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THE PRODUCTION OF ENGLISH SYLLABLE-FINAL CONSONANTS BY BRAZILIAN EFL LEARNERS

por

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HOMENAGEM ESPECIAL

Aos meus pais.

Ao meu irmão e sua família.

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ABSTRACT

The Production of English Syllable-Final Consonants by Brazilian EFL Learners

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The present study is concerned with the production of syllable-final consonants by Brazilian EFL learners, in relation to: (1) the influence of markedness relations in SLA phonology, based on Eckman (1987a), and (2) differences in strength or sonority across syllables as an important environmental factor, based on Hooper (1976), Murray & Venneman (1983) and Carlisle (1991, 1992, 1994). Target consonant characteristics found to be important in predicting frequency of epenthesis were (1) markedness concerning the voicing distinction, (2) relative strength across classes and within the class of obstruents, and (3) place of articulation within the class of voiced stops. The environmental aspects found to be related to the frequency of epenthesis were the consonant/vowel distinction and the relative differences in consonantal strength across syllables. Recordings were made of six undergraduate students of English reading 432 sentences containing 16 different target consonants in 27 different phonological context.

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RESUMO

O presente estudo diz respeito à produção das consoantes em posição final da sílaba por estudantes brasileiros do inglês levando-se em conta: (1) a influência das relações de marcação na aquisição da fonologia, com base na teoria de Eckman (1987a); e (2) as diferenças na sonoridade entre as sílabas como um importante fator ambiental, a partir do trabalho de Hooper (1976), Murray & Venneman (1983) e Carlisle (1991, 1992, 1994). As características da consoante-alvo consideradas importantes para predizer a freqüência da epêntese foram: (1) o conceito de marcação em relação à sonoridade, (2) a sonoridade relativa entre as classes e dentro da classe das obstruintes, e (3) o ponto de articulação dentro da classe das plosivas sonoras. Os aspectos ambientais encontrados que se relacionam com a freqüência da epêntese foram a distinção consoante/vogal e as relativas diferenças na sonoridade consonantal entre as sílabas. As gravações foram feitas com seis alunos de graduação de inglês que leram 432 sentenças contendo 16 diferentes consoantes-alvo, em posição final, em 27 diferentes contextos fonológicos.

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CHAPTER 1

INTRODUCTION

Pronunciation, in general, has been playing a significant role in second language acquisition (SLA) studies lately throughout the world. With the flourishing of English Language Schools in Brazil in the early 80s, much emphasis started to be given to the spoken language. Hence, in most of the text books and tapes produced by these schools, a special importance appears to have been given to pronunciation in general. In addition, many English pronunciation manuals such as Morley (1979); Roach (1983); Prator and Robinett, 4th ed. (1985); Avery & Ehrlich (1992) etc. were published during this period in order to help teachers of English, offering several practical exercises and suggestions to specific pronunciation difficulties.

For many Brazilian EFL learners, pronunciation becomes a stumbling block in their efforts to develop communicative abilities in English. This, in principle, may be due to factors such as differences in the phonetic inventories of Portuguese and English, differences in the syllable structure of the two languages, the resulting interference of the Portuguese language, etc. Among the greatest difficulties of Brazilian students is the production of consonants in syllable-final position. A study developed by Pereira (1994), claims that students overcome these

problems in the early stages of language acquisition. My experience as a teacher of English, however, has shown that for some students, these problems persist even after they reach an advanced level of proficiency in other areas.

As a result, studies concerning foreign/second language learners of English have been widespread in SLA phonology. However, the production of English syllable-final consonants by interlanguage (IL) speakers, in general, has not been commonly investigated. Only one study, Fernandes (1997), has been carried out regarding the production of English syllable-final consonants by Brazilian English as a foreign language (EFL) learners. Thus, the present study sets out to investigate both the difficulties in relation to the production of English syllable-final consonants by Brazilian EFL learners and the main causes of these difficulties.

In order to explain the difficulties of Brazilian EFL learners in producing English syllable-final consonants, it is imperative to discuss, first of all, the importance of some SLA and phonological theories in general. As a theoretical base on which to develop this work, it was decided, thus, to apply the following concepts: the Markedness Differential Hypothesis (MDH) (Eckman, 1987a), Natural Generative Phonology (NGP) (Hooper, 1976), concepts on strength/sonority (Murray

& Venneman, 1983); as well as the interaction of phonological environments and markedness relations (Carlisle, 1994).

The MDH, as a strong theoretical base on which to develop this study, appears to be crucial in explaining the voiced/voiceless distinction in the production of English syllable-final consonants. Eckman was the first investigator to take into account implicational markedness as a relevant aspect involving the difficulty of target language (TL) phonological structures in general. The author states, in the MDH, that TL structures that are both different from the native language (NL) and more marked than those of the NL are more difficult to learn.

Based on Hooper (1976) Natural Generative Phonology has as its main purpose the description concerning the knowledge or competence which native speakers have to understand and produce the sound system of their language. For the present study, it becomes relevant to discuss Hoopers' concept of strength relations in her "Syllable Structure Condition" (SSC) (pp. 195-207), which claims that there is a strength relation for every syllable structure and "requires that a syllable-initial C be stronger than the immediately preceding syllable-final C" (p. 220).

Murray & Venneman (1983) extend Hooper's Condition by referring to relative strength differences and diachronic sound change. In

other words, the researchers claim that resyllabification occurs because of adjacent syllables which violate the SSC.

Carlisle (1994), in turn, discusses markedness relationships and phonological environment as possibly the two most important elements in terms of influencing the phonological variants produced by EFL learners in general.

The development of this study proceeds as follows: Chapter two is a review of literature of the most relevant studies and work by authors distributed in the following sections: 2.1. SLA phonology: Brazilian learners; 2.2. Phonogical theory; 2.3. The syllable in SLA; 2.3.1. Transfer, developmental factors and universals; 2.3.2. Markedness; 2.3.3. Final stops 2.3.4. Carlisle: The importance of environment and 2.4. is a conclusion of the chapter discussing the contribution of SLA phonology considering both the theory and empirical factors.

Chapter three concerns the methodology of the research presented in the following sequence: a discussion of the approaches applied based on Altenberg & Vago (1987); 3.1. Hypotheses 3.3.1.; Markedness of the target consonant subdivided in Hypothesis 1, Sub-hypothesis 1.1., sub-hypothesis 1.2., Sub-hypothesis 1.3. and Sub-hypothesis 1.4.; 3.1.2 Influence of phonological environment subdivided in Hypothesis 2, Sub-

hypothesis 2.1., Sub-hypothesis 2.2.; 3.2. Subjects; 3.3. Material; 3.4. Procedure and 3.5. Analysis.

Chapter four, in turn, contains the results, organized in the following sequence: 4.1. Markedness of the target segment; 4.1.1. Voicing distinction; 4.1.2. Relative strength (obstruents vs. nasals); 4.1.3. Relative strength within obstruents; 4.1.4. Place of articulation; 4.2. Influence of environment; 4.2.1. Consonants vs. vowels vs. pause; 4.2.2. Consonantal strength (or sonority) and syllable contact and lastly 4.3. a discussion of the results.

Finally, chapter five includes the final remarks discussing general aspects, especially related to the results found in terms of markedness relationships, phonological environment and strength (or sonority). There are also some ultimate considerations hoping that this study may encourage students of linguistics, in general, to carry out studies in SLA phonology. Further, an emphasis on the importance of more appropriate English pronunciation manuals to Brazilian EFL students is also given.

CHAPTER 2

REVIEW OF LITERATURE

2.1. SLA phonology: Brazilian learners

There have been a limited number of studies in the area of SLA phonology with Brazilian Portuguese as the first language. Some of the areas previously dealt with are stress placement (Baptista, 1989; Terzi, 1977); general pronunciation (Xavier, 1989); vowels (Baptista, 1992) and vowel epenthesis in the interphonology of Portuguese and English (Fernandes, 1996).

Terzi (1977) examines, through the analysis of the acquisition of word-stress rules in English by native speakers of Portuguese, the adequacy of the error analysis proposal, which essentially describes the learner's ability to form hypotheses as he/she moves towards bilingual competence. According to this author, the students' errors are indicative both of their level of knowledge and the ways in which they learn the second language. Terzi uses the approximative system approach for her analysis, taking into consideration the native and target language systems, which are affected by other external factors.

Xavier (1989) is concerned with the segmental errors in English that persist for undergraduate students of Letters. The segments analyzed were the consonantal phonemes /ŋ, tʃ, dʒ, θ, ð, ʃ, ʒ, s, z/; the vocalic phonemes /ɪ, i:, æ, ɛ, u, ʊ:/; the plural and the past allomorphs and the allophones [pʰ, tʰ, kʰ]. The author claims that, depending on the learner, the reasons why these segmental errors might occur are the graphic and the phonological contexts. In the former, the learner confuses the graphic representation of English with the sound representation of Portuguese (e.g. *call* [kɔ:l] becomes [kaw] in Portuguese). Then, in the latter, some learners tend to substitute rules of their native language (NL) for phonological rules in the target language (TL) (e.g. *had* [hædʒi] for [hæd]).

Baptista (1987) deals with the difficulty of Brazilian learners of English in producing correct word stress. The author carries out an error analysis with the purpose of discovering the greatest difficulties of these learners regarding English stress and the reasons for these difficulties. In this study Baptista refers to word stress as the predominance of one syllable of a word due to various dimensions. The error distribution shows that in the process of acquiring word-stress rules, Brazilian EFL learners make use of word-stress prediction strategies that may facilitate or impede the acquisition of certain rules.

Baptista (1992), is a longitudinal acoustic analysis of the acquisition of English vowels by Brazilians. This dissertation reports on both the phonetic and phonemic "evolution of the non-back portion of the English interlanguage (IL) vowel systems of eleven Brazilian-Portuguese speakers" (Baptista, p. 4). The author analyzes the acquisition of the three new non-back vowels /ɪ/, /æ/, /ʌ/, as well as the changes regarding the adjoining "old" vowels /i/, /ei/, /ɛ/, and /ɑ/, referred to as "old" vowels because there are corresponding similar vowels in Portuguese. Thus, the researcher shows, through her analysis, the relevance of dealing with IL vowels as an integrated system.

Finally, Fernandes (1997) reports on an investigation of the occurrences of vowel epenthesis in initial and final position by Brazilian learners of English from English language schools in Pelotas and Santana do Livramento (R.S). The author considers (1) the following and the preceding phonological contexts; (2) the point of articulation of the consonants in the immediately following context; (3) word stress according to the dictionary; (4) word stress produced by the subjects; (5) number of syllables produced; (6) openness of the epenthetic vowel and (7) the type of discourse. Eventually, Fernandes states that a considerable number of occurrences of the epenthetic vowel /i/ occurred in both final and initial position. The presence of schwa /ə/, although less frequent than /i/, was also significant. The author claims that the

production of epenthesis by Brazilian EFL learners might be attributed to resyllabification due to the differences in syllable structure of English and Portuguese.

Then, Fernandes states that this frequency of epenthesis is a "variable phenomenon". From his results, it became evident that its occurrence depends on both linguistic and extralinguistic factors. After the analysis and comparison of the results, the author concludes that: (1) the epenthetic vowel /i/ had the highest number of occurrences; (2) dentals and alveopalatals in the following phonological context favored the frequency of epenthesis; (3) labials, in the preceding phonological context favored the epenthesis; (4) epenthesis resulted in stress placement in the middle of the word; and (5) due to resyllabification, the epenthesis produced an increase in the number of syllables.

Although only the investigation by Fernandes follows the same line of research as the present study, the rest of the studies reviewed in this section are significant to situate the reader in relation to what has been done in Brazil as far as SLA phonology is concerned.

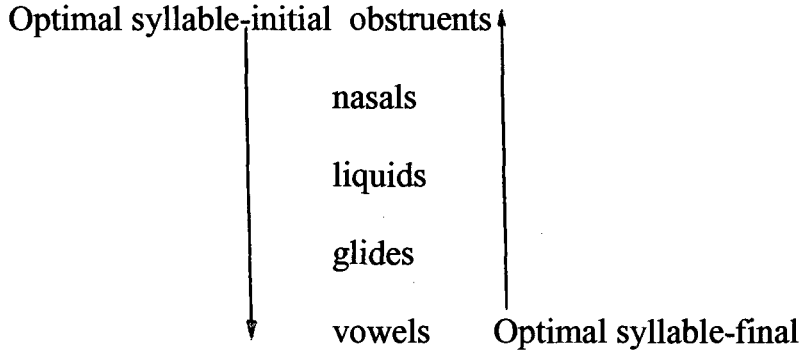
2.2. Phonological theory

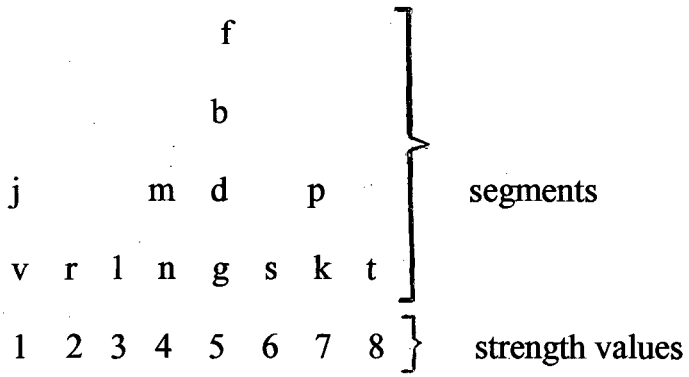
Dziubalska-Kolaczyk (1986) claims that "in order to account for language phenomena, a phonological theory should be able to satisfy two basic requirements: (1) it should allow for a comprehensive formal description of language (both universal and specific); and (2) its description should be consistent with psychological reality" (Dziubalska-Kolaczyk, p. 193). She argues that Natural Generative Phonology meets these two requirements and is, thus, adequate theory of phonology for SLA. In keeping with this point of view, I have decided to opt for Natural Generative Phonology as the theoretical model on which to base my hypotheses.

Hooper (1976), in her book Introduction to natural phonology (Chapter 10, pp. 195-207), introduces the concept of "Strength Relations in Syllable Structure". The author claims that there is a strength relation for every syllable structure. Hooper alludes to a lack of phonetic parameters for strength, however, and does not define precisely what the term really means. She defines the term mainly by distribution, claiming that the strongest segments are at the margins of the syllable. The weakest consonants on the strength scale are the most sonorant, and therefore the most vowel-like consonants. The strongest (or optimal)

consonant is defined as the least vowel-like consonant, whether the particular parameter is sonority or openness [1] (1976, p. 198).

Hooper proposes an analysis of strength relations in the syllable structure of Spanish. She shows in the strength scale below, "that the occurrence of a segment seems to depend on whether it is an obstruent, nasal, liquid, glide, or vowel" (Hooper, 1976, p. 196), and that ..."there is a rough hierarchy of suitability for initial and final positions." (p. 196).





[1] Openness refers to the degree of constriction or obstruction which prevents the flow of air from coming through the nose or mouth as in stops, fricatives or affricates (Crystal, 1985).

Strength, in truth, appears to represent the sense of a burst of air coming out. In the strength scale for Spanish above, the burst of air becomes stronger as we move from left to right because of the degree of closure before the burst. The stops are the most closed because of their total air obstruction. Following the stops, the fricatives represent the next most closed segments because of their partial obstruction. However, the liquids (r and l), have less obstruction compared to the fricatives. Ultimately, the glides, at least in both English and Romance languages, are considered to have the same degree of closure as a high vowel, which is seen as the most closed vowel.

It is important to point out that the ranking of segments along the sonority hierarchy cannot be considered universal, but rather specific to each language. However, there is a general tendency among languages to have the obstruents at one end and the glides at the other. Hooper illustrates this general tendency in her universal strength hierarchy (1976, p. 206):

			voiced	voiceless contin.	voiceless
glide	liquid	nasal	contin.	voiced stops	stops →
1	2	3	4	5	6

with the addition of the affricates, which were assigned a strength value of 7.

To this day there is not a consensus as to the position of natural classes along this hierarchy. Dziubalska-Kolaczyk (1997), for example, proposes the following hierarchy, with no voiced/voiceless distinction:

vowels	semivowels	liquid	nasal	fricatives	affricates	plosives
0	1	2	3	4	5	6

Hankamer & Aissen (1974) deal with essentially the same concepts as Hooper's, but prefer to use the opposite term — sonority. Thus, the strongest consonants in Hooper's terms are the least sonorant in Hankamer & Aissen's terms; the most sonorant segments are the vowels. These authors dispute Chomsky and Halles' (1968) claim that phonological processes are dependent simply on natural classes by features and not on any hierarchical relations among the phonological classes. According to Hankamer & Aissen, "...the required hierarchical relation, which we call sonority, must be directly represented in some fashion so that phonological rules can refer to it." (p. 131). To support their point, the authors describe the hierarchical "nature" of the consonant assimilation process, operating synchronically in Pali (p. 132).

Murray and Venneman (1983), on the other hand, base their study of diachronic phonological change mostly on Hooper, reviewed above. The authors propose "The Syllable Contact Law (SCL)" (1983, p. 520), in which they assert that "The tendency for a syllabic structure

A$B to change, where A and B are marginal segments and a and b are the Consonantal Strength values of *A* and *B* respectively, increases with the value of *a* minus *b*." (p.520). In the strength scale for Spanish, for example, any pair of the listed segments could correspond to *A* and *B*; the values for these segments in the Table would correspond to *a* and *b*. What Murray & Venneman mean is that whenever there is syllable contact, the preferred sequences are those where there is a difference in strength between these two segments and the stronger one is the second one. This tendency can be illustrated with synchronic examples from Brazilian Portuguese. It is possible to state, for instance, that the word *pato* totally conforms to the SCL because /t/ is much stronger than /ɑ/; *apto* marginally conforms to the law as there is little or no difference in strength between the two stops; *ritmo* is in gross violation of the law, as /t/ is much stronger than /m/. Thus, in colloquial Brazilian Portuguese, there is never any resyllabification of *pato*, and one would expect *ritmo* to be resyllabified by epenthesis more frequently than *apto*.

There is a universal tendency for strengthening the beginning of the syllable and weakening the end of it. Hooper (p. 199), for instance, gives as an example the Spanish word *huevo* (egg), which in some dialects is pronounced [g^{w}eβo]. The phoneme /g/ is added at the beginning of the word in order to strengthen it; otherwise the word begins just with the glide [w]. There is a tendency in Spanish, as well, to

either weaken or omit certain consonants in syllable-final position, such as final /s/, as in *las casas* [lah kasah] (the houses), and final /d/, as in *libertad* [libertá] (liberty); *intimidad* [intimidá] (intimacy) etc. In Portuguese we also have syllable final weakening in the form of the elimination of the nasal consonants in final position and the nasalization of the vowel, as in *sim* [sĩ], and the rounding of final /l/, as in *sal* [saw].

Considering what has been discussed so far in this section, it is possible to perceive the importance of phonological theory in order to explain interlanguage (IL) phonological phenomena in general. Yet a more convincing universal consonantal strength (or sonority) hierarchy has not been developed so far. Even accounting for the years after Hooper's (1976) edition, no general agreement has been reached towards the most satisfactory hierarchy to be used. Although Dziubalska-Kolaczyk (1997) is a recent publication, the author does not make distinctions between voiced/voiceless pairs, and she rates stops as being stronger than fricatives. However, these theories refer to the native language by itself without making any reference to their application to IL. As a matter of fact, since ILs are in a constant state of change, a continuous development of phonological theories, in this respect, becomes more and more necessary.

2.3. The syllable in SLA

Studies of consonants, in general, are particularly widespread in SLA phonology research. However, the production of single English consonants in syllable-final position by foreign students appears to be an area not much explored in second language phonology research. As far as I know, a limited number of relevant studies have been published dealing with final consonants (Anderson, 1987; Eckman, 1987b; Tarone, 1987b; etc.). Yet these studies do not deal only with syllable-final consonants, but with syllable structure in general.

2.3.1. Transfer, developmental factors and universals

Major (1991) goes through current theory, data and results of several important figures in L1 and L2 phonology (Eckman; Curtis; Scovel; Flege; Leather & James etc.) Among the most relevant issues in L1/L2 phonology reviewed by Major are: age, personality, transfer and contrastive analysis, phonological similarity, markedness (UG), developmental factors, style etc. In addition to the discussion of these issues mentioned above, the author also provides a historical depth in the new trends of IL phonology. Hence, he explains that IL phonology research, in general, "has widened its scope from the early nearly exclusively contrastive analysis approach, with the assumption that all

errors were due to native language transfer, to a more broadly based approach incorporating general linguistic theory " (Major, p. 196). Major adds that current studies have also considered markedness theory and socialinguistic variables. The studies reviewed below deal with four of the issues mentioned by Major: age, transfer, developmental factors and universal grammar (UG).

