

Investigation into Phonological Attrition among Beginner Chinese Mandarin Language Learners

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Abstract: Studying foreign language attrition is important in the context of Chinese language learning because, in light of a growing worldwide interest in learning Chinese languages, language professionals need to understand the complexities of Chinese language acquisition. However, little research exists to date on foreign language attrition among Chinese language learners. In this study, we examined the features of language attrition, especially phonological attrition, among Mandarin learners in a higher educational institution in Brunei Darussalam. Additionally, we sought to test, in a Bruneian context, prominent theories and hypotheses about language attrition, including markedness theory and functional load theory. Our sample consisted of 86 beginner Mandarin students who spoke Malay as their native language and English as the academic language. Participants were 18–20 years old and studied Mandarin formally 4 hours per week for 14 consecutive weeks, during which they were also required to study for 8 hours per week on their own. Subsequently, they took a 3-month break from studying. We tested participants before and after the break and computed descriptive statistics to compare the results of the two tests. Our results showed the greatest attrition rates in tones and special structures of Mandarin, with less attrition in final and initial sounds. We discuss specific phonological findings as they relate to native Malay speakers, and we describe how our findings confirm or contradict, within the Bruneian context, existing theories. We conclude that markedness theory is applicable in our research context, but our findings failed to support functional load theory.

Keywords: phonological attrition, foreign language attrition, Mandarin as a foreign language, Mandarin phonology

1. Introduction

It is very common among foreign language students to struggle with the target language after returning from a long-term break. Such individuals may be afraid that continuing their

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studies will reveal how much language they have lost, resulting in an unsatisfactory grade at the end of the new semester. This common phenomenon, known as *language attrition*, was summarized by Schöpfer-Grabe, who once expressed that “Almost everybody who has learned a foreign language shares the experience of forgetting the acquired language skills once the period of formal instruction is over” (Schöpfer-Grabe, 1998:231).

Language attrition, especially foreign language attrition, can be defined as language loss that occurs when the learner uses the foreign language to an insufficient degree (De Bot & Weltens, 1991:43) or when environmental changes limit the use of the target language and another language becomes dominant (Olshtain, 1989:151). Köpke and Schmid (2004:5) defined foreign language attrition as “non-pathological decrease in a language that had previously been acquired by an individual”. Understanding language attrition can help inform the understanding of the language acquisition processes because both areas of research investigate changes in proficiency over time.

The current worldwide interest in learning Chinese languages has brought about a need to better understand factors that affect foreign/second language learning. Chinese language professionals also need to understand the complex processes involved in Chinese language acquisition and attrition. However, empirical research on Chinese language attrition has been minimal. The literature is also scarce on how Chinese language learners lose their language skills and the major factors affecting this process. In this study, therefore, we aim to examine the features of language attrition, especially phonological attrition, among Mandarin learners in higher educational institutions in Brunei Darussalam. We do so by exploring the linguistic abilities that learners retain or lose after stopping formal classroom instruction for a designated period of time. We also examine relevant hypotheses and theories about attrition to provide empirical research on Mandarin language learners’ phonological attrition in a Bruneian context.

2. Background

Language attrition research, a comparatively young area of linguistic research, has gained popularity in recent years. In general, it is concerned with what aspects of the language are lost, how they are lost, and why they are lost (Hansen, 1999). The research on language attrition is becoming part of the field of foreign language acquisition (Hansen, 2001:61). Robert Russell (1999:297) explained the rationale behind the coming together of these two areas:

‘Scholars have become increasingly aware of the interrelatedness of the processes of language acquisition, maintenance, and attrition . . . and with that awareness has come the realization that not only should our knowledge of the acquisition process inform our attempts to understand the process of attrition, but that our study of language attrition can also be expected to inform our understanding of its acquisition.’

As explained in the Introduction, in this study, we endeavor to examine the features of phonological attrition among Mandarin language learners. The sections below present some relevant findings from past research.

