CHINESE FOREIGN LANGUAGE ATTRITION: INVESTIGATING ASPECT MARKER USAGE

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Michael A. Paul

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As members of the Dissertation Committee, we certify that we have read the dissertation prepared by Michael A. Paul
entitled Chinese Foreign Language Attrition: Investigating Aspect Marker Usage
and recommend that it be accepted as fulfilling the dissertation requirement for the Degree of Doctor of Philosophy

_____Date: 10/23/09
Feng-hsi Liu

_____Date: 10/23/09
Timothy Vance

_____Date: 10/23/09
Rudolph Troike

_____Date: 10/23/09
Matthew Christensen

Final approval and acceptance of this dissertation is contingent upon the candidate's submission of the final copies of the dissertation to the Graduate college.
I hereby certify that I have read this dissertation prepared under my direction and recommend that it be accepted as fulfilling the dissertation requirement.

_____Date: 10/23/09
Dissertation Director: Feng-hsi Liu

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SIGNED: Michael A. Paul

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ABSTRACT

The purpose of this study is to investigate the effect that rote memorization has on language attrition. More specifically, the loss of grammatical aspect markers is investigated. This study measures the general language attrition of a memorized narrative and an open-ended narrative between time one (T1) and time two (T2) measurements. Attrition of the memorized narrative at T2 is compared to how well the subject had it memorized it at T1. The attrition of aspect is then investigated in both the memorized narratives and open-ended narratives. Aspect marker attrition in the memorized narratives is also compared to how well the subject originally had the narrative memorized at T1. Aspect attrition is then compared between the memorized and open-ended narratives to see the effect of memorization on aspect attrition. Lastly, a qualitative investigation examines the effect of telicity on correct and incorrect aspect marking. This study reveals that learners of Chinese who spend time in a Chinese-speaking environment and gain a fairly high level of oral proficiency retain much of their oral production abilities over a 12-year period. Additionally, subjects are able to retain and use syntax and lexicon from narratives they had previously memorized as beginning-level learners. However, significant levels of content and length attrition occur for both types of narratives. Aspect marker -LE is used the most frequently, but it also has the highest percentage rate of error. Other aspect markers are used less frequently, and have lower percentage rates of error. Attrition in type, variety, and usage of aspect markers is significant between T1 and T2. There is not a significant relationship between how well the subjects produced the memorized narrative at T1 and either their performance at T2 or the attrition of aspect

markers in either narrative. The subjects tend to mark telic verbs for perfective aspect more frequently and correctly than atelic verbs. Pedagogical implications of this study include suggestions for teaching perfective aspect as well as designing curriculum for students who are re-learning Chinese. Finally, the author invites further attrition research focusing on the effect of memorization on fluency variables.

1. INTRODUCTION

After returning from a three-month summer break, foreign language students may relate to the title of Lynne Hansen's 2001 article, "Language Attrition: The Fate of the Start" as they struggle to speak the language after a long hiatus. They may be afraid that to take up their study again will only result in a revelation of how much language they have actually lost. However, "the fate of the start" Hansen is referring to is not the fate of beginning level foreign language students, neither is it the fate of those first few weeks of fall semester, in which students begin to realize the meaning of language loss. In her article, Hansen is merely referring to the progress made over the previous five years of language attrition research. In fact, other article titles by Hansen such as "Not a Total Loss" (1999) and "Forgotten But Not Gone" (Hansen, Umeda, & McKinney, 2000) provide hope for the students (and their teachers) who feel they have "forgotten everything" over the summer. This study will show that Chinese foreign language (CFL) learners do in fact retain a surprising amount of linguistic ability, even over periods of time stretching beyond a decade.

The current worldwide interest in learning Chinese has brought about the need to better understand factors that affect language learning and language loss. Today's students expect to gain the linguistic skills necessary to enable them to live and work in a Chinese-speaking society. Consequently, CFL professionals need to understand the complex processes involved in acquiring the Chinese language. Understanding CFL attrition can help inform the understanding of language acquisition processes because both areas of research investigate changes in proficiency over time. Consequently,

language attrition research is becoming part of the field of second language acquisition (Hansen, 2001, p. 61). Robert Russell (1999b) explained the rationale behind the coming together of these two areas. He states,

> 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 (p. 297).

This study attempts to combine the study of the processes of language acquisition and attrition by examining the affect that one pedagogical technique (memorization) has on language loss after a 12-year period of L2 disuse.

1.1 Introduction to Second Language Attrition

The roots of today's language attrition research go back almost 130 years. Early research into the cerebral organization of language in bilingual speakers focused on instances of aphasia where brain damage affected the production of one language more than the other. Ribot (1883) claimed "the oldest and first acquired language would first return and be better preserved following brain damage" (qtd. in Porch &Berkeley-Wykes, p. 107, 1985). This is also known as his 'rule of primacy.' Conversely, Pitres (1895) argued that "the most currently used language at the time of the injury would be less affected by damage and would be the first to return" (qtd. in Porch & Berkeley-Wykes, 1985, p. 107). This is known as the 'rule of recency.' While aphasia is beyond the scope of this study, Ribot's 'rule of primacy' and Pitres 'rule of recency' raises important questions central to the field of L2 language attrition research. Is language that is acquired first loss first, or is the more recently learned language forgotten most easily?

Language acquisition researchers have examined this and other questions related to language loss. The topic gained popularity in the 1970s and 1980s with research into a variety of L2 loss variables. Some areas of attrition research are listed below.

Structures acquired early in learning: Cohen 1974; Berko-Gleason 1982; Moorcroft & Gardner 1987; Kuhberg 1992

Structures better learned: Godsall-Myers 1981

Rate of attrition over time: Magiste 1979; Berman and Olshtain 1983; Weltens, Van Els, & Schils 1989

Transfer from L1 and features of the target language: Scherer 1957; Hansen 1980; Anderson 1982; Van Els 1986; Weltens and Van Els 1986; Pino-silva 1989; Yoshida et. al. 1989; Yoshitomi 1994)

L2 proficiency level: Scherer 1957; Smythe, Jutras, Bramwell & Gardner 1973; Edward 1977; Robinson 1985; Hedgcock 1991; Reetz-Kurashige 1995

Critical Threshold: Bahrick 1984; Neisser 1984; Yoshitomi 1994; Smith 1996

Reverse Order Hypothesis: Cohen 1975; Berko-Gleason 1982; Olshtain 1989; Kuhberg 1992

The language attrition research completed in the 1970s and 1980s typically focused on commonly taught languages such as English, Spanish, French, and German. Beginning in the 1990s, interest in L2 attrition research spread to less commonly taught languages such as Japanese (Yoshitomi 1992, 1994; Tomiyama 1994; Reetz-Kurashige 1995; Nagasawa 1999; Russel 1999a, 1999b, 2004), and Chinese (Zhang 1988, R. Wang 1999; S. Wang 2002, 2007, Hayden 2003, Chen 2006).

In his unpublished master's thesis looking at verb attrition in adult L2 learners of Spanish, Michael Smith (1996) explains that most of the previous attrition research falls into one of four categories. These categories are

1. Child case studies where L1 attrition was mentioned in passing and treated only as an adjunct to acquisition
2. Group studies, which examined the decline of a second very incompletely learned language over short periods of time (from several weeks to as long as 3 months).
3. Group studies which examined the decline of a second, incompletely learned language over longer periods of time (from one to many years)
4. Studies that examine the decline of a second, more complete or completely learned language by older subjects over periods of time among groups and/or individuals (pp. 3-4).

This study falls in the last category. The researcher believes that using subjects with a higher L2 proficiency allows for the investigation of more complex structures such as aspect marking, which will be investigated. Investigation of these complex structures requires a clear definition of terms and a clear outline for the study.

1.2 Definition of Key Terms

For the purposes of this study, Lynne Hansen's (2001) definitions of language loss and attrition will be adopted. She explains that "*language loss* is a general term applied to any instance of the decline of linguistic skills, whether of individuals or speech communities. *Language attrition*, … refers to the gradual forgetting of a language by individual *attriters*, persons who are experiencing attrition" (p. 61).

1.3 Outline of this Study

With a working definition of language loss and attrition in mind, this study attempts to advance the field of CFL language attrition research by examining the effect of memorization on general language attrition, and specifically, the ability to use verb aspect markers correctly. In Chapter Two, a survey of the existing CFL attrition literature is provided to offer a foundation and a context of previous studies using the same subjects and similar data. A discussion of grammatical aspect marking in Chinese is also

made available, as well as a brief discussion of the use of memorization in the L2 classroom. The research questions investigated in this study are located at the end of the chapter.

In Chapter Three the methodology of this research, including subjects, procedures, types of analysis and lists of variables, are provided. Chapter Four contains the quantitative and qualitative analysis used to answer each of the research questions along with the corresponding answers. Chapter Five summarizes the results of the study, discusses the pedagogical implications and describes the limitations of the study. Finally, suggestions for future research into language attrition are provided.

2. REVIEW OF THE LITERATURE

The following review of the literature is meant to provide a concise, relevant context in which to view this current study. First, the more current and relevant studies of Chinese foreign language (CFL) attrition will be reviewed. Second, the grammatical aspect system in Chinese will be discussed, including an introduction to grammatical aspect markers in Chinese and related L2 learner-based research. Third, recent research on rote memorization of lexical chunks and dialogues in the CFL classroom will be presented. Weaknesses in the studies reviewed will then be discussed and the research questions for this study will be presented.

Studies in CFL attrition research relevant to the purposes of this study are very limited. All but one of these studies were carried out at Brigham Young University (BYU), located in Provo, Utah, and utilized oral production data from college level subjects who served foreign language-speaking missions for the Church of Jesus Christ of Latter Day Saints, and then returned to their studies at BYU. These missions last from 18 to 24 months, and involve service and proselytizing in the foreign language. Generally speaking, these subjects had little knowledge of the foreign language they used on their mission before serving. At the beginning of their missions they typically had two months of intensive formal language instruction at a missionary training center before departing for their country of service. Once in country, the missionaries would continue to informally study the language on their own, while at the same time using it to fulfill their proselytizing responsibilities. Upon completion of their service, some "returned-missionaries" would choose to continue their language study formally by taking classes,

while others did not. These returned-missionaries, now turned university students, form the learner pool from which subjects for the following studies were selected. The studies involve French (Mauerman, 1985), Spanish (Smith 1996), Japanese (Sullivan 1992; Russell 1999a, 1999b, 2004)), and Chinese (Zhang 1988; R. Wang 1999; S. Wang 2002; Chen 2006; S. Wang 2007) speaking returned-missionary subjects. These subjects spent a total of 18 months (females) to 24 months (males) learning and using their respective foreign languages while serving their missions.