In addition to being the only study dealing with age, Weinberger (1987) deals with the production of vowel epenthesis and syllable structure in general. In this article, the researcher reviews and compares data from Mandarin Chinese subjects he analyzed himself to both Eckman's (1981) and Heyer's (1986) data. Weinberger, then, points out that the reason why L2 children prefer consonant deletion to epenthesis is their lack of maturity regarding the recoverability principle (RP). Adult L2 learners, in contrast, rely more on vowel epenthesis than on consonant deletion, due to the fact that the RP has already matured in them, and they appear not to lose access to this UG principle, even while they may lose access to others. The author also exemplifies by saying that "Given that phonetic ability (i.e., the skill to pronounce complex syllable structure) does not develop significantly after puberty, adult L2 learners with a more developed knowledge of the target language lexicon will more fully operationalize the recoverability principal" (p. 299).

Tarone (1980) is an investigation of the English IL of speakers of Korean, Cantonese and Brazilian Portuguese, between the ages of nineteen and thirty. The six subjects were audiorecorded describing sequential pictures and narrating them afterwards. For this pilot study, the author examines the three processes which had the greatest effect on the IL syllable: language transfer, reactivated first language acquisition processes, and universal processes. Of these, L1 transfer was responsible for the greatest number. The universal process most evident in her study was a universal tendency among learners to prefer an open CV syllable pattern, rather than typical English closed CVC pattern[2]. Tarone emphasizes that these universal processes might exist together with other processes, "such as language transfer, to produce an even stronger preference for the open syllable in the interlanguages of some learners; but clearly, the preference for the CV syllable seems in this study to be process which operates independently of language transfer" (p.241).

Sato (1984) investigates the relative importance of transfer and developmental processes in the acquisition of the L2 syllable. The subjects for this study are two Vietnamese brothers who were ten and twelve years old when they arrived in the U.S.A. They were recorded at home speaking freely in an "unstructured informal conversation" (p.

[2]The CVC (consonant vowel consonant) sequence is a very common pattern in English. In such a case, the following terminology could be used: the opening segment of a syllable = the **onset**; the closing segment of the syllable = the **coda** and the central segment of the syllable = the **center** or **nucleus**. The CV (consonant vowel) sequence, on the other hand, is a pattern which appears to be found in all languages: because the syllable is not closed by another consonant, this type of syllable is often called an open syllable type (Crystal, 1985).

253). The author sets out to discover whether there is going to be a preference for the open syllable even in the interlanguage of Vietnamese learners of English, whose native language prefers a closed syllable in its phonological structure. She eventually concludes that language transfer is strong in Vietnamese learners of English, evidenced by "(1) a preference for closed syllable in the modification of English syllable-final consonant clusters; (2) greater difficulty in the production of final than initial clusters; and (3) negligible use of epenthesis as a syllable modification strategy" (Sato, p. 260).

Broselow (1987a) analyzes the syllable structure of both American English as the native language and Egyptian Arabic as the L2. According to Broselow, the production and perception of word juncture errors have not been much explored in SLA literature. The author points out that these phenomena "are a function of syllable structure; the rules determining the syllable structure of a language will account for the phonetic effects associated with word juncture in that language" (Broselow, p. 262). The problems concerning the production of junctures in Arabic by native speakers of American English result from "an attempt to apply the syllable structure rules of the native language both in processing and in producing strings of the target language" (p. 262). Broselow concludes by claiming that syllable structure restrictions are also likely to be influenced by transfer.

Broselow (1987b) deals with the prediction of epenthesis errors in the acquisition process of initial English consonant clusters by speakers of two dialects of Arabic: Iraqi Arabic and Egyptian Arabic, which do not have these clusters as part of the language inventory. The author claims that the difficulty in producing the initial consonant clusters in English is a result of a lack of knowledge of the target language (TG) grammar rather than any transfer processes predictable by contrastive analysis. However, Broselow stresses that Iraqi Arabic and Egyptian Arabic speakers apply different rules for epenthesis in medial three-consonant clusters. In Egyptian the epenthetic vowel appears after the second of three consonants ($\phi \rightarrow$ i / CC__C) such as in "chil*i*dren" (*children*) (Broselow, p. 297). In Iraqi, on the other hand, it appears after the first of three consonants ($\phi \rightarrow$ i / C__CC) as in "child*i*ren" (*children*) (p. 297). Thus, although the researcher states that transfer does not play an important role in SLA, she agrees with the assumption that for some general rules such as epenthesis transfer may take place.

In sum, all the studies reviewed in this section allude to the fact that consideration of transfer, developmental factors and universals combined is imperative to assess EFL learners' interlanguage production in general. However, most SLA researchers, appear to embrace the idea that not all substitutions in L2 are generally due to transfer. There is no indication that transfer by itself was sufficient to clear up most of these

substitutions. In addition, it is difficult to claim that transfer could explain why some structures are acquired before others. For these reasons, further studies carried out in these three areas may represent a significant step and a challenge, indeed, towards improvement in the analysis of SLA data.

2.3.2. Markedness

Eckman (1981, 1987b, 1986) attempts to show the connection between interlanguage (IL) phonological rules and the phonological structure of both the NL and the TL. In addition, he examines the principles which control these IL phonological rules.

Eckman represents one of the most relevant names in the area of interlanguage (IL) phonology studies. Some of the most recent investigations (e.g., Anderson, 1987) in IL phonology are based on Eckman's Markedness Differential Hypothesis (henceforth MDH) (1987a). The MDH applies some principles of language universals to the contrastive analysis hypothesis (CAH). It is stated in the MDH that it is imperative to have information from contrastive analysis (henceforth CA), as well as information about universal grammar (UG), in order to make predictions about the areas of difficulty in SLA. In other words, while CA is only partially successful in predicting which aspects of the

target language (TL) phonology, syntax, etc. will be difficult for speakers of a particular native language (NL), the author claims that "if the CAH is revised to incorporate certain principles of universal grammar, it is possible to predict what can be termed the 'directionality of difficulty'" (Eckman, 1987a, p. 55).

In Eckman's definition of markedness, if "the presence of A in a language implies the presence of B; but the presence of B does *not* imply the presence of A" (p. 60), then A is more marked than B. The author exemplifies, noting that *voiced* stops are more marked than *voiceless* stops because in some languages, such as Korean, there are only voiceless stops, while in other languages, such as English, there are voiced and voiceless stops (p. 61), but there are apparently no languages that have voiced stops without voiceless stops. The author then points out the fact that the difficulties encountered by the language learner can be predicted by comparing systematically both the native and the target language, (p. 61) as in traditional CA, and by including markedness relations, claiming that:

> (a) those areas of the target language which differ from the native language and are more marked than the native language will be difficult. (b) the relative degree of difficulty of the areas of the target language which are more marked than the native language will correspond to the relative degree of markedness. (c)Those areas of the target language which are different from the native language, but are not more marked than the native language will not be difficult (p. 61).

Eckman, in this way, manages to provide a way to maintain the CAH, and ultimately make it more valid. For him, the first language structure is relevant and it is likely to interfere with the second language structure when the latter is more marked. Portuguese, for example, is considered to have a much less marked syllable structure than English does, making the typical English CVC syllable structure more difficult compared to Portuguese. The following pages review some studies of IL syllable structure, illustrating the relevance of the MDH.

Eckman (1981) is a study on the voicing distinction in the production of voiced word-final and word-medial obstruents of the target language by Cantonese and Japanese learners of English. The concept of markedness Eckman applies to this study is based on the notion of

'typological markedness'[3]. Students from the University of Wisconsin-Milwaukee between the ages of eighteen and thirty were asked to listen and repeat a list of words placed in random order, and this repetition was tape-recorded. The researcher, then, concluded that while Cantonese students appeared to apply a rule created for devoicing word-final obstruents, the Japanese subjects, in contrast, learned interlanguage rules to add an epenthetic word-final schwa. The author, as a result, claims that despite the fact that they were using different rules, their strategies were the same, considering that both the target and the native language were being compared.

Edge (1991) reports a partial replication and extension of Eckman (1981). In this study on word-final voiced obstruents, data were collected from seven Japanese and seven Cantonese speakers, who carried out three different tasks differing in speech style. The same tasks were tested with native speakers of English to compare native-like assimilated forms with non-native production as an IL phenomenon. Since both the Cantonese and the Japanese speakers were found to apply a terminal devoicing rule on this study, it was concluded that there is a universal tendency for the devoicing of final consonants, independent of the existing of a voicing contrast in the NL. Also contrary to Eckman (1981), epenthesis was a less-frequently used strategy in this study.

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[3]A phenomenon A in some language is more marked relative to some other phenomenon B if, cross-linguistically, the presence of A in a language necessarily implies the presence of B, but the presence of B does not necessarily imply the presence of A. (Eckman, 1981, p.19)

From the IL data of Cantonese, Japanese and Korean learners of English, Eckman (1986), claims "that what appear to be unsystematic deletions in final consonant clusters can be systematically characterized if one hypothesizes that the IL rule involved operates to produce final clusters which are less complex both in the length and make up of the cluster. The proposed basis by which this complexity is measured is the notion of typological markedness" (p. 158). The author claims that interlanguage rules are not required to correspond to the same principles as primary languages, but only "that the representations which are the output of these IL grammars will be in conformity with typological markedness" (p. 158).

Anderson (1987) analyzes the efficacy of the MDH for predicting difficulties in the acquisition of the L2 syllable. Through a study of speakers of Amoy Chinese, Mandarin and Egyptian Arabic learning English; she shows that the MDH is, in fact, considered to be a good predictor in terms of "syllable simplification" strategies used by the subjects. The data show that whenever there seemed to exist an opposition in the predictions made by the markedness criteria and transfer, "the MDH proved to be a more accurate predictor of performance than NL transfer" (Anderson, 1987, p. 290).

In contrast to his previous studies, Eckman's (1991) Structural Conformity Hypothesis (SCH) is an investigation about universal generalizations, in which the author claims that the "generalizations that hold for the primary languages hold also for interlanguages" (p.24). Yet, in this research the author does not account for differences between the NL and the TL. In this study, the experimenter investigates the acquisition of English consonant clusters by eleven EFL subjects (Japanese, Korean and Chinese) who had lived in the U.S.A for a period varying from 2 months to 1 year. The Fricative-Stop Principle and the Resolvability-Principle were both tested as universal generalizations, in this investigation. In this case, both principles entail implicational markedness. According to Eckman, the interesting aspect about these results is "that the interlanguages could have deviated from the NL and TL in question in a number of logically possible ways that were counter to universals" (p.34).

The results, then, lead the author to conclude that interlanguages should be considered natural languages; and that the basic ideas concerning interlanguages are also true for primary languages. Even though in his Structural Conformity Hypothesis (SCH), Eckman does not take into account differences between the target language (TL) and the native language (NL), the SCH, as the MDH, could be applied to the voiced/voiceless relationship because of the fact that in the world's

languages voiced consonants are more marked in syllable-final position than voiceless consonants.

Taking into account what has been said about the MDH so far, one can perceive the importance of markedness relations in order to examine and explain the syllable structure in interlanguage. As the most important name, Eckman (1987a) was the first one to claim that target language (TL) structures which differ from those of the native language (NL) and are more marked than the NL will be more difficult (p. 61). In addition, the degree of difficulty will depend on the degree of markedness. Furthermore, Eckman (1991) himself has stressed that his structural conformity hypothesis (SCH) is a stronger hypothesis for being more falsifiable. The SCH makes predictions based on universals, while the MDH makes predictions both on the differences between the NL and TL and on universals.

Among the studies on markedness, it is necessary to say that there is only one that does not support the MDH, which is Edge's (1991). In Edge's replication of Eckman's (1981), epenthesis, for example, was a less-frequently used strategy compared to devoicing. Supporting the MDH, Eckman's study, in contrast, had found that Cantonese speakers avoided word-final voiced obstruents by devoicing them. Anderson (1987), in turn, supports the MDH by claiming that the "MDH is a fairly

good predictor of the syllabification performance of the Arabic and Chinese ESL learners investigated. As predicted, the marked longer clusters were more difficult than the unmarked shorter ones for both groups, and for the Chinese group, the marked final clusters were more difficult than the unmarked initial ones" (Anderson, p. 290).

2.3.3. Final stops

There are not many studies published on final single stops in interlanguage SLA phonology and of those that do exist most concern devoicing. In addition to the studies reviewed in this section, both Eckman (1981), Edge (1991) and Weinberger (1993) also discuss final stops, considering mostly the notion of markedness in word-final obstruents. The articles reviewed in the following pages, in turn, deal with final stops produced by various interlanguage speakers.

Eckman (1987b) demonstrates that the MDH predicts that both Spanish and Mandarin speakers will have difficulty with the English voice contrast in final position, as the contrast does not occur in this position in either NL, and this position is also more marked. However, the fact that this difficulty leads to terminal devoicing by the Spanish speakers and schwa paragoge by the Mandarin speakers can only be

explained by further reference to the NL syllable structures and the surface phonetic constraints.

Although Spanish does not have a terminal devoicing (TD) rule, neither does it have a superficial voice contrast in final position. Thus, Spanish speakers learning English have the task of learning to produce this contrast, and use the TD rule until they learn it. Mandarin, according to Eckman (1987b), does not have the voice contrast in any position, initial consonants being voiceless, medial consonants being voiced and final consonants being limited to sonorants. Thus, all obstruents being difficult to pronounce in final position, a TD rule would not solve the Mandarin Speakers' problems. Therefore, the strategy left to these speakers is schwa paragogue. Thus, although the IL rules are not transferred from the native language (NL), it is the NL which determines the IL rule applied.

Yavas (1994) reviews studies of devoicing of final stops in interlanguages in general. The author observes that English, for example, has both voiced and voiceless stops taking place in syllable-final position. In contrast, German, Turkish, Dutch, Finish, Polish, Russian, etc. have only voiceless stops in syllable-final position. In the analysis of the devoicing process of voiced final stops in English, spoken as interlanguage, speakers of these languages are expected to devoice, for

instance, the marked English target consonants /b, d, g/ and produce them as /p, t, k/ correspondingly. Yet Spanish has voiced and voiceless obstruents in final position and its speakers tend to devoice the final obstruents, as well. Spanish speaking EFL learners are, therefore, an example of the fact that it is not only transfer that makes the difference but universal strategies as well. In addition, Yavas also shows in the end of his analysis that there are some investigations (Locke, 1983) claiming that the quality of the preceding vowel seems to play an important role in terms of the devoicing of the following consonant. The studies have found that the higher the preceding vowel the stronger the tendency for both L1 and L2 speakers to devoice the final voiced/voiceless consonant.

Finally, Eckman and Iverson (1994) is an investigation of the production of distinct consonants and syllable codas in English as interlanguage. In analyzing the data from adult native speakers of Japanese, Cantonese and Korean, the authors state that pronunciation problems found in these foreign learners result from phonological variation along with markedness principles. As a result, Eckman and Iverson report that they found a greater difficulty for L2 learners in producing marked coda obstruents than unmarked coda sonorants. The researchers assert that affricates, for example, are considered the most marked among the obstruents in final position, followed by the fricatives and ultimately by the stops. This is, to a certain extent, contrary to

Hooper (1976), Selkirk (1982), etc. who state that stops are stronger (less sonorous) than fricatives according to Hooper's scale of consonantal strength.

In brief, the studies reviewed above consider final stops mostly in terms of terminal devoicing, a strategy that is not normally used by Brazilian EFL learners. In order to explain this interlanguage simplification, most of the authors found it imperative to discuss markedness relationships. Based on their data from adult Korean, Japanese, and Cantonese EFL learners; Eckman and Iverson (1994), for example, argue that both markedness constraints and phonological properties of segments determine, in fact, the nature of the second language phonological variation. Thus, the study of final stops is another example which shows the relevance of markedness to explain the interlanguage phenomenon.

2.3.4. Carlisle: The importance of environment

Carlisle (1991) examines the influence of environment in the production of vowel epenthesis in the Spanish/English interphonology. The frequency of epenthesis in syllable initial-position before /st/, /sp/ and /sk/ was observed through the reading of 253 sentences by five Spanish speakers between the ages of eighteen and thirty-four. The first

finding has suggested that vowel epenthesis was the simplification process used possibly because of the influence of the subjects' L1 syllable structure. Spanish, for example, does not allow /st/, /sp/ and /sk/ clusters in syllable-initial position. Secondly, there was a strong indication that the production of epenthesis was affected by the preceding phonological environment. Moreover, the researcher claims that "in both of the studies described here the consonantal sonorants seemed to induce epenthesis less frequently than the obstruents, but more frequently than the vowels. This could indicate that the frequency of epenthesis may be inversely proportional to the sonority of the preceding environment" (p. 90).

Carlisle (1992) investigates the interaction of environment and markedness relationships on vowel epenthesis in word-initial /sl/ and /sN/. For this study, 14 subjects were recorded reading a controlled test containing these clusters with 28 different word-final segments in the environment. Between the two types of onset clusters, /sN/ is considered more marked than /sl/. Hence, the researcher found that epenthesis was considerably more frequent before the more marked onset rather than the less marked one. In addition, the occurrence of epenthesis was greater after word-final consonants than word-final vowels. Thus, it can be concluded that there was, indeed, an interaction between the two sets of constraints in the sense that a greater frequency of epenthesis occurred

after the consonants before /sN/ and the least frequent occurrence was produced after vowels before /sl/.

Carlisle (1994) is a review of studies in which he investigates the effect of the interaction between markedness and the linguistic environment as a very important factor in the structuring of interlanguage phonology. In this article, Carlisle argues that linguistic environment may play an imperative role in ascertaining a higher frequency of occurrences of one target linguistic variant rather than another. Hence, the investigator raises an interesting question whether environments by themselves "can be in markedness relationships and whether the less marked environment will induce a higher frequency of target variant than will a more marked environment" (p. 246). The author, then, points out that very little investigation has been carried out with the aim of proving this interaction between markedness relationships and environment.

2.4. Conclusion of review of literature

To conclude this chapter, all the studies reviewed, in general, are of a great contribution to SLA phonology considering both theoretical and empirical factors. Although most of the studies carried out by Brazilian researchers were significant only to relate the reader to the SLA context, they were also valid to throw light on the interlanguage

(IL) of Brazilian EFL learners. Factors such as transfer, development and universals were shown in general studies to influence the difficulty of production. Within the area of universals, phonological theory was crucial, especially for explaining effects of markedness and for Carlisle's strength relations processes in IL. Markedness seems to play an imperative role, in most of the studies reviewed, in explaining the IL production of voiced syllable-final consonants by Brazilian EFL learners. Contrary to the ± voiced contrast, the concept of markedness in relation to other characteristics of the target consonant (e.g. strength relations, point of articulation etc.), has not been fully developed in the studies reviewed, but rather barely touched upon. This represents, therefore, a gap in the SLA phonology literature.

However, the relevance of phonological environment as a determinant factor in the occurrence of epenthesis was an issue apparently investigated only by Carlisle (1991, 1992). Consonantal Strength (or sonority) appears to be another significant environmental factor taken into account only by Carlisle. Carlisle (1991) examines interaction between markedness and phonological environment, mostly considering consonants vs. vowels and the height of the vowels. The author considers the sonority of environmental consonants as a relevant factor only in the investigation of initial /s/ - clusters (1991), but not in his investigation of final consonants. The present study, then, attempts to

fill this gap by examining whether the immediately following segment of the phonological context and the strength relations between this segment and the target final consonant may be influencing the frequency of epenthesis. Chapter three will present the hypotheses followed by a detailed discussion of results in chapter four.

CHAPTER 3

METHOD

Altenberg & Vago (1987) make an error analysis of the IL English phonology of two native speakers of Hungarian. In this general investigation, the authors address four related issues concerning second language phonology: (1) constraints on transfer; (2) other factors involved in TL production; (3) criteria for evaluating foreign accent; (4) a comparison of the error analysis approach with Eckman's approach, which they call "the autonomous system analysis approach" (Altenberg & Vago, p. 149). The error analysis identifies, classifies and systematically interprets the learner's second language errors. The autonomous system analysis, in turn, "analyzes the phonology of the second language speaker as a system unto itself and then attempts to account for the characteristics of that system" (p. 148). The authors ultimately claim that "each approach provides unique information and that both need to be used together in order to provide the most insight into second language phonology" (p. 149). Thus, in the present study, a combination of both of the approaches described above was applied. In other words, subjects' errors were identified, analyzed, classified and interpreted based on natural generative phonological theory.

3.1. Hypotheses

Applying the Markedness Differential Hypothesis (MDH) to the present study on final consonants, the theory provides an explanation for Brazilian students' difficulty in pronouncing syllable-final consonants without resyllabification (e.g., *sit* [sɪti], *language* [læŋgwədʒi] etc.). What the MDH alone does not provide, however, is a way of predicting which consonants will be more difficult than others. It may be predicted only that voiced consonants, because they are more marked in final position than voiceless consonants, will be more difficult for learners to pronounce, which is the first hypothesis of this study. To make further predictions in this study, consonantal strength and syllable contact were considered.

Thus, generally speaking, this study investigated to what extent the difficulty of English syllable-final consonants is influenced (3.1.1.) by markedness of the target consonant and (3.1.2.) by markedness in the phonological environment. For each of these two main variables, sub-variables were also taken into account. The hypotheses and subhypotheses are given in sections 3.1.1 and 3.1.2.