2.1 Phonological Attrition

Bullock and Gerfin (2004:303) pointed out that most research on language attrition and language loss is concerned with lexical and syntactic matters, and there is “a dearth of evidence in studies of phonological attrition”. They conducted a significant piece of research in the subfield of phonological attrition. They investigated phonetic and phonological properties of French spoken in a linguistic enclave community in Pennsylvania. This study provides a methodological basis for future similar studies in phonological attrition.

2.2 Theories and Hypotheses Relevant to Phonological Attrition

In the research of foreign language attrition, researchers have proposed some theories and hypotheses to explain why some linguistic structures are more subject to attrition than others. Among them, markedness theory and functional load theory are widely cited.

Markedness theory. Markedness theory originally developed from phonology and then was extended to other subfields of linguistics, including morphology, syntax, and semantics. *Markedness* in linguistics refers to those unusual, difficult forms, in comparison with more common or regular forms. In other words, more complex grammatical forms that have a narrow linguistic distribution are marked (Gürel, 2004). During language attrition, marked linguistic elements may be more subject to attrition than less marked forms (Anderson, 1982; Gürel, 2004; Hanson & Chen, 2001).

Functional load hypothesis. As the name suggests, the term *functional load* refers to the extent and degree of contrast between certain linguistic units, usually phonemes, in making distinctions in a language (King, 1967). In the field of second language attrition, Anderson (1982) explained that, when the loss of certain phonological, morphological, or syntactical distinctions would result in frequent loss of information, these distinctions could be considered as of high functional load. He suggested in his hypotheses that:

- Similar phonological features existing both in a language learner’s first and second language are more resistant to attrition.
- High functional load phonological features in a language learner’s second language are more resistant to attrition than others.

Based on Anderson’s hypotheses, Olshtain (1989) further argued that functional load features in a second language are more resistant to attrition, even if these features are different from those in the first language.

2.3 Selectivity of Foreign Language Attrition

Wei (2014) suggested that, from the perspective of linguistic components, one can see the selectivity of foreign language attrition in two categories: selectivity of linguistic

components at the intracomponent and intercomponent levels.

Attrition at the intracomponent level refers to the attrition experience that happens within every linguistic component, including phonology, lexicon, morphology, and syntax. Studies to date have found some evidence to confirm that, within one linguistic component, linguistic features are not equally subject to attrition. In other words, within the category of one common linguistic component, some linguistic features are more susceptible to attrition than others.

Attrition at the intercomponent level refers to the attrition experience happens among linguistic components. Herdina and Jesner (2002) argued that phonology, lexicon, morphology, and syntax are affected to an unequal degree during second language attrition. De Bot and Weltens (1995) reported that French learners in the Netherlands experienced greater attrition in grammar than in phonology and lexicon after zero, two, and four year of non-use of French.

Because the aim of this study is to investigate the phonological features of attrition, we define the selectivity of phonological attrition at the intracomponent level.

2.4 Chinese Foreign Language Attrition Studies

Existing studies in Chinese foreign language (CFL) attrition research relevant to the topic of this study are few. Zhang (1988) originally collected pretest data for a study on CFL tone attrition. Twelve years later, Wang (1999) contacted many of the same subjects for subsequent testing, focusing on vocabulary attrition. Wang then used this dataset again in 2002 to examine tone attrition, this time expanding the research to include both individual-word and discourse-level tone production.

In his master's thesis, titled "Attrition Patterns in Learners' Use of Mandarin Chinese Tones," Zhang (1988:40) identified patterns of tone attrition among English-speaking CFL learners. The results of his study indicated that the CFL learners' language production did not "suffer attrition in tones although they may lose other features of the language". Zhang discovered that "the tone remains stable with the speakers as long as the vocabulary remains with them". However, vocabulary attrition was prevalent among his subjects, who had the most errors with the second and third tones. Zhang suggested that one possible explanation for his findings is the way in which the subjects learned the language. He hypothesized that continued learning of the language in a Chinese-speaking environment may account for the lack of tone attrition for retained vocabulary items.