2.1 Chinese Foreign Language Attrition Studies

This section of the literature review examines several previous CFL studies that have all used the same returned-missionary subject attrition data. This data set, which has been used for several MA thesis projects, as well as one previous doctoral dissertation, is also used for this current study. Jie Zhang (1988) originally collected the pre-test (T1) data for a study on CFL tone attrition. Twelve years later, Ru-yi Wang (1999) relocated many of the same subjects for subsequent testing (T2), which focused on vocabulary attrition. This T1/T2 data set was then used in 2002 by Shu-Pei Wang to again examine tone attrition, but this time expanding the research to include both individual word and discourse level tone production. In 2006, Katherine Dz Rung Chen used the data set to investigate fluency attrition. Most recently, Shu-Pei Wang (2007) used the data for a second time, but this time to examine syntax attrition. This extremely rich and varied data set is again used for the purposes of this current research study.

In this study, the researcher incorporates previously examined, as well as new sections of data that have not been previously analyzed. To better understand the data set

as well as CFL attrition in general, each of the studies just mentioned is discussed in greater detail below. An in-depth discussion of the data set is also provided in chapter three of this study.

In his master's thesis titled, "Attrition Patterns in Learners' Use of Mandarin Chinese Tones" Jie Zhang (1988) identified patterns of tone attrition by CFL learners. Zhang located 40 Chinese-speaking returned-missionaries who had spent 18 to 24 months in a Chinese-speaking area. These returned-missionaries shared similar language-learning backgrounds and all spoke English as their native language. Additionally, all the subjects had studied Chinese intensively for two months at a missionary training center before going to their assigned area of service in Taiwan. Once 'in-country' they continued their study informally while at the same time using the language on a daily basis.

Zhang's subjects were all Brigham Young University students who had returned to the United States from their mission anywhere from six months to five years before participating in the study. Subjects were interviewed and tested on a variety of language use tasks. Each interview was recorded. Subjects were tested on 100 vocabulary items taken from a word frequency collection of 3,000 elementary Chinese words. Subjects were also asked to read a Chinese sentence and fill in the missing word. English translations accompanying each Chinese sentence were also provided. Subsequently, two native speakers judged tone accuracy of the subject's responses. While not used in Zhang's study, subjects also answered open-ended questions and completed a retelling of a story using a series of pictures. Results of his study conclude that the CFL learners' language production did not "suffer attrition in tones although they may lose other

features of the language" (p. 40). 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 second and third tones (p. 40).

Zhang suggests that one possible explanation for his findings is the way in which the subjects learned the language. He hypothesizes that learning the language in country may account for the lack of tone attrition for those vocabulary items that were retained. Russell (1999a, 1999b, 2004) used similar explanations to justify the results of his Japanese foreign language studies. It is important to note that his subjects had returned from Japan for about two years when his studies took place. While Zhang's subjects varied in the length of time since returning from Taiwan (six months to five years), it is quite possible that significant and/or widespread attrition of language skills is not observable until after a much longer period of time. Learning a language intensively, yet informally, in country may stave off attrition for more than a few years. Conversely, attrition of linguistic skills not examined by Zhang and Russell may have already taken place.

One study that addresses this theory is Ru-yi Wang's (1999) master's thesis titled "Vocabulary Attrition in Intermediate Level Mandarin Speakers." She relocated 29 of Zhang's (1988) 79 original subjects and gave them the same array of tests. A survey questionnaire was also used to determine the frequency of Mandarin usage since the pre-test. Again, two native speakers were used to judge the correctness of the subjects' responses on a nine-point rating based on word choice, vowels/consonants, and tones. Subjects were organized into groups depending on what year they had returned to the

United States from Taiwan. Analysis of the data shows that there was a difference between groups on the pre-test, although it was not linear according to the year of return. Additionally, there was a significant difference between the pre-test and post-test results for each group, indicating that significant vocabulary attrition did occur. Also, in the post-test there was no statistically significant difference between groups, which means that "years removed from the L2/FL to a point was not a significant predictor of attrition" (p. 56). Each of the six groups had similar attrition levels. Finally, 20% of the vocabulary items survived 12-17 years of limited or non-use. R. Wang describes these vocabulary items as being very basic and frequently used, indicating that they were the first learned, most often used, and therefore the best retained. This supports the 'last learned-first forgotten' principle (p. 57). Conversely, the results of her study might suggest that the most common and frequently used lexical items will be the last lost. Nevertheless, the fact that subjects lost an average of 80% of their lexical ability over a 12 year period shows that significant attrition did occur, regardless of the of method of language learning.

Several years later, Shu-Pei Wang (2002) used the compiled T1 (Zhang 1988) and T2 (R. Wang 1999) data for her master's thesis titled, "Chinese Lexical Tone Attrition in Adult Mandarin Speakers." This study built off of prior tone attrition work done by Zhang. In this study, however, S. Wang emphasizes the rate and pattern of lexical tone attrition in both individual vocabulary terms and in lexical items situated in complete sentences. S. Wang sought to determine if tone attrition in isolated words, not in context, differs significantly from tone attrition of words in sentence contexts. Additionally, she

wished to determine the rate lexical tones are lost over time and if this rate differs among the subjects (p. 5). The instruments and procedures used in this study mirrored R. Wang's (1999) study using the same data. Besides utilizing the vocabulary elicitation portion of the data set, the researcher also used a small portion of a narrative re-telling activity. Native speakers judged the tone correctness of each of the four tones. Subjects were arranged into five groups according to their year of return from their missions and statistical analysis determined outcomes individually and between groups.

The results of S. Wang's study are somewhat surprising. She concludes that little tone attrition happens over time, although the subjects had difficulty with tone sandhi rules (p. 49). She hypothesizes that sandhi rule errors are most likely caused by subjects not learning them correctly in the first place, and not because of attrition. Viewed in the light of R. Wang's (1999) findings, it appears that while subjects do lose a fair amount of their vocabulary, they also retain the corresponding tones for the terms that they can recall. Perhaps the subjects have internalized the tones of high frequency vocabulary and are subconsciously using the tones as they recall the terms.

In 2006, Katherine Dz Rung Chen completed a master's thesis that utilized the same returned-missionary Chinese language attrition data originally collected by Zhang (1988) and R. Wang (1999) as described above. In her study titled "Fluency Attrition in Adult L2 Mandarin Speakers," Chen attempted to answer the following research questions:

> 1. After twelve years of not using the target language, has the participants' Chinese fluency level declined significantly? If so, how much and in what aspects?
> 2. Does the time spent in the target culture affect the attrition level? If so, how does it affect attrition and in what aspects?

> 3. Is there a significant difference among the different groups according to the year of return from the target culture? If so, how much and in what aspects? (p.5).

Again, the subjects had all learned Mandarin Chinese while completing an 18 to 24 month full time mission in Taiwan. None of the subjects took language classes or used the language on a regular basis during the 12-year span between exams.

Chen divided the 23 participants into groups based on the year of completion of their missionary service. Another grouping was formed according to the actual time spent in Taiwan (Group A 19-24 months; Group B 16-18 months) (p. 40). In order to answer her research questions, Chen examined recorded oral data from the first situation of a speaking exam administered by both Zhang (1988) and R. Wang (1999). Subjects were asked to take the role of a missionary and explain to a couple the story of the founder of the church, including the founder's interest in religion and attempts to find truth. Chen explains that this task would be very familiar to the participants of the study, because as part of their missionary training, they had been required to memorize the story word for word in Chinese. Additionally, this material would have been reviewed constantly as they taught interested parties in Taiwan (p. 42).

Chen utilized R. Wang's (1999) questionnaire to again control for subject variables, such as the amount of formal study or time spent in country during the 12-year interval. All subjects completed identical speaking exams and all were allowed only four minutes of response time for their narrations. Subject responses were transcribed for analysis. Chen examined nine variables in the narrations including rate of speech, ratio of tonal words uttered relative to the number of T-Units, ratio of total speech time to the number of T-Units, percentage of the total duration of unfilled pauses relative to total

speech time, ratio of the total duration of unfilled pauses to the number of unfilled pauses, percentage of the total filled pauses relative to the total words uttered, ratio of the total filled pauses to the number of T-Units, percentage of the total number of repair words relative to the total words uttered and the ratio of attempts to repair (pp. 45-46). Chen defines a T-Unit as an independent clause including any embedded subordinate clauses. Analysis of Variance tests were used to determine significance between variables.

The attrition of language fluency by Chen's subjects is evident from her analysis. Results show that "there is a significant decrease overall in the post-test for the rate of speech and words per T-Unit" (pp. 65-66). Additionally other variables related to a drop in fluency also decreased. Chen states " there was an increase in time needed to produce each T-Unit, the percentage of silence time, the duration of unfilled pauses, the percentage of filled pauses and filled pauses per T-Unit" (p. 66).

These findings are interesting in light of Russell's (2004) JFL fluency attrition work with returned-missionaries who served in Japan. As described above, Russell measured fluency attrition over a two-year period and found very little fluency attrition had occurred. The only variable measured with significant difference between T1 and T2 measurements was the percentage of hesitation and unfilled pauses time relative to total speech time. Chen's similar study over a 12-year interval found significant attrition occurring over a wider range of variables. This suggests that, at least for fluency attrition, a period of time longer than two years is needed to measure statistically significant language loss.

Another interesting finding from Chen's study is that there was no correlation between the subjects' year of return from the target culture and the amount of attrition observed (p.68). Chen explained this result by suggesting that the subjects may have reached different proficiency levels by the end of their missions (something not measured in the study) or lost different amounts of language ability during the 12-year span. It is an unfortunate limitation of the data that the proficiency level of the subjects was not measured when they returned from Taiwan. It is important to remember that the subjects had most likely already experienced language attrition when Zhang (1988) collected data from them.

One limitation of the study mentioned by Chen, but not elaborated on, is that the subjects' narration of the founding of the religion was memorized and that missionaries were instructed when teaching it to repeat the story verbatim. Even though Chen found evidence of attrition after 12 years, it is likely that these findings are more a result of memorization, than they are of time. That is, if subjects had spoken on another subject, it is quite possible that they would not even be able to talk about the subject in the post-test because their language proficiency would be so low and their attrition level so high. This begs the question, what is the affect of rote memorization on language attrition? This present study investigates this question. Is it possible that Weltens' (1989) "better learned, less attrited" theory holds true for memorized materials? Perhaps the better memorized, the less attrited.