3.1.1. Markedness of the target consonant

Hypothesis 1

Based on Eckman's (1987a) MDH, hypothesis 1 states that the more marked the target final consonant, the more difficult the production of this consonant by Brazilian EFL learners will be. This hypothesis includes four sub-hypotheses, stated and explained below.

Sub-hypothesis 1.1.

Eckman has found in his studies that EFL learners often use devoicing as a strategy to produce English syllable-final voiced consonants, since voiceless consonants are less marked, especially in syllable-final position. The present study, however, has found only one case of devoicing in this position, the usual strategy being epenthesis. Moreover, as a teacher of English, the author of the present study has heard throughout his teaching experience very few instances of devoicing as a strategy used by EFL Brazilian learners of English. Based on Eckman's MDH, however, it was considered conceivable that the voicing distinction might still affect the difficulty of producing syllable-final consonants. Sub-hypothesis 1.1. states that voiced final consonants will cause a greater frequency of epenthesis than voiceless final consonants.

To investigate this hypothesis, a comparison was made of the frequency of epenthesis in voiced/voiceless pairs of stops, fricatives and affricates.

Sub-hypothesis 1.2.

In turn, as mentioned before, Hooper's (1976) Strength Hierarchy is based on the assumption that there is a strength relation in syllable structure. The author also points out that there is a tendency in natural languages towards a universal condition on preferred syllable structure (1976, p.199). Thus, consistent with Hooper, stronger consonants are, in general, less "optimal" in syllable-final position than weaker consonants.

Eckman and Iverson (1994), in their study about the production of distinct consonant codas, found that because of differences in degree of sonority, and thus of markedness, obstruent codas were, in general, more difficult than the nasals, which were more difficult than the liquids. Accordingly, the present study set out to discover whether the strength of the final consonant would also determine difficulty for Brazilian EFL learners. Because of lack of liquids included as target consonants in this study, Subhypothesis 1.2. states simply that the stronger and more marked obstruents will cause more frequent epenthesis than the weaker less marked nasals.

Sub-hypothesis 1.3.

As far as relative strength within the class of obstruents is concerned, Eckman and Iverson also claim that the most marked obstruents are the affricates, followed by the fricatives, and then followed by the stops. This statement, is contrary to Hooper (1976), who asserts that the stops are stronger than the fricatives. Although being different from Hooper's, this research, based on Eckman and Iverson's hypothesis, investigated the truth of this claim for Brazilian EFL learners. Thus, Sub-hypothesis 1.3. states that the greatest rate of epenthesis will be found after affricates, followed by fricatives, and finally by stops.

Sub-hypothesis 1.4.

Yavas (1994, 1997), citing Ohala (1976, 1983) and Ohala and Riordan (1979) to support his hypothesis, investigates the place of articulation of stops in final position. This is a factor that concerns only markedness, not strength, though. Yavas found that velars are considered to be the most difficult stops to voice in final position because a smaller supraglottal area would facilitate devoicing. As a result, alveolars would be considered the second most difficult, followed by bilabials. Based on these claims, this study investigated whether this would hold true for

Brazilian EFL learners. Thus, based on Yavas, Sub-hypothesis 1.4. states that voiced velars will cause more epenthesis than voiced alveolars, which would cause more epenthesis than voiced bilabials.

3.1.2. Influence of phonological environment

Hypothesis 2

According to Carlisle (1994), the phonological environment and markedness relationships are equally important in terms of influencing the phonological variants produced by EFL learners, in general. Thus, the interaction between them was expected to influence the rate of epenthesis. This hypothesis includes two sub-hypotheses, stated and explained below.

Sub-hypothesis 2.1.

Carlisle also compares consonants and vowels in the environment and has found that the former tend to cause more epenthesis than the latter. Therefore, this study set out to investigate Sub-hypothesis 2.1. which states that environmental consonants will cause more epenthesis than vowels and, in addition, that environmental vowels will result in more epenthesis than pauses.

Sub-hypothesis 2.2.

Finally, the last and possibly most important hypothesis is based both on Hooper's (1976) concept of relative strength relations and Murray & Venneman's (M&V, 1983) Syllable Contact Law (SCL). Hooper's Syllable Structure Condition (1976) "requires that a syllable-initial C be stronger than the immediately preceding syllable-final C" (p. 220). Thus, as opposed to the hypothesis which deals with strength of the final consonant, this hypothesis will depend on the difference in the strength between the word-final consonant and the first segment of the following word. In this case, epenthesis corresponds to the resyllabification mentioned by M&V (1983):

> THE SYLLABLE CONTACT LAW (SCL): The preference for a syllabic structure $A^{\$}B$, where A and B are marginal segments and a and b are the Consonantal Strength values of A and B respectively, increases with the value of b minus a. COROLLARY: The tendency for a syllabic structure $A^{\$}B$ to change, where A and B are marginal segments and a and b are the Consonantal Strength values of A and B respectively, increases with the value of a minus b (p. 520).

In other words, the greater the violation of the Syllable Contact Law (SCL) the more likely resyllabification will occur. Although Murray & Venneman (M&V, 1983) were referring to diachronic change in primary languages, applying this law to interlanguage gives Sub-hypothesis 2.2., which states that the greater the value of *a* (the strength of the target consonant) minus *b* (the strength of the first segment of the following word), the greater will be the frequency of epenthesis.

In order to investigate this hypothesis, strength values were given to the target consonant and to the context consonant (sentences with vowels in the immediately following context were excluded), the second value was subtracted from the first, giving the Syllable Contact Number (SCN). The hypothesis predicts, then, that the greater the SCN, the greater will be the rate of epenthesis.

3.2. Subjects

The subjects chosen for this study were six Brazilian students of English (three male and three female) from the first, second and eighth semesters of the Letters course at the Universidade Federal de Santa Catarina (UFSC) between the ages of 19 and 29 (mean age 25.1). Four of the subjects are originally from Florianópolis (SC), one from São Miguel do Oeste (SC) and one from São Paulo (SP). All have spent most of their

lives in their respective hometowns and none of them had any sort of experience with a second language at home. All had studied English as a foreign language only in primary and secondary schools before entering the Letters course. Among the subjects, only one had spent a month in England, while the rest had never been abroad or had much contact with English speaking people in Brazil.

Subj.	Age	Sex	Home State	Time Abroad
MAR	27	M	SP	ϕ
GI	28	F	SC	ϕ
EN	25	M	SC	ϕ
OTA	29	M	SC	ϕ
KA	23	F	SC	1 Mo.
TA	19	F	SC	ϕ

3.3. Material

The data were collected by means of a test containing a total of 432 simple contextualized sentences (*e.g. the pet runs/the man drives fast/the thief became violent,* etc.) written by the investigator to be read by the subjects. These sentences included twenty-seven sentences for each of the following word-final consonants (all target words were monosyllabic[1]); / p, b, t, d, k, g, f, v, s, z, ʃ, tʃ, dʒ, m, n, ŋ/. The consonants /θ, ð, ʒ, l, r/ were not included in the test because of their infrequent appearance in final position or to avoid the intervening variable of articulatory difficulty. The dental fricatives /θ/ - /ð/, for example, are frequently pronounced by Brazilians as stops in initial position and as sibilants in final position. Moreover, they are not very frequent in word-final position. The same holds true for /ʒ/, which appears in final position only in some French borrowings such as *garage, massage* etc. The liquid /l/, in turn, is frequently pronounced by Brazilians as the glide /w/ in final position, as in words such as *call* [kaw]. As for /r/, it can be said that it causes considerable articulatory problems as well. In addition, students who prefer British pronunciation pronounce no /r/ consonant at all in final position.

[1] Polysyllabic words were excluded from the test to limit the scope of the study. The inclusion of these words would imply the inclusion not only of the variable number of syllables, but also the variables of word stress and position of the target syllable within the word. Thus, future studies which consider this variable need to be conducted.

Each of the 27 sentences corresponds to one of the following phonological contexts, following the target word-final consonant: the nineteen consonants [p, b, t, d, k, g, tʃ, dʒ, f, v, θ, ð, s, ʃ ,h, ,m, n, l, r]; the glides [j, w]; the five vowels [æ, ɑ, ɔ, ɛ, oʊ]; and silence (utterance final position). The sentences were printed out in six different random orders (one for each subject) in font Times New Roman size 14 and double spaced.

3.4. Procedure

The subjects were told only that the test was to evaluate their pronunciation of English, but not that the emphasis was on word-final consonants. They were recorded individually reading the sentences (one sentence was accidentally omitted from the test) in a quiet room on campus, in the presence of the investigator. Recordings were all made on a small mini cassette recorder (GE Automatic Voice Recording, DC 3V) to avoid intimidating the subjects.

Each recording session was preceded by an informal 10 to 15-minute chat in English and Portuguese to make subjects feel as comfortable as possible. After that, the subjects were asked to read each sentence naturally at their own reading speed, keeping their place with a ruler or file card to avoid skipping or repeating any sentence. In case of

mispronouncing any word due to lack of attention, they were encouraged in advance to take their time and read the sentence again. In addition, subjects were told not to worry about words they were not familiar with, taking into account that the objective here was merely to test pronunciation. Also, because of the hot weather during the days of the recordings, there was a five-minute break in the middle of every session so that subjects could stretch and have some water. Each recording lasted about forty minutes or so depending on each subject's reading speed.

3.5. Analysis

The type of research carried out in this study was descriptive, taking into consideration that an existing condition was being described through a quantitative analysis. The recordings were transcribed phonetically in narrow transcription using the standard IPA (International Phonetic Alphabet). Only the target word of each sentence (the word with the final consonant) and the phonological context (the word immediately following) were transcribed. The occurrences of epenthesis were tabulated and percentages of epenthesis within each category were calculated.

CHAPTER 4

RESULTS AND DISCUSSION

It has been pointed out in preceding studies (Tarone, 1980; Sato, 1987) that there is a universal tendency for simplifying vowel-consonant (CVC) pattern into CV. Similar tendencies may be coupled with other processes such as transfer to reinforce the CV preference. Yet, in order to predict which final consonants are the most difficult and in which environments, it is imperative to consider other factors in addition to those mentioned above. Therefore, the factors to be discussed in detail in the following sections of this chapter are: (4.1.) markedness of the target segment and (4.2.) the influence of phonological environment. In addition, section 4.3. is a general discussion of the results in light of phonological and SLA theory.

4.1. Markedness of the target segment

This section is a discussion of the markedness of the target consonants considering basically four factors: (1) the ± voice distinction of the target segments; (2) relative strength between obstruents and nasals; (3) relative strength within the class of obstruents comparing affricates, fricatives and stops (based on Eckman and Iverson (1994),

rather than Hooper's (1976) strength scale); and finally (4) place of articulation.

4.1.1. Voicing distinction

Several studies in SLA phonology have pointed out the fact that native speakers of languages without voiced consonants in final position tend to devoice them as target consonants. Few occurrences of devoicing has taken place in the data of the present study. Yet voicing of the target consonants seems to have played a crucial role in determining the frequency of occurrences of epenthesis. As can be noticed in Table 1, it appears to be harder for a Brazilian EFL student to produce a voiced final consonant than a voiceless one.

Table 1 displays the frequency and the rates of epenthesis per final obstruent in terms of [± voiced] pairs[1]. These numbers were obtained considering solely the realization or non-realization of epenthesis (i.e. **1** for production and **0** for non-production).

[1] The alveopalatal fricative /ʃ/ was included in the study, but its voiced counterpart /ʒ/ was excluded for lack of examples. Thus, since Table 1 displays voiced/voiceless pairs, /ʃ/ was excluded from this Table, but is included in the statistics of Table 2.

	Bilabial Stops	Alveolar Stops	Velar Stops	Lab-dental Fricatives	Alveolar Fricatives	Alveopal. Affricates	Total
No. [-vd]	162	156	162	162	162	162	966
Epen [-vd]	17	16	21	30	10	18	112
% [-vd]	**10.5%**	**10.3%**	**13.0%**	**18.5%**	**6.2%**	**11.1%**	**11.6%**
No. [+vd]	162	162	162	162	162	162	972
Epen [+vd]	17	27	34	30	27	48	183
% [+vd]	**10.5%**	**16.7%**	**21.0%**	**18.5%**	**16.7%**	**29.6%**	**18.8%**
Total No.	324	318	324	324	324	324	1938
Total Epen	34	43	55	60	37	66	295
Total %	**10.5%**	**13.5%**	**17%**	**18.5%**	**11.4%**	**20.4%**	**15.2%**

Table 1: Rates of epenthesis after obstruents by voiced/voiceless pairs.

Eckman (1987a) claims that voiceless consonants in final position are less marked than their voiced counterparts. Although the exceptional bilabials and the labial dental fricatives weaken this support, the results shown above appear to support the hypothesis that voiced consonants in general are more problematic. Thus, a higher score for the voiced member of the pairs of the alveolar stops, velar stops, alveolar fricatives, and alveopalatal affricates. On the other hand, this is not true for the bilabial stops or the labial dental fricatives. As mentioned before, Yavas (1994, 1997) in citing Ohala (1976, 1983); Ohala and Riordan (1979); and Maddieson (1984), has stressed that because of a larger supraglottal area, bilabials are the least frequently devoiced among the stops and velars are the most frequently devoiced, with alveolars being intermediate. Thus, since labials are not difficult to pronounce with

voicing, there is no difference in frequency of epenthesis between voiced/voiceless labial pairs.

4.1.2. Relative strength (obstruents vs. nasals)

Another significant factor to be considered is the relative strength of the target consonant, although this was difficult to evaluate due to the fact that nasals were the only sonorants included in this study, because of the fact that the others were expected to cause difficulties other than epenthesis. As mentioned in chapter three, /r/ is commonly pronounced as /x/ by most Brazilian learners, while /l/ is frequently pronounced as the glide /w/, as in *call* [kaw].

Despite the different strategies used for nasals in final position, the results of the present study to a limited extent support the hypothesis based on Eckman and Iverson (1994), which states that the strong and more marked obstruents will cause epenthesis more frequently than the weaker less marked nasals. As illustrated in Table 2 below, the three nasals were produced with an epenthesis rate of 43%[2]. Assimilation and deletion occurred at a rate of 7.6%, providing a combined error rate of 11.9%. This represents less than the average frequency of epenthesis of the obstruent pairs shown in Table 1 (15.2%) and is lower even than the

[2] Since the hypothesis in question deals with consonantal strength and the three consonants are classified as having the same strength, they were not scored individually. This distinction might be considered in discussions concerning the effect of point of articulation in future studies.

frequency of obstruents including the alveopalatal /ʃ/ (14.9%)[3]. In other words, in spite of the small difference obtained, the marked obstruents have resulted in a greater frequency of epenthesis compared to the three nasals. Therefore, these results back up Eckman and Iverson's investigation. Furthermore, in this process, the pertinence regarding native language (NL) transfer becomes noticeable especially in terms of strategies used by EFL learners to overcome the difficulties of pronouncing final consonants.

	Nasals /m/, /n/, /ŋ/	Obstruents Excluding /ʃ/	Alveopal. Fricative /ʃ/	Obstruents Including /ʃ/
No. Productions	486	1938	162	2100
No. Epenthesis	21	295	17	312
% Epenthesis	4.3%	15.2%	10.5%	14.9%
No. Assim./deletion	37	----		----
% Assim./deletion	7.6%	----		----
No. Combined error	58	295	17	312
% Combined error	11.9%	15.2%	10.5%	14.9%

Table 2: Rates of epenthesis for obstruents versus nasals.

4.1.3. Relative strength within obstruents

The third factor relevant to the target consonant is in regard to the analysis of markedness within the class of obstruents. To a large extent,

[3] See footnote 1.

the results presented in this study are compatible with Eckman and Iverson's assertion that the most marked consonants in final position are the affricates, followed by the fricatives, and finally by the stops[4]. Based on results presented in Table 1, it becomes evident that the highest frequency of occurrence of epenthesis took place with alveopalatal affricates (20.4%). The labiodental fricatives, in the following sequence, had the second highest rate of epenthesis (18.5%). After that, the velar stops (17.%) presented a higher percentage in comparison to the alveolar stops (13.5%). At last, the percentage for the bilabial stops (10.5%,) was the lowest in this sequence.

As expected, the affricates caused a greater occurrence of epenthesis in comparison to fricatives, followed by stops. An exception was the alveolar fricatives (11.4%). This can be explained by the fact that /s/ within the class of alveolar fricatives included in this investigation is the only consonant in Brazilian Portuguese common in syllable-final position. In any event, the realization of this consonant in this position may depend both on the dialect and the environment as in [s], [z], [ʃ], [ʒ]. The fricative /ʃ/ (Table 2) presented a low frequency of epenthesis because of its frequency in syllable-final position in Portuguese as a variant of /s/. Consequently, the interference of NL transfer with markedness was significant to a certain extent in this case.

[4] Note that this is different from both Hooper's (1976) and Dziubalska-Kolaczyk's (1997) hierarchies of strength/sonority.

This importance, however, was not sufficient enough to reduce or exclude all the epenthesis errors.

4.1.4. Place of articulation of stops

Considering the place of articulation of voiced syllable-final stops, it is noteworthy to mention that the results found in the present study were also expected. According to Table 1, for example, there was a small difference in the occurrence of epenthesis within the voiceless stops (10.5%, 10.3% and 13.0%). The frequency of epenthesis among the voiced stops varies from an average of 21.0% for velars to 16.7% for alveolars and 10.5% for the bilabials. As explained in 4.1.1., based on Yavas (1994, 1997) citing Ohala (1976, 1983), Ohala and Riordam (1979) and Maddieson (1984) voiced velars are the most difficult because of a smaller supraglottal area that favors devoicing. There were only one or two cases of devoicing used as a strategy by the subjects of this investigation. Further, there were not any NL factors involved as an important factor for comparing stops.

4.2. Influence of environment

Strength by itself plays a significant role in IL syllable structure. Yet no study dealing with differences in consonantal strength between

the target consonant and the immediate following segment was found by the author of the present study. In any event, Carlisle (1991, 1993) appears to be the only author known that investigates the adjoining segments as environment. However, his studies are only related to differences between vowels and consonants and between the height of vowels.

Therefore, the present study investigates the environment not only considering consonant vs. vowel vs. pause and the height of a vowel, but especially the role of environment in terms of differences in strength between the target consonant and the next segment in the context, based on Hooper's (1976) Syllable Structure Condition (SSC) and on Murray and Venneman's (M&V, 1983) Syllable Contact Law (SCL). The following two sections deal with the analysis of these two environmental variables.

4.2.1. Consonants vs. vowels vs. pause

In this section, phonological environment is based on the differential effects of the consonants, vowels and the pause subsequent to the syllable-final consonant.

Based on Table 3, the difference between the frequency of occurrence of epenthesis within consonantal and vocalic environments appears to be minimal, - 11.9% for vowels and 13.6% - although tending in the same direction as in Carlisle's (1992, 1994), who found a facilitating effect of vowels in the environment. Comparing these results with the epenthesis rate before a pause (7.3%), a larger difference was evidenced. Hence, these results show that the more marked syllable structure in final position is more difficult to pronounce with this continued production of speech than in isolation.

	Consonant	Vowel	Pause	Total
No. Productions	2010	480	96	2586
No. Epenthesis	273	57	7	337
% Epenthesis	13.6%	11.9%	7.3%	13.0%

Table 3: Rates of epenthesis by environment

4.2.2. Consonantal strength (or sonority) and syllable contact

According to Hooper (1976), whenever there is syllable contact, the preferred syllables in the context are those where there is a difference in strength between the two adjoining segments and the stronger one is the first segment. According to Murray & Venneman (1983), resyllabification is more frequent whenever the adjacent syllables violate the SCL and to the extent that the SCL is violated. In this investigation, the degree of

violation corresponds to the difference obtained by subtracting the strength value of the first segment in the second syllable from the value of the final consonant of the first syllable. In this case, the syllables in greatest violation of the SCL are those in which the first consonant is stronger than the second.

Each segment was assigned a consonantal strength value based on Hooper's universal strength hierarchy (see section 2.2.). After that, the differences were calculated and each target instance of syllable contact was assigned a syllable contact number (SCN). The values assigned for the SCN varied from -4 to +6. Thus, as an example, the target word *pop* followed by the context word *music* has a strength value 6 for the /p/ minus strength value 3 for /m/, resulting in a SCN of 3.

Thus, according to these values, the sentences that had negative numbers were supposed to be less problematic for having the favored syllable structures. On the other hand, those sentences with a positive SCN were expected to be more difficult and, as a result, cause a greater amount of epenthesis.

Table 4 presents the frequency of epenthesis by SCN. According to this table and the information shown in Figure 1, the frequency of

epenthesis gets progressively higher from SCN -4 to 6, with only three deviations in this general tendency for SCN 1, 4, and 6.