Several years later, Wang (2002) used data compiled from the Zhang (1988) and Wang (1999) studies for her thesis, titled "Chinese Lexical Tone Attrition in Adult Mandarin Speakers." In this study, Wang (2002) emphasized the rate and pattern of lexical tone attrition in both individual vocabulary terms and in lexical items situated in complete sentences. Wang (2002:5) sought to determine whether tone attrition in isolated,

Investigation into Phonological Attrition among Beginner Chinese Mandarin Language Learners

noncontextualized words differed significantly from tone attrition in words in sentence contexts. Additionally, she wished to determine the rate at which lexical tones are lost over time and whether this rate differed among the subjects.

The results of Wang's (2002:49) study are somewhat surprising. She concluded that little tone attrition occurs over time, although the subjects had difficulty with tone change or the tone rules. She hypothesized that tone rule errors are most likely caused by subjects not having learned them correctly in the first place, and not by attrition.

2.5 Mandarin Phonology and PINYIN

Because PINYIN is the most popular phonetic alphabet system among Chinese educators and learners, we represent phonetic values in this study using the PINYIN alphabet.

Initials and finals. In the PINYIN system, initials (*shēngmǔ*) and finals (*yùnmǔ*) are the fundamental elements. Except for a small number of special sounds, every Mandarin syllable can be spelled with one initial followed by one final.

Tones. Mandarin, or standard Chinese, is based on the Beijing dialect of Chinese. Its actual pronunciation varies among Chinese speakers, who come from different dialect backgrounds. Mandarin, like other dialects of Chinese, is a tonal language. The elements in the Mandarin sound system include not only initials and finals but also tones (*shēngdiào*). Tones are applied to each syllable in Mandarin to distinguish words from each other, although some syllables are pronounced without tones in conversational contexts; these are defined as having a neutral tone.

There are four tones in Mandarin, plus the neutral tone. Diacritic or tone marks are placed over vowels to mark the four tones of Mandarin. The four tones are called the first tone (flat or high-level tone), the second tone (rising or high-rising tone), the third tone (falling-rising tone), and the fourth tone (falling or high-falling tone). Neutral tone is represented with no tone marks. In real conversational contexts, original tones assigned to each character may be changed spontaneously by native speakers, based on the tones or pronunciations of adjacent characters or words, to make it easier to pronounce. This phenomenon of changing tones is called tone *sandhi*, which includes, for example, the third tone sandhi and changing tones on some special syllables, including *yī* (one) and *bù* (no).

3. Methodology

To investigate what linguistic abilities learners in fact retain or lose when away from formal classroom instruction, we designed the study as a comparison of the results of two sets of tests conducted before and after the university summer break.

3.1 Participants

Stevens (1996:65) suggested, "The standard approach to 'smoothing out' any unavoidable heterogeneity of the test population is to increase the sample size". Hence, in this study, we

enrolled all of the participants available in the second semester in the academic year of 2013 to 2014 to ensure statistical power.

Participants were selected among students who registered in a level 1 Mandarin as a foreign language module at the University of Brunei Darussalam in the second semester of the 2013–2014 academic year. We developed selection criteria to minimize differences in Mandarin language proficiency and cognitive abilities among participants. Criteria used to select appropriate participants included:

- Participants must speak Malay as their native language and use English as the academic language.
- Participants must not have studied Mandarin formally or have used any dialect of Chinese at home or in any social context prior to this study.
- Participants must be 18–20 years old.

We selected 90 learners to participate in this study. They all studied Mandarin as a foreign language at the University of Brunei Darussalam in a formal setting for 4 hours per week over 14 consecutive weeks. At the time of study, participants were required to study the language informally on their own for an additional 8 hours per week. After the 14-week study period, participants did not receive formal instruction in the Mandarin language for a period of 3 months.

3.2 Design

We aimed to determine the linguistic abilities the students retain or lose when away from formal classroom instruction for a designated period of time. Therefore, we examined participants' linguistic competence in Mandarin phonology via testing both before and after the designated period, which was the three-month summer break. The tests comprised listening and nonlistening tests.