In 2007 Shu-Pei Wang (S. Wang) completed a doctoral dissertation titled, "Syntactic Attrition in L2 Mandarin Speakers." In this study, S. Wang again utilized the

returned-missionary attrition data originally collected by Zhang (1988) and R. Wang (1999) and used by S. Wang (2002) and Chen (2006). This study, however, explored how the learners' L1 (in this case English) affected the attrition of Mandarin word order. S. Wang examined five syntactic structures, which resembled English syntax, were dissimilar, or were not found in English syntax to see if errors could be attributed to L1 transfer. These structures included "a) placement of adverbial phrases, b) verb copying, c) coverbs/ prepositions d) numerical series, and e) object-raising in Chinese specific 把 *ba*" (p. 31). In this study S. Wang attempted to answer four main research questions:

> 1. To what extent was L2 syntactic skill maintained or lost over time?
> 2. How did length of exposure time to the L2 affect the maintenance of overall L2 syntactic skill over time?
> 3. How were five selected Chinese syntactic structures subject to attrition over time?
> 4. Were errors related to those structures attributed to L1 transfer? Wang S examined attrition data from 24 participants who had learned and used Mandarin Chinese from between 16 to 22 months (p. 43).

Groups were formed according to year of departure and length of exposure to L2. A background questionnaire was used to find out length of L2 exposure and to make certain that none of the subjects had formally studied, or used their L2 on a regular basis. An oral test, part of the original data set, was used to elicit the desired syntactic structures. The test was comprised of 55 written English sentences that the subjects were required to provide an oral translation in Chinese of the sentences (S. Wang, 2007, p. 46). Eleven out of the 55 test questions were selected and transcribed for analysis. This was done for both the 1986 and 1999 tests, which had been carried out in the exact same manner. Two native Mandarin speakers then scored each sentence for syntactic errors.

Results for the first research questions showed that for the first test (1988) the subjects who had a shorter period of discontinued regular L2 usage had a statistically significant higher retention score. On the second test, the mean retention scores between groups, while much lower, were not significantly different. Results for the second research question, which asked if exposure time to the L2 affected maintenance of syntactic skill over time (p. 53), show that exposure time to the L2 had no affect on syntactic maintenance.

The third research question looked at the attrition of the selected syntactic structures. Results for this question show that the scope of dates was the most vulnerable to attrition. Next was the coverb 往/向 *wang/xiang* 'toward' and verb copying for quantity adverbial phrases. The placement of punctual time adverbials was the least vulnerable to attrition. Next, least vulnerable was the coverb 从 *cong* 'from.' When looking at changes in retention rate between tests, numerical series for addresses has the greatest attrition (S. Wang, 2007, p. 55).

A qualitative analysis of the incorrect responses for both tests was used to answer the fourth research question, which asked if errors in syntactic structure production could be blamed on L1 transfer. Results of this analysis show that "punctual time adverbials suffered the least attrition, while verb copying for quantity adverbial phrases has the greatest attrition" (S. Wang, 2007, p. 69). S. Wang suggests that the subjects "did not seem to be affected by their more flexible L1 word order patterns in their placement of punctual time adverbials" (p. 69). However the complexity of verb copying might not have been well learned initially and so suffered more attrition. S. Wang concludes that

frequency of use in the L2 environment and the better the acquisition at the initial stage reduced the L1 influence of syntactic errors.

The results of the first two research questions are interesting. It seems that the 12-year interval between T1 and T2 measurements was significantly long enough to even out differences between exposure time groups (18 or 24 months) and subjects who originally had a shorter time of discontinuance at T1. S. Wang attributes the results of the third research question to patterns the subjects had learned and used while on their missions in Taiwan. It is possible that some syntactic patterns were used more frequently than others, thus influencing the results of the analysis. It might have been helpful to closely examine all of the materials that the subjects had been required to memorize and use while on their missions.

Results of the fourth research questions suggest that L1 transfer is not a major factor affecting syntactical attrition in this study. This finding is perhaps also related to the environment and manner in which the subjects learned the language. Unlike formal classroom learning, which may rely more on the L1 in the form of translation or grammatical explanations, informal learning in country would tend to be acquired more naturally, without overdue reliance on the L1.

Perhaps the first rigorous study of CFL learner attrition outside of BYU is Jeffrey Hayden's 2003 study titled, "Shocking Our Students to the Next Level: Language Loss and Some Implications for Teaching Chinese as a Foreign Language." In this important CFL study, Hayden investigates reading proficiency attrition of beginning and intermediate level CFL students over the summer break. He hypothesizes that "there will

be a light but measurable degree of attrition among beginning and intermediate students" (p. 4). Hayden tested his students before and after a three-month summer break using Ted Yao's Computer Adaptive Test for Reading Chinese (CATRC). This computer-based test rates learners' Chinese language reading ability and gives a proficiency score based on the ATFL Chinese Proficiency Guidelines.

Results of Hayden's study show that mean reading proficiency stayed the same for the first year students and decreased for the second year students. The author cautions that these results have to be interpreted in light of several weaknesses with the study. He comments that the second test was given three to four weeks after the term had started so there is a good chance that students had relearned much of what they had forgotten. Additionally, the data shows that some of the students were randomly guessing on the T2 test and that many of the subjects completed the test much quicker than they had done during the T1 measurement. This suggests that these subjects were trying to hurry and finish the test so they could leave early. Hayden concludes that time away from the language classroom and the subsequent language attrition that occurs during the winter and summer breaks might be one factor that causes students to discontinue their study of Chinese.

2.2 Aspect Marking in Chinese

In their widely used Chinese grammar text "Mandarin Chinese: A Functional Reference Grammar" Charles Li and Sandra Thompson (1981) describe the different ways of viewing a situation in Chinese, aspect, as "how the situation itself is being viewed with respect to its own internal makeup" (p. 184). This differs from tense, which

compares the occurrence of a situation to speech time. Although different descriptions of the Chinese aspect system have been proposed, for the purposes of this study the researcher will adopt the verbal aspect categories, and their corresponding markers, as put forth by Li and Thompson (for other classifications, see Smith 1997). Since the purpose of this study is to investigate the effect that rote memorization has on general attrition and more specifically, the attrition of aspect marking and usage, it will not be necessary to delve into a deep theoretical investigation of the Chinese aspect system. Rather, a general overview of grammatical aspect-marking categories is discussed, including the verbal markers that accompany each category. After a general introduction, studies investigating aspect usage by L2 learners of Chinese are examined. The researcher hopes that the findings of this study will help further the teaching and learning of Chinese as a foreign language. Insights into the acquisition and attrition of verb marking help to achieve this goal.

The attrition of six grammatical aspect markers -LE, GUO, ZAI, ZHE, NE as well as verb reduplication (V+V) are investigated in this study. These markers fall into four grammatical aspect or viewpoint aspect categories described below. These categories include the perfective and imperfective, experiential and delimitative.

2.2.1 perfective aspect.

The perfective aspect in Mandarin Chinese is marked by the verbal suffix marker -LE. This perfective marker is not to be confused with the sentence-final marker *le* which although sharing the same character and pronunciation marks current relevant state and

not perfectively. Some researchers, such as Christensen (1994), do not agree with this distinction. Describing the sentence final particle -LE Yang (2003) stated,

> There are so many functions associated with or attributed to the particle *le* that the search for a basic meaning is a real challenge. Depending on the theories of how many distinctive particles of *le* there are, the familiar candidates that have been floating around and gained some currency include perfectivity, inchoativity, change of state, currently relevant state, perfect, and modal particle, to name just a few (p. 77).

The -LE debate, however interesting, is beyond the scope of this attrition study. On the other hand, the perfective verb suffix –LE presents a closed event and will be examined in this study. Carlota Smith (1997) explains, "-*le* spans the initial and final endpoints of an event" (p. 263). Li and Thompson (1981) similarly state that –LE indicates, "that an event is being viewed in its entirety or as a whole" (p. 185). Events are viewed in their entirety (initial and final endpoints) when they are bounded or quantified. Verbs are bounded when they have limits placed on them by a phrase, which tells their limit. Additionally, events are considered bounded when the direct object is a definite noun phrase. Li and Thompson (1981) list the following four ways an event can be bounded:

1. Being a quantified event
   Ta shui le san ge zhongtou
   3sg sleep PFV three CL hour
   S/He slept for three hours.
2. Being a definite or specific event
   Wo peng dao le Lin Hui
   I bump arrive PFV Lin Hui
   I ran into Lin Hui
3. Being inherently bounded because of the meaning of the verb
   Ta qu nian si le
   3sg last year die PFV
   S/He died last year.
4. Being the first event in a sequence.
   Wo kan wan le bao, jiu shui
   I read finish PFV paper, then sleep

When I finish reading the paper, I will go to sleep (pp. 185-199).

Notice that in the first example the verb *shui* 'sleep' does not have an endpoint inherent in its meaning, so the verb must be bounded by the time phrase *san ge zhongtou* 'three hours' if it is to be marked for perfectively by -LE. We can compare the verb *shui* 'sleep' which does not have built in endpoint with the verb *si* 'die' in the third example, which has a very abrupt endpoint. Death happens and then it is over, you are dead.

2.2.2 imperfective aspect.

The other major aspect category in Mandarin is imperfective. Chinese uses the progressive ZAI and stative imperfective ZHE aspect markers to mark the ongoing or durative aspect of an event. Smith (1997) describes ZAI as presenting "an internal interval of a durative situation, and often has the connotations of the activity associated with events" (p. 271). Unlike -LE, GUO and ZHE, ZAI precedes the verb and often occurs with the morpheme *zheng* and the sentence final particle NE (as in *zhengzai…ne*). ZHE on the other hand "expresses an imperfective viewpoint that presents a continuous and stable situation without regard to endpoints" (p. 273). Its function is to "present the internal stages of durative events as static" (p. 274). Since there are two markers it is necessary to look at the type of verb to determine which aspect marker can go with it. Below are the various verb types and examples borrowed from Li and Thompson (1981).

Activity verbs take the marker *zai*.
Zhangsan zai da Lisi
Zhangsan DUR hit Lisi
Zhangsan is hitting Lisi.
Verbs of posture are marked by *–zhe*.
Ta zai fangzi li zuo zhe
3sg at house in sit DUR
S/He is sitting in the house.

