaf							
128	a	swathe	b	sways	c	swathe							
129	a	node	b	no	c	node							
130	a	seethe	b	seed	c	seethe							
131	a	Jew	b	do	c	do							
132	a	rate	b	wraith	c	rate							
133	a	lathe	b	late	c	late							
134	a	math	b	mat	c	math							
135	a	fuse'n	b	fusion	c	fusion							
136	a	pore	b	bore	c	pore							
137	a	vile	b	pile	c	pile							
138	a	rich	b	Ritz	c	rich							

TEST 2

The words in italics were recorded by the researcher on to a master audio-cassette

1	*gross*	groat	growth	grows	grow	.....
2	car	cart	*card*	.....		
3	baa	*bag*	back	bad	.....	
4	tip	ship	gyp	*chip*	.....	
5	coo	*kook*	.....			
6	*bathe*	bay	bays	bade	bait	.....
7	poor	port	*poured*	.....		
8	lease	*lees*	lea	.....		
9	sop	*shop*	.....			
10	suit	*soothe*	sue	sued	sues	.....
11	*math*	mat	massed	mass	.....	
12	pain	fain	*bain*	vain	.....	
13	*Zack*	Jack	shack	sack	.....	
14	loaf	low	lope	*lobe*	.....	
15	lass	*lash*	.....			
16	zoo	sue	*shoe*	.....		
17	hoe	*hose*	.....			
18	ship	*zip*	sip	.....		
19	*thin*	tin	fin	sin	.....	
20	bain	vain	pain	*fain*	.....	
21	bad	*badge*	batch	bads	bat	.....
22	*bit*	fit	pit	.....		
23	seed	seize	*seethe*	seat	see	.....
24	try	trice	*trite*	.....		
25	ricks	rib	rick	riff	*rip*	.....
26	pain	*vain*	fain	deign	Thane	bain .....
27	*aitch*	A	ache	ate	age	.....
28	ass	as	*ash*	.....		
29	*chill*	shill	till	Jill	.....	
30	sin	*shin*	.....			
31	H	*ate*	A	.....		
32	too	*toot*	.....			
33	*strife*	stripe	strive	.....		
34	doe	*though*	.....			
35	*live*	lie	life	.....		
36	cop	cob	*cough*	.....		
37	say	*sake*	.....			
38	*thou*	vow	dow	.....		
39	den	*then*	Zen	.....	item lost from master tape	

40 Lee	leap	*leaf*	leave	.....		
41 sick	tick	*thick*	.....			
42 muss	*mush*	.....				
43 surf	*serve*	sir	.....			
44 *beep*	bee	beaks	beak	beef	.....	
45 sap	*zap*					
46 pledger	*pleasure*	.....				
47 cat	fat	*pat*	.....			
48 day	*jay*	.....				
49 Bro'	*broke*	brogue	.....			
50 *gyp*	chip	dip	.....			
51 lea	lead	leak	*league*	.....		
52 can	*pan*	fan	.....			
53 *thigh*	tie	fie	sigh	.....		
54 ate	aye	*aid*	.....			
55 *chew*	too	shoe	Jew	.....		
56 pea	fee	*bee*	V	.....		
57 mack	Madge	*match*	mat	mats	.....	
58 rope	*rove*	row	robe	.....		
59 *tab*	ta	tat	tap	.....		
60 Ada	*Asia*	.....				
61 fee	V	pea	bee	.....		
62 true	truced	*truth*	truce	.....		
63 *Madge*	mat	mads	mad	match	.....	
64 gray	*graze*	grace	.....			
65 rope	row	*robe*	rove	wrote	.....	
66 pan	*fan*	ban	van	.....		
67 rick	ridge	*rich*	writs	writ	.....	
68 ruch	rues	*rouge*	rude	ruse	.....	
69 *ague*	A	ache	aid	.....		
70 *Jew*	due	you	do	.....		
71 force	fort	*forth*	for	forced	.....	
72 pub	pucks	puck	puff	*pup*	.....	
73 *V*	pea	Dee	bee	thee	fee	.....
74 *cease*	sees	see	seat	seethe	.....	
75 *van*	pan	Dan	ban	than	fan	.....
76 grays	gray	grate	*grace*	.....		
77 *pine*	kine	fine	.....			
78 Ritz	writ	rids	rid	*ridge*	rich	.....