Listening test questions required the students to circle the right initial, final, tone, and syllable according to the listening materials. There were 100 questions in total in both the first and second listening tests. Among these, 20 questions examined participants' ability in initials, 20 in finals, 20 in general tones, 20 in tone sandhi, 10 in neutral tones, and 10 in retroflex. The questions were given in random order without notifying the participants which phonological feature was to be examined.

In addition to these tests, there were 200 nonlistening test questions using pictures or English words. The questions evaluated the students' Pinyin reading and writing abilities, and their Mandarin-speaking abilities. Phonological features examined in these nonlistening test questions were distributed as in the listening tests. As with the listening tests, the questions were in a random order. Table 1 presents an example nonlistening question.

Table 1. Non-listening Test Question: Tone Marking

3. Mark the correct tone on the following syllables according to the meanings in the brackets.	
1. dui	(‘correct’)
2. jiu	(‘nine’)
3. xian zai	(‘now, current’)
4. peng you	(‘friend’)
5. yu yan	(‘language’)
6. bu yao	(‘do not want’)
7. hen hao	(‘very good’)
8. shi jian	(‘time’)

Together with the second test, we also administered questionnaires to the participants to learn about their Mandarin acquisition approach and frequency of Mandarin use during the period of attrition, with the goal of eliminating outliers. Participants who spent too much (more than 12 hours per week) or too little (less than 1 hour per week) time on Mandarin during the period of attrition were considered outliers, and their tests were not included in the results of this study. Four participants’ tests were eliminated. Consequently, we analyzed data collected from 86 participants’ first and second test results.

4. Results

Accuracy rates of 86 participants for the listening, reading, writing, and pronunciation tests are presented in Figures 1–4.