> Activity verbs signaling states associate with their activity meanings also take –*zhe*.
>
> *Zai men kou de boli shang xie zhe si ge zi*
> At door mouth ASSOC glass on write DUR four CL character
> On the glass in the doorway are written four characters (pp. 218-221).

In complex sentences, Li and Thompson (1981) state that "the durative aspect marker –*zhe* can also be used in the first of two clauses to signal that one event provides a durative background for another event" (p. 223). For example,

> *Xiao gou yao zhe weiba pao le*
> Small dog shake DUR tail run CRS
> The small dog ran away wagging its tail (p. 223).

The sentence final particle NE is also investigated in this study. NE can also be used with or without ZAI to signal the durative aspect for an activity verb. The decision to include NE was made so that all instances of imperfective/durative aspect would be examined and to see if the subjects made frequent use of the particle. Li and Shirai (2000) argue that NE "encompasses both progressive (*zai*) and durative (*-zhe*) meanings" and classify it as a general imperfective marker (p. 93)

2.2.3 experiential aspect.

While Smith (1997) includes GUO in her discussion of perfective aspect, Li and Thompson (1981) describe it as an experiential aspect suffix which marks a verb that has been experienced at least once, usually in the indefinite past. Smith states that GUO "presents a prior closed situation of any type, and conveys that its final state no longer obtains" (p. 266). For example, the sentence *Wo chi guo Hanguo cai* suggests that the speaker has had the experience of eating Korean food at least one time in the past. The experiential marker -GUO signals that the event has been experienced before and requires

a discontinuity with the present, which distinguishes it from -LE. For GUO to be used, the action has to be repeatable.

The following table borrowed from Duff and Li (2002) provides review of the various aspect markers described thus far.

Table 2.1

Grammatical Aspect Markers in Mandarin Chinese

Aspect	Marker	Meaning	Example
PERFECTIVE	LE	Bounded, perfective	Ta kan-LE yi ge dianying he see-LE a movie 'He saw a movie'
	GUO	Experiential	Ta kan-GUO neige dianying he see-GUO that movie 'He has seen that movie'
IMPERFECTIVE	ZAI	Progressive (foregrounded)	Ta ZAI kan dianying he ZAI watch movie 'He is watching a movie'
	ZHE	Stative, durative (backgrounded); progressive situation (esp. in writing)	Ta kan-zhe dianshi chi fan he watch-zhe TV eat rice 'He ate while watching TV'
	NE	Progressive (in colloquial speech); durative	Wo (ZAI) chi fan-NE I (ZAI) eat rice-NE 'I'm eating'

Source: Duff, Patricia & D. Li (2002). The acquisition and use of perfective aspect in Mandarin. In Rafael Salaberry & Yasuhiro Shirai (Eds.), *The L2 acquisition of tense-aspect morphology* (pp.417-453). Philadelphia: Benjamins, p. 419.

2.2.4 delimitative aspect.

The final aspect category examined in this study is delimitative. Delimitative aspect is marked in Chinese by the reduplication of the verb and indicates that the action of the verb is done "a little bit" or for a short period of time (Li & Thompson, 1981, p. 232). An optional *yi* 'one' is sometimes inserted between the verb and its reduplication. Below is an example from Li and Thompson.

Ni xihuan chang ge, na ni jiu chang (yi) chang ba!

You like sing song then you just sing (one) sing SA

You like to sing, so go ahead and sing a little! (p. 232)

2.3 L2 Acquisition of Chinese Aspect

This section of the literature review focuses on recent studies that have investigated the aspect system in Chinese. A handful of L2 aspect acquisition studies using university-level CFL subjects will then be discussed. This review of current aspect acquisition literature provides a basic framework with which to approach aspect from an L2 language attrition perspective.

In her 1995 article titled "Second Language Acquisition of the Chinese Particle *Le*" Xiaohong Wen examined verb suffix -LE and the sentence-final particle LE production by 14 beginning and intermediate level second language learners of Chinese. In this study, Wen investigated if one function of LE (either -LE or LE) is acquired before the other and what factors would account for this order of acquisition.

Additionally, she attempted to identify the mechanisms learners' employ in acquiring LE. All of the subjects were interviewed individually three times over the

course of a three-week period. During the informal conversational interviews, the subjects were required to answer a series of questions, which required the use of -LE/LE to answer correctly. The researcher also asked specific questions about a selection of pictures that would also elicit LE usage by the learners. Finally, the learners were asked to describe an arrangement of pictures that were constructed in such a way as to elicit patterns using -LE/LE. The interviews, which lasted approximately 25 minutes each, were recorded and later transcribed for analysis. Individual usages of LE were then classified as either the perfective aspect marker or the sentence-final model particle.

Results of the study show that beginning level subjects used the perfective aspect marker -LE correctly 75.2% of the time. A *t*-test was used to determine if the correct uses of -LE was statistically significant between groups. Results of the *t*-test show that the difference between proficiency levels was not significant.

A closer look at the data reveals that the subjects in this study used the perfective aspect -LE in two sentence patterns. First, -LE was used after the first verb in a pattern that contains two actions to indicate that the first action is complete. This pattern was used by both beginning (with 79% accuracy) and intermediate level subjects (with 89% accuracy)(p. 53). The second verb suffix -LE pattern found in the data was the duration of time Verb-Object Verb2 -LE pattern. Again, subjects had high levels of correct usage, 74% at the beginning level and 84% for the more advanced level subjects.

In conclusion, Wen (1995) notes that when the subjects tended to "acquire the verb suffix -le, their strategies seem to be unitary and meaning-based" (p. 58). She provided evidence explaining that in the linear pattern of two events, it is "logical and

easily understood" that -LE is used consistently with the first pattern (p. 58). Additionally, when subjects used verbs with the complement *wan* (finish), they always used –LE even though it is typically optional. Similarly, subjects always used -LE with the time adverb *yihou* (after) even though it is also optional. Finally, subjects used -LE with verbs "which have an inherent end-point built into their meaning or when a durative verb expresses a clear-cut end-point" (p. 56). Wen concluded that learners of Chinese are more sensitive to constraints on verbs rather than whole sentences and consequently acquire perfective -LE earlier and more easily than the less concrete and more varied sentence final LE (pp. 59-60).

In his 2005 exploratory study titled "Patterns of Acquisition of Chinese Linguistic Features by CFL Learners" Chuanren Ke examined the usage of common Chinese linguistic features by 64 CFL learners. These learners were at four different levels of instruction (first year through fourth year) and were attending an eight-week summer intensive program at Indiana University. Data for this study consisted of audio recordings made while the learners took a standardized oral proficiency test developed by the Center for Applied Linguistics. Except for the first year students, all subjects were sampled at the beginning and the end of the summer program. The research question for this study asked "What are the patterns of grammatical achievement for CFL learners?" (Ke, 2005, p. 4). To answer this question, Ke examined 19 linguistic features. For the purposes of this review, only three features relevant to this present study are discussed here: aspect marker -LE, aspect particle GUO, and verb reduplication.

The oral data was transcribed and the sentences containing the target linguistic features were coded according to syntactic and semantic acceptability. Analysis of the subject-produced linguistic features revealed several patterns that answered the research question. Two of the patterns involved the aspect patterns of interest. A positive relationship was found between the subjects' year of study and the acceptability of the linguistic feature. The aspect particle -LE fell into this pattern. Ke (2005) describes the second pattern as "a U-shaped pattern indicating the subjects' performance on certain linguistic features decreased after their initial successful learning and increased again as they became more proficient with the language" (p. 9). The experiential aspect particle GUO and verb reduplication both fall into this pattern.

Both of these patterns of acquisition suggest that practice does make perfect and that by the fourth year subjects have made substantial progress in their use of the linguistic features. It is interesting that the aspect marker -LE fell into pattern one development while, experiential particle GUO and verb reduplication fall into the U-shaped second pattern. Most likely the frequency of -LE gave learners ample exposure throughout their years of study.

In her 2006 doctoral thesis, "Acquisition of the Perfective Aspect Marker *LE* of Mandarin Chinese in Discourse by American College Learners," Lixia Ma focused on CFL learners' knowledge about, and use of, the discourse functions of the perfective aspect marker -LE. Ma's study involved 26 learners of Chinese and 30 native Chinese speakers. The subjects participated in three test instruments, a multiple-choice

grammatical competence test, a fill-in-the-missing -LE characters in a dialogue, and an oral production task using six pictures sequenced to tell a story.

Ma's first research question asked "Is there any significant difference in the acquisition of -LE across different learning levels?" (p. 66). Results from the analysis showed "an ascending trend in the maximum score and mean score from the beginning learners to advanced learners and to native speakers" (p. 66). This means that the beginning level learners made the most mistakes, while the native speakers made the least with the advanced learners in between. Results of a statistical analysis show that there was in fact a significant difference between the mean scores across the different levels for this measurement. This suggests that the acquisition of -LE is a process that takes place over a period of time.

Ma's (2005) second research question asked "Is there a significant difference in the acquisition of each of the three discourse functions of -LE across different learning levels?" (p. 72). Analysis again shows an upward trend from beginning learner to native speaker for each of the three discourse categories analyzed with the mean difference of all three discourse functions being significant across learning levels. Again, the acquisition of the discourse functions of -LE appears to be a gradual process.

The third research question in Ma's study asked "What patterns of -LE in discourse are observed in the production data across different learning levels?" (p. 79). To answer this question, Ma focused on the distribution of perfective aspect marker -LE in three different perspectives. Results of the analysis show that beginning level learners most frequently (54% of total uses) use -LE to mark the end of a discourse sentence. Next

frequent was the anteriority usage with 32% of total usages. Finally, the peak event usage accounted for 14% of total usages (p. 80). The subjects at the intermediate level used –LE to mark the end of a discourse sentence 45% of total usages, with anteriority and peak event usage equaling 30% and 25% respectively. Advanced level learners' total usage of -LE was 29% for marking the end of a discourse sentence, 31% for anteriority usage and 40% for peak event usage. These results also show a gradual shift in the usage of perfective aspect marker -LE.

When examining the erroneous uses of the perfective aspect marker -LE, Ma (2005) found that the error rates, which include overuse and misuse, were fairly low. Beginning, intermediate and advanced level learners had error rates of 8%, 20% and 5% respectively. A closer look at these results reveals that the beginning level subjects had very limited usage of -LE and by no means did they have the aspect system mastered. Conversely, the advanced level subjects had a high level of usage, yet a low error rate. This suggests that they did have a good grasp on perfective aspect –LE.