SCN	-4	-3	-2	-1	0	1	2	3	4	5	6
No	36	87	252	276	426	306	264	156	132	60	24
Epenth	1	6	23	28	52	36	47	31	23	16	05
Rate	2.8%	7.7%	9.1%	10.1%	12.2%	11.8%	17.8%	19.9%	17.4%	26.7%	20.8%

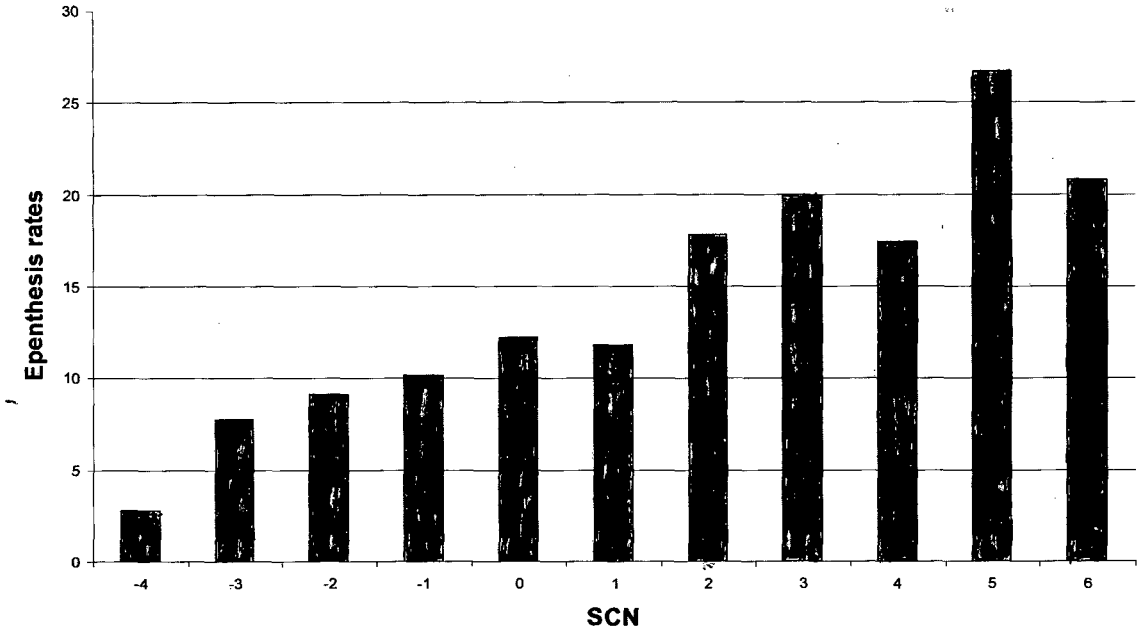
Table 4: Epenthesis rates by syllable contact number (SCN)

These deviations might be attributed partially to the simple fact that statistical results usually appear to be more representative with larger numbers, and some of the SCNs had few tokens. Moreover, the influence of native language (NL) transfer may have interfered with universal tendencies. For example, the final /z/ and /s/ were shown to be easier to pronounce in syllable-final position in English because both are common in this position in Portuguese, such as in *mais* [mays]. This must certainly have affected those SCNs involving both voiced and voiceless continuants.

Another imperative factor regards the fact that as far as strength (or sonority) is concerned, there is no universal hierarchy applicable to consonantal strength. In addition, there is still no unanimity in terms of a standard hierarchy to be used as a model, as well. Dziubalska-kolaczyk (1997), for instance, as mentioned in 2.2., does not distinguish between voiced/voiceless pairs in her strength scale. Moreover, she classifies the

stops as being stronger than the affricates. The fact that the results in the present study appear to be consistent with Eckman and Iverson's (1994) is indicative that fricatives might be more marked than stops. Hence, this alludes to the fact that this hierarchy concerning fricatives and stops may need to be adapted.

Figure 1: Epenthesis rates by syllable contact number (SCN)



By observing Figure 1 above, one can noticeably perceive that the difficulty for production of final consonants in English results from an increase with the difference in consonantal strength across syllables boundaries. Therefore, the generalizations about diachronic change in primary languages described in Murray and Venneman's SCL might be also applicable to interlanguage (IL). This statement seems to be also in

conformity with Eckman's SCH, which states that universal generalizations which are relevant to primary languages might be also true for interlanguages (1991, p. 24).

4.3. Discussion

Regarding voicing distinction, the results, in fact, confirmed what was expected; voiced final consonants caused more epenthesis than voiceless final consonants. As far as relative strength (obstruents vs. nasals) is concerned, the results obtained supported, in part, what was predicted. Although a small difference in the frequency of epenthesis was found, the more marked obstruents, in truth, caused more epenthesis than the nasals, as found with the Japanese, Korean and Cantonese EFL learners of Eckman's and Iverson's study. Moreover, consistent with Eckman and Iverson, NL transfer is evident in the pronunciation strategies used by the learners.

As for the relative strength within obstruents, voiced velars, as predicted, did also cause more epenthesis than voiced alveolars, which, in turn, caused more epenthesis than voiced bilabials. Considering that the class of alveolar fricatives was the only exception, it can be explained based on the fact that the alveolar fricatives /s/ and /z/ are the

only consonants tested in this study that are realized in syllable-final position in Brazilian Portuguese.

The last aspect regarding markedness that is consistent with the claims by Yavas (1994, 1997), citing Ohala (1976, 1983) and Ohala and Riordam (1979), indicated that the place of articulation of voiced syllable-final stops also produced the predicted results. Thus, according to these researchers cited by Yavas, the greater differences in epenthesis rates among the velar stops were due to the larger supraglottal areas that would build up to much pressure in the smaller area above the glottis forcing the opening of the vocal cords and eventually favoring devoicing.

Based on Carlisle (1994), the most relevant aspects to this discussion are in regard to the interaction between phonological environment and markedness relations, which in general, was found to influence the phonological variants produced by EFL learners. This influence is discussed here considering the various effects of a vowel, consonant, or pause following the target syllable-final consonant. Thus, consistent with Carlisle's claims, the results showed, indeed, that environmental consonants, in the present study, caused more epenthesis than vowels. Moreover, environmental vowels also resulted in more epenthesis than pauses.

Finally, the second environmental aspect was based on Hooper's (1976) Syllable Structure Condition and Murray & Venneman's (1983) SCL. The former claims that there is a strength relation for every syllable structure. The latter claims that differences in consonantal strength between the last segment of the target word and the first of the following word would affect resyllabification in diachronic change. Compatible with claims about diachronic change, the results of the present study support the hypotheses that those same differences in consonantal strength across syllables would affect the frequency of epenthesis in interlanguage.

In short, despite interfering factors, the overall tendency claiming that the difficulty of the production of syllable-final consonants increases with the difference in consonantal strength across syllables is evident. M&V's SCL, then, might be applied not only to diachronic changes in primary languages, but also to any specific stage of interlanguage (IL). This, as a result, supports Eckman's Structural Conformity Hypothesis (SCH), which claims that "the universal generalizations that hold for primary languages hold also for interlanguage." (1991, p. 24). The following chapter presents the final remarks of this study, discussing generally the theoretical and pedagogical implications, as well as what can be expected in terms of future research.

CHAPTER 5

CONCLUSION

In general, markedness relationships and phonological environment were significant in order to explain the interlanguage production of English syllable-final consonants by Brazilian EFL learners in this study. For the analysis of these data, as a result, it was essential to consider not only SLA theories, on the whole, but also phonological theories. These theories were, therefore, crucial in order to explain the difficulty Brazilian EFL learners have in producing English syllable-final consonants. Eckman's (1987a) Markedness Differential Hypothesis (MDH), for example, combined with phonological environment based on Hooper (1976) and Murray & Venneman (M&V, 1983) have constituted, undoubtedly, an indispensable theoretical base to develop this work. Moreover, Carlisle (1994) is the only previous investigation that supports the claim made by this study that one of the difficulties to produce the English syllable-final consonant seems to depend on the influence between the word-final consonant and the immediate syllable-initial consonant of the phonological context.

Getting back to Fernandes' study (1997) and comparing his results to the present one, it is important to mention a few things. The results in

Fernandes show that labials, in the preceding phonological context, for example, favored epenthesis in syllable-final position. The present study, however, obtained rather different results. As mentioned previously, this is because of the greater supraglottal area, which because it favors voicing makes final voiced stops no more difficult than final voiceless stops. On the other hand, alveopalatals and velars in both studies favored epenthesis in the preceding phonological context.

Bilabials stops did not favor epenthesis but labial dental fricatives did. Moreover, to a certain extent, there was no difference between voiced and voiceless among bilabial stops or labial dental fricatives. There was a considerable difference among the other voiced/voiceless pairs, though.

Hence, despite its limitations, it is also important to consider the directions this study may point to for future investigation. The tendencies presented in the results of this study seem to be supportive of new directions in SLA phonology research in general. Thus, if results of future investigations appear supporting the results of the present study, this would constitute strong implications for SLA theory, as well as for the teaching of pronunciation, as discussed in the paragraphs below.

As for theory, this study supports the principal that universals that hold for primary languages also hold for interlanguages (Eckman, 1991). Consequently, universal generalizations about diachronic change of primary languages might hold for interlanguages, as well, since interlanguages are in a constant state of change. The benefit of future studies regarding relative strength in syllable contact, concepts regarding consonantal strength need to be improved and a universal hierarchy or hierarchies perfected.

As for the teaching of L2 pronunciation, Eckman and Iverson (1994), Yavas (1994) and Carlisle (1994) allude to the need of applying findings of interlanguage phonology to this endeavor. Accordingly, Eckman and Iverson, for example, stress that syllable-final consonants, in general, should be more emphasized as far as teaching is concerned. Yavas claims that consonants should be taught in consideration of the quality of the prior vowel, as well as of the difference between vowels and consonants in the subsequent syllable. Carlisle, in turn, believes that initial /s/ clusters should be presented according to their degree of markedness because their degree of difficulty can be affected.

In terms of teaching, syllable-final consonants, according to this study, should be dealt with independently. Correspondingly, sonorants, for instance, should be taught before obstruents, stops before fricatives

and affricates, and among the voiced obstruents, bilabials should be introduced before alveolars and velars. Moreover, this study has shown that the degree of predominance of markedness relations might be influenced by native language phonology, in general. Ultimately, Yava's viewpoint regarding the need for controlling environment is supported by the present research. Despite the difficulty and the time involved in controlling environment by the teacher of English or the materials developer, this didactic procedure can be conducted through a systematic preparation.

Considering that this may be the first study to investigate differences in strength across syllable boundaries, the present investigation may represent a notable contribution to the influence of markedness relations in SLA phonology for future studies, especially for having partially cleared up doubts related to markedness presented by preceding authors. In addition, it is also hoped that this study will encourage, in one way or the other, both undergraduate and graduate students of linguistics and English to become more interested in SLA phonology and the oral performance of Brazilian EFL learners of English.

The present study also hopes to stimulate materials writers to consider more carefully the importance of SLA phonology studies. In general, most pronunciation manuals tend to ignore results of studies in

SLA phonology, basing their choice of items to be included, order of presentation, type of context, etc. merely on knowledge of the phonological and phonetic aspects of the language and on intuitions about acquisition, acquired through phonology teaching experience.

In regard to pronunciation manuals in Brazil, it is possible to affirm that most of the manuals, in general, are not, in fact, appropriate to the NL of Brazilian EFL learners. That is, most manuals used in Brazil include many exercises that are not suitable for Brazilians and exclude many important ones, especially those dealing with final consonants.

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APPENDIX 1: TEST SENTENCES

/p/

p	The cheap pencil was sold to me.	1
b	This tape belongs to Mary.	2
t	I hope to be there soon.	3
d	I can't help drinking beer.	4
k	The phone beep can be heard.	5
g	A good crop grows in this farm.	6
tʃ	A hot soup cheers her up.	7
dʒ	Keep joking with him.	8
f	The World Cup fascinates us.	9
v	I saw Paul on the troop van.	10
θ	I took a sip three minutes ago.	11
ð	The birds flap their wings.	12
s	He'll reach the top soon.	13
ʃ	The tip should be given to her.	14
h	The dope has been studied.	15
m	They enjoy pop music.	16
n	The ape needs the food.	17
l	Children cannot sit next to the escape latch.	18
r	This cop runs fast.	19
j	I didn't turn up the tap yet.	20
w	The map was sold to him.	21
æ	Give him a slap after class.	22
ɑ	Cheap olives are sold here.	23
ɔ	She takes a nap on Sundays.	24
ɛ	The frogs hop every second.	25
oʊ	They weep over and over.	26
ø	The cat jumped from my lap.	27

/b/

p/æ	This cab picked him up at 4:00.	28
b	The doorknob broke.	29
t	The mob took down the sign.	30
d	There's a big slab down there.	31
k	She made a good ad-lib comment.	32
g	The kid likes to daub glue on the wall.	33
tʃ	Rob chopped down the tree.	34
dʒ	Bob jokes around a lot.	35
f	I go to the pub from time to time.	36
v	I've seen scenes of mob violence.	37
θ	He did the job thoroughly.	38
ð	Ray managed to scrub the whole floor.	39
s	My pen's nib seems to be broken.	40
ʃ	The lab should be opened.	41
h	The crab hurt his finger.	42
m	The cab must be closed.	43
n	Rob needs a new car.	44
l	The globe lightens up the place.	45
r	He likes to rob rich people.	46
j	He broke his rib yesterday.	47
w	The tribe was approaching.	48
iː	Bob eloped with his girlfriend.	49
oʊ	Jobe obeyed his father.	50
ɪ	The tub is full of water.	51
ɔ	They gab all the time.	52
ɛ	She didn't scrub everything.	53
ø	I broke the crib.	54

/t/

p	This cab transports two people.	55
b	This show was a little bit better.	56
t	I read that too.	57
d	The bat died quickly.	58
k	She lives in a hot country.	59
g	The debate got worse.	60
tʃ	The heat changed the environment.	61
dʒ	Don't let Jane leave.	62
f	The state fired many workers.	63
v	I sit very near them.	64
θ	Can I write three poems for you?	65
ð	At night the cold gets terrible.	66
s	Pat soaked her foot.	67
ʃ	The light shines very intensely.	68
h	I caught him immediately.	69
m	The bright moon is beautiful.	70
n	This plate needs washing.	71
l	I taught literature last year.	72
r	This pet runs fast.	73
j	He broke his foot yesterday.	74
w	The gate was open.	75
ə	I can see a lot of people.	76
ei	The cat ate the fish.	77
ou	They skate over the bridge.	78
ɑ	That opera is beautiful.	79
æ	I saw a rat and a roach.	80
ø	I love this flat.	81

/d/

p	The flood places were known.	82
b	They sat side by side.	83
t	I gave her a ride to town.	84
d	The blood drips from the cut.	85
k	The blade cut his hand.	86
g	The dead girl was pretty.	87
tʃ	Ted chased his brother across the room.	88
dʒ	This code generates problems.	89
f	He looks like a sad fellow.	90
v	The maid vanished from here.	91
θ	Tad thought we had arrived.	92
ð	They came to load the van.	93
s	The blood soon dried on his skin.	94
ʃ	Pride shone in John's eyes.	95
h	My grade has improved.	96
m	This is a bad moment.	97
n	The food needs to be replaced.	98
l	This kid likes to study.	99
r	The bed remained unmade.	100
j	I bid you good morning.	101
w	The cod was delicious.	102
iː	His shoulders are broad enough.	103
oʊ	Add only sugar.	104
ei	The toad ate the insect.	105
ɛ	They bring wood every day.	106
ɪ	Ted impressed everyone.	107
ø	They kept up with the trade.	108

/k/

p	The stroke paralyzed his face.	109
b	The tick became even worse.	110
t	Rick taught him to read.	111
d	The brake didn't work.	112
k	Your check can be cashed here.	113
g	The track got too wet in the rain.	114
tʃ	This sock changed colors.	115
dʒ	I don't like gin.	116
f	What do you take for a cold?	117
v	They talk very loudly.	118
θ	She is going to bake three cakes.	119
ð	She broke the law.	120
s	This cake sounds great.	121
ʃ	I hate this thick shirt.	122
h	She shook her purse.	123
m	Don't take more than one.	124
n	He put the rake next to me.	125
l	They poke little holes in the sand.	126
r	The truck ran him over.	127
j	I didn't wreck your weekend.	128
w	It's bad luck whistling at night.	129
ɪ	The lake is full of people.	130
i:	I took each the articles.	131
ʌ	I woke up late.	132
æ/ə	Look at the moon.	133
ɛ	I eat a Big Mack every day.	134
ø	The train is on the next track.	135

/g/

p	This is a vague passage.	136
b	The egg broke.	137
t	Drug traffic is getting worse.	138
d	The skateboaders zigzag down the hill.	139
k	This hog can be dangerous.	140
g	The rug gets dirty easily.	141
tʃ	Greg cheered her up.	142
dʒ	The frog jumped high.	143
f	The fog faded away.	144
v	Greg voted for Clinton.	145
θ	The thug threw the weapon.	146
ð	I can see the fig there.	147
s	I like to dig seeds in the garden.	148
ʃ	The big shoe is black.	149
h	My leg hurts.	150
m	Your bag might be stolen.	151
n	The plague needs to be eliminated.	152
l	This wig looks terrible.	153
r	There's a bug right next to you.	154
j	They're in the league you saw play.	155
w	The log was sold yesterday.	156
ei	That dog ate my shoes.	157
æ/ə	Can I read that mag after you?	158
ɔ	The mug almost escaped.	159
ə	There is a peg under the table.	160
oʊ	This will be in vogue over night.	161
ø	This is a huge flag.	162

/f/

p	Jeff prays every day.	163
b	The thief became violent.	164
t	Don't invite any riffraff to the party.	165
d	This cough drives me crazy.	166
k	They sniff cocaine.	167
g	He is a tough guy.	168
tʃ	The deaf child likes to read.	169
dʒ	The calf jumped over the fence.	170
f	The leaf fell from the tree.	171
v	The whole staff voted for him.	172
θ	The chief thought about the job.	173
ð	I don't feel safe there.	174
s	This loaf seems too stale.	175
ʃ	The roof should be repaired.	176
h	The chef had a good idea.	177
m	I've been through some rough moments.	178
n	Biff needs to talk to you.	179
l	His wife lives with her mother.	180
r	The knife remains in the drawer.	181
j	I didn't manage to talk to Jeff yet.	182
w	The beef was eaten.	183
ɔ	The reef almost killed the surfer.	184
ə	I ate half of the apple.	185
ɪ	Life is short.	186
oʊ	She blew some fluff over the table.	187
ɑ	John's gaffe obviously impressed them.	188
ø	You don't have any proof.	189

/v/

p	I gave Pamela good advice.	190
b	I never arrive between two and three.	191
t	They love to work here.	192
d	He drove down to the store.	193
k	This stove cost a pretty penny.	194
g	The brave guy survived.	195
tʃ	I forgive Chuck for what he did.	196
dʒ	Steve jumps very high.	197
f	The dove flew to the south.	198
v	I leave very early.	199
θ	We need to save thirty dollars.	200
ð	The water is above the proper level.	201
s	I like the grave scene best.	202
ʃ	I can prove she was here.	203
h	He gave her a nice gift.	204
m	She spent five minutes there.	205
n	I live next to Paul.	206
l	Eve lives far from here.	207
r	This cave reminded me of that film.	208
r	Mr. Reeve resembles my uncle Tom.	209
w	The glove was in my pocket.	210
oʊ	I have only one dollar.	211
ɛ	They move every year.	212
ɔ	The slave often tried to escape.	213
ei	Dave ate the orange.	214
i:	Steve eats in good restaurants.	215
ø	She doesn't like to drive.	216

/s/

p	Peter is a nice person.	217
b	Her voice became hoarse.	218
t	What bliss to able to sleep.	219
d	The goose died.	220
k	The dress cost a lot of money.	221
g	The grass grows everywhere.	222
tʃ	Mr. Ross chose these two books.	223
dʒ	This dose just made me sick.	224
f	The boss fired him.	225
v	Chris visited her best friend.	226
θ	They toss things into the air.	227
ð	Just press this button.	228
s	I loved the lace sent by my sister.	229
ʃ	This is the place she was looking for.	230
h	I don't like to pass him the ball.	231
m	I floss my teeth every day.	232
n	Your niece needs to study harder.	233
l	I didn't kiss Linda.	234
r	The mouse ran to the hole.	235
j	I miss you.	236
w	No trace was found here.	237
ei	The moose ate the weed.	238
ɛ	The O.J. Simpson case ends this week.	239
ɔ	I spilled rice on the floor.	240
i:	I love Christmas Eve.	241
ou	Ross opened the door.	242
ø	The climbers returned to the base.	243

/z/

p	The horses graze peacefully.	244
b	His nose bleeds a lot.	245
t	I have no cause to go back.	246
d	This maze drives me crazy.	247
k	I'm not at ease quite often.	248
g	The night haze got worse.	249
tʃ	I bought the rose cheap at the market.	250
dʒ	The craze just started.	251
f	Did you lose five bucks?	252
v	Liz vanished with her boyfriend.	253
θ	It's difficult to raise three kids.	254
ð	She chose the best book.	255
s	We'll start the quiz soon.	256
ʃ	The clause should be shorter.	257
h	Hold the hose higher.	258
m	Ted is a wise man.	259
n	The fire hose needs repair.	260
l	This cheese looks great.	261
r	The breeze refreshed me.	262
j	He signed up for the cruise yesterday.	263
w	This prose was written last year.	264
ɪ	The phrase is too long.	265
æ/ə	He doesn't like to gaze at girls.	266
oʊ	The smoke rose over the hill.	267
ɔ	Don't close all the doors.	268
ei	I froze eight cubes of water.	269
ø	I could here the buzz.	270