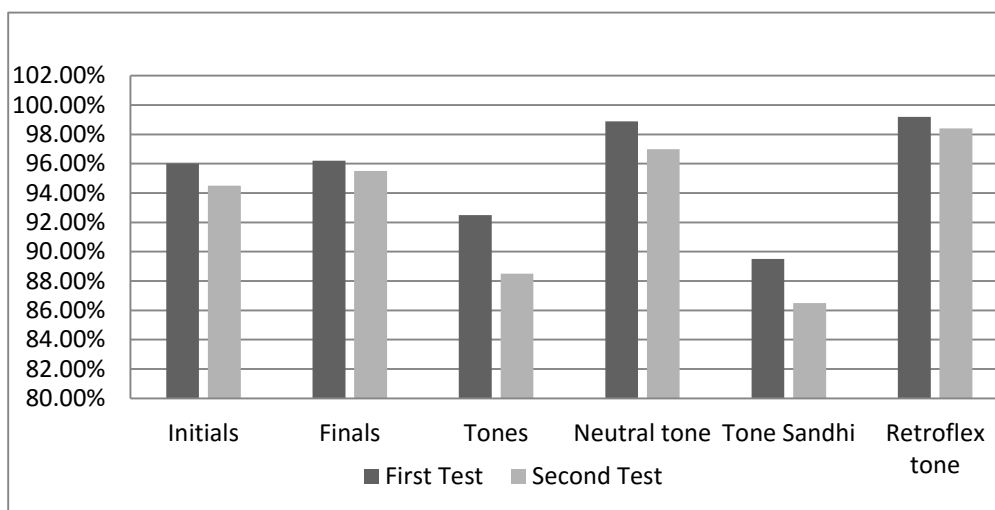


Figure 1. Comparison of First and Second Listening Test Results

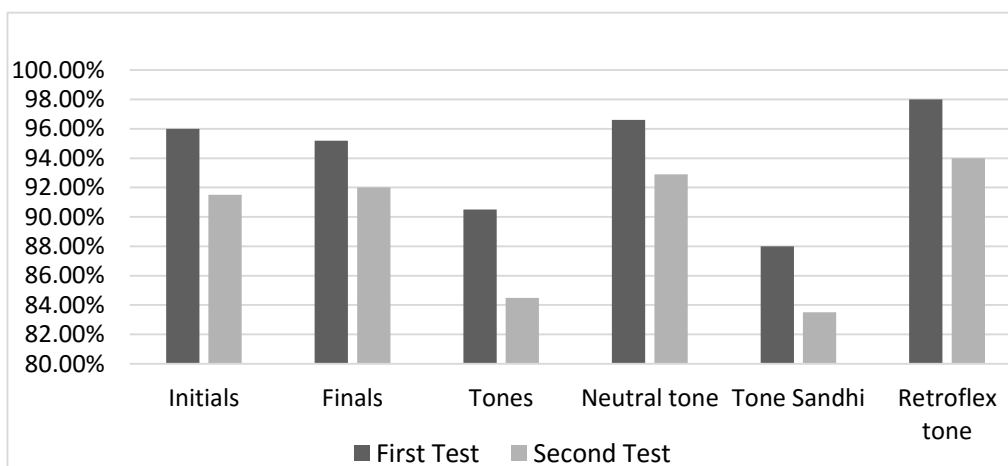


Figure 2. Comparison of First and Second Pinyin Reading Test Results

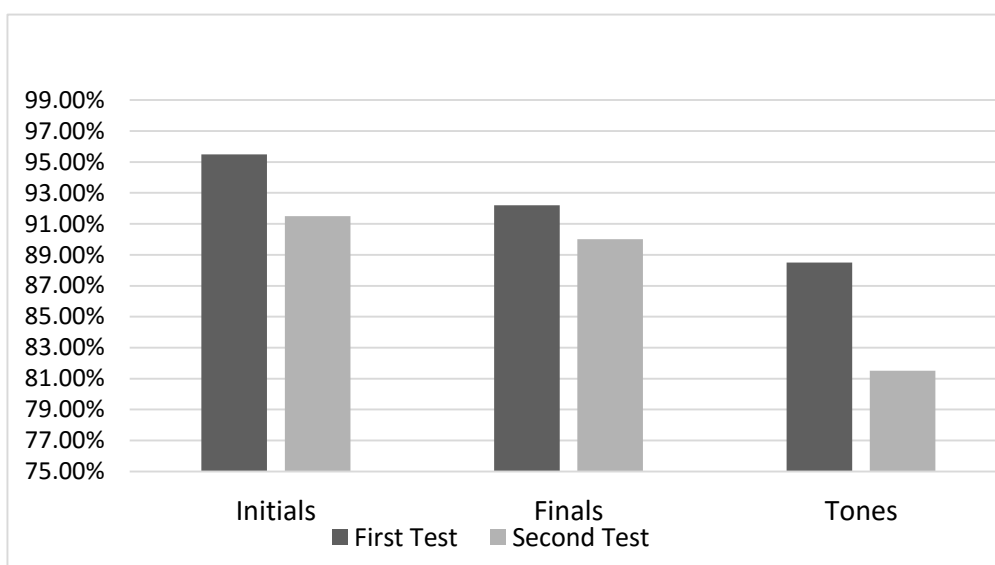


Figure 3. Comparison of First and Second Pinyin Writing Test Results

Investigation into Phonological Attrition among Beginner Chinese Mandarin Language Learners