Ma's (2005) fourth research question asked "What characteristics do learners' production data exhibit against the commonly observed patterns of *–le* across different learning level?" (p. 95). To answer this question, Ma compared the subject data to 10 patterns of -LE usage identified by Ke (2005). Results of her analysis suggest that beginning learners use –LE as a past tense marker. This L1 transfer error is understandable, since many learners assume that the aspect system in Chinese is the same as tense in English. Additionally, beginning level learners were able to use common idiomatic expressions using -LE such as *tai….le* 'too much' and *hao le* 'ok, good' (p. 99).

At the intermediate level tense type transfer errors from the subjects' L1 were even more common. However, subjects at this level used a variety of more complex patterns that included -LE. One example is the BA +object +verb +le pattern. Similarly, at the advanced level subjects used -LE in an even larger variety of sentence patterns, but with a very low error rate.

In their 2002 study titled "The Acquisition and Use of Perfective Aspect in Mandarin" Patricia Duff and Duanduan Li examined usage of the perfective aspect marker –LE by nine native speakers of English studying Mandarin and nine native Mandarin speakers. The subjects participated in a recorded semi-structured oral interview. During the interview the subjects completed three elicitation tasks. The purpose of this study was to investigate the differences between native speakers and non-native speakers usage of the perfective aspect marker -LE. Variability within groups across tasks was also investigated. Finally, the researchers sought to identify the " interaction between the inherent lexical aspect in verbs and le marking" (p. 420).

The first task comprised of watching and then retelling Chafe's Pear Story video. The second task was to tell a personal vacation travel experience. Lastly, the subjects completed a written editing task where they filled in missing –LE markers while at the same time completing a think-aloud protocol of their meta-linguistic awareness of the -LE usage (Duff & Li, 2002, p. 428).

Overall results of the analysis showed that native speakers use -LE much more frequently and correctly in both obligatory and optional contexts than did the non-native speakers of Mandarin (Duff & Li, 2002, p. 429). In the retelling of the Pear story, native

speakers produced –LE an average of 17.55 times, while the non-native speakers produced an average of only 3.21 instances of –LE (p. 431). In the narration of the travel experience, the native speakers again used far more instances of perfective -LE, than did the non-natives with the average tokens equaling 12.99 and 2.55 respectively.

On the written editing tasks, the native speakers supplied -LE an average of 5.44 times correctly in obligatory contexts, while the non-native speakers averaged 4.33 times. It is interesting to note that non-native speakers also oversupplied -LE in ungrammatical contexts an average of 5.56 times (p. 442). The researchers concluded that the non-native speakers generally "tended to oversupply *–le* in their oral narratives, omitting it in certain obligatory contexts, intended to oversupplied it with certain stative and non-perfective activity verbs" (Duff & Li, 2002, p. 444). Finally, the think-aloud protocols suggest that transfer from L1 seems to be a major problem among non-native speakers who tend to equate perfective -LE with past tense. Aspect usage errors seem to be highly susceptible to transfer errors from L1 English speakers, especially those learners at the beginning levels.

Before finishing the discussion of aspect marking in Chinese, particularly verb suffix marker –LE, it is important to acknowledge that not everyone agrees that two separate LE's exist (Christensen, 1990, 1994). In fact, in his 2003 article titled "Back to the Basic: The Basic Function of Particle *le* in Modern Chinese" Jun Yang argued that all the different functions of modern particle LE can be "reduced to the single function of encoding perfective viewpoint" (p. 77). Yang used a three-dimensional system of temporality to argue that instead of separate perfective aspect –LE and CRS sentence

final LE, only one LE exists regardless of its position in a sentence. While his detailed argument with supporting examples appears solid, it has yet to cause a dramatic shift in L2 pedagogical theory or methods.

2.4 Memorization in the L2 Classroom

The purpose of this study is to measure language attrition and the affect that the rote memorization of narratives has on rate and type of language loss. Rote memorization is not currently en vogue in most foreign language classrooms in the United States, and consequently recent research tends to skip over the topic. In fact, as early as 1978, Ausubel, Novak and Hanesian made the distinction between "rote" and "meaningful" learning. (p. 78). Based on this distinction, a classroom activity such as memorizing a dialogue for performance was not considered meaningful and therefore, not suited to the language classroom. With the downfall of behaviorist theory, rote memorization also fell out of favor as well (Taguchi, 2007, p. 436). More recently however, the rote memorization and performance of culturally contextualized dialogues is being promoted by the Performed Culture approach to East Asian language pedagogy. This approach advocates rote memorization of dialogues at the beginning and intermediate level. In fact, Christensen and Warnick (2006) recommend that students come to class the first day of a new chapter having already memorized an assigned dialogue. Memorizing the dialogue is not the goal in itself, but rather it forms the foundation for the daily activities of that chapter (p. 75).

Learners first perform the dialogue as they have memorized it, then the instructor leads them to expand on the dialogue, personalizing it to their own situation. By the end

of the learning unit (typically the chapter of a textbook), students can perform their own open-ended dialogue using the grammatical structures and vocabulary learned from their prior rote memorization and expanded upon through instructor-led class oral activities. Christensen and Warnick (2006) advocate the following Performance-Based Approach, which utilizes a memorized dialogue as the basis of instruction and builds acquisition and learning culturally appropriate performances and expansion on the basic memorized forms. This three-step approach is outlined below.

1. Begin with the whole
    - Learners familiarize themselves with the context and five elements of the performance that surrounds the situation
2. Performance of the whole
    - Learners perform the dialogue, paying attention to how the vocabulary and patterns fit into the context of the communicative situation.
3. Communicative practice
    - Learners practice using the language in realistic and authentic communicative situations (p. 173).

This approach is supported by the 2006 NFLC Guide to Basic Chinese Language Programs that also advocates that students memorize short 6-10 line dialogues at the beginning level. The Guide states, "before they can use a language creatively to express their own thoughts, learners need to internalize samples of the language in order to master grammatical structures and develop fluency" (p. 74). It is suggested that students memorize short dialogues on common topics that include one or two grammar points. These dialogues are then to be performed at the beginning of class and followed by role-playing based on variations of the dialogue.

This final section of literature review focuses on the few recent articles from the last several years that examine the "unfashionable" topic of memorization. The first

article argues that rote memorization and imitation was key factor in the success of English language speech competition winners in China. The second article looks at the effect of student memorization of language chunks on oral proficiency. The final article also looks at L2 speakers of English who created, memorized, and practiced a dialogue for a situation that they would be experiencing in the near future. These recent studies suggest that rote memorization can be an effective tool in the language acquisition process. This study helps to discover if it is an effective tool against language loss.

In a recent article titled "Text Memorization and Imitation: The Practice of Successful Chinese Learners of English" Yanren Ding (2007) interviewed three college students at Nanjing University in China who won awards in nationwide English speaking competitions. Ding interviewed each of the subjects to find out what they thought was the most important factor that led to their success in learning English. Each of the subjects believed that they had a better feel for English than other students. They attributed their success "to the practice of texts memorization and imitation during their middle school years" (p. 273). The learners felt that although it was very difficult to memorize and imitate dialogues, the middle school years were where they made the biggest progress in English.

One of the subjects described how she went about memorizing the text. She said that she would listen to the reading of the text by a native speaker and then imitate and recite it, paying special attention to the intonation patterns. She then had to recite the text verbatim in front of her teacher. In class, students would then participate in discussions

where they could "put to use the text material we had memorized…so that what had been memorized became our own language" (Ding, 2007, p. 275).

Outside of the classroom, all of the subjects saw themselves as "filmoholics" and watched large quantities of English language movies not for entertainment, but to imitate and memorize them. One subject mentioned that when speaking English, lines from a movie would just pop into his head. Another subject said that even after watching a movie multiple times, he would wake up in the middle of the night and turn on the movie to check a line that they could not remember.

The subjects in the study mentioned several benefits from memorizing texts. First, they said that it helped them learn many collocations that they could then use in their writing and speech. Next, they felt that text memorization helped them to focus on the details of the language, which helped them have a better feel for it. This in turn led to acquisition and mastery of English. Ding (2007) closed the article by arguing, "text memorization and imitation have a legitimate place in second language acquisition" (p. 279). This argument is, of course, very common in China where the education system is famous for its emphasis on rote memorization. What is interesting is the subjects' awareness that memorization was the crucial factor to their success in mastering English. They mention collocations that they then internalized and were able to use in writing and speech. The next study takes a more in-depth look at these memorized chunks of speech.

In "Chunk Learning and the Development of Spoken Discourse in a Japanese as a Foreign Language Classroom" Naoko Taguchi (2007) examined "the extent to which grammatical chunks, enforced through classroom drills and memorization, are

internalized in learners' linguistic systems over time and are used to communicate personal meaning" (p. 434). Taguchi described chunks as a "semi-fixed grammatical pattern that carries a specific function" (p. 437). The study addressed the following research questions:

> 1. Are there changes in the frequency and range of grammatical chunks produced by L2 learners over time across different task conditions?
> 2. Are there changes in L2 learners' use of grammatical chunks in the creative construction of discourse? (p. 437).

The participants of this study consisted of 22 university students enrolled in their first semester of Japanese as a foreign language. Grammatical chunks of language were explicitly taught, practiced, and incorporated into learner-memorized dialogues that were presented orally in class. Data was collected in the form of speech samples that were taken twice during the semester. Learners participated in individual speaking sessions where they completed a conversation task and a narrative task. These sessions were recorded and transcribed for analysis.

To answer the first research question, different types of chunks were coded and frequency (average number of different types of chunks and the average number of different types of chunks between time 1 and time 2, as well as between the two tasks) was calculated (Taguchi, 2007, p. 440). Results of the analysis show that both the number of grammatical chunks and the range of chunks increased substantially, with the frequency more than doubling, and the range nearly doubling.

To answer the second research question, Taguchi analyzed the subjects' conversations for the range of topics spoken on by the learners. Analysis suggests that, at Time 1, the subjects' topics of discussion were limited to ones they had memorized in

dialogues. At Time 2, however, "learners initiated a wide range of personal topics, which were not restricted to the ones in the dialogue" (p. 444). When speaking on these topics they used previously memorized chunks of speech. Taguchi concluded that the ability to use these chunks in a variety of topics beyond those memorized in dialogues shows that the learners are able to use the chunks creatively to express "personal situations and need" (p. 445). Although the subjects at the beginning level memorized small and simple chunks at the individual level, connecting these chunks together allows the subjects to produce and continue discourse-level narratives. Lastly, findings regarding the usage of chunks "revealed a perfect correspondence between the frequency of the chunks that appeared in the dialogues and the frequency of the chunks that the learners produced spontaneously in the conversation tasks" (448). This finding suggests that memorized grammatical chunks may be directly related to student production.

