Chapter VI

Conclusion and Recommendations

6.1 Conclusion

Certain linguistic hypotheses were borne out in the informant study, though they did not explain all relative outcomes. Other linguistic and non-linguistic factors were also evident. What was *not* borne out in the study was any significant or uniform correlation between the accuracy of a coda and its frequency of use. Using Table 6 the correlation was in fact only 0.14, p=0.366 (sample size, 44 complex codas). That this correlation is positive at all would be intuitive, as many of the rarest codas in the list are also the most difficult, even for NS: /skt/, /sks/, /θs/. Some positive correlation could be expected even if frequency of exposure to a coda had no effect on accuracy. But the findings in the evaluation study[15] do not show a uniform or consistent effect among the learners. This shows a malfunction in pedagogy if the intent is to make learners more intelligible in pronunciation. The /fs/ coda was indeed one of the easiest, as was speculated in 2.2, despite its occurring only 0.1 times per 1,000 words.

The MDH and its sequel, the Structural Conformity Hypothesis appeared to best fit the case of complex coda production. Voiced phonemes in codas were uniformly harder than voiceless ones. However, where the MDH predicted two potential outcomes, e.g., voiced is harder; greater number of phonemes is harder, the latter prediction was overridden with several cases of voiceless triple-consonant codas

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achieving a higher score than most voiced, and some voiceless, doubletons. The number of phonemes was less of a factor than their voicing status and markedness. The implication of Morpheme Acquisition Order that **–s** inflected codas are easier than **–ed** inflected codas (at least for plurals) was borne out in the study. But there was no apparent difference between mean plural scores and third person singulars—both were 68. This might indicate that the supposed reason for the latter's difficulty (semantics or rarity in use) may not be as true as commonly believed, and that the /s/ and /z/ codas which derive from the **–s** inflections are simply easier to pronounce than the /t/ and /d/ codas that derive from the **–ed** inflections—at least for more advanced speakers. However, definite conclusions cannot be drawn because the elicitation instrument did not assess both forms (plural **and** third person singular) of the identical /s/ and /z/ codas.

It was difficult to see how to apply Contrastive Analysis to the problem of the complex coda, for two reasons. Firstly, CA pertains to allophonic distributions, and the equivalents and near-equivalents of [s], [l], [tʃ], and [dʒ] do not exist in post-vocalic position in Thai for more fundamental orthographic-phonological reasons, as was remarked in sections 1.7 and 2.1.1. Nevertheless, the impediment to the acquisition of the English postvocalic phonemes may be similar to what CA would predict for different allophonic distributions: Thai learners would have difficulty pronouncing the above consonants in final (postvocalic) position because of allophonic rules. Secondly, how would allophonic and orthographic-phonological rules apply to complex codas? Would the six phonemes above be more difficult in ultimate or penultimate position? Using the pair of codas /ts/ and /st/, CA might predict the latter to be more difficult, as /s/ is in postvocalic position--which was indeed the case; /s/ immediately following a vowel was

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more difficult than /s/ in final position. But using the voiced pair, /dz/ and /zd/, the results were reversed. True, there are no allophonic, or even orthographic-phonological rules for /z/, as it does not exist in Thai phonology. In any event, the sample size of pairs is too small to make definite conclusions; many doubleton codas cannot be reversed to compare the results. It would seem that CA has some bearing on the relative outcomes, but it also seems evident that intermediate-advanced learners have overcome some of the most common restrictions, such as post-vocalic /s/--as was shown when comparing informant with student scores. Post-vocalic /l/ was much less successful, and was only consistently articulated following the /e/ vowel.

Feature permutations displayed mixed results depending on whether the codas were voiced or voiceless. Comparison of the scores (from Table 6) of all voiceless-voiced pairs was revealing: [/ts/, /dz/] (95,57); [/ks/, /gz/] (87, 53), [/ps/, bz/] (87,60); [/kt/, /gd/] (78, 56); [/ntʃt/, /ndʒd/] (75,48); [/fs/, /vz/] (75, 59); [/st/, /zd/] (70,62); [/pt/, /bd/] (67,54); [/tʃt/, /dʒd/] (64,50); and [/ft/, /vd/] (62,54). The score differences between the voiced and voiceless codas in each pair were respectively: 38, 34, 27, 22, 27, 16, 8, 13, 14, and 8, showing that the higher the score of the voiceless coda, the greater the difference between its score and that of its voiced counterpart. In fact, there was a 0.916 positive correlation between voiceless coda scores and their 'premium' over their voiceless counterparts, which was highly significant ($p=0.00019$). The voiced codas were not helped if their voiceless equivalents were easy. There was no single prevailing strategy with voiced codas. Most often there was additional deletion, usually of the final phoneme in the voiced coda; the /dz/ coda underwent 4 additional final consonant

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deletions over the /ts/ coda and the /gz/ underwent 2 over its voiceless counterpart /ks/. Sometimes there was imitation of the voiceless coda: the /bz/ coda underwent devoicing of both coda consonants 6 times. Elsewhere there was a wide range of deletions and substitutions. The learners seem to have made a distinction between the voiced and voiced codas within pairs, though it is not evident whether voiced finals are deleted intentionally or unwittingly.