TEST 3

Reading passsage

Which would you choose - a mug of coffee or a cup of tea? As children we could only have a glass of hot chocolate or cold orange squash. I think that wasn't very fair. My brother Jim Howett always tried to cadge two teas for us from the zany cook, Rob Grease, but he never got them. We would watch our parents taking their leisure with the forbidden drinks safe from us, listening to music in [the]* lounge. We would peek through the shutters at them with grave faces, and seethe with rage, biting back tears at the unfairness of life. It was the basis of our nursing extended grudges against them.

* [the] was missing on the reading passage photocopies given to the participants

TEST 4

Interview schedule

1. Where were you born, and in what year?
2. Tell me something about the ..... (ethnic group)?
3. What ethnic group does your mother's mother belong to?
4. What ethnic group does your mother's father belong to?
5. What ethnic group does your father's mother belong to?
6. What ethnic group does your father's father belong to?
7. What language did you first learn as a child, from whom?
8. What language do your parents use with you?
9. What was the second language you learnt, where?
10. How did you learn .....(second language)?
11. What was the third language you learnt, where?
12. What was the fourth language you learnt, where?
13. What was the fifth language you learnt, where?
14. Which sounds do you have difficulty pronouncing in English?
15. Why are you studying English?
    or
    Why did you decide to study in the English department?
16. Tell me about something very frightening that ever happened to you.

APPENDIX D

STATEMENT OF DISCLOSURE AND INFORMED CONSENT

Ingrid Mathew is researching the errors made in pronouncing English consonants by first-language speakers of Acehnese, Gayo, Tamiang Melayu and Indonesian, in order to discover what should be taught in English pronunciation classes in Aceh.

Volunteers will be needed for 4 hours - 2 hours on 2 Saturday afternoons.

Any questions you have about this research can be directed to Ingrid Mathew in her office at LDC IAIN.

I (the participant) have read the information above , and any questions I have asked have been answered to my satisfaction. I agree to participate in this activity, realising I may withdraw at any time. I agree that the research data gathered for this study may be reported in a Masters thesis and/or published provided I am not identifiable.

Participant's name : .....

Signature : .....

Date : .....

Researcher's name : .....

Signature : .....

Date : .....

APPENDIX E

ERROR DATA by subjects - showing code, language, English dep./not, sex
Each language group has 4 female subjects aged 19-22,
4 male subjects aged 19-25 and one non-English dept subject
Test 1 - aural-discrim. - showing 2or 3 out of 3 occur. phoneme tested for o = ellipsis
except for item 16, each 1 out of 1 occurrence.

	test1	I220Ef	I520Ef	I421Ef	T321Ef	I619Em	I820nEm	I923Em	I1024Em
1	initial p								
3	initial b								
5	initial v								
7	initial f								
13	initial z								
17	initial ʃ					s			
19	initial θ					s			
21	initial ð								
23	initial tʃ	dʒ							
25	initial dʒ	tʃ							
2	final p		o						
4	final b								o
9	final t								
10	final d								
11	final k		tʃ						
12	final g		o						
6	final v				f			f	
8	final f				v			v	
14	final z								s
15	final s			θ					z
16	med\fin ʒ			z			z	z	z
18	final ʃ								
20	final θ			s	o				
22	final ð								
24	final tʃ		k dʒ			o		ts	dʒ
26	final dʒ		tʃ						dz tʃ

	test1	G119Ef	G520Ef	G421Ef	G322Ef	G619nEm	G821Em	G922Em	G1024En
1	initial p								
3	initial b				v				
5	initial v				b				
7	initial f								
13	initial z								
17	initial ʃ								
19	initial θ								
21	initial ð								
23	initial tʃ		dʒ						
25	initial dʒ		tʃ						
2	final p								
4	final b	v							
9	final t						θ		
10	final d						ð		
11	final k								
12	final g								
6	final v	b					f		
8	final f						v		
14	final z		s				ð		ð
15	final s		z				θ		
16	med\fin ʒ			dz z					z
18	final ʃ								
20	final θ						t s		
22	final ð						d z		z
24	final tʃ	ts			ts		ts		ts
26	final dʒ				dz		dz		