Other researchers have also tested the effects of memorized language on oral production. In their 2006 article titled "Breaking Up is Not So Hard to Do: Individual Differences in L2 Memorization" Tess Fitzpatrick and Alison Wray explored what happened when learners memorize a native-like way of saying something they thought they would need to know how to say, and then actually used it in a real interaction. While the researchers admitted that rote memorization is not a "particularly realistic option for teaching and learning," they wanted to be able to control variables, which typically are not controlled for in Second Language Acquisition studies. The study addressed the following research topics:

1. The learning characteristics of individuals who find it easy to memorize and reproduce prefabricated material.

2. The effect of being in the *real* conversation (compared with rehearsing)
3. The extent to which effects are consistent across participants
4. The characteristics of conversations that most support the use of prepared materials

The study involved six intermediate to advanced female masters students who were living and working in an English environment. Half of the subjects were L1 speakers of Japanese, while the other half were L1 speakers of Chinese. Each subject worked one-on-one with the researcher to identify a conversation or transaction that they would be having in a few days with a native English speaker. The conversations ranged from getting film developed at a local store, to asking advice from a vet on how to get hamsters to mate (Fitzpatrick & Wray, 2006, p. 39). The researcher helped the subjects plan what they would say and develop 10-12 native-speaker-like sentences to be used in the target exchange. These sentences were then recorded on a CD for the subjects to study. No written version was provided and subjects were discouraged from transcribing the audio tracks. After practicing repeating the audio files, the subject then met with the researchers again to check the progress of the memorization. At that time the researcher also role-played the target conversation with the subject. This practice was recorded. Next, the subjects completed the real-life conversation, which they also recorded. The desire for the women in these situations was to "achieve [their] interactional goals by using, as far as possible, the memorized target utterances" (p. 39). One or two days after the real-life conversation, the subjects again met with the researcher to report on how it went. Finally, several months later the researcher unexpectedly asked each participant to recall as much as possible the memorized material.

Although a wide range of results was discovered from analysis of the data, only the ones most relevant to this present study are discussed here. Comparing the practice conversation with the researcher and the real-life target conversation shows that there was a significant correlation, indicating that subjects who attempted to use a great number of the target utterances in the practice conversation also did so in the real-life one. It is interesting to note that willingness to attempt the memorized utterances did not correlate to the subjects' proficiency level. Additionally, there was no significant correlation between the accuracy of produced structures and the subjects' proficiency level. Results of the data analysis also show that the subjects used significantly fewer target utterances in the real-life situation than they did in the practice conversation, although it is unclear whether they merely did not have the chance to use them, or if they couldn't think of them. The researchers also looked to see if level of formality affected the number of utterances that were attempted. Results show that in informal and unknown (the two interlocutors did not know each other) situations, the subjects used a majority of the target utterances. However, in the formal situations, the subjects only used about a quarter of the target utterances (Fitzpatrick &Wray, 2006, p. 51).

2.5 Weaknesses in Prior Studies

Most studies in L2 attrition have traditionally been limited by the relatively short amount of time they cover. Most studies look at language loss after a summer recess. Additionally, many studies have only looked at beginning or lower intermediate level subjects which may give an incomplete picture of general language attrition. However, these two weaknesses are not relevant to the CFL attrition studies using returned

missionary data. The problem isn't weaknesses with the studies, but that only the surface of research possibilities using this data has been scratched. Research has focused on the more accessible topics, such as lexical, tonal, fluency, and syntactical attrition. These investigations have focused solely on word and sentence-level constructions. By using oral narratives, this study will examine aspect in naturally produced language that is longer than the sentence level.

Looking at previous CFL aspect studies, Christensen (1994) summarized their weaknesses, saying, "only a small percentage of the studies of aspect in Chinese analyze authentic discourse data, or in other words, how aspect really functions in the language as opposed to how it is supposed to according to some prescribed grammar" (p. 128). Christensen also called for a descriptive grammar approach to aspect research, rather than the more traditional prescriptive approach. This present study hopes to further CFL attrition research by examining two oral narratives and attempting to measure general language attrition.

Finally, although not currently popular in second language pedagogy, memorization plays a central role in learning a foreign language. This study takes a fresh look at memorization from the perspective of language attrition.

2.6 Research Questions

The purpose of this study is to investigate the effect that rote memorization has on language attrition. More specifically, the loss of grammatical aspect markers is investigated. First, this study measures the general language attrition of a memorized narrative and an open-ended narrative between time one (T1) and time two (T2)

measurements. Attrition of the memorized narrative at T2 is then compared to how well the subject had it memorized at T1. Second, the attrition of aspect marker usage is investigated in both the memorized narratives and open-ended narratives. Aspect marker attrition in the memorized narratives is then compared to how well the subject originally had the narrative memorized at T1. Grammatical aspect marker attrition is compared between the memorized and open-ended narratives to see the effect of rote memorization on aspect attrition. Lastly, an investigation is carried out on the type (telic or atelic) and variety of aspect marked verbs to see if differences in usage exist between the two types of narratives. With these purposes in mind, this study attempts to answer the following research questions:

1) How much language attrition of the memorized narratives occurred over a 12-year period, as measured by a content and median length analysis of subject production at T1 and T2?
2) How much language attrition of the open-ended narratives occurred over a 12-year period, as measured by the median length of subject production at T1 and T2?
3) Is the attrition level of each memorized narrative at T2, related to how well the narrative was memorized at T1, as measured by a content analysis?
4) In the memorized narratives, did the subjects show attrition in the number, variety, and usage of grammatical aspect markers between T1 and T2, as measured by an analysis of grammatical aspect markers?

5) In the open-ended narratives, did the subjects show attrition in the number, variety, and usage of grammatical aspect markers between T1 and T2, as measured by an analysis of grammatical aspect markers?

6) Is there a relationship between how well the memorized narrative was memorized at T1 and the attrition of grammatical aspect markers in both the memorized and open-ended narratives, as measured by an analysis of grammatical aspect markers?

7) Is there a relationship between the attrition of grammatical aspect markers found in the memorized narratives and the attrition of the grammatical aspect markers found in the open-ended narrative?

3. METHODOLOGY

As stated above, the purpose of this study is to investigate the effect that rote memorization has on language attrition. More specifically, the loss of grammatical aspect markers is investigated. This chapter describes relevant information pertaining to the subjects, data collection and analysis procedures used in the study.

3.1 Subjects

The subjects and corresponding data for this project have been used in previous CFL attrition studies (Zhang, 1988; R. Wang, 1999; S. Wang, 2002; Chen, 2006; S. Wang, 2007) as described in the review of the literature. Zhang (1988) originally identified 40 subjects and interviewed them in 1986 (this present study's T1 data). Approximately 12 years later the last three months of 1999 and first two months of 1999, R. Wang (1999) relocated 29 of Zhang's original subjects and retested them using the same procedures and elicitation tasks (this present study's T2 data). Twenty-three of the subjects' T1 and T2 data were used for this present study. Five of Zhang's 29 subjects were eliminated because of subsequent formal Chinese language study during the 12-year interval. Additionally, one subject's digitized oral narrative data became corrupted and was unusable.

The subjects who participated in Zhang's study were all Brigham Young University students who had completed an 18-24 month proselytizing mission. The 16 male and 7 female subjects are all native English speakers who spent the first two months of their mission in a missionary training center, where they studied Mandarin in a formal intensive setting. After the initial two months of language training, the subjects were

transferred to Taiwan for the remainder of their service. Once in Taiwan the subjects were totally immersed in the language and culture and were expected to use Chinese daily to accomplish a variety of tasks. The subjects had no formal language training while in country, but studied on their own. The focus of their study was the memorization of six formal missionary lessons that they shared with interested parties. By the completion of their missionary experience, the subjects "had achieved a level of proficiency such that they were able to converse freely, collaborate, and establish friendships with the native Mandarin speakers by the time they left the L2 environment" (S. Wang, 2002, p. 44). Although their proficiency level was not formally measured at T1, it is possible to identify the subjects' general proficiency using the American Council on the Teaching of Foreign Languages Proficiency Guidelines for Speaking found at http://www.actfl.org/files/public/Guidelinesspeak.pdf. Based on these guidelines, the subjects in this study reached approximately the Advanced Low proficiency level although individual variation is likely. At this level the subjects could actively engage in a wide variety of informal communicative tasks and a limited number of formal conversations. Their speech, although not error free, could be understood by native speakers not used to speaking with non-natives. The subjects could also narrative and describe both routine and unexpected situations while utilizing a variety of communicative strategies to aid communication.

At the time the subjects participated in Zhang's study, they had discontinued their missionary service for a period of time ranging from several months to five years. When R. Wang (1999) located the subjects for a second study, approximately 12 years had

passed. Subjects who had used Chinese regularly or studied it formally during that interval were eliminated from this present study.

Table 3.1

Subjects by Year of Mission

Year of mission	Number of participants
1978	1
1979	1
1980	4
1981	2
1982	4
1983	5
1984	6
Total	23

3.2 Source of Data

Although the data set originally collected by Zhang (1988) and R. Wang (1999) includes a variety of oral production data, for the purposes of this study the researcher will only focus on the data from two speaking tasks. Subjects were given a speaking test consisting of two situations in English to which the subjects were required to respond orally in Chinese. At T1, each situation was read aloud to the subject, whereas at T2, most participants listened to a tape recording of each situation. At both T1 and T2 subject responses were limited to four minutes. Subjects were instructed to "try to respond as naturally as possible to each situation even though the microphone is your only audience." One of the two situations included a task that was identical or very similar to one they would have performed while performing missionary service in Taiwan. The two oral tasks were presented as follows:

Situation 1

> As a missionary you have met a young couple who have expressed some interest in learning about the LDS church. At the moment they only have a few minutes to talk with you so you decide to tell them about Joseph Smith and the first vision. Tell in as much relevant detail as possible the Joseph Smith story beginning with his interest in the religions of his time and his attempts to find truth.