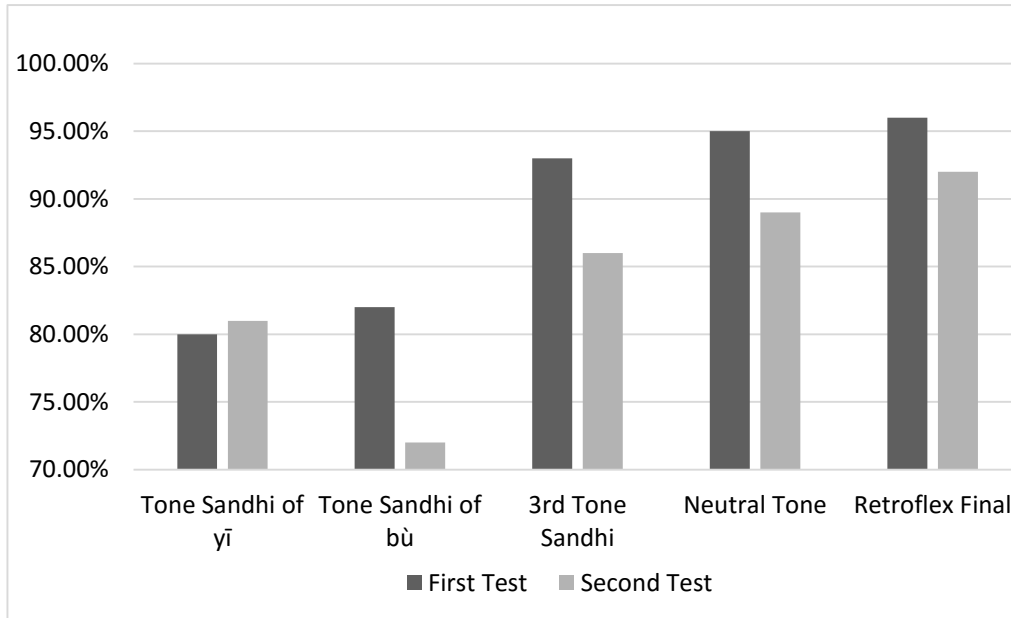


Figure 4. Comparison of First and Second Tests of Pronouncing Words in Mandarin

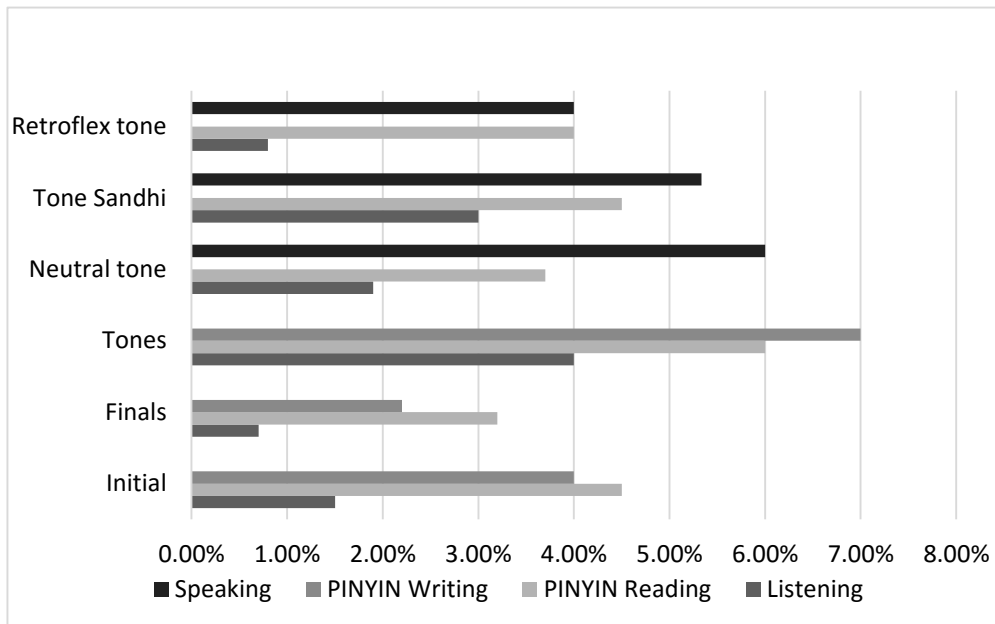


Figure 5. Comparison of Phonological Features of Attrition

In Figures 1–4, attrition is reflected by the disparity in accuracy rates between the first and second tests. The disparities are compared in Figure 5.