	test1	A219Ef	A519Ef	A120Ef	A1121nEf	A719Em	A820Em	A922Em	A1025Em
1	initial p								
3	initial b								
5	initial v								
7	initial f								
13	initial z								
17	initial ʃ								
19	initial θ								
21	initial ð								
23	initial tʃ			dʒ	dʒ				
25	initial dʒ			tʃ	tʃ				
2	final p								
4	final b								
9	final t								
10	final d								
11	final k								
12	final g								
6	final v	f			f				
8	final f	v			v				
14	final z						s		
15	final s						z		
16	med\fin ʒ		ʃ	ʃ				ʃ	ʃ
18	final ʃ								
20	final θ								
22	final ð								
24	final tʃ	dʒ		dʒ	dʒ				
26	final dʒ	tʃ dz		tʃ	tʃ				

Test 2 - repetition - 2/3 of 3 occur. of phoneme tested for. \ = 1 of each ex. produced except for item 21, 1/2 of 2 occurrences ~ = no answer given, o = ellipsis									
	test2	I220Ef	I520Ef	I421Ef	T321Ef	I619Em	I820nEm	I923Em	I1024Em
1	initial p								
3	initial b								
5	initial v								
7	initial f								
13	initial z								
17	initial ʃ					s			
19	initial θ		s					t	
21	initial ð						v	d	
23	initial tʃ							t\dʒ	
25	initial dʒ					d	d		
2	final p								
4	final b	p\p\k		p					v\p
9	final t								
10	final d	t	o	t	t\o		t	t	t
11	final k								
12	final g		k	k	k		k		k
6	final v		f\b						
8	final f								
14	final z			s	s\v		s		v\s
15	final s							z	
16	med\fin ʒ					z			
18	final ʃ					s\z			
20	final θ		s			s\f	t\f		
22	final ð	z	z	t\z\v	z\z\f	d\t		k\z\z	v\z
24	final tʃ	t			t	t\dʒ		t\dʒ	
26	final dʒ	tʃ	tʃ	tʃ	t\t\tʃ	d\dz	t	t\tʃ	t\tʃ\tʃ

	test2	G119Ef	G520Ef	G421Ef	G322Ef	G619nEm	G821Em	G922Em	G1024En
1	initial p					f\t	f		
3	initial b							v	
5	initial v								
7	initial f								t\p
13	initial z			dʒ					
17	initial ʃ				s		s		
19	initial θ		t\ʃ		s\t		s\s\f		s\t
21	initial ð		d						d
23	initial tʃ	t							
25	initial dʒ				d				
2	final p	f\k			f\k	f	f		
4	final b	v			f\v\v			v	v\v\f
9	final t								
10	final d	t		t	o	t	o	t	
11	final k								
12	final g				o				k\o
6	final v								
8	final f								
14	final z					s	s\o\o		
15	final s								
16	med\fin ʒ			d\ʃ	d\v\dʒ				
18	final ʃ				s				
20	final θ						s\p		s\t
22	final ð	z\z\d	z	z	o			v	
24	final tʃ	t		t	t	t\‿			t
26	final dʒ	t\tʃ	tʃ	t\t\tʃ	t\t\dz	tʃ	t\t\d	tʃ	d\dz

	test2	A219Ef	A519Ef	A120Ef	A1121nEf	A719Em	A820Em	A922Em	A1025Em
1	initial p								
3	initial b								v
5	initial v			f					
7	initial f							p\v	
13	initial z				s\tʃ		ð\v		
17	initial ʃ								
19	initial θ					s		t\t\s	f
21	initial ð					v\z		v\z	
23	initial tʃ								
25	initial dʒ					d			
2	final p							k\t	
4	final b				p			k\v\o	
9	final t								
10	final d	t	o	t	t			t\z\o	t
11	final k								
12	final g				k	d\k	k	k\p\o	
6	final v	f					f		
8	final f								
14	final z		s\o		s\o			s	v
15	final s			z					
16	med\fin ʒ					d\z			
18	final ʃ					s			
20	final θ	t\f	s\f	s\f	t\f	t\s\f		s\ks	
22	final ð	z	v\z	o		v\z\z			z\o
24	final tʃ	t	t	t			t	t\dʒ	
26	final dʒ	tʃ	t	t			t	ʃ\tʃ	t\tʃ