Situation 2

> You are talking with a close friend and he/she asks you what your plans are over the next few years. Explain in detail what you expect or wish to be doing over the next five to ten years. You may wish to include a discussion of your goals and plans in some of the following areas: education, career, marriage and family, where you wish to live, special interests, etc.

Each of these situations asks the subjects to use language that they learned while living in Taiwan. Each situation is related in different ways to the six missionary lessons that the subjects memorized during their two-month language training at the missionary training center (in the United States) and over the first few months spent in Taiwan. These missionary lessons typically consist of six lessons that are presented to someone investigating the religion. The subjects in this study would have been given the materials in written Yale Romanization form, as well as in traditional character form. They did not have access to an audio version of the lessons, such as on cassette tapes. They would have been required to memorize each of the lessons and pass them off verbatim after arriving in Taiwan. The teaching of each lesson would take about an hour, including time for investigator questions. The language of the lessons is somewhat formal and would be presented in a monologue format with several comprehension questions added here and there. The two oral narrative tasks used for this study are related to the missionary lessons in very different ways.

In the first situation, subjects are asked to tell about the founder of their religion, and relate his spiritual experience known as the "first vision." The information needed to complete this oral task is found in the second missionary lesson that the subjects were required to memorize word for word. Additionally, this task is one the subjects would have shared on a daily basis as part of their missionary responsibilities. To respond to this situation, a subject could merely recite what they had previously memorized. It is quite possible that a missionary could have shared the first vision story literally word-for-word hundreds of times while in Taiwan. For the purposes of this study, the "first vision" experience, as found in the missionary lessons, is referred to as the *memorized narrative*.

The second oral situation task required the subjects to explain their personal plans and goals for the next five to ten years. This situation differs significantly from the other situation because it is not religion-based. Subjects were not able to rely directly on their knowledge of the memorized lessons. However, indirectly, they could still utilize linguistic features that they had memorized and used in the missionary lessons such as word order, syntactic patterns, some lexicon, and other features such as discourse and aspect markers. One of the purposes of this study is to see if subjects could, in fact, transfer their knowledge of the memorized lessons to complete a non-religious task. For the purposes of this study, the five to ten year personal plan narrative will be referred to as the *open-ended narrative*.

Zhang (1988) and R. Wang (1999) used the same data collection procedures. The subjects were allowed four minutes to respond orally in Chinese and were instructed to respond to the topic as naturally as possible. The instructions were provided in English to

the subjects in both oral and in written format. The narration tests were recorded onto audiotape that was later digitized and transcribed for analysis. A native Chinese speaker from northern China transcribed the situation one (T1 and T2) data and the researcher then checked the accuracy of the transcription. Two Taiwanese graduate students transcribed the situation two data (T1 and T2) and the accuracy of the transcription was checked by a third Taiwanese graduate student. The T1 data for this study consists of 23 transcribed oral narratives for situation one, and 23 transcribed oral narratives for situation two. The T2 data likewise consists of 23 transcribed oral narratives for situation one and 23 transcribed oral narratives for situation two from the exact same subjects as in T1.

3.3 Establishing a Baseline Attrition Score

The first step in understanding the effect of rote memorization on language attrition is to measure how well the missionary lessons were originally memorized at T1 and then determine how much language ability was lost over the 12-year interval by seeing how well they could complete the task at T2. Measuring the language loss of the memorized narrative between T1 and T2 can provide a baseline with which to compare the loss of general language skills represented by the open-ended (non-memorized) narrative (situation two). Ideally, it would be possible to measure how well the subjects had the memorized narrative committed to memory right before they terminated their missionary service. This would reveal the subjects' peak proficiency levels, assuming that attrition of language skills started occurring the moment the plane from Taiwan touched down in America. Unfortunately, because of the nature of the data set and the

limitation in identifying subjects for the study, the T1 test data that Zhang recorded in1986 occurred five months to six years after the completion of the subjects' missionary service. It is important to note that the T1 data is not pretest data, nor does it represent the peak language ability of the subjects. The subjects' oral production at T1 already includes language attrition, although it is impossible to measure how much.

3.3.1 comparing lesson versions.

A change in the Mandarin missionary lessons occurred during the time the subjects in this study performed their service in Taiwan. The first version was copyrighted in 1973 and was used until approximately the first part of 1982. The second version was copyrighted in 1983 but evidence from the data suggests that is was already being used by new missionaries during the second half of 1982, perhaps in a pilot program. From the data alone, it is impossible to determine exactly which version of the missionary lessons each subject used, especially during the overlap period where it is quite likely that two different versions were being used simultaneously. Consequently, it will be necessary to see if the memorized narrative (first vision story) found in the two versions of the lessons is similar enough that the same analysis is acceptable for all the subjects regardless their year of service.

The most apparent difference in the two versions is the length of the account, with the 1973 version being much longer and much more detailed. The 1973 story is 947 characters long, while the 1983 story is only 293 characters long. The shorter 1983 version includes paraphrases of quoted texts such as Bible scriptures and accounts written by the founder of the religion, while the earlier version quotes these passages word for

word. Although differing in length, formality and amount of detail, the actual content of the two versions is very similar. Both versions of the story start in the same way and end at the same time and place. Consequently, the researcher felt it prudent to examine the founder's "first vision" story as a whole, rather than looking at the same number of characters from each version. Only comparing length would have resulted in one version being viewed in its entirety and only a third of the other version being examined. As will be discussed below, it seems as though the later version is merely a shortened adaptation of the earlier one. In fact, much of the language used in the 1983 version seems to be taken directly from the 1973 version. Consequently, subjects who had memorized the earlier, longer version should know all the content and much of the language of the later edition.

Although the earlier version of the founder's story is shorter and less formal, the content of the two versions is very similar. For example, the 1973 version quotes the Bible scripture James 1:5 exactly, while the 1983 version paraphrases the verse. In the following excerpts from the memorized narrative, all translations are the researcher's unless noted.

1973 Version

雅各书第一章第五节，“你们

中间若有缺少智慧的，应

当求那厚赐与众人，也不

斥责人的神，主就必赐给

他. ”

James Chapter 1 Verse 5,

“If any of you lack wisdom, let him ask of God, that giveth to all men liberally, and upbraideth not; and it shall be given him.” (King James Version)

1983 Version

雅各书在第一章第五节，

一个人如果想知道真

理， 他就应该用信心求问神，

神一定让他知道

James Chapter 1 Verse 5,

If someone desires to know truth, then they should use faith and ask God, and God will surely cause them to know.

While the earlier version is much longer than the later version, they do share some similar wording. For example, the opening line of both versions share very similar wording. The portions of the text underlined below are the same between the 1973 and 1983 versions of the Mandarin missionary lessons.

1973 Version

我们特别想要你们认识一位名叫斯密约瑟的先知。

We especially want to introduce to you a prophet named Joseph Smith.

1983 Version

我们要跟你们谈一谈， 一位名叫斯密约瑟的先知。

We would like to discuss with you a prophet named Joseph Smith.

Later in the story is another example of similar wording in which the 1983 version seems to be taken directly from the earlier version, although only the key phrases were used. The length of the later version is also significantly shorter.

1973 Version

耶稣基督答复他的问题，吩咐他不要加入任何教会，并且告诉他为什么不要加入教会。(35 characters)

Jesus Christ answered his question, and commanded him not to join any church, moreover, told him why he shouldn't join a church.

1983 Version

基督吩咐斯密约瑟不要加入任何教会。(16 characters)

Jesus Christ commanded Joseph Smith not to join any church.

Since the two versions of the lessons appear similar, the researcher decided to do a side-by-side comparison of the content of the two lessons to see if one could be used as a measuring stick for both versions. Additionally, it was necessary to divide the text up into linguistic 'chunks' that could be used to measure the attrition of the subjects' oral output between time one and time two. Consequently, it is necessary to compare the 1983 version of the memorized narrative to written and oral discourse.

Various ways of dividing up written and spoken texts have been used by previous researchers. For example, researchers utilizing recall protocol methodology such as Myers (1975) advocated a very complex hierarchical scoring system that requires the construction of the template where relationships among ideas are outlined in a tree-like

fashion. This system required almost an hour to score in addition to the many hours needed to construct the template. A more simple system of text division was proposed by Johnson (1970) in which a text is divided up into pausal units that are then categorized into a hierarchy of important ideas on a simple four-point scale. Pausal units were identified by noting where a native speaker would hesitate while reading the text. Bernhardt (1991) compared these two scoring methods and found that there was a strong correlation between the two methods, suggesting that Johnson's more simple scoring system was no more accurate than Myer's complex one. Turning to oral discourse, Chafe (1980) measured discourse length using a unit of measurement called an idea unit. Chafe described idea units as ending with a clause-final intonation pattern, separated by a pause, and typically consisting of a single clause.

For the purposes of this study, the researcher divided the 1983 version of the founder's "first vision" story into modified pausal units. This was accomplished by having a native speaker read a version of the story from which the punctuation had been removed and then having her mark where she naturally paused while reading. This coded version was then compared to the original text found in the missionary lessons. Surprisingly, the original punctuation matched the native informant's pause marks almost identically. This correlation suggested that the punctuation had been purposely placed so the learners' pauses would seem natural and native-like. The researcher then further divided some of the pausal units into smaller chunks when more than one unique idea was expressed in the same pausal unit. For example, for native-speaker identified pausal unit *yiwei ming jiao Simi Yuese de xianzhi* (一位名叫斯密约瑟的先知), *a prophet*

called by the name of Joseph Smith, the last three characters de xianzhi (的先知), *prophet*, were divided into a new unit because they introduced a unique concept. The first part of the pausal unit introduces the religion's founder by stating his name. The second part introduces the concept of him being a prophet.

This modification to the pausal unit was done so that a more precise comparison of the two story versions could be carried out. Additionally, this alteration allowed for easier scoring of the subjects' T1 and T2 data in the content analysis described below. What is important to keep in mind is that the same scale will be used for the analysis of all the subjects' data. Furthermore, T1 scores will be compared to T2 scores for each subject, and not compared against the total number of modified pausal units. Therefore, the number of units the text is divided into is not crucial to that analysis.

Below is a side-by-side comparison of the two versions. In the left-hand column is the original 1983 version divided up into modified pausal units retained in their original order. In the right-hand column the longer 1973 version has been divided into chunks corresponding to the later version. Extra content from the 1973 version not corresponding to the 1983 version has been omitted from the table.