5. Discussion and Conclusion

Based on the data collected, this study reveals that beginner learners' ability in listening is more resistant to attrition than their abilities in speaking and reading. Compared with other components in PINYIN, initials and finals are more resistant to attrition, and attrition occurred mainly with tones. Additionally, participants understood special components in PINYIN well, but had difficulties applying the rules. The findings were largely consistent with the initial impressions from the tests. In the following sections, we address the findings in more detail using the results of the data analysis. Next, we discuss some relevant theories and hypotheses about attrition. Finally, we suggest possible future studies.

5.1 Findings

This study reveals that, compared with other components in PINYIN, initials and finals are more resistant to attrition. In initials, attrition appears mainly with the initial “q”. Many participants read the initial “q” as [k^h] rather than the proper pronunciation, [tɕ^h]. This may not entirely have been a result of attrition; Malay-speaking participants may have confused the initial “q” with the Malay pronunciations of the letter q. Some learners may have not acquired the sound of “q” in the first place. However, there are learners who did well in the first test regarding the sound of “q”. These learners had acquired this sound well. When they showed increased mistakes with this sound in the second test, they exhibited attrition. Learners' attrition in the sound of “q” supports Anderson's hypothesis that similar phonological features existing both in a language learner's first and second language are more resistant to attrition; by contrast, different features are more vulnerable to attrition.

In finals, attrition appears mainly with the final sound “Ü”. However, there were many mistakes made with the final Ü sound in the first test, as well. It is understandable that participants have difficulties with this sound, because it does not exist in Malay phonology. Therefore, we conclude that participants may never have fully acquired the sound “Ü”.

We observed large attrition rates with tones. This finding is very different to Zhang's statement that CFL learners' language production did not “suffer attrition in tones...the tone remains stable with the speakers as long as the vocabulary remains with them” (Zhang, 1988:40). However, the results from our study show that the participants suffered comparatively large attrition rates in tones, though their vocabulary was stable. A possible explanation for this is that, in Zhang's study, participants continued to study in a Chinese-speaking environment, which may account for the lack of tone attrition.

Additionally, in this study, participants showed that they could acquire special features or the marked features in PINYIN well, but these features were more subject to attrition. From

Investigation into Phonological Attrition among Beginner Chinese Mandarin Language Learners

the results of the first test, we observed few errors with neutral tone, tone sandhi, and the retroflex finals. In the second test, the participants had difficulties with these features of Mandarin phonology. Our findings therefore fail to support Wang's (2002) hypothesis that sandhi rule errors are caused by not having learned correctly in the first place and not because of attrition.

5.2 Theories and Hypotheses in Attrition

In the research on foreign language attrition, scholars have posited some theories and hypotheses to explain why some structures are more subject to attrition than others. Among these, markedness theory and functional load theory are widely cited. We examined these hypotheses and theories in the Mandarin phonology context.

Markedness theory. In this study, we define special features in Mandarin PINYIN, such as neutral tone, tone sandhi, and retroflex finals, as markedness. These marked structures proved to be more subject to attrition than less marked forms. In this case, markedness theory is applicable to the context of learning Mandarin as a foreign language.

Functional load theory. Mandarin tones make important distinctions in the language. Loss of tones would definitely result in loss of information. Hence, Mandarin tone distinctions have high functional load. According to Anderson (1982), linguistic features with distinctions of high functional load should be maintained longer than others with low functional load. However, from the results of this study, Anderson's hypothesis is not applicable to Mandarin. A possible reason for this is that Anderson might not have taken tonal languages into account. Hence, we conclude that, in tonal languages such as Mandarin, tones carry high functional load but are more subject to attrition.

5.3 Unequal Attrition in One Phonological Feature

As mentioned previously, we define attrition in this study at the intracomponent level, namely within the linguistic component of phonology. Based on the results from this study, beginner learners' ability in listening was more resistant to attrition than their abilities in speaking and reading. Therefore, we would like to suggest that, at the intracomponent level, attrition in one phonological feature could happen unequally in the learners' cognition of the feature and the skills to apply the feature. In other words, second language learners' knowledge of a specific phonological feature may be maintained longer than their skills to pronounce the feature.