Test 3 - reading passage - showing any instance of error							˺ means unreleased		
	Test 3	I220Ef	I520Ef	I421Ef	T321Ef	I619Em	I820nEm	I923Em	I1024Em
1	initial p					f		f	
3	initial b								
5	initial v								
7	initial f								
13	initial z								
17	initial ʃ								
19	initial θ						t	t	
21	initial ð		d		d			d	d
23	initial tʃ			k			k		k
25	initial dʒ								
2	final p	p˺	p˺	p˺	p˺	p˺	p˺	f	p˺
4	final b								
9	final t	t˺	t˺		t˺	t˺	t˺ o	t˺ o	t˺
10	final d	t˺ t		o	d˺ o	o	o	o	o
11	final k	k˺	k˺	k˺	k˺	k˺	k˺	k˺	k˺
12	final g	g˺		k	g˺	g˺	k	k˺	k
6	final v								
8	final f								
14	final z					o	o	o	
15	final s			ʃ					
16	med\fin ʒ			z	z		z		ʃ
18	final ʃ	s		s		s	s	s	s
20	final θ								
22	final ð			t					t
24	final tʃ					θ			
26	final dʒ	tʃ g				t d˺	tʃ o	o	t

	test3	G119Ef	G520Ef	G421Ef	G322Ef	G619nEm	G821Em	G922Em	G1024En
1	initial p	f		f	f		f v		
3	initial b	v					v		
5	initial v								
7	initial f								
13	initial z		ʒ		ʒ		dʒ	dʒ	dʒ
17	initial ʃ								
19	initial θ	t	t	t	s			t	t
21	initial ð	d z	d		d		d	d	d
23	initial tʃ	k	k	k	k	k	s k		
25	initial dʒ								
2	final p	pˀ	pˀ	f		pˀ	f	pˀ	pˀ
4	final b					pˀ			
9	final t		tˀ n o	tˀ o	tˀ		o	o tˀ	o
10	final d	t o	o	t o	dˀ o	dˀ t		o	t
11	final k	kˀ	o	kˀ o	kˀ	kˀ		kˀ	kˀ o
12	final g	kˀ	kˀ	ʔ				kˀ	o
6	final v								o
8	final f		o	o					o
14	final z	o		o	o	o	o	s	
15	final s			ʃ			ʃ		
16	med\fin ʒ	z				z	z		
18	final ʃ		s	s	s	z	s		ʒ
20	final θ	s				t			t
22	final ð	t		t					
24	final tʃ								
26	final dʒ	g	t	t n	t	t	ʒ		t z

	test3	A219Ef	A519Ef	A120Ef	A1121nEf	A719Em	A820Em	A922Em	A1025Em
1	initial p		f						
3	initial b								
5	initial v								r
7	initial f								
13	initial z							dz	
17	initial ʃ						s		
19	initial θ					t		s	
21	initial ð	d		dz d				d z	d
23	initial tʃ	ʃ	k	k	k		ʃ k	ʃ	ʃ
25	initial dʒ								
2	final p	p˺	p˺	p˺	p˺	o	p˺	p˺	p˺
4	final b	p˺							
9	final t	t˺	t˺			t˺		t˺	t˺
10	final d	d˺ t		t	o		d˺	d˺ t˺ o	o
11	final k		k˺	k˺	k˺			k˺ o	k˺
12	final g	k			k˺		k		k
6	final v								
8	final f						v		
14	final z		o	o		o			o
15	final s				ʃ				
16	med\fin ʒ		ʃ	ʃ			z		z
18	final ʃ	s		s		s			
20	final θ							s	
22	final ð	t	d		θ				
24	final tʃ							ʃ	ʃ
26	final dʒ	tʃ	dz	tʃ t		t˺ g	k	g ʒ	d