Table 3.2

Mandarin Missionary Lessons Comparison

1983 Version	Do the contents of the 1973 account each idea found in the 1983 Version?	1973 Version
1. 我们要跟你们谈一谈	Yes	我们特别想要你们认识
2. 一位名叫斯密约瑟	Yes	一位名叫斯密约瑟
3. 的先知	Yes	识一位名叫斯密约瑟的先

		知
4. 1820 年的时候，	Yes	在一八二零年
5. 斯密约瑟还是个少年，	Yes	的青年
6. 他住在美国	Yes	斯密约瑟还是一位在美国
7. 的纽约州	Yes	纽约州的
8. 那个时候大家	Yes	许多人 / 那时候
9. 都很关心宗教	Yes	附近发生了很大的很大的宗教骚动
10. 每一个牧师	Yes	各宗派的牧师
11. 都希望人加入他的教会	Yes	希望人人加入他们的教会
12.约瑟希望加入真实的教会	Yes	无法确定哪个教会事对的，哪个教会是错的
13.但是每个教会教导的事互相矛盾，	Yes	各宗派间的冲突实在 是太大了 / 因为各宗派的教师对同样的经文都有不同的解释
14.他不知道哪一个教会才是真的	Yes	使这位对人对 事都缺乏认识的青人得 不到结论，无法确定哪个 教会事对的， 哪个教会是 错的。
15. 有一天斯密约瑟在读圣经	Yes	有一天， 斯密约瑟读到圣经
16. 的雅各书	Yes	雅各书
17. 在第一章	Yes	第一章
18. 第五节，	Yes	第五节
19. 他读到：	Yes	读到
20. 一个人	Yes	你们中间。。。的
21. 如果想知道真理，	Yes	若有缺少智慧
22. 他就应该用信心	No	[He should use faith]
23. 求问神，	Yes	应当求那厚赐与众人，也不斥责人的神
24. 神一定让他知道	Yes	应当求那厚赐与众人，也不斥责人的神
25. 这个应许	No	[This promise]

26. 深深的打动了约瑟 的心	Yes	斯密约瑟非常感动
27. 他决定求问神，	Yes	也许我应遵照圣经的指示 求问神去
28. 到底哪一个教会是对的	Yes	到底哪个教会使对 的，哪个教会是错的
29. 有一个春天	Yes	一八二零年春天
30. 的早晨，	Yes	美丽明朗的早晨
31. 约瑟到一个小树林	Yes	走近树林
32. 去祈祷	Yes	跪下来全心全意的 祈祷
33. 在他祈祷的时候， 天父	Yes	我们见证天父和
34. 和耶稣基督	Yes	我们见证天父和他的爱子 耶稣基督
35. 从天上降下来，	Similar idea	明亮的光渐渐的落在他的身上
36. 向他显现	Yes	向斯密约瑟显现
37. 天父叫著斯密约瑟的名 字，	Yes	其中一位叫着斯 密约瑟的名字
38. 指著耶稣基督	Yes	并且指着另一位
39. 说：	Yes	说
40. 这是我的爱子，	Yes	“这是我的爱 子
41. 听他说！	Yes	听他说！
42. 基督吩咐斯密约瑟	Yes	耶稣基督答复他的问题， 吩咐他
43. 不要加入任何教会	Yes	不要加入任何教会
44. 他说他们的教训是人为 的，	Yes	虽有崇拜神的 形式，却教导人为的教义
45. 不是神的教训	Yes	，而不是神的教义。

This side-by side comparison makes it clear that the two versions of the founder's story are very similar. Only two content units 他就应该用信心 *he should use faith* and 这个应许 *this promise* are not accounted for in the 1973 version. Otherwise, the two versions are comparable, with the longer version containing almost every concept found

in the short version. Consequently, for the purposes of this study, the 1983 version of the founder's study is used as the standard by which to measure the attrition of the rote memorized materials.

This choice, however, is not without drawbacks. Theoretically the subjects who memorized the longer earlier version would know three times the content of those who memorized the shorter version and thus would score better on the content analysis if they had the same level of attrition as those who memorized the shorter version. The opposite would also possibly be true and the subjects who served later in Taiwan would have lower content analysis scores. This result could be mediated by the fact that the actual content of the versions is so similar, with the shorter version containing the mains points found in the longer version. Regardless of the outcome, the subjects' scores will only be compared against themselves and not against the other subjects. Therefore the version of the lesson the subject memorized is not a controlled variable in this study. The 1983 and 1973 versions of the founder's story are located in appendix B and appendix C.

3.4 Content Analysis

A content analysis of the subjects' T1 and T2 memorized narratives was made, and the results of the two analyses were compared in order to obtain a baseline attrition score of the rote-memorized material. The researcher has previously used this type of analysis (Paul, 2005). A side-by-side comparison of the subjects' oral production with the 1983 version of the memorized narrative was done in order to see exactly what content the subject was able to produce as compared with the original memorized material. The subjects' situation one performance data was matched up with the original text by cutting

and pasting the oral narrative data into a table across from the modified pausal unit it most closely resembled. The subjects' complete narrative data was put into the table, but not necessarily kept in its original order.

Two native speakers of Mandarin then scored the subjects' oral narrative. One point was given for utterances that matched content found in the original version of the story. Half a point was given for oral production that somewhat matched the original content. Zero points were given if the subject did not speak on the original modified pausal unit. Since the 1983 version was divided into 45 modified pausal units, the subjects' narratives were given a score out of 45 points. This was completed for T1 and T2 subject narratives. A baseline attrition score for each subject was then calculated based on the difference between T1 and T2 content scores. Two native speakers of Mandarin, both from Mainland China, scored the narratives and differences in scoring were negotiated by the scores until 100% agreement was reached.

It is important to keep in mind that the purpose of the content analysis was to measure language attrition and not content attrition. The ability by the subjects to convey the contents of the story represents language skills that have been retained and not lost over time. Consequently, the researcher was not interested in comparing the subjects' scores to the 45 modified pausal units identified in the 1983 memorized narrative. Rather, a comparison was made between the subjects' own T1 and T2 performances. Thus the effect of the 12-year interval between the two tests can be seen. It should also be noted that the contents of the memorized narrative are central to subjects' religion and would have been continually reinforced, albeit in English, over the 12-year period.

Consequently, the subjects' oral production theoretically only represents their linguistic ability at test time, and not their cognitive ability to remember the contents of the story. A sample-scoring sheet is provided below. Note that the 1983 version of the founder's story is divided into the same modified pausal units that were used for the side-by-side comparison of the two versions of the story. In table 3.3, the scoring form for subject S-14's T1 performance is provided. A blank content analysis scoring sheet can be found in appendix D.

Table 3.3

Sample Content Analysis Scoring Form

1983 Memorized Narrative	Subject: S-14 (T1) (not necessarily in original order)	Points
1. 我们要跟你们谈一谈	好（huh）我们愿意告诉你有一点关于	
2. 一位名叫斯密约瑟	我们所讲的先知斯密约瑟	
3. 的先知	的先知	
4. 1820 年的时候，	这个是一八，一八，一八二零年的时候	
5. 斯密约瑟还是个少年，		
6. 他住在美国	他是一个美国人，	
7. 的纽约州	住在纽约州，	
8. 那个时候大家	在那个时候，那个地区	
9. 都很关心宗教	发生了一个宗教的骚动	
10. 每一个牧师	所以，有很多牧师他们，	
11. 都希望人加入他的教会	他们都说，哦，请来，来加入我们的教会（huh）我们教会是真实的。	
12. 约瑟希望加入真实的教会		
13. 但是每个教会教导的事 互相矛盾，	可是，他们的教训都是互相矛盾	
14.他不知道哪一个教会才是真的	所以斯密约瑟他，他非常好奇，他想，想知道哪一个教会到底是真实的，	

15. 有一天斯密约瑟在读圣经	可是那个时候，斯密约瑟他在读圣经。	
16. 的雅各书	在圣经的雅各书，	
17. 在第一章	第一章	
18. 第五节，	第五节，	
19. 他读到：	他读到一段经文告诉他	
20. 一个人	如果人（huh）	
21. 如果想知道真理，	缺智慧，	
22. 他就应该用信心		
23. 求问神，	他们应该去求问神，	
24. 神一定让他知道	神会让他们知道（huh	
25. 这个应许		
26. 深深的打动了约瑟的心		
27. 他决定求问神，	求问天父	
28. 到底哪一个教会是对的	关于这个情形，他要求问他哪一个教会是真实的，他应该加入哪一个教会，	
29. 有一个春天	所以有一天	
30. 的早晨，		
31. 约瑟到一个小树林	他到了一个小树林	
32. 去祈祷		
33. 在他祈祷的时候，天父	所以在那个时候，天父	
34. 和耶稣基督	和耶稣基督	
35. 从天上降下来，	从天上降下来	
36. 向他显现	向他显现（huh）	
37. 天父叫著斯密约瑟的名字，		
38. 指著耶稣基督		
39. 说：		
40. 这是我的爱子，		
41. 听他说！		
42. 基督吩咐斯密约瑟	天父吩咐他	
43. 不要加入任何教会	不要加入任何的教会，	
44. 他说他们的教训是人为的，		
45. 不是神的教训		

Below is an example of a content analysis that has been scored by the native speakers. Notice the scoring and the difference between a one-point score and a half-point score. For example, in line four, the subject says *zai yibaerling nian* 'in 1820' which corresponds to the original text's *1820 nian deshihou* 'in 1820.' One line down in number five, the subject says *yige nianqing ren* 'a young person' which the scorers' rate at somewhat corresponding to the line in the original text which states *Simi Yuese haishi ge shaonian* 'Joseph Smith was still youth' and award the subject half a point for that pausal unit. The subject does not produce any utterance that corresponds to lines six and seven and therefore receive no points for those pausal units.

Table 3.4

Sample Scored Content Analysis

1983 Version Idea Units	S-3 T1	Points
1. (3.1) 我们要跟你们谈一谈		0
2. 一位名叫斯密约瑟	名叫斯密约瑟，	1
3. 的先知	就是说，就是他将来要当先知，	1
4. 1820 年的时候，	在一八二零年，	1
5. 斯密约瑟还是个少年，	有一个年轻人	0.5
6. 他住在美国		0
7. 的纽约州		0

3.5 Median Length Analysis

A median length analysis was done with the subject-produced memorized narratives (oral situation one) and open-ended narratives (oral situation two). Results of this analysis serve as one indicator of attrition. In this study, the subjects had four

minutes to complete each oral task. At