/ʃ/

p	She likes to wash plates.	271
b	The foolish boy was playing with matches.	272
t	The crash totally damaged the car.	273
d	The flash disturbed my sight.	274
k	The rush caused the accident.	275
g	The rash gets worse in the summer.	276
tʃ	I wish Charlie was here.	277
dʒ	The fish jumped out of water.	278
f	How did the robbers vanish from sight?	279
v	Josh veered off the road.	280
θ	We saw her squash three beer cans.	281
ð	I didn't polish the floor.	282
s	Mrs. Nash set up an appointment.	283
ʃ	I can imagine the anguish she felt.	284
h	The bush has beautiful branches.	285
m	I brush my teeth every hour.	286
n	They ate at a posh New York restaurant.	287
l	The dish looks terrible.	288
r	The cash register broke down.	289
j	I wish you all the best.	290
w	The trash was thrown in the basket.	291
æ	Fresh apples are delicious.	292
ɔ	I didn't crush all the eggs.	293
ɛ	He can't push every table.	294
iː	Nancy doesn't blush easily.	295
oʊ	The crèche opens early.	296
ø	I love English.	297

/tʃ/

p	The Scotch people are nice.	298
b	They catch butterflies.	299
t	The book is a crutch to my memory.	300
d	I ate the sandwich during the day.	301
k	Mitch crossed his finger.	302
g	I teach grammar.	303
tʃ	Each child was introduced.	304
dʒ	They preach Jesus' gospel.	305
f	I dug this ditch for him.	306
v	Ritch vomited on the floor.	307
θ	Can you fetch thirty books?	308
ð	Don't scratch this wall.	309
s	I don't watch Sam working.	310
ʃ	This clutch should be fixed.	311
h	The pouch has food in it.	312
m	The rich man just talked to me.	313
n	The couch needs to be replaced.	314
l	The Dutch language is beautiful.	315
r	This sketch reminded me of my house.	316
j	Stretch your arms.	317
w	That leech won't stay away from me.	318
æ	I like peach and apple pie.	319
ei	The roach ate the candy.	320
ou	The match opened the World Cup.	321
i:	I can't touch even the edge.	322
ɔ	She didn't blotch all the papers.	323
ø	She wears an eye patch.	324

/m/

p	Tom plays soccer.	352
b	The game began very early.	353
t	She is too lame to walk here.	354
d	The team deserves credit.	355
k	The drum can be sold here.	356
g	Time goes on.	357
tʃ	Jim cheered me up.	358
dʒ	The flame just spread around.	359
f	I liked the cream filling.	360
v	Kim violated Jack's privacy.	361
θ	I can't skim through this article.	362
ð	They didn't slam the door.	363
s	The bum seems to be nice.	364
ʃ	This gem should be sold.	365
h	I didn't frame him.	366
m	I didn't trim my hair.	367
n	Mom needs to work.	368
l	Tim lives here.	369
r	The dream refreshed my mind.	370
j	I came yesterday.	371
w	The clam was sold.	372
ɛ	I didn't claim anything.	373
oʊ	They roam over the hills.	374
ei	They are about the same age.	375
ɪ	The room is beautiful.	376
æ	Jim asked me to come.	377
ø	Her waist was slim.	378

/dʒ/

p	Age plays an important role.	325
b	I ran into the refuge by myself.	326
t	There was a new edge to his voice.	327
d	His grudge disturbs him a lot.	328
k	His image caused him some trouble.	329
g	Her rage got worse.	330
tʃ	Midge chased him down the street.	331
dʒ	The wage just increased.	332
f	They found a lodge for the night.	333
v	He tried to nudge Valerie.	334
θ	The sage thought for a while.	335
ð	They didn't dredge the whole river.	336
s	The fudge sounds delicious.	337
ʃ	The badge should be given to Joan.	338
h	The judge has many books.	339
m	The garbage must be collected.	340
n	The cabbage needs salt.	341
l	The wedge lifted the ball out if the sand.	342
r	The fridge remains open.	343
j	I made a pledge years ago.	344
w	The voyage was wonderful.	345
ɪ	The cage is broken down.	346
oʊ	They played Bridge Over Troubled Water.	347
ɛ	She didn't oblige everyone to come.	348
ʌ	He's on the ridge up there.	349
iː	Dodge each ball that comes.	350
ø	I walked along the ledge.	351

/n/

p	Ben practiced tennis.	379
b	The human body is weak.	380
t	Get into the left lane to turn left.	381
d	That man drives fast.	382
k	The tone could be heard.	383
g	Jane goes to work every day.	384
tʃ	Ken chatters all the time.	385
dʒ	The train just arrived.	386
f	The team managed to win five rounds.	387
v	The bran varies in its quality.	388
θ	Sampras won three sets.	389
ð	Open this door.	390
s	The brain cells increased.	391
ʃ	The sun shone on the sidewalk.	392
h	The sermon had some importance.	393
m	The rain must come to an end.	394
n	The nun needs them.	395
l	Dan likes to study English.	396
r	Ben runs faster than Tom.	397
j	She visited the shrine yesterday.	398
w	The sun was intense.	399
ɔ	I couldn't scan all the passages.	400
ɪ	There is no sin in his acts.	401
ɑ	The clan occupied the whole field.	402
ɛ	I mow the lawn every day.	403
oʊ	The gun owner was convicted.	404
ø	I had a lot of fun.	405

/ŋ/

p	Martha has lung problems.	406
b	The wrong bike was sold.	407
t	The boring teacher left.	408
d	Sting deserves a lot of credit.	409
k	The sting can be dangerous.	410
g	The strong guy was here.	411
tʃ	The swimming champions arrived.	412
dʒ	The fighting just began.	413
f	The lighting frightens them.	414
v	The long vowel must be pronounced.	415
θ	They sling things across the room.	416
ð	I rang the bell.	417
s	The morning sun makes me feel good.	418
ʃ	The evening show was wonderful.	419
h	They bring him the book.	420
m	The king must help.	421
n	This ceiling needs some remodeling.	422
l	I sing love songs.	423
r	Bowling reminds me of Tim.	424
j	I went skateboarding yesterday.	425
w	The song was beautiful.	426
iː	I sang each of these songs.	427
ɔ	This gang almost killed him.	428
ə	Don't hang around with these guys.	429
oʊ	I felt a bang over the head.	430
ei	The wolf's fang ached a lot.	431
ø	I've heard the bang.	432

APPENDIX 2: TRANSCRIPTIONS

/p/

	Mar	**Gi**	**En**
1	[tʃi:p pɛnsju:]	[tʃi:p pɛnsju:]	[tʃi:p^{h} pɛnsiʊ]
2	[teipi bilong]	[teip bilɔngz]	[teip bilɔngz]
3	[hoʊp tu:]	[hoʊp tu:]	[hoʊp tu:]
4	[hɛʊpi drinkin]	[hɛʊp drinkiŋ]	[hɛʊp drinkiŋ]
5	[bip^{h} kɛn]	[bi:pi kɛn]	[bi:p kɛn]
6	[kɔp groʊz]	[krop groʊz]	[krɔp grɔʊns]
7	[sop ʃi:rs]	[sop tʃɛrs]	[su:p tʃi:rs]
8	[ki:p dʒoʊkiŋ]	[ki:p dʒoʊkiŋ]	[ki:p dʒɔki]
9	[kop feisineits]	[kʌp fɛsineits]	[kʌp fɛsineits]
10	[trɔp vɛn]	[tru:p vɛn]	[tru:p vɛn]
11	[sip θri]	[sip θri]	[sipi θri]
12	[flɛp ðei]	[flɛp deir]	[flɛp də]
13	[tɔp su:n]	[tɔp su:n]	[tɔp su:n]
14	[tipi ʃu:d]	[tipi ʃu:d]	[tipi ʃoʊd]
15	[dop hɛs]	[doʊp hɛs]	[doʊp hɛs]
16	[pɔp mju:sik]	[pɔp mju:sik]	[pɔpi mju:ziki]
17	[aip^{h} ni:ds]	[eipi ni:dz]	[eipoʊ ni:dz]
18	[iskeip lɛtʃ]	[skeip lɛtʃ]	[skeip lɛtʃ]
19	[kɔp rʌns]	[kɔp rʌns]	[kɔp rʌns]
20	[tɛpi jɛt]	[teip yɛt]	[tɛpi iɛt]
21	[mɛp wəs]	[mɛp wɔs]	[mɛp wɔs]
22	[izlɛp ɑfter]	[izlɛp ɛftər]	[izlɛp aftɛr]
23	[tʃi:p olivz]	[tʃi:p ɔlivz]	[tʃi:pt ɔlivz]
24	[næp ən]	[nɛp ɔn]	[nɛp^{h} ɔn]
25	[hɔp ɛvɛri]	[hoʊp ɛvri]	[hoʊp ɛvri]
26	[wip oʊvər]	[hwi:p^{h} oʊvər]	[wi:p^{h} oʊver]
27	[lɛp]	[lɛp]	[lɛp]

/p/	Ota	Ka	Ta
1	[ʃri:p pɛnsiʊ]	[tʃi:p pɛnsoʊ]	[tʃi:p pɛnsju:]
2	[teip bilongz]	[teip bilongz]	[teip bilongz]
3	[hop tu:]	[houp tu:]	[houp tu:]
4	[hɛʊp drinki]	[hɛʊp drinkiŋ]	[hɛʊp drinkiŋ]
5	[bi:p kɛn]	[bi:p kɛn]	[bi:p kɛn]
6	[krɔp grouz]	[krɔp grouz]	[krɔp grəs]
7	[sʊp tʃɛrs]	[soup tʃi:rs]	[su:p ʃi:rs]
8	[ki:p dʒouki]	[ki:p dʒoukiŋ]	[ki:p dʒɔkin]
9	[kʌp feisɛt]	[kʌp fæsineits]	[kɑp^{h} fɛsineits]
10	[trɔp vã]	[trɔp væn]	[trʊp vɛn]
11	[sipi tri]	[sip tri:]	[sipi θri:]
12	[iʃlɛp dɛr]	[flɛp ðɛr]	[flɛp dɛr]
13	[tɔp su:n]	[tɔp sʌn]	[tɔp su:n]
14	[tʃipi ʃu:di]	[tip^{h} ʃu:d]	[tip ʃu:d]
15	[dop hɛs]	[doup hɛs]	[doup hɛs]
16	[pɔpi mju:siki	[pɔp mju:sik]	[pɔpi mju:ziki
17	[eip ni:dz]	[eip ni:dz]	[eip ni:dz]
18	[iskeip lɛtʃ]	[skeip lɛtʃ]	[skeip lɛtʃ]
19	[kɔp rʌns]	[kɔp rʌns]	[kɑp rʌns]
20	[teip jɛt]	[tæp jɛt]	[tɛp^{h} jɛt]
21	[mɑp^{h} wɑs]	[mæp wəs]	[mɛp wəs]
22	[izlɛp ɛftər]	[zlɛp ɛftər]	[zlɛp ɛftər]
23	[tʃi:p ɔlɛvz]	[tʃi:p ɔləvz]	[tʃi:p ɔliviz]
24	[nɑp ɔn]	[nɛp ɔn]	[nɛpi ən]
25	[hop ɛvri]	[xɔp ɛvri]	[hop ɛvri]
26	[wi:p ouver]	[wi:p ouvər]	[wi:p ouvər]
27	[lɛp^{h}]	[læp]	[lɛp^{h}]

/b/	Mar	Gi	En
28	[kɛb pikɛt]	[kɛp pikɛt]	[kɛb piktə]
29	[dɔrnɔ:b brouki]	[dɔrnɔ:b brouk]	[du:rnob brouk]
30	[mɔ:b tu:k]	[mu:b tu:k]	[mɔb tu:ki]
31	[izlɛb daun]	[zlɛb daun]	[izlɛb daun]
32	[ɛdlib koment]	[edlib koment]	[ɛdlibi komɛnt]
33	[dɔb glu:]	[dɔ:b glu:]	[daub glu:]
34	[rɔb tʃɔpt^{h}]	[rob ʃopt]	[rɔb tʃu:ptə]
35	[bɔb dʒouks]	[bɔb dʒouks]	[bɔb dʒouks]
36	[pʌb from]	[pʌb frõ]	[pʌb from]
37	[mɔb vaiilens]	[mu:b vaiəlɛns]	[mɔb vaiəlɛns]
38	[dʒɔb trogoly]	[dʒɔb θu:ru:li]	[dʒɔb trouli]
39	[skrʌb de]	[skrʌb de]	[iskrʌb dɛ]
40	[nib si:ms]	[ni:b si:ms]	[nib si:ms]
41	[lɑbi ʃu:d]	[lɛb ʃu:d]	[lɛb ʃoud]
42	[krɛb hət]	[krɛb hərt]	[krɛbə hərt]
43	[kɛbi mʌst]	[kɛb mʌst]	[kɛb mʌst]
44	[rɔb ni:ds]	[rɔb ni:dz]	[rɔb ni:dz]
45	[glob laits]	[gloub laitəns]	[gloud laits]
46	[rɔb riʃ]	[rɔb ri:tʃ]	[roud ritʃ]
47	[rɪb jɛstədei]	[rib iɛstərdei]	[ribi iɛstɛrdei]
48	[traib wɔs]	[tri:b wɔs]	[traibə wɔz]
49	[bɔb ilɔp]	[bɔb i:lɔpt]	[bɔb i:loupti]
50	[dʒɔb obeid]	[dʒɔb obeidi]	[dʒoub obaidi]
51	[tʌb iz]	[tu:b is]	[tʌm ɪs]
52	[gɛb ɒʊ]	[gɛb aʊ]	[gɛb ɔu]
53	[skrəb ɛvɛriθin]	[skrʌb ɛvriθing]	[skrʌb ɛvri]
54	[krɪb]	[kaib]	[krib]

/b/	Ota	Ka	Ta
28	[kɛb pikənit]	[kæb pikt]	[kɛb pikət]
29	[dɔrknɔ:b brouk]	[dɔrnɔ:b brouk]	[dɔrnə:b brouk]
30	[bɔbi tu:k]	[mɔb tu:k]	[mɔb tʃu:k]
31	[izlɛb daun]	[iʒlɛb daun]	[izlɛb daun]
32	[ɛblibi komɛnt]	[ɛdlib kɔmɛnt]	[ɛdlib komɛnt]
33	[dɑb glu:]	[daub glu:]	[dɔ:b glu:]
34	[rɔb ʃopt]	[rɔb ʃɔpti]	[rɔb tʃopt]
35	[bɔbi dʒouks]	[bɔb dʒouks]	[bɔb dʒouks]
36	[pʌb frõ]	[pʌb from]	[pʌb from]
37	[mɔb vaiəlɛns]	[mɔb vaiolɛns]	[mɔb vaiəlɛns]
38	[dʒɔbi trogoli]	[dʒɔ:b θu:ru:li]	[dʒɔb θɔgrəli]
39	[iskrʌb də]	[skrʌb də]	[iskrʌb de]
40	[nibi si:ms]	[ni:b si:ms]	[nib si:ms]
41	[lɛbi ʃu:d]	[lɛb ʃu:d]	[lɛb ʃu:d]
42	[crɑb hərtʃ]	[krɛb hərt]	[krɛb hərt]
43	[kɛb mʌst]	[kɛb mʌst]	[kɛb mʌst]
44	[rɔb ni:dz]	[rɔb ni:dz]	[xɔb ni:dz]
45	[gloubi laitʃ]	[gloub laitəns]	[gloub laitəns]
46	[rɔb ritʃ]	[rɔb ritʃ]	[rɑb ritʃ]
47	[ribi iɛstərdei]	[rib jɛstədei]	[rib jɛstərdei]
48	[tribə wəs]	[traib wəs]	[traib wəs]
49	[bɔb izlɔptə]	[bɔb iloupət]	[bɔbi ilɔpt]
50	[dʒoub obaiəd]	[dʒob obaiəd]	[dʒobi obaiədi]
51	[tʌb is]	[tju:b is]	[tʌb is]
52	[gɛb ɔu]	[gæb ɔu]	[gɛt ɔu]
53	[skrʌb ɛvrisingi]	[skrʌb ɛvrəθiŋ]	[skrʌb ɛvriθiŋ]
54	[crib]	[krib]	[krib^{h}]

/t/ Mar	Gi	En
[kɛb trənspɔrt]	[kɛb trənspɔrts]	[kɛb trɛnspɔrts]
[bit bɛdər]	[bit bɛtər]	[bit bɛɾər]
[dɛt tʃu:]	[dɛt tu:]	[dɛt tu:]
[bɛti daiəd]	[bɛt^{h} daiəd]	[bɛt daid]
[hɔt kaʊntri]	[hɒt kʌntri]	[hɔt kaʊntri]
[dibeit gɔt]	[dibeit gɔt]	[dibeit gɔt]
[hi:tʃi tʃendʒ]	[hɛt tʒeindʒ]	[hɪt tdʒeindʒɛd]
[lɛt dʒein]	[lɛt dʒein]	[lɛt dʒein]
[steit faiərd]	[steit faird]	[steit faird]
[siti vɛri]	[siti vɛri]	[sit^{h} vɛri]
[rait θri]	[rait θri]	[rait θri]
[nait de]	[nait de]	[nait də]
[pɛt soʊkət]	[pɛt soʊkt]	[pɛt soʊkəd]
[laiti ʃainis]	[lait ʃains]	[lait ʃains]
[kɒt hɪm]	[kɒt him]	[kaʊd him]
[brait mu:n]	[briti mu:n]	[brit mu:n]
[pleit ni:ds]	[pleits ni:dz]	[pleit ni:dz]
[θaʊt litʃərɑtu:r]	[tɒt litərətu:r]	[θɔʊt litɛrətu:r]
[pɛt rʌns]	[pɛti rʌns]	[pɛt rʌns]
[fu:t jɛstədei]	[fu:tə iɛstərdei]	[fʊt jɛstərdei]
[geit wɔz]	[geit wəz]	[geit wəz]
[lɔr ɔf]	[lɔt ɔv]	[lɔd ɔf]
[kɛt eit]	[kɛt^{h} eit]	[kɛt eit]
[skeit oʊvər]	[iskeit^{h} oʊvər]	[izkeiti oʊver]
[dɛt ɔpərɑ]	[dɛt ɑpərə]	[dɛt ɔpərɑ]
[χɛt ɛnd]	[rɛt end]	[rɑt ɛnd]
[flɛt^{h}]	[flɛt^{h}]	[flɛt]

/t/	Ota	Ka	Ta
55	[kɛb trənspɔrts]	[kɛb trənspɔrts]	[kɛb trənspɔrts]
56	[bit bɛdər]	[bit bɛtər]	[bit bɛtər]
57	[dɛti tʃu:]	[dɛt tu:]	[dɛt tu:]
58	[bɛt^{h} daiəd]	[bɛt daiəd]	[bɛt daid]
59	[hɔt kaʊntri]	[hɔt kaʊntri]	[hɔt kaʊntri]
60	[dɛbeit gɔt]	[dəbeit gɔt]	[dibɛt gɑt]
61	[hɪ:t tʃeintʒed]	[hi:t tʃeindʒɔd]	[hi:t tʃend]
62	[lɛt dʒein]	[lɛt dʒein]	[lɛt dʒein]
63	[steit faiərd]	[steit faird]	[steit faid]
64	[siti vɛri]	[sit vɛri]	[siti vɛri
65	[raiti tri]	[rait twri:]	[rait θri:]
66	[nait^{h} dɛ]	[nait də]	[nait dɛ]
67	[pɛt su:k]	[pɛt soʊkt]	[pɛt soʊkət]
68	[lait ʃains]	[lait ʃains]	[lait ʃains]
69	[kaʊtʃ him]	[kɔt him]	[kɔt him]
70	[braitʃ mu:n]	[brait mu:n]	[brait mu:n]
71	[plɛit ni:dz]	[pleit ni:dz]	[pleit ni:dz]
72	[taʊtʃ litɛrɑtʃu:r]	[tɔt litərətʃu:r]	[tɔ:t litɛrətu:r]
73	[pɛtʃ rʌns]	[pɛt rʌns]	[pɛti rʌns]
74	[fu:tʃ iɛsterdei]	[fu:t jɛstərdei]	[fu:t jɛstərdei]
75	[geitʃ wɔz]	[geit wəz]	[geit wɔs]
76	[lɔt ɔf]	[lɔr ɔf]	[lɔt ɔf]
77	[kɛt^{h} eit]	[kæt eit]	[kɛt eit]
78	[skeitʃ oʊvər]	[skeit oʊvə]	[skeiti oʊvər]
79	[dɛti ɔpɛrɑ]	[dɛt ɔpəra]	[dɛt ɔpərə]
80	[χɑt ɛnd]	[rɛt ɛnd]	[ræt ɛnd]
81	[flɛt^{h}]	[flɛt]	[flɛt^{h}]