A revised feature permutations accuracy hierarchy was devised, which took account of voicing status. Voiceless doubletons, then voiced doubletons with postvocalic nasals and voiceless tripletons were found to be easiest. Voiced tripletons, then voiced doubletons with postvocalic stops/affricate were found to be most difficult for both the group of 4 informants and the group of 8 students. Correlation of all seven permutation mean scores between informant and student populations was highly significant.

The relative accuracy rankings /ntʃt/ > /tʃt/ > /ʃt/ (informant study) and /lpt/ > /pt/ (student study) were the only anomalies not predicted or adequately explained by the hypotheses; they contradicted the MDH, which would have predicted more difficulty with the tripleton codas. Possibly, CA could explain the first ranking order by the presence in Thai of the postvocalic consonants /n/ and /t/, analyzing the /tʃ/ affricate as two separate phonemes—as is sometimes done (Roach, 2000). The second anomaly may simply be a case of 'beginner's luck'; the word "helped" /helpt/ may well be more familiar to them than the bi-syllabic "adopt" /ədɒpt/. In any event, postvocalic /l/ following the /e/ vowel was generally the only combination in which /l/ was pronounced in both the informant and student coda evaluations.

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Difficult codas underwent a wider range of production than easier codas. They underwent more deletions and bizarre substitutions, often of crucial consonants, which rendered them less intelligible. They underwent novel strategies, such as epenthesis and paragoge in learners not accustomed to using these repair strategies. They underwent occasional metathesis, often in combination with other errors, which sometimes made them unintelligible. Easier codas had fewer representations, often were pronounced perfectly in the wordlists, and often suffered a deletion of the final consonant in the narratives. Deletion and voicing substitution were prevalent, feature substitution less so.

The Pearson correlation between codas evaluated at the segmental level and overall intelligibility of the narratives and interviews assessed by the auditors was 0.958, $p = 0.042$, which was much stronger than anticipated. However, because of the small population of informants (4), the significance was insufficient to completely validate the scoring method.

6.2 Recommendations

The following six codas, all of which occur more than once in 1,000 words, had relatively low scores (narrative scores of 60 or less in the informant study): /nd/ (60), /st/ (60), /mz/ (60), /ld/ (56), /vd/ (52), and /vz/ (56). Their respective frequencies are 31.7, 8.9, 3.1, 3.1, 1.2, and 1.1 per 1,000 English words. The prevailing strategy was deletion of the second and final phoneme (/d/ or /z/). Other strategies were deletion of initial /l/ and devoicing substitutions. Five of the six codas are voiced, and the sixth, voiceless coda (/st/) was presented in its uninflected form ("must") in the narrative. The inflected form ("passed") was utilized in the wordlist, and it scored well (80). As expected, the

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problem lies with the voiced codas, where the final voiced consonant was apt to be deleted. This would indicate that Thai learners should be given practice drills on pronouncing voiced final consonants starting with voiced singleton obstruents (/b/, /d/, /g/, /v/, /z/, and /dʒ/), perhaps with vowels following, e.g., "baby", and then gradually pronounce them without the final vowel, viz., "babe". Then voiced doubletons could be introduced in the same manner, e.g., "sandy" → "sand". This strategy might reduce the fear of failure that affects so many learners. Learners might be encouraged to pronounce these difficult codas by devoicing substitutions, if necessary at the beginning, and then to apply proper voicing when they are able.

Some learners may never acquire voicing on complex codas, yet may acquire an intermediate level of intelligibility—a West-European standard, where consistent de-voicing takes place, while the grammatical inflections are maintained. To this end, learners should also be encouraged to utilize the common native speaker reduction of difficult codas (Celce-Murcia, et.al.1996). Examples: /θs/ → [ss], /sts/ and /sks/→ [ss], /skt/ →[sst], /kts/ →[kss], and /pts/ → [pss]. The general rule is, the medial consonant of a difficult triple cluster is deleted and the final consonant of the coda is maintained to keep the inflection evident. These substitutions are often as easy to pronounce as some of those the informants in fact made, namely on "deaths" (/θs), and "asked" (/skt): compare [ts] with [ss] or [æstɛʔ], [æsk], and [æks] with [æst], respectively.

There are few specific recommendations for tripleton codas. All of them occur less frequently than the six doubletons listed above (less than once per 1,000 words), and most of them are difficult—had narrative scores of 50 or below. The typical strategy on

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the difficult triple consonant codas (/lvz/, /lvd/, /lmz/, /skt/, /ndʒd/, /sks/, /lts/, /lpt/, /kst/) was deletion of one or two consonants and devoicing. Post-vocalic /l/ is troublesome for native Thai speakers, and five of these nine tripleton codas contain /l/, which is often deleted. The tripleton codas containing /l/ might be practiced in their uninflected doubleton forms (/lv/, /lm/, /lp/, and /lt/). Of the remaining four codas, /ndʒd/ is difficult because it is voiced, and /skt/ and /sks/ are often difficult for native English speakers, and are frequently simplified, as noted above. The remaining /kst/ coda, e.g., "fixed" should be easier (Section 1.4.2), and in fact was the easiest of the nine difficult tripletons.