Test 4 - interview - showing 33%+ error						` means unreleased			
	test4	I220Ef	I520Ef	I421Ef	T321Ef	I619Em	I820nEm	I923Em	I1024Em
1	initial p								
3	initial b								
5	initial v								
7	initial f								
13	initial z								
17	initial ʃ								
19	initial θ								
21	initial ð								
23	initial tʃ								
25	initial dʒ								
2	final p								
4	final b								
9	final t			t`			t`	t`\o\?\k	t`\?\tʃ
10	final d			d`\t`\o	d`\t\o	o\t			t\d`\?
11	final k					k`\?	k`\?\o	k`\?	
12	final g								
6	final v								
8	final f								
14	final z								
15	final s								
16	med\fin ʒ								
18	final ʃ	s	s						
20	final θ								
22	final ð								
24	final tʃ								
26	final dʒ					o\d`			

	test3	A219Ef	A519Ef	A120Ef	A1121nEf	A719Em	A820Em	A922Em	A1025Em
1	initial p		f						
3	initial b								
5	initial v								r
7	initial f								
13	initial z							dz	
17	initial ʃ						s		
19	initial θ					t		s	
21	initial ð	d		dz d				d z	d
23	initial tʃ	ʃ	k	k	k		ʃ k	ʃ	ʃ
25	initial dʒ								
2	final p	p˺	p˺	p˺	p˺	o	p˺	p˺	p˺
4	final b	p˺							
9	final t	t˺	t˺			t˺		t˺	t˺
10	final d	d˺ t		t	o		d˺	d˺ t˺ o	o
11	final k		k˺	k˺	k˺			k˺ o	k˺
12	final g	k			k˺		k		k
6	final v								
8	final f						v		
14	final z		o	o		o			o
15	final s				ʃ				
16	med\fin ʒ		ʃ	ʃ			z		z
18	final ʃ	s		s		s			
20	final θ							s	
22	final ð	t	d		θ				
24	final tʃ							ʃ	ʃ
26	final dʒ	tʃ	dz	tʃ t		t˺ g	k	g ʒ	d

Test 4 - interview - showing 33%+ error						ˀ means unreleased			
	test4	I220Ef	I520Ef	I421Ef	T321Ef	I619Em	I820nEm	I923Em	I1024Em
1	initial p								
3	initial b								
5	initial v								
7	initial f								
13	initial z								
17	initial ʃ								
19	initial θ								
21	initial ð								
23	initial tʃ								
25	initial dʒ								
2	final p								
4	final b								
9	final t			t˒			t˒	t˒\o\?\k	t˒\?\tʃ
10	final d			d˒\t˒\o	d˒\t\o	o\t			t\d˒\?
11	final k					k˒\?	k˒\?\o	k˒\?	
12	final g								
6	final v								
8	final f								
14	final z								
15	final s								
16	med\fin ʒ								
18	final ʃ	s	s						
20	final θ								
22	final ð								
24	final tʃ								
26	final dʒ					o\d˒			

	test4	G119Ef	G520Ef	G421Ef	G322Ef	G619nEm	G821Em	G922Em	G1024En
1	initial p								
3	initial b								
5	initial v								
7	initial f								
13	initial z								
17	initial ʃ								
19	initial θ	t	t\s					t	
21	initial ð				d		d		d
23	initial tʃ								
25	initial dʒ								
2	final p								
4	final b								
9	final t		t'\o	t'\ʔ	t'\ks	t'\ʔ		t'\ʔ	
10	final d	t\o			t\d'\o		t	d'\t\o	t\d'
11	final k			k'				k'	ks\k'\ʔ
12	final g								
6	final v								
8	final f								
14	final z								
15	final s								
16	med\fin ʒ								
18	final ʃ			s	s	s	s		
20	final θ	t							t\t'
22	final ð								
24	final tʃ								
26	final dʒ			tʃ\o	tʃ\dz\o\ʒ\z	tʃ	ʃ		tʃ\o\z