5.4 Future Research

The findings of this study are limited and preliminary. A more thorough set of tests and additional recordings of natural pronunciation in conversations would yield more accurate results. It would be interesting to conduct more extensive studies of novice-level Mandarin learners to see if the changes observed in this study are common throughout the Malay community.

References

- Andersen, R. 1982. Determining the linguistic attributes of language attrition [A]. In R. Lambert & B. Freed (eds.), *The loss of language skills* [C]. Rowley, MA: Newbury House Publishers, 83-118.
- Bullock, B. E. & C. Gerfen. 2004. Frenchville French: case study of phonological attrition [J]. *International Journal of Bilingualism*, 8(3): 303-320.
- De Bot, K. & B. Weltens. 1991. Recapitulation, regression, and language loss [A]. In H. W. Selinger & R. M. Vago (eds.), *First language attrition* [C]. Cambridge, England: Cambridge University Press, 31-53.
- Gürel, A. 2004. Selectivity in L2-induced L1 attrition: A psycholinguistic account [J]. *Journal of Neurolinguistics*, 17(1): 53-78.
- Hansen, L. 1999. Not a total loss: The attrition of Japanese negation over three decades [A]. In L. Hansen (ed.), *Second language attrition in Japanese contexts* [C]. Oxford: Oxford University Press, 142-153.
- _____. 2001. Language attrition: The fate of the start [J]. *Annual Review of Applied Linguistics*, 21: 60-73.
- Hansen, L. & Y. L. Chen. 2001. What counts in the acquisition and attrition of numeral classifiers? [J]. *JALT Journal*, 23(1): 83-100.
- Herdina, P. & U. Jessner. 2002. *A dynamic model of multilingualism: Changing the psycholinguistic perspective* [M]. Clevedon, England: Multilingual Matters.
- King, R. D. 1967. Functional load and sound change [J]. *Language*, 43(4): 831-852.
- Köpke, B. & M. S. Schmid. 2007. Bilingualism and attrition [A]. In B. Köpke, M. S. Schmid, M. Keijzer, & S. Dostert (eds.), *Language attrition. Theoretical perspectives* [C]. Amsterdam, Philadelphia: John Benjamins Publishing Company, 1-8.
- Oishtain, E. 1989. Is second language attrition the reversal of second language acquisition? [J]. *Studies in Second Language Acquisition*, 11: 151-165.
- Russell, R. 1999. Measuring Attrition in L2 Japanese Syntactic Competence [A]. In P. Robinson (ed.), *Representation and process: Proceedings of the 3rd Pacific Second Language Research Forum* [C]. Pacific Second Language Research Forum, 297-308.
- Schöpfer-Grabe, S. 1998. Use it or lose it? The phenomenon of Foreign Language Attrition [J]. *Journal of Foreign Language Research*, 9(2): 231-263.
- Stevens, R. D. & A. D. Edwards. 1996. An approach to the evaluation of assistive technology [A]. In *Proceedings of the second annual ACM conference on Assistive technologies* [C]. New York, NY: ACM, 64-71.
- Wang, R. 1999. *Vocabulary attrition in intermediate level Mandarin speakers* [D]. Unpublished Master's Thesis, Brigham Young University, Provo, Utah.
- Wang, S. 2002. *Chinese tone attrition in adult Mandarin speakers* [D]. Unpublished Master's Thesis, Brigham Young University, Provo, Utah.
- Wei, J. 2014. Selectivity of second language attrition [J]. *Theory and Practice in Language Studies*, 4(8): 1603-1608.
- Yip, M. 2002. *Tone* [M]. Cambridge, England: Cambridge University Press.
- Zhang, J. 1988. *Attrition patterns in learners' use of Mandarin Chinese tones* [D]. Unpublished Master's Thesis, Brigham Young University, Provo, Utah.