6.3 Limitations

Detailed scoring of codas, as was performed for the informant wordlists and narratives was time-consuming, if revealing. The more personal and impressionistic scoring of the student narratives was much faster, if less accurate. There is inevitably a tradeoff between accuracy and convenience. The scope of codas evaluated would be apt to be repeated neither by the evaluator nor by TESOL instructors at large, yet was revealing of patterns in the way informants deal with awkward codas.

The evolution of the methodology used to evaluate complex codas was as involved as their actual evaluation. Since little previous methodology was evident in the published literature—whether on the individual coda types and their relative importance to TESOL instruction, or on possible comparative scoring methods, much methodological groundwork had to be prepared before the codas could be finally assessed. The scope of the study was broad and necessarily scattershot, as it attempted to map the vast range of

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complex coda production. This limited to some degree the quantity of coda tokens which could be accommodated among the various tasks (wordlist, narrative) and forms (inflected/uninflected, plural noun/third person singular verb forms, voiced/voiceless diphthongs). Congruence between the number of codas tested in first and final student evaluations and between the number of tests administered to the informant and student population was lacking. The degree of formality of the informant and student narratives was unequal. Hopefully, this did not skew the results for relative coda and coda-group accuracy within test/task populations.

Another limitation is that the elicitation instrument was synthetic, not authentic. The rationale for this was that a large number and wide variety of complex codas could not be generated in authentic speech. The scoring method attempts a compromise between speaker and listener-centered criteria which is necessarily subjective and rather convoluted. A panel of arbiters might have been preferable in the development of the scoring method itself.

6.4 Suggested Areas for Further Research

As Section 1.1.4 remarked, TESOL instructors are more apt to assess the listening skill as it relates to word recognition than the speaking skill as it relates to pronunciation of the word, due to time constraints in the classroom. Thus, a fruitful potential study might compare the reception of the various complex codas, instead of their production. Additionally, results could be correlated with those arising from studies such as the present one to see if similar patterns in coda group accuracy are evident. Surely, the productive and receptive skills are equally important and feed off one another. A simple

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test of intelligibility might be generated by read paired sentences with equally plausible grammatical choices such as:

1) I never *use* a computer at home.

2) I sometimes *used* a computer at home.

This test would probably be appropriate to a simple binary pass/fail scoring with many tokens, which could potentially generate significant results. Indeed, a wide array of sampling techniques is warranted to generate accurate findings on coda production and reception.

Another field which researchers are starting to investigate involves the association between grammar and phonology: to what extent do their limitations in the learner L1 (lack of plural or past tense, lack of complex codas) affect each other? This raises the philosophical question of the degree to which these linguistic items can be extended, and of pedagogical priorities, i.e., teaching methods and approaches which might be used with particular learners to enlarge their productive and receptive range of grammar and phonology in English.

Thai TESOL learners have to grapple with an indigenous influence, namely the practice of assimilating loanwords from an unrelated language into Thai and altering them to fit the characteristic phonology of the target language (stressed final syllables, no fricatives, affricates, or laterals in codas, extraneous tones). As a sizable number of such loanwords already are in the lexicon, they may compete with standard practice—i.e., the way the words are generally pronounced and taught internationally. This represents another challenge to the TESOL profession. To what extent do these alterations affect intelligibility? Are there lexical, as well as linguistic reasons to explain these alterations,

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e.g., existing Thai words with a given tone which demand that the English loanword adopt a different tone so as not to cause mis-identification?

Closer to the present study, future studies might first wish to verify the coda rankings of a smaller sample of perhaps 30 of the most common codas, with /s/, /z/, /t/, and /d/ categories equally represented. A population sample size of perhaps 10 informants reading multiple tokens of the same codas across various tasks and categories (e.g., plural vs. third person singular, inflected vs. uninflected) could generate perhaps 600 tokens, and presumably significant results. Coda types might be represented multiple times to control for mistakes. Evaluating words in wordlists would not be as time-consuming as narrative words, so more tokens might be accommodated.

Finally, more studies should be done to determine whether any of this matters to the eventual outcome. Do adult learners benefit from remedial instruction in the pronunciation of the complex codas, and are such benefits permanent? Chapter 5 of the present study has demonstrated at least temporary improvements to coda accuracy following some attention to pronunciation. Might such instruction also have additional benefits for intelligibility/communicability, or even for the written production of the grammatical **–ed** and **–s** inflections? The strong correlation between overall intelligibility and coda well-formedness in the informant study would predict it may for the former, and the studies cited by Read (2000) which were quoted at the beginning of this study would predict that the productive use of lexis, and hence, writing, would benefit, as well. Regardless of how these ultimate questions are settled, at least this study has alerted the reader to the most troublesome complex codas and the most probable error strategies they incur.

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