/d/	Mar	Gi	En
82	[flu:d pleis]	[flu:d pleis]	[flu:d pleisis]
83	[said bai]	[said bai]	[said bai]
84	[raid tu:]	[χaid tu:]	[raid tu:]
85	[blu:d drips]	[blu:d drips]	[blɔd drips]
86	[bleid kʌt]	[bleidi kʌti]	[bleid kʌt]
87	[dɛd gɛʊ]	[dɛd gərʊ]	[dɛd gərl]
88	[tɛdi tʃeizd]	[tɛd tʃeis]	[tɛd tʃeized]
89	[koʊd dʒinereit]	[koʊd dʒɛnerei]	[koʊd dʒɛnəreits]
90	[sɛd fɛloʊ]	[sɛd filoʊ]	[sɛd filoʊ]
91	[meid vəniʃ]	[meid vəniʃ]	[meid vɛniʃd]
92	[tɛd trɔgu:]	[tɛd^{h} θɔt]	[tɛd θɔʊ]
93	[louəd de]	[loʊd de]	[lɔ:d də]
94	[blu:d su:n]	[blʌd sʌn]	[blʌd su:n]
95	[praid ʃɔ:n]	[praid ʃoʊn]	[praidi ʃoʊn]
96	[greidi hɛs]	[greid hɛs]	[greid hɛs]
97	[bɛd moment]	[bed^{h} moʊment]	[bɛd momɛnt]
98	[fu:d ni:ds]	[fu:d ni:dz]	[fu:d ni:dz]
99	[kid laiks]	[kidz laiks]	[kid laiks]
100	[bɛdi rimens]	[bɛd rimeinəd]	[bɛd rimeinəd]
101	[bidi ju:]	[bidi ju:]	[bidi ju:]
102	[kɔd wɔz]	[koʊd wɔz]	[kɔd wɔz]
103	[bru:d inəf]	[brɔ:d inʌf]	[broʊd inoʊ]
104	[ɛd ɔnli]	[ɛd oʊnli]	[ɛd oʊnli]
105	[toʊd eit]	[toʊd eit]	[toʊd eit]
106	[wu:d ɛvɛri]	[wu:d ɛvri]	[wu:d ɛvri]
107	[tɛd impresed]	[tɛdi imprest]	[tɛd impreisɛd]
108	[treid]	[treidi]	[treid]

/d/	Ota	Ka	Ta
82	[flu:d pleisɛs]	[flu:d pleisɪs]	[flu:d pleis]
83	[saidi bai]	[said bai]	[said bai]
84	[raid tu:]	[raid tu:]	[raidi tu:]
85	[blu:d^{h} drips]	[blʌd drips]	[blu:d drips]
86	[bleid kʌti]	[bleid kʌt]	[bleid kʌt]
87	[dɛd^{h} gəru]	[dɛd gərl]	[dɛd gərl]
88	[tɛd tʃɑzɛd]	[tɛd tʃeizd]	[tɛd tʃeizd]
89	[kozu:di ʒenəreits]	[koʊd dʒɛnəreits]	[ku:d dʒɛnəreits]
90	[sɛd filoʊ]	[sɛd fɛloʊ]	[sɛd fɛloʊ]
91	[meidi vɛnəʃʌd]	[meid vɛniʃd]	[meid vɛniʃd]
92	[tɛd^{h} θɔt]	[tɛd tɔt]	[tɛd θɔt]
93	[loʊdi dɛ]	[loʊd də]	[lɔd dɛ]
94	[blu:d su:n]	[blʌb sʌn]	[blu:d su:n]
95	[praidi ʃu:]	[praid ʃɔni]	[praid ʃɔn]
96	[greidi hɛs]	[greid hɛs]	[greidi hɛs]
97	[bɛd momɛnt]	[bɛd momɛnt]	[bɛdi moʊmɛnt]
98	[fu:di ni:dz]	[fu:d ni:dz]	[fu:d ni:dz]
99	[kid laiks]	[kid laiks]	[kid laiks]
100	[bɛdə rimeined]	[bɛd rimeind]	[bɛd rimeinəd]
101	[bidʒiu:]	[bidʒ ju:]	[bidi ju:]
102	[kɔdi wɑs]	[kɔd wəs]	[kɔds wəs]
103	[brɔ:d ɛnʌf]	[brɔ:d inɔf]	[brɔ:d enʌf]
104	[ed^{h} oʊnli]	[æd oʊnli]	[ɛd oʊnli]
105	[todu: eitʃ]	[toʊd eit]	[tod eit]
106	[wu:di ɛvri]	[wu:d ɛvəri]	[wu:d ɛvri]
107	[tɛdʒi impresid]	[tɛd impresd]	[tɛd impresd]
108	[treidə]	[treidɪ]	[treid^{h}]

/k/	Mar	Gi	En
109	[strok pɑrɑlaized]	[strouk pɑrɑlaiz]	[strouk prɑlaizd]
110	[ti:k bikeim]	[tik bikəm]	[tik bikeim]
111	[rik tɔʊt]	[rik tɔt]	[rik taʊt]
112	[breiki didi]	[breiki didənt]	[breik didənt]
113	[tʃɛk kein]	[tʃɛk kɛn]	[tʃɛk kɛn]
114	[trɛk goʊt]	[trɛk gɔt]	[trɛks gɔt]
115	[sɔk tʃɛndʒ]	[sɔk tʃeindʒ]	[sɔk tʃeindʒ]
116	[laik dʒin]	[laik dʒin]	[laik dʒi]
117	[teik fɔr]	[teik fɔr]	[t^heik fɔr]
118	[taʊk vɛɾi]	[tɔʊk vɛri]	[taʊk vɛry]
119	[beiki θri]	[beik θri]	[beik θri]
120	[bɾoʊk də]	[broʊk ðə]	[broʊk də]
121	[keik saʊnds]	[keiki saʊndz]	[keik saʊnds]
122	[tik ʃərt]	[θik ʃərt]	[θiki ʃərt]
123	[ʃu:ki hɛr]	[ʃu:k hər]	[ʃu:k hər]
124	[teik mɔr]	[teik mɔ:r]	[t^heik mɔr]
125	[reik nɛkst	[reik nɛkst]	[reik nɛkst]
126	[pu:k liɾoʊ]	[poʊk liɾoʊ]	[poʊk liɾoʊ]
127	[tru:k rʌn]	[trʌk rɛn]	[trok rʌn]
128	[rɛk jɔ:r]	[rɛk jɔ:r]	[rɛk jɔ:r]
129	[lʌki wistliŋ]	[lu:k wiʃiliŋ]	[lʊk wistli]
130	[leiki is]	[leiki is]	[leiki is]
131	[tu:ki i:tʃ]	[tu:k i:tʃ]	[tu:k i:tʃ]
132	[wʊk ʌp]	[iok ʌp]	[woʊk ʌp]
133	[lu:k ɛt]	[lu:kɛt]	[lu:ki ɛt]
134	[mɛk ɛvrədei]	[mɛk ɛvri]	[mɛk ɛvri]
135	[trɛk]	[trɛk]	[træk]

/k/	Ota	Ka	Ta
109	[ɛʃtroʊk pɑrɑlizd]	[stroʊk pərɑlaizd]	[stroʊk pɛrɛlaizd]
110	[sik bikeimi]	[θik bikeim]	[tik bikeim]
111	[rik taʊtʃ]	[xik tɔ:t]	[rik^{h} tɔt]
112	[breik^{h} didənt]	[breik didənt]	[breik didənt]
113	[tʃɛk kɛn]	[tʃɛk kɛn]	[tʃɛkɪ kɛn]
114	[trɛk gɔt]	[trɛk gɔt]	[trɛk gɑt]
115	[sɔk tʃeindʒəd]	[sɔk tʃeindʒəd]	[sɔk tʃeindʒ]
116	[laik dʒi]	[laik dʒin]	[laik dʒɪn]
117	[teik fɔr]	[teik fɔr]	[teik fɔr]
118	[tɑki vɛri]	[tɔk vɛri]	[tɔk vɛri]
119	[beik tri]	[beik θri:]	[beik θri:]
120	[brɔ:k də]	[broʊk də]	[broʊk de]
121	[keik saʊndz]	[keik saʊndʂ]	[keik saʊndz]
122	[tʃik^{h} ʃərt]	[θik ʃərt]	[θik tʃərt]
123	[ʃʊk hər]	[ʃu:k hər]	[ʃu:k hɛr]
124	[teik mɔ:r]	[teik mɔ:r]	[t^{h}eik mər]
125	[reiti nɛkst]	[reik nɛkst]	[reik nɛkst]
126	[poʊkə lirou]	[poʊk litou]	[poʊk lirou]
127	[trʌk rɛn]	[trʌk rʌn]	[trʌk xɛm]
128	[wu:ɛki jɔ:r]	[rɛk jɔ:r]	[rɛki jɔ:r]
129	[lʌk wiʃili]	[lʌk wisiliŋ]	[lʌki wistlin]
130	[leik^{h} is]	[leiki is]	[leiki is]
131	[tu:k witʃ]	[tu:k i:tʃ]	[tu:k i:tʃ]
132	[woʊk ʌp]	[woʊk ʌp]	[wok ʌp]
133	[lʊk ɛt]	[lu:k ət]	[lu:k ɛt]
134	[mɛk ɛvri]	[mæk ɛvri]	[mɛki ɛvri]
135	[trɛk]	[trɛk]	[trɛk]

/g/	Mar	Gi	En
136	[veig pɑsɑʒ]	[veig pɛsədʒ]	[veig pɑseidʒ]
137	[ɛgs brouk]	[ɛg brouk]	[ɛg brouk]
138	[druːg trɛfiki]	[drʌg trɑfiki]	[drʌg trɛfik]
139	[zigizɑgi daun]	[zigzɑg daun]	[zigzæg daun]
140	[hɔg ken]	[hɔg kɛn]	[hɔg kɛn]
141	[ruːg gɛts]	[rʌg gɛts]	[rʌgz gɛts]
142	[greg tʃerəd]	[grɛgi tʃɛrd]	[greg tʃiːrd]
143	[frɔg dʒəmpət]	[frɔg dʒʌmpt]	[frɔg dʒʌmpt]
144	[fɔg feidɛd]	[fɔg fɛdid]	[fɔg feidəd]
145	[greg voutɪd]	[greg voutəd]	[greg voutəd]
146	[t^huː trɔu]	[tuːg θru]	[θog trjuː]
147	[fig der]	[fig dɛr]	[fig ðɛr]
148	[dig siːds]	[dig siːdz]	[dig siːdz]
149	[big tʃuː]	[bigi ʃuː]	[bigi ʃuː]
150	[lɛg hərts]	[lɛd hərts]	[lɛg hərts]
151	[begi mait]	[bɛg mait]	[bɛg mait]
152	[pleigi niːds]	[pleigi niːdz]	[pleidʒ niːdz]
153	[wigi luːks]	[wig^h luːks]	[wigi luːk]
154	[bʌg rait]	[bɪg rait]	[bʌg rəit]
155	[liki juː]	[liːgi juː]	[liːgou juː]
156	[log wəz]	[lɔg wəz]	[lɔg wɔs]
157	[dɔg eit]	[dɔg eit]	[dɔg eit]
158	[mɛg ɑftəR]	[mɛg ɑftəR]	[mæg ɑftər]
159	[məg auməst]	[mʌg aumoust]	[mʌg ɔumoust]
160	[pɛg ʌndəR]	[pɛg ʌndər]	[pɛg ʌndər]
161	[veig ouvər]	[vougə ouvər]	[voug ouvɛr]
162	[flɛg]	[flæg]	[flɛg]

/g/	Ota	Ka	Ta
136	[vɑg pɛsɛdʒ]	[veig pɛsədʒə]	[veigi pɛsədʒi]
137	[ɛgi broʊkə]	[ɛg broʊk]	[ɛgi broʊk]
138	[drʊg trɑfik]	[drʌg trɛfik]	[drʌg trɛfiki]
139	[zigizɑgi daʊn]	[zigzɑg daʊn]	[zigizɛgi daʊn]
140	[hɔg kɛn]	[hɔg kɛn̩]	[hɔg kɛn]
141	[ru:g gɛts]	[rʌg gɛts]	[rʌg gɛts]
142	[grɛg ʃɛrɑd]	[greg ʃi:rd]	[grɛg tʃiwrd]
143	[frɔg dʒʌmptə]	[frɔg dʒʌmptə]	[frɔg dʒʌmpət]
144	[fɔgə fɛdid]	[fɔg feidəd]	[fɔg feidəd]
145	[grɛgi voʊtədə]	[greg voʊtəd]	[grɛg voʊtəd]
146	[su:g θri]	[θʌg du:g]	[θʌg θrju:]
147	[figi dɛr]	[fig ðer]	[fig dɛr]
148	[digi si:dz]	[dig si:dz]	[dig si:dz]
149	[bigi ʃu:]	[bigi ʃoʊ]	[bigi ʃu:]
150	[lɛgi hərts]	[lɛgi hərts]	[lɛgi hərts]
151	[bɛg mait]	[bɛg mait]	[bɛg mait]
152	[pleigi ni:dz]	[pleig ni:dz]	[pleigi ni:dz]
153	[wigi lu:ks]	[wig lu:ks]	[wigi lu:ks]
154	[bʌgə raitʃ]	[bʌg rait]	[bʌg rait]
155	[lɪr ju:]	[li:g ju:]	[li:g ju:]
156	[lɔg wɔz]	[lɔg wəs]	[lɔg wəs]
157	[dɔg eit]	[dɔg eit]	[dɔg eit]
158	[mɛng ɛftər]	[mæg ɛftər]	[mɛg ɛftər]
159	[mʌg aʊmoʊst]	[mʌg aʊmoʊst]	[mʌg aʊmoʊst]
160	[pɛgi ʌnder]	[pɛg ʌndər]	[pɛg ʌndər]
161	[voʊg oʊvɛr]	[voʊg oʊvər]	[voʊgə oʊvɛr]
162	[flɛg]	[flɛg]	[flɛg]

/f/	Mar	Gi	En
163	[dʒɛf preis]	[dʒɛf preiz]	[dʒɛf preis]
164	[ʃi:f bikeimi]	[ti:f bikʌm]	[ti:f bikeim]
165	[rifrɛf tu:]	[rifrɛfi tu:]	[rifrɑf tʃu:]
166	[koʊ draivz]	[kɔtʃ draivs]	[kaʊ draivz]
167	[iznifi kokein]	[iznifi kokein]	[iznifi kokai:n]
168	[toʊ gai]	[toti gai]	[taʊ gai]
169	[dɛf tʃaid]	[di:f tʃaju:d]	[di:fi tʃaiju:d]
170	[kaʊf dʒʌmpə]	[kaʊf dʒʌmpt]	[kaʊf dʒʌmpt]
171	[li:f fɛʊ]	[lɛf fɛʊ]	[li:f fɛʊ]
172	[stɛf voʊt]	[stɛfi voʊtəd]	[stɛf voʊt]
173	[tʃi:f trəgoʊ]	[tʃi:f tɔt]	[tʃi:f troʊf]
174	[seif ðɛr]	[seif dɛr]	[seif dɛr]
175	[loʊf si:ms]	[lɔf si:ms]	[loʊf si:ms]
176	[ru:f ʃu:d]	[ru:f ʃu:d]	[ru:f ʃoʊd]
177	[tʃi:f hɛdə]	[tʃi:f hɛd]	[tʃɪf hɛd]
178	[roʊ momənts]	[roʊf moments]	[roʊs momɛnts]
179	[bi:fi ni:ds]	[bi:f ni:dz]	[bif ni:dz]
180	[waifi livis]	[waifi li:viz]	[waifə laivz]
181	[knaif rɪmens]	[naif rimɛns]	[naiv rimeins]
182	[dʒɛfi jɛt]	[dʒɛf jɛt]	[dʒɛfə jɛt]
183	[bif wɔz]	[bi:f wɔs]	[bi:f wɔz]
184	[rɪf ɔlməst]	[ri:f aʊmoʊst]	[ri:f ɔʊməst]
185	[hɑlf ɔf]	[haʊf ɔf]	[haʊf ɔf]
186	[laifi is]	[laifi is]	[laif is]
187	[fləf ɔvər]	[flu:f ɔʊvɔr]	[flʌf ɔvər]
188	[geiv ɔbvioʊzli]	[geif ɔbviozli]	[geif ɔbviəzli]
189	[pru:v]	[pru:f]	[pru:f]

/f/	Ota	Ka	Ta
163	[dʒɛfi preiz]	[dʒɛf preis]	[dʒɛf preis]
164	[tʃju: bikəm]	[θi:f bikɛm]	[ti:f bi:keim]
165	[rifrɑt tu:]	[rifræf tu:]	[rifrɛf tu:]
166	[kɔʊtʃ draivz]	[kɔ:f draivz]	[kɒf draivz]
167	[iznifi kokɑi:n]	[isnif kokein]	[znifi kokɛn]
168	[taʊt^{h} gai]	[tɔ:t gai]	[tʌf gai]
169	[dɛf tʃaiju:d]	[dɛf tʃaiju:d]	[dɛf tʃaid]
170	[kaʊfi dʒʌmptə]	[kɔf dʒʌmpt]	[kaʊf dʒʌmpt]
171	[livi fɛʊ]	[lɛf fɛʊ]	[li:f fɛʊ]
172	[istəf vɔtədə]	[stɛf voʊtəd]	[stæf vɔtəd]
173	[tʃi:fi θɔʊt]	[tʃi:f tɔ:t]	[tʃi:f θɔgt]
174	[seifi dɛr]	[seif dɛr]	[seif dɛr]
175	[loʊf simi:s]	[loʊf si:ms]	[lɔf si:ms]
176	[ru:fə ʃu:d]	[ru:f ʃu:d]	[ru:f ʃu:d]
177	[tʃɛf hɛdi]	[tʃɛf hɛd]	[tʃɛf hɛd]
178	[roʊθ moments]	[roʊf moʊmənts]	[rɔf moments]
179	[bifi ni:dz]	[bi:f ni:dz]	[bif ni:dz]
180	[waif liviz]	[waif livz]	[waifs li:vz]
181	[naifə rimeins]	[naif rimɛns]	[naif rimɛns]
182	[dʒɛf jɛt]	[dʒɛf jɛt]	[dʒɛf jɛt]
183	[bi:fi wɔz]	[bi:f wəʂ]	[bi:f wəs]
184	[ɾifi aʊməst]	[ri:f aʊmoʊst]	[ri:f ɔʊmoʊst]
185	[haʊf ɔf]	[hæf ɔf]	[haʊf ɔv]
186	[laifi is]	[laif is]	[laif is]
187	[flu:f ɔvər]	[flu:f oʊvər]	[flʌf oʊv̩ər]
188	[geifi obvioʊzli]	[gɛf ɔbvioʊzli]	[geif ɔbvioʊzli]
189	[pru:f]	[pru:f]	[pru:f]

/v/	Mar	Gi	En
190	[geiv pəməlɑ]	[geiv pəmɛlɑ]	[geiv pɛmɛlɑ]
191	[ɑɾaivi bitwi]	[əraiv bitwi:n]	[ɑfaiv bitwi:n]
192	[lɔv tu:]	[lɔv tu:]	[lɔv tu:]
193	[dɾouv dau]	[drouv daun]	[drouv daun]
194	[stouv ku:st]	[istouv kʌst]	[istouv koust]
195	[breiv gai]	[breiv gai]	[breiv gai]
196	[foRgiv tʃu:ki]	[forgɪv tʃʌk]	[forgivi tʃʌk]
197	[stiv dʒʌmps]	[sti:v dʒʌmps]	[sti:v dʒʌmps]
198	[douv fleu]	[douv flu:]	[douv fju:]
199	[livi vɛɾi]	[li:v vɛri]	[li:v vɛri]
200	[seivi tərti]	[seiv θərd]	[seiv tʌrti]
201	[ɑbov de]	[ɑbɔv de]	[əbouv də]
202	[gɾeiv skin]	[greiv si:n]	[greiv si:n]
203	[pru:vəʃi:]	[pru:v ʃi:]	[prov ʃi:]
204	[geiv hɛr]	[geiv hər]	[geiv hər]
205	[faivi minits]	[faiv minits]	[faiv minu:ts]
206	[livi nɛkst]	[livi nɛkst]	[livi nɛkst]
207	[i:v liviz]	[i:v livz]	[ɛv livz]
208	[keivər imaid]	[keiv rimaid]	[keiv rimaindəd]
209	[rɪv rizembouz]	[ri:v rizembərs]	[ri:v risembou]
210	[glouv wɔz]	[glouv wɔz]	[glouv wɔz]
211	[hɛv õli]	[hɛv ounli]	[hɛvi ounli]
212	[mu:v ɛvɛri]	[mu:v ɛvri]	[mouv ɛvri]
213	[izleiv ɔften]	[zleivə oufen]	[izleiv ɔfən]
214	[deiv eit]	[deiv eit]	[deiv eit]
215	[sti:v i:ts]	[sti:v i:ts]	[sti:v i:ts]
216	[draiv]	[draiv]	[draiv]

/v/	Ota	Ka	Ta
190	[geiv pɛmɛlɑ]	[geiv pəmɛlɑ]	[geiv pɛməla]
191	[ɑraivi bitwi:]	[ɑraiv bitwi:n]	[ɑraiv bitwi:n]
192	[lɔv tu:]	[lɔ:v tu:]	[lɔv tʃu:]
193	[drɔvi dɔn]	[drouv daun]	[drouv daun]
194	[istouv kɔst]	[stouv kɔst]	[stouv kɔts]
195	[breiv gai]	[breiv gai]	[breiv gai]
196	[forgivi tʃu:k]	[forgi:v tʃʌk]	[forgiv tʃʌk]
197	[sti:vi dʒʌmps]	[sti:v dʒʌmps]	[sti:vi dʒʌmps]
198	[douv flau]	[douv flu:]	[douv flju:]
199	[li:və vɛri]	[li:v vɛri]	[li:vi vɛri]
200	[seivi θərdi]	[seiv θərti]	[seiv θərti]
201	[ɑbɔvə dɛ]	[ɑbɔv dɛ]	[abov dɛ]
202	[greiv sɛns]	[greiv si:n]	[greiv sɪn]
203	[pru:v ʃi:]	[pru:v ʃi:]	[pru:v ʃi:]
204	[geiv hər]	[geiv hər]	[geiv hər]
205	[faiv minits]	[faiv minits]	[faiv minits]
206	[livi nɛkst]	[liv nɛkst:]	[liv nɛkst]
207	[ɛv laivz]	[ɛv laivz]	[ɛvə li:vz]
208	[kweiv remaində]	[keivɪ rimaindəd]	[keivi rimaindz]
209	[rivɛu rɛsɛmbouz]	[ri:v rizɛmbous]	[ri:vi risɛmbouz]
210	[glouvə wɑs]	[glouv wəz]	[glouv wəz]
211	[hɛv ounli]	[hɛv ounli]	[hɛvi ounli]
212	[mu:v ɛvəri]	[mu:v ɛvri]	[mu:v ɛvri]
213	[izlɛv ɔfɛn]	[zleiv ɔfən]	[zleiv oufən]
214	[deiv eiti]	[deiv eit]	[deiv eit]
215	[sti:vi its]	[sti:v i:ts]	[sti:v i:ts]
216	[draiv]	[draiv]	[draivə]

/s/	Mar	Gi	En
217	[nais pərsən]	[nais pərsən]	[nais pərsən]
218	[vɔis bikeim]	[vois bikəm]	[vois bikeim]
219	[blis tuː]	[blis tuː]	[blis tuː]
220	[guːs daid]	[guːs daid]	[guːz daiɛd]
221	[drɛs kɔst]	[drɛs kost]	[drɛs kəst]
222	[grɛs grouɔs]	[grɛs grouz]	[grɛz grouns]
223	[rɔs tʃuːz]	[rɔs tʃuːz]	[rɔs tʃuːz]
224	[dəz dʒʌst]	[douz dʒʌst]	[douz dʒʌst]
225	[bɔs faid]	[bɔs faird]	[bɔs faird]
226	[kris visiti]	[kris visitə]	[kris visitə]
227	[tɔs tʰin]	[tɔs θingz]	[tɔs θingz]
228	[prɛs dis]	[prɛs diz]	[prɛs diz]
229	[leis sɛnd]	[leis sɛnt]	[leis sɛnt]
230	[pleisi ʃi]	[pleis ʃiː]	[pleis ʃiː]
231	[pɛs him]	[pɛs him]	[pɛs him]
232	[flɔz mai]	[flos mai]	[flɔz mai]
233	[niːs niːds]	[niːs niːdz]	[niːs niːdz]
234	[kis lindɑ]	[kis lindɑ]	[kis lindɑ]
235	[mouzi rɛn]	[mauzə rein]	[mouz rʌn]
236	[mis juː]	[mis juː]	[mis juː]
237	[treis wəs]	[treis wəz]	[treis wɔz]
238	[muːs eitə]	[muːz eit]	[muːz eit]
239	[keizɪ ɛnds]	[keis ends]	[keiz ɛndz]
240	[rais ɔn]	[rais ɔn]	[rais ɔn]
241	[krɪʃmən ɪv]	[kriʃmɑs iːv]	[krismәs iːv]
242	[xɔs ɔpən]	[rɔs oupənid]	[rɔs ɔupəned]
243	[beizi]	[beis]	[beiz]

/s/	Ota	Ka	Ta
217	[nais pɛrsõ]	[nais pərsən]	[nais pɛrson]
218	[vois bikəm]	[vois bikeim]	[vois bikeim]
219	[blis tuː]	[bliss tuː]	[blis tuː]
220	[guːz daiəd]	[guːz daiəd]	[gjuːs daiəd]
221	[drɛs kɔst]	[drɛs kɔz]	[drɛs kɔst]
222	[rɛz grounz]	[grɛz grouz]	[grɛz grounz]
223	[rɔs tʃuːz]	[rɔs tʃuːs]	[xɔs tʃouz]
224	[doz dʒʌst]	[douz dʒʌst]	[douz dʒʌst]
225	[bɔs faird]	[bɔs faird]	[bɔs faird]
226	[krɪz visitɛdə]	[kris visitəd]	[kris visitɛd]
227	[tɔs singis]	[tɔs θings]	[tɔs θingz]
228	[prɛs diz]	[prɛs ðiz]	[prɛs diz]
229	[leisi sɛnti]	[leis sɛnt	[leis sɛnt]
230	[pleisi ʃiː]	[pleis ʃiː]	[pleis ʃiː]
231	[pɛsi hi]	[pɛs him]	[pɛs him]
232	[flɔs mai]	[flɔz mai]	[flɔs mai]
233	[niːs niːdz]	[niːs niːdz]	[niːs niːdz]
234	[kis lindɑ]	[kiz lindɑ]	[kis lindɑ]
235	[maʊz rʌn]	[maʊz rɛn]	[moʊz rʌn]
236	[misi juː]	[mis juː]	[mis juː]
237	[treis wɑz]	[treis wəs]	[treis wəz]
238	[muːz eit]	[muːz eit]	[muːs eit]
239	[keiz ɛndz]	[keiz ɛndz]	[keiz ɛndz]
240	[rais ɔn]	[rais ɔn]	[rais ɔn]
241	[krismәz ɛvin]	[krismәs iːv]	[kriʃmɑs ɛv]
242	[rɔs opənəd]	[xɔs ɔpən]	[rɔs oʊpənd]
243	[beis]	[beisi]	[beis]

/z/	Mar	Gi	En
244	[greis pi:sfu:li]	[greis pi:sifu:li]	[greis pi:si:fu:li]
245	[noz bli:dz]	[nouz blɛdz]	[nouz bli:dz]
246	[kouz tu:]	[kauz tu:]	[kəuz tʃu:]
247	[meizə draivi]	[meis draivz]	[meiz draivz]
248	[i:s kwait]	[i:zi kwait]	[i:zi kwait]
249	[heis gɔt]	[heis gɔt]	[heiz gɔt]
250	[rous tʃi:p]	[rouz tʃi:p]	[rouz tʃi:pə]
251	[kreis dʒʌst]	[greiz dʒʌst]	[kreiz dʒʌst]
252	[lu:zə faiv]	[lu:z faiv]	[lu:z faiv]
253	[liz vəniʃ]	[liz væniʃ]	[liz vəniʃd]
254	[reizi θri]	[reis θri]	[reiz θri]
255	[tʃu:zə də]	[tʃu:z de]	[tʃouz də]
256	[kwis su:n]	[kwiz su:n]	[kwisu:n]
257	[klauz ʃu:d]	[klauz ʃu:d]	[klauz ʃoud]
258	[houz haiər]	[houz hair]	[houz haidər]
259	[wais mæn]	[waiz mɛn]	[waiz mɛn]
260	[houz ni:ds]	[houz ni:dz]	[hous ni:dz]
261	[tʃɪs lu:ks]	[tʃi:s lu:ks]	[tʃi:s lu:ks]
262	[bris xifrɛʃreʃ]	[blis frɛʃ]	[bri:z rifrɛʃ]
263	[kruis jɛstədei]	[kru:s iɛstərdei]	[kruiz iɛsterdei]
264	[prouzi wɔz]	[prouz wɔs]	[prouz wɔz]
265	[freiz iz]	[freizi is]	[freizi is]
266	[geizi ɛt]	[geiz et]	[geiz ɛt]
267	[rouz ouvər]	[rouz ouver]	[rouz ouver]
268	[klouz au]	[klouz ɔu]	[klouz ɔu]
269	[froz eit]	[frouz eit]	[frouz eit]
270	[bʌs]	[bʌs]	[bʌz]

/z/	Ota	Ka	Ta
244	[kreizi piʊsifuːli]	[greis pisiːfuːli]	[greis piːsifuːli]
245	[noʊzə bliːdz]	[noʊz bliːdz]	[noʊz bliːdz]
246	[kɔʊzi tuː]	[kɔz tuː]	[kaʊz tuː]
247	[meizi draivz]	[meiz draivz]	[meiz draivz]
248	[iːzi kwaitʃ]	[iːzi kwait]	[iːzi kwait]
249	[weizi gɔt]	[heiz gɔt]	[nait heiz]
250	[roʊz ʃiːp]	[roʊz tʃiːp]	[roz ʃiːp]
251	[kreizi dʒʌst]	[kreiz dʒʌst]	[kreiz dʒʌst]
252	[luːz faiv]	[luːz faiv]	[luːs faiv]
253	[lis vɛniʃəd]	[liz vɛniʃt]	[lis vɛniʃd]
254	[reizi triː]	[reiz twriː]	[reiz θriː]
255	[tʃoʊzi də]	[tʃoʊz də]	[tʃuːz də]
256	[kwis suː]	[kwis sʌn]	[kwis suːn]
257	[klaʊz ʃuːdi]	[klɔz ʃuːd]	[klɔs ʃuːd]
258	[hɔz aidɛr]	[hoʊz hair]	[hoʊz haiər]
259	[waizi mɛn]	[waiz mɛn]	[waiz mɛn]
260	[hoʊz niːdz]	[hoʊz niːdz]	[hɔʊz niːdz]
261	[tʃiːz luːks]	[tʃiːs luːkz]	[tʃiːz luːks]
262	[briːzə refrɛʃəd]	[brizi rifrɛʃd]	[briːzi rifrɛʃɛd]
263	[kruiz iɛstərdei]	[kruːiz jɛstədei]	[kruːz jɛstədei]
264	[proʊz wɑs]	[proʊz wəz]	[proʊz wɔs]
265	[freiʒ itʃ]	[freiz is]	[freiz is]
266	[geizi ɛt]	[geiz æt]	[geiz ɛt]
267	[roʊz oʊver]	[roʊz oʊver]	[roʊz oʊver]
268	[kloʊzi ɔʊ]	[kloʊs ɔʊ]	[kloʊz ɔʊ]
269	[froʊz eit]	[froʊz eit]	[froʊz eit]
270	[bʌs]	[bʌz]	[bʌs]

/ʃ/	Mar	Gi	En
271	[wɔʃ pleits]	[wɔʃ pleits]	[wɔʃ pleits]
272	[fu:liʃ bɔi]	[fu:liʃ bɔi]	[fu:liʃi bɔi]
273	[krɛʃ totɑli]	[krɛʃ toutəli]	[krɛʃ toutəli]
274	[flɛʃ distərbəd]	[flɛʃ distərbd]	[flæʃ distərbd]
275	[RʌʃkaʊzdJ	[rʌʃ kəz]	[rʌʃ kaʊzəd]
276	[rɛʃ gɛts]	[roʃ gɛts]	[rɛʃ gɛts]
277	[wiʃ tʃɑrli]	[wiʃ tʃɑrl]	[wiʃ tʃɑrli]
278	[fiʃi dʒʌmpə]	[fiʃ dʒʌmpt]	[fiʃ dʒʌmptə]
279	[vɛniʃi fɔR]	[væniʃ fron]	[vəniʃ frəm]
280	[dʒɔʃ vɾid]	[dʒos virdJ	[dʒʌʃ vi:rd]
281	[skwɛʃ tri]	[skwɛʃ θri]	[skwɛʃ θri]
282	[pɔliʃi də]	[poliʃ de]	[poliʃ də]
283	[nɛs sɛt]	[nɛʃ sɛt]	[næʃ sɛt]
284	[əngwiʃ ʃi:]	[ɛngwiʃ ʃi:]	[angiʃ ʃi:]
285	[bʌʃ hɛs]	[bu:ʃ hɛs]	[bu:ʃ hɛs]
286	[bɾʌʃə mai]	[brʌʃ mai]	[brʌʃ mai]
287	[pouʃ nju:]	[pouʃ nu:]	[poʃ nju:]
288	[diʃi lu:ks]	[diʃ lu:ks]	[diʃ lu:ks]
289	[klɛʃ ɾɛʒistər]	[kɛʃ rɛdʒistər	[kɛʃ rɛʒister]
290	[wiʃi ju:]	[wiʃ ju:]	[wiʃ iu:]
291	[trɛʃ wɔs]	[trɛʃ wəs]	[trɛʃ wɔz]
292	[frɛʃ eipoʊs]	[frɛʃ ɛpoʊs]	[frɛʃ eipoʊz]
293	[kɾʌʃ ɔʊ]	[krʌʃ ɔʊ]	[kru:ʃ ɔʊ]
294	[pu:ʃə ɛvɛri]	[pʊʃ ɛvrɛ]	[pʌʃ ɛvri]
295	[blʌʃ izi:li]	[blʌʃ i:zi:li]	[blʌʃ i:zili]
296	[krɛʃin oʊpens]	[krɛtʃi oʊps]	[kreiʃ oʊps]
297	[iŋgliʃ]	[iŋgliʃ]	[iŋgliʃ]

/ʃ/	Ota	Ka	Ta
271	[wɑtʃ pleits]	[wɔʃ pleits]	[wɔʃ pleits]
272	[fɔliʃilɪʃ bɔi]	[fu:liʃ bɔi]	[fu:liʃ bɔi]
273	[krɑʃ totɑli]	[krɛʃ toʊ təl̩i]	[krɛʃ toʊ təl̩i]
274	[flæʃ distu:rbəd]	[flɛʃ distərbd]	[flɛʃ distərbd]
275	[roʃ kaʊzd]	[rʌʃ kɔzd]	[rʌʃ kɔzd]
276	[rɑʃ gɛts]	[rɛʃ gɛts]	[rɛʃ gɛts]
277	[wiʃi ʃarli]	[wiʃ tʃɑrli]	[wiʃ tʃɑrli]
278	[fiʃi dʒʌmptə]	[fiʃ dʒʌmpt]	[fiʃ dʒʌmpt]
279	[vɛniʃ from]	[vɛniʃ frəm]	[vɛniʃ frəm]
280	[dʒɔn vɛri]	[dʒɔʃ vɛrɪd]	[dʒɔʃ vɛrɪd]
281	[skwɑʃ tri]	[skwɛʃ tri:]	[skwɛʃ tri:]
282	[pɔliʃ də]	[poʊliʃ də]	[poʊliʃ də]
283	[næʃ sɛt]	[næʃ sɛt]	[næʃ sɛt]
284	[ɛndʒɛd ʃi:]	[ængwiʃ ʃi:]	[ængwiʃ ʃi:]
285	[bu:ʃ hɛs]	[bʌʃ hɛs]	[bʌʃ hɛs]
286	[brʌʃ mai]	[brʌʃ mai]	[brʌʃ mai]
287	[pɔʊʃ nju:]	[pɔʃ nju:]	[pɔʃ nju:]
288	[diʃi lu:ks]	[diʃ lu:ks]	[diʃ lu:ks]
289	[kɛtʃ rɛdʒistər]	[kɛʃ rɛdʒistər]	[kɛʃ rɛdʒistər]
290	[wiʃ ju:]	[wiʃ ju:]	[wiʃ ju:]
291	[trɛʃ wɔs]	[trɛʃ wəs]	[trɛʃ wəs]
292	[frɛʃ ɛipoʊ]	[frɛʃ ɛpoʊs]	[frɛʃ ɛpoʊs]
293	[kru:ʃ aʊ]	[krʌʃ ɔʊ]	[krʌʃ ɔʊ]
294	[pʊʃ ɛvri]	[pʌʃ ɛvri]	[pʌʃ ɛvri]
295	[blʌs i:zi:li]	[blʌʃ i:zi:li]	[blʌʃ i:zi:li]
296	[krɛʃə opɛns]	[krɛʃə oʊpəns]	[krɛʃə oʊpəns]
297	[ɪŋglɪʃ]	[iŋgliʃ]	[iŋgliʃ]

/tʃ/	Mar	Gi	En
298	[skɔt pi:poʊ]	[skɔt pi:poʊ]	[skɔt pi:poʊs]
299	[kɛtʃ bətərflais]	[kɛtʃ bɑtɔRflais]	[kɛtʃ bɑtɔrflais]
300	[krətʃ tʃu:]	[krʌtʃ tu:]	[kru:tʃ tʃu:]
301	[sɛndwiʃ du:nin]	[səndwiʃi du:riŋ]	[sɛndwiʃ du:rin]
302	[mitʃi krɔs]	[mitʃ krɔs]	[mitʃ krosd]
303	[titʃ grɑmɑ:]	[ti:tʃ grɛmɑr]	[ti:tʃ græmər]
304	[itʃ tʃaid]	[i:tʃ tʃaiju:d]	[i:tʃ tʃajd]
305	[prɛs dʒɛzəs]	[pri:tʃ dʒizu:z]	[pri:tʃ dʒizʌz]
306	[ditʃi fɔr]	[ditʃ fɔ:r]	[ditʃ for]
307	[rɪtʃi vomitən]	[ritʃ vomiti]	[ritʃ voʊmit]
308	[fɛti təRt]	[fi:tʃ tʌrti]	[fɛtʃ tʰərri]
309	[skræʃ dis]	[skrɛt dis]	[skrɛtʃi dis]
310	[wɔtʃ sɛm]	[wɔtʃ sʌm]	[wɔtʃ sɛm]
311	[klətʃ ʃu:d]	[klʌtʃ ʃu:d]	[klʌtʃ ʃoʊd]
312	[pʊʃ hɛs]	[potʃ hɛs]	[poʊʃ hɛs]
313	[riʃ mɛn]	[ritʃ mɛn]	[ritʃ mɛn]
314	[koʊtʃ ni:dz]	[koʊtʃ ni:dz]	[koʊtʃ ni:dz]
315	[dʌtʃ ləngwɪʃ]	[dʌtʃ lɛngwəʒ]	[du:tʃi lɛngwɛdʒ]
316	[skɾeʃ rimaindɛd]	[iskwɛtʃi rimaindi]	[kɛtʃə rimaind]
317	[skɾɛʃ jɔ:r]	[stri:ʃ jɔ:r]	[stɾɛtʃ jɔ:r]
318	[liʃ wont]	[li:ʃ wont]	[li:ʒ wont]
319	[pitʃ ɛndi]	[pi:tʃ ɛnd]	[pi:tʃ ɛnd]
320	[roʊʃə eit]	[roʊtʃ eit]	[roʊʃ eit]
321	[mætʃʰ ɔpənin]	[mætʃ oʊpənid]	[mɛtʃ ɔpəned]
322	[tək ivɛn]	[tʌtʃ ivin]	[toʊtʃ i:vən]
323	[blɔtʃ aʊ]	[blɔtʃ ɔʊ]	[blɔtʃ ɔʊ]
324	[pɛtʃʰ]	[pɛtʃ]	[pɛtʃ]

/tʃ/	Ota	Ka	Ta
298	[skɔtʃ pi:poʊ]	[skətʃ pi:poʊ]	[skɔtʃ pi:poʊ]
299	[ketʃʰ broʊtəfaird]	[kɛtʃ bətərflais]	[kɛtʃ bətərflais]
300	[krʌtʃ tu:]	[krʌtʃ tu:]	[krʌtʃ tu̟:]
301	[səndwitʃ dju:ri]	[sɛndwitʃ du:riŋ]	[sɛndwiʃ dju:rin]
302	[mitʃi krɔsəd]	[mitʃ krɔst]	[mitʃ krɔs]
303	[ti:tʃ grəmər]	[ti:tʃ græmə]	[ti:tʃ grɛmə]
304	[ɪtʃ tʃaiju:d]	[i:tʃ tʃaiju:d]	[i:tʃ tʃaiju:d]
305	[prɛntʃi dʒɛzus]	[pri:tʃ dʒɛzəz]	[pri:t dʒi:zəz]
306	[ditʃ fər]	[ditʃ fɔr]	[ditʃ fɔr]
307	[ritʃə vomitəd]	[ritʃ vomitəd]	[xitʃ vu:mit]
308	[fɛʃə θərdi]	[fɛtʃ θərti]	[fɛʃt θərt]
309	[skrɛtʃ dis]	[skrɛtʃ diz]	[skrɛʃ diz]
310	[wɔtʃi sʌm]	[wɔtʃ sæm]	[wɔtʃ sɛm]
311	[klʌtʃ ʃu:d]	[klʌtʃi ʃu:d]	[clʌtʃ ʃʊd]
312	[potʃ hɛs]	[poʊtʃ hɛs]	[pʌtʃ hɛs]
313	[ritʃ mɛn]	[ritʃ mɛn]	[ritʃ mɛn]
314	[kaʊtʃ ni:dz]	[kaʊtʃ ni:dz]	[kəts ni:dz]
315	[dʌtʃ læŋgwədʒ]	[dʌtʃ lɛgwədʒ]	[dʌtʃ lɛngwədʒi]
316	[skrɛtʃi rimeinimi]	[skɛtʃ rimaindəd]	[skɛtʃ rimaind]
317	[strɛntʃ jɔ:r]	[strɛtʃ jər]	[strɛtʃi jɔ:r]
318	[li:tʃ wont]	[li:tʃ wont]	[li:tʃ wont]
319	[pi:tʃ ɛnd]	[pi:ʃ ɛnd	[pi:tʃ ɛnd]
320	[rəʃ eit]	[roʊtʃ eit]	[rotʃ eit]
321	[mætʃ opənəd]	[mætʃ oʊpənd]	[mɛtʃ oʊpəned]
322	[tɔ:k ɛvʌn]	[taʊtʃ i:vən]	[tʌtʰ i:vən]
323	[blɔ:tʃʰ aʊ]	[blɔtʃ ɔʊ]	[blɔtʃ ɔʊ]
324	[pætʃ]	[pætʃ]	[pɛtʃ]

/dʒ/	**Mar**	**Gi**	**En**
325	[eiʒ pleiz]	[eidʒ pleiz]	[eiʒ pleis]
326	[rifuːʒ bai]	[rifuːd bai]	[rɛfjuːdʒ bai]
327	[ɪdʒ tʃuː]	[ɛdʒ tuː]	[ɛdʒ tuː]
328	[grʌdʒ distərb]	[grʌd distərbs]	[gruːdʒi distərbs]
329	[imeidʒ kaʊzed]	[imɑdʒ kaʊzed]	[imidʒ kaʊzd]
330	[reiʒ gɔt]	[χeidʒ gɔt]	[reiʒ gɔt]
331	[midʒ tʃeized]	[midʒ tʃeizi]	[midʒ tʃeizɛd]
332	[weid dʒəst]	[weidʒ dʒʌst]	[weiʒ dʒʌst]
333	[lɔːdʒ fɔr]	[lɔdʒ fɔr]	[lɔːdʒ fɔːr]
334	[nʌd vɛlɛɾi]	[nʌdʒ vælərɪ]	[nʌdʒ vɛləri]
335	[seidʒ toʊt]	[seig tɔt]	[seiʒ tɔʊt]
336	[drɛtʃ de]	[drid de]	[drɛdʒ də]
337	[fuːd saʊnd]	[fuːd saʊndz]	[fuːdʒ saʊnds]
338	[bædʒi ʃuːd]	[bædʒ ʃuːd]	[bɛdʒi ʃoʊd]
339	[dʒʌdʒi hɛs]	[dʒʌd hæs]	[juːdʒə hɛs]
340	[gɑːbɑdʒ mʌst]	[gɑrbɑːdʒ mʌst]	[gɑrbeidʒ mʌst]
341	[kɛbəd niːdz]	[kɛbɛdʒ niːdz]	[kɛbɛdʒ niːdz]
342	[witʃ lɪfti]	[wɛd^{h} lift]	[wɛdʒi lifti]
343	[fridʒi rimeins]	[fraid rimens]	[fridʒə rimeins]
344	[plidʒi yiɔs]	[pliːdʒ jiːrs]	[plɛd jiːrs]
345	[vɔiəʒ wɔs]	[voiədʒ wɔz]	[voiʒ wəz]
346	[keiʒ is]	[keidʒi iz]	[keidʒ is]
347	[bridʒ oʊvər]	[bridʒi oʊvər]	[briːdʒ oʊvər]
348	[oblidʒi ɛvrəwʌn]	[obliːg ɛvriwən]	[obligi ɛvriwən]
349	[ridʒi ʌp]	[ridʒ ʌp]	[riːdʒ ʌp]
350	[dədʒ iːtʃ]	[dɔːd iːtʃ]	[dɔdʒ iːtʃ]
351	[lɛdʒi]	[lɛdʒ]	[lɛdʒ]

/dʒ/	Ota	Ka	Ta
325	[eidʒ pleis]	[eidʒ pleiz]	[eidʒ pleis]
326	[rɛfu:dʒ bai]	[rɛʃju:ʒ bai]	[rifju:ʒi bai]
327	[edʒə tʃu:]	[ɛdʒɛt tu:]	[ɛdʒ tu:]
328	[grʌdʒ distərbs]	[grʌdʒʰ distərbz]	[grʌd distərbs]
329	[imɛdʒɛd kaʊzəd]	[imɑdʒ kɔzed]	[iməʊdʒ kəzd]
330	[reidʒi gɔt]	[reidʒ gɔt]	[reidʰ gɒt]
331	[maidʒi tʃeizɛd]	[midʒə tʃeizəd]	[midʰ tʃeizi]
332	[weidʒi dʒʌst]	[weidʒi dʒʌst]	[weidʒ dʒʌst]
333	[lɔdʒɪ fɔr]	[lɔdʒi fɔ:]	[lɔdʒ fɔr]
334	[nʌdʒi vɛləri]	[nʌdʒi væləri]	[nʌdʒ vɛləri]
335	[seidʒi θru:]	[seidʒ θɔt]	[seidʒ sɔt]
336	[dɛdʒən dɛ]	[drɛdʒə də]	[drɛdʒ də]
337	[fɑdʒi sondz]	[fju:dʒ saʊndz]	[fu:dʒ saʊndz]
338	[bɛdʒi ʃu:d]	[beidʒ ʃu:d]	[bɛdʒ ʃʊd]
339	[dʒu:deʒə hɛs]	[dʒʌdʒi hɛs]	[dʒʌ hɛs]
340	[gɑrbidʒ mʌst]	[gɑrbədʒ mʌst]	[gɑrbeidʒ mʌst]
341	[kɛbɛdʒi ni:dz]	[kæbədʒ ni:dz]	[kɛbɛdʒi ni:dz]
342	[wedʒi lifti]	[wɛdʒə liftəd]	[wɛd laift]
343	[fridʒju: rɛmeins]	[fridʒ rimaindz]	[fraidʒ rɛmeins]
344	[plɛdʒiə ji:rs]	[plɛdʒi ji:rs]	[pledʒi ji:rs]
345	[voiɑʒ wɔs]	[voiɑʒ wɔs]	[voiədʒ wɔz]
346	[keidʒi iz]	[keidʒi iz]	[keidʒi is]
347	[brɪdʒ oʊvər]	[bridʒ oʊvər]	[bri:dʒ oʊvər]
348	[obligi ɛvɛriwʌn]	[oblaidʒ ɛvriwən]	[oblaig ɛvriwən]
349	[xidʒ op]	[ridʒ ʌp]	[raid ʌp]
350	[dɔ:ʒ witʃ]	[də:dʒi i:tʃ]	[dɔdʒi i:tʃ]
351	[lɛdʒʰ]	[lɛdʒʰ]	[lɛdʒʰ]

/m/	Mar	Gi	En
352	[tõ pleis]	[tõ pleis]	[tõ pleis]
353	[geim bigɛn]	[geim bigən]	[geim bigɛn]
354	[leim tʃu:]	[leim tu:]	[leim tʃu:]
355	[ti:m dizɛrvz]	[ti:m dizərvs]	[ti:m dizərvz]
356	[drʌm kɛn]	[drʌm ken]	[drʌm kɛn]
357	[taim gouz]	[ti:m gouz]	[taim gouz]
358	[dʒi tʃiurd]	[dʒim tʃɛr]	[dʒi:m tʃi:rd]
359	[fleim dʒʌst]	[fleim dʒʌst]	[fleim dʒʌst]
360	[cri:n fili]	[kri:m filiŋ]	[kri:m fili]
361	[ki violɛt]	[kim violeit]	[kim vaioleited]
362	[skin tru:aut]	[iskim θru]	[skim θru:]
363	[izləm də]	[zlæm də]	[zlæm də]
364	[bʌn si:ms]	[bʌm si:ms]	[bʌm si:ms]
365	[dʒɛm ʃu:d]	[dʒi:m ʃu:d]	[dʒɪm ʃoud]
366	[freimi him]	[freim him]	[freim hɪm]
367	[tri:m mai]	[θrim mai]	[trim mai]
368	[mʌm ni:ds]	[mu:m ni:dz]	[mom ni:dz]
369	[tim li:vz]	[tim li:vz]	[tim livz]
370	[dri:m rifrɛsh]	[dri:m rifrɛʃt]	[dri:m rfrɛʃ]
371	[keim jɛstədei]	[keim jɛstərdei]	[keimi jɛstɛrdei]
372	[kləm wɔs]	[kleim wɔs]	[klɛn wɔz]
373	[klaimə eniting]	[keim ɛniθin]	[kleim ɛniθing]
374	[rul ouvər]	[roum ouvər]	[roum ouvər]
375	[seim eidʒ]	[sɛm eiʒ]	[seim heidʒ]
376	[ru:m iz]	[ru:m iz]	[ru:m is]
377	[dʒi ɑsk]	[dʒɪm ɛsk]	[dʒim æsket]
378	[izling]	[slim]	[slim]

/m/	Ota	Ka	Ta
352	[tõ pleis]	[tõ pleis]	[tõ pleis]
353	[geimi bigən]	[geim bigæn]	[geim bigɛn]
354	[leimi tʃu:]	[leim tu:]	[leim tu:]
355	[ti:m dizərvərs]	[ti:m dizərvəs]	[ti:m dizərvz]
356	[dru:m kɛn]	[drʌm kɛn]	[drʌm kɛn]
357	[taimi gouz]	[taim gouz]	[taim gouz]
358	[dʒi ʃʍrə]	[dʒɪm tʃi:rd]	[dʒim ʃi:rd]
359	[fleim dʒʌst]	[fleim dʒʌst]	[fleimi dʒʌst]
360	[kri:m fili]	[kri:m filiŋ]	[kri:m fi:li]
361	[kim vaiəlɛt]	[kim vaiəleited]	[ki violeited]
362	[skwi θru:]	[skim θru:]	[skim θru:]
363	[izlɛm də]	[izlæm də]	[zlɛm də]
364	[bʌm si:mis]	[bʌm si:ms]	[bʌm si:ms]
365	[dʒi ʃu:di]	[dʒɛm ʃu:d]	[dʒem ʃu:d]
366	[frʌm hɪm]	[freim him]	[freim hɪm]
367	[trim mai]	[trim mai]	[trim mai]
368	[mʌm ni:dz]	[mʌm ni:dz]	[mʌm ni:dz]
369	[ti liviz]	[ti:m li:vz]	[ti:m li:vz]
370	[dri:mə rɛfrɛʃədə]	[dri:m rifrɛʃd]	[dri:m rifrɛʃdi]
371	[keimi iɛstərdei]	[keim jɛstərdei]	[kɛm jɛstədei]
372	[klʌm wɑs]	[klæn wəs]	[klɛm wəs]
373	[kleim ɛnising]	[klɛim ɛniθing]	[klei ɛnitθing]
374	[roum ouvɛr]	[roum ouvər]	[rɔm ouvər]
375	[sɛm eidʒ]	[seim eidʒ]	[seim eidʒ]
376	[ru:m iz]	[ru:m is]	[ru:m iz]
377	[dʒi ɛskəd]	[dʒim æskt]	[dʒim ɛskəd]
378	[izlim]	[zlim]	[slim]

/n/	Mar	Gi	En
379	[bɛn prɑktəsi]	[bɛn prɑktisid]	[bɛn præktisid]
380	[hu:mən bɔdi]	[u:mən bɔdi]	[wju:mɛn bʌdi]
381	[lein tu:]	[lein tu:]	[lein tʃu:]
382	[mein draiv]	[men draivz]	[men draivz]
383	[ton ku:d]	[toʊn ku:d]	[ton koʊd]
384	[dʒens goʊs]	[dʒʌni goʊz]	[dʒɛni goʊz]
385	[kɛn tʃɑtərs]	[kɛn tʃɛtərs]	[kɛn tʃɑrtərs]
386	[trein dʒʌst]	[trein dʒʌst]	[trein dʒʌst]
387	[wi faiv]	[wim faiv]	[wi faiv]
388	[brɛn vɛris]	[brɛn vɑri:s]	[brʌn vərais]
389	[won tri]	[wõ θri]	[wõ θri]
390	[oʊpɛn diz]	[oʊpɛn diz]	[oʊpɛn diz]
391	[brɛn ciz]	[brein sɛʊz]	[brein sɛʊs]
392	[sʌn ʃoʊn]	[sʌn ʃoʊn]	[sʌn ʃɔn]
393	[sirmõ hed]	[sɛrmon hɛd]	[sɛrmõ hɛd]
394	[rein mʌst]	[rein mʌst]	[rein mʌst]
395	[nʌn ni:dz]	[nʌm ni:dz]	[nʌn ni:dz]
396	[dã laiks]	[dɛn laiks]	[dɛn laiks]
397	[be rəns]	[bɛn rʌns]	[bɛn rʌns]
398	[ʃraini yɛstədei]	[ʃrein iɛstərdei]	[ʃrain iɛsterdei]
399	[sʌn wɔz]	[sʌm wɔz]	[sʌn wɔz]
400	[skæn aʊ]	[skɛn ɔʊ]	[skæn ɔʊ]
401	[sin in]	[sin in]	[sin in]
402	[klɛn okjupaid]	[klɛn ɔkju:paidi]	[klʌn əkju:paid]
403	[laʊ ɛvri]	[lɔ ɛvridei]	[lɔʊn ɛvridei]
404	[gʌn ɔrnɛr]	[gʌn wʌnər]	[gʌn oʊnər]
405	[fʌn]	[fʌn]	[fʌn]

/n/	Ota	Ka	Ta
379	[bɛn prɑktisid]	[be prɛkts]	[bɛn prɛktisə]
380	[hju:mɛn bɔɾi]	[hju:mən bɔɾi]	[ju:mən bɒɾi]
381	[lein tu:]	[lein tu:]	[lein tu:]
382	[mɛn draivs]	[mɛn draivz]	[mɛn draivz]
383	[tõ ku:di]	[toʊn ku:d]	[ton kʊd]
384	[dʒɛns goʊz]	[dʒein goʊs]	[dʒein goʊz]
385	[kɛn tʃɛtərs]	[kɛn tʃɛtərs]	[kɛn ʃeitərs]
386	[trein dʒʌst]	[trein dʒʌst]	[trein]
387	[wi faiv]	[win faiv]	[wi faiv]
388	[brɛn ʊerais]	[brɛn vɛri:z]	[brɛn veris]
389	[wõ tri]	[wən θri:]	[wɔn θri:]
390	[oʊpɛn diz]	[oʊpən diz]	[open dis]
391	[brein sɛʊs]	[brein sɛʊs]	[brein sɛʊs]
392	[sʌn ʃon]	[sʌn ʃɔn]	[sʌn ʃoʊn]
393	[sɛrmõ hɛd]	[sərmən hɛd]	[sɛrmõ hɛd]
394	[rein mʌst]	[rein mʌst]	[rein mʌst]
395	[nu ni:dz]	[nʌn ni:dz]	[nʌn ni:dz]
396	[dã laiks]	[dɛn laiks]	[dæn laiks]
397	[bɛn rʌns]	[bm rʌns]	[bɛn rʌns]
398	[ʃwrain iɛstərdei]	[ʃrain jɛstərdei]	[ʃrəin jɛstədei]
399	[sʌn wəs]	[sʌn wəs]	[sʌn wəz]
400	[skɪn aʊ]	[skɛn ɔʊ]	[skæn əʊ]
401	[sin in]	[sin in]	[sin in]
402	[klɛn oku:peid]	[klɛn ɔkju:paid]	[klæn okju:paid]
403	[lã ɛvri]	[lɔwən ɛvridei]	[lɔ ɛvri]
404	[gʌn woneɾ]	[gʌn ɔʊnəɾ]	[gɛn ənəɾ]
405	[fʌn]	[fʌn]	[fʌn]

/ŋ/	Mar	Gi	En
406	[lʌng prɔblems]	[lʌng prɔbləms]	[lʌng prɔbləms]
407	[rɔng baiki]	[rong baik]	[rɔng baik]
408	[bɔri titʃə]	[bɔriŋ ti:tʃər]	[bɔriŋ ti:tʃər]
409	[sting dizɛrvs]	[izting dizərvz]	[sting dizərvz]
410	[sting kɛn]	[sting kɛn]	[sting kɛn]
411	[strɔng gai]	[strɔng gai]	[strɔng gai]
412	[swimi tʃɛmpiɔns]	[swimiŋ tʃɛmpiɔns]	[swimi tʃɛmpiɔns]
413	[faindi dʒʌst]	[faitiŋ dʒʌst]	[faiti dʒʌst]
414	[laiti fraitins]	[laitiŋ fraitinɛs]	[laitin fraitins]
415	[long vaʊɛʊ]	[long vaʊ]	[lɔng voʊ]
416	[izling tings]	[izling θings]	[izling θingz]
417	[xɛng də]	[rɛng de]	[rʌng dɛ]
418	[mɔrni sʌn]	[mɔ:rniŋ sʌn]	[mɔrni sʌn]
419	[ivni ʃoʊ]	[i:viniŋ ʃoʊ]	[i:vini ʃoʊ]
420	[bring hɪm]	[bring him]	[bring him]
421	[king mʌst]	[kim mʌst]	[king mʌst]
422	[cɛli nids]	[sɛliŋ ni:dz]	[sɛlin ni:dz]
423	[singi lɔv]	[sing lɔv]	[sing ləv]
424	[boʊli rimainds]	[boʊliŋ rimaindz]	[bɔʊli rimaind]
425	[skeitbɔrdi jɛstədei]	[skeitbɔrdiŋ jɛstərdei]	[skeitbɔrdi iɛsterdei]
426	[sɔng wɔz]	[sɔng wɔz]	[sɔng wɔz]
427	[sʌng itʃ]	[sɛngi i:tʃ]	[sʌng i:tʃ]
428	[gɛng aʊməst]	[gɛng aʊmoʊst]	[gæng ɔʊmoʊst]
429	[hɛng ɑraʊnd]	[hʌng ɑraʊnd]	[hɛng ɛraʊnd]
430	[bɛng oʊvər]	[beng oʊvəχ]	[bæng ouvər]
431	[fɛng ɑʃɪ]	[fɛng ɛkti]	[fæng ɛksi]
432	[bɛng]	[bɛng]	[bæng]

/ŋ/	Ota	Ka	Ta
406	[lʌng prəblʌms]	[lʌng prɔblems]	[lʌng prɔblems]
407	[rəngə baiki]	[rɔŋ baik]	[rɔng baik]
408	[bɔri tʃi:tʃər]	[brɔriŋ ti:tʃər]	[bɔri ti:tʃər]
409	[stingi dizərves]	[sting dizərvz]	[isting dizərvz]
410	[iʃting kɛn]	[stiŋ kɛn]	[sting kɛn]
411	[strɔng gai]	[strɔŋ gai]	[strɔng gai]
412	[swimi ʃapiəns]	[swimiŋ tʃæmpions]	[swimi ʃɛmpiɔns]
413	[faiti dʒʌst]	[faitiŋ dʒʌst]	[faiti dʒʌst]
414	[laitʃiŋ fraitʃins]	[laitiŋ fraitəns]	[laitin fraitens]
415	[lɔngu: waʊvu:]	[ləŋ vaʊwju:]	[lɔng vaʊwju:]
416	[isling θings]	[izling θingz]	[zling θingz]
417	[rɛngi də]	[ræng də]	[rɛng də]
418	[mɔrni sʌn]	[mɔrniŋ sʌn]	[mɔrnin sʌn]
419	[ɛvini ʃoʊ]	[ivi:niŋ ʃoʊ]	[i:vini ʃoʊ]
420	[bringi him]	[briŋ him]	[bring him]
421	[kingi mʌst]	[kiŋ mʌst]	[king mʌst]
422	[sɛli ni:dz]	[seiliŋ ni:dz]	[si:li ni:dz]
423	[sing lɔvi]	[sing lɔv]	[sing lɔv]
424	[bɔʊli rimaindz]	[boʊliŋ rimaindz]	[bɔʊli rimaindz]
425	[skeitbɔrdi jɛstərdei]	[skɛitɔrdiŋ jɛstədei]	[skeitbɔrdi jɛstərdei]
426	[song wɔz]	[sʌng wəz]	[səng wəs]
427	[səng i:tʃ]	[sæŋ i:tʃ]	[sɛng i:tʃ]
428	[gɛngə aʊmoʊst]	[gæng aʊmoʊst]	[gɛngi əʊmoʊst]
429	[hɛng ɑru:nd]	[hæŋ ɑraʊnd]	[hɛng ɛraʊnd]
430	[bɛngi oʊvɛr]	[bæng oʊvər]	[bɛng oʊvər]
431	[fɛng ɛtʃəd]	[fæng eitʃɛt]	[fɛng eitʃed]
432	[bɛng]	[bæng]	[bɛng]