	test4	A219Ef	A519Ef	A120Ef	A1121nEf	A719Em	A820Em	A922Em	A1025Em
1	initial p								
3	initial b								
5	initial v								
7	initial f								
13	initial z								
17	initial ʃ								
19	initial θ			t\s					
21	initial ð			d					
23	initial tʃ	ʃ							
25	initial dʒ								
2	final p								
4	final b								
9	final t	o\tʃ\ʔ\kˀ\tˀ\r			tˀ\o			tˀ\ʔ	tˀ\o\tʃ
10	final d	t\tʃ\o	o\t			o\dˀ\t\ʔ	o\t\dˀ\tˀ		t\dˀ\ʔ\o
11	final k			kˀ			kˀ\o	kˀ\ʔ	
12	final g								
6	final v								
8	final f								
14	final z								
15	final s								
16	med\fin ʒ								
18	final ʃ				s	s			
20	final θ	t\tˀ							
22	final ð								
24	final tʃ								
26	final dʒ	tʃ		dˀ\o	o	o\tʃ		tʃ\ʒ\o	

	test4	G119Ef	G520Ef	G421Ef	G322Ef	G619nEm	G821Em	G922Em	G1024En
1	initial p								
3	initial b								
5	initial v								
7	initial f								
13	initial z								
17	initial ʃ								
19	initial θ	t	t\s					t	
21	initial ð				d		d		d
23	initial tʃ								
25	initial dʒ								
2	final p								
4	final b								
9	final t		t'\o	t'\ʔ	t'\ks	t'\ʔ		t'\ʔ	
10	final d	t\o			t\d'\o		t	d'\t\o	t\d'
11	final k			k'				k'	ks\k'\ʔ
12	final g								
6	final v								
8	final f								
14	final z								
15	final s								
16	med\fin ʒ								
18	final ʃ			s	s	s	s		
20	final θ	t							t\t'
22	final ð								
24	final tʃ								
26	final dʒ			tʃ\o	tʃ\dz\o\ʒ\z	tʃ	ʃ		tʃ\o\z

APPENDIX F					
ERROR DATA by first language group					
			\ means answers of 1 participant o means no phoneme at all		
INDO.		test 1-aural	test 2 - repetition	test 3-reading passage	test4 - interview
initial					
1	p			f f	
3	b				
5	v				
7	f				
13	z				
17	ʃ	s	s		
19	θ	s	s t	t t	
21	ð		v d	d d d d	
23	tʃ	dʒ	t\dʒ	k k k	
25	dʒ	tʃ	d d		
final					
2	p	o		p˺ p˺ p˺ p˺ p˺ p˺ p˺ f	
4	b	o	p p\p\k p\v		
9	t			t˺ t˺ t˺ t˺ t˺ t˺\o t˺\o	t˺ t˺ t˺\o\ʔ\k t˺\ʔ\tʃ
10	d		t t t t t t\o o	o o o o o o\d˺ t˺\t	d˺\t˺\o d˺\t\o t\o
					d˺\t\ʔ
11	k	tʃ		k˺ k˺ k˺ k˺ k˺ k˺ k˺ k˺	k˺\ʔ k˺\ʔ k˺\ʔ\o
12	g	o	k k k k k	g˺ g˺ g˺ k˺ k k k	
6	v	f f	f\b		
8	f	v v			
14	z	s	s s s\v s\v	o o o	
15	s	z θ	z	ʃ	
16	ʒ	z z z z	z	z z z ʃ	
18	ʃ		s\z	s s s s s s	s s
20	θ	s o	s s\f t\f		
22	ð		z z z\z\f z\z\k z\v z\v\t t\d	t t	
24	tʃ	dʒ dʒ\k o ts	t t t\dʒ t\dʒ	θ	
26	dʒ	tʃ tʃ\dz	tʃ tʃ tʃ tʃ tʃ\tʃ\t tʃ\t tʃ\t\t	t\d˺ t o o\tʃ g\tʃ	o\d˺
			d\dz		

GAYO		test 1-aural	test 2 - repetition	test 3-reading passage	test 4 - interview
1	p		f f\t	f f f f\v	
3	b	v	v	v v	
5	v	b			
7	f		p\t		
13	z		ʤ	ʒ ʒ ʤ ʤ ʤ	
17	ʃ		s s		
19	θ		s\s\f s\t s\t t\ʃ	t t t t t s	t t t\s
21	ð		d d	d d d d d d\z	d d d
23	ʧ	ʤ	t	k k k k k k\s	
25	ʤ	ʧ	d		
final					
2	p		f f f\k f\k	pˀ pˀ pˀ pˀ pˀ f f	
4	b	v	v v v\v\f v\v\f	pˀ	
9	t	θ		tˀ tˀ\n\o o\tˀ o\tˀ o o	tˀ\? tˀ\? tˀ\? tˀ\o tˀ\ks
10	d	ð	t t t t o o	o o t\dˀ o\dˀ o\t o\t	t t\o t\dˀ t\dˀ\o
					t\dˀ\o
11	k			kˀ kˀ kˀ kˀ kˀ\o kˀ\o o	kˀ kˀ kˀ\ks\?
12	g		k\o o	kˀ kˀ kˀ o ?	
6	v	f b		o	
8	f	v		o o o	
14	z	s ð ð	s s\o\o	o o o o o s	
15	s	z θ		ʃ ʃ	
16	ʒ	z z\dz	d\ʃ d\v\ʤ	z z z	
18	ʃ		s	s s s s z ʒ	s s s s
20	θ	s\t	s\t s\p	t t s	t t\tˀ
22	ð	z z\d	z z z\z\d v o	t t	
24	ʧ	ts ts ts ts	t t t t t		
26	ʤ	dz dz	ʧ ʧ ʧ ʧ\t ʧ\t\t t\t\d	t t t t\z t\n g ʒ	ʧ\o ʧ\o\z ʧ\o\z\dz\ʒ
			t\t\dz dz\d		ʧ ʃ

ACEH.		test 1-aural	test 2 - repetition	test 3-reading passage	test 4 - interview
1	p			f	
3	b		v		
5	v		f	r	
7	f		p\v		
13	z		tʃ\s ð\v	dz	
17	ʃ			s	
19	θ		s s\t\t f	t s	s\t
21	ð		v\z v\z	d d d\dz d\z	d
23	tʃ	dʒ dʒ		k k k k\ʃ ʃ ʃ ʃ	ʃ
25	dʒ	tʃ tʃ	d		
final					
2	p		k\t	pˀ pˀ pˀ pˀ pˀ pˀ pˀ o	
4	b		p k\v\o	pˀ	
9	t			tˀ tˀ tˀ tˀ tˀ	tˀ\o tˀ\o\tʃ tˀ\o\tʃ\ʔ\kˀ\r
					tˀ\ʔ
10	d		t t t t t\z\o o	o o t o\dˀ\tˀ dˀ\t dˀ	dˀ\tˀ\ʔ\o dˀ\tˀ\t\o dˀ\t\ʔ\o
					t\o\tʃ t\o
11	k			kˀ kˀ kˀ kˀ kˀ\o	kˀ kˀ\o kˀ\ʔ
12	g		k k k\d k\p\o	k k k kˀ	
6	v	f f	f f		
8	f	v v		v	
14	z	s	s s\o s\o v	o o o o	
15	s	z	z	ʃ	
16	ʒ	ʃ ʃ ʃ ʃ	d\z	z z ʃ ʃ	
18	ʃ		s	s s s	s s
20	θ		s\f s\f s\f\t t\f t\f s\ks	s	t\tˀ
22	ð		z z\v z\z\v z\o o	t d θ	
24	tʃ	dʒ dʒ dʒ	t t t t t\dʒ	ʃ ʃ	
26	dʒ	tʃ tʃ tʃ\dz	tʃ tʃ\ʃ tʃ\t t t t	tʃ tʃ\t tˀ g\ʒ dz k d	o o\dˀ o\tʃ o\tʃ\ʒ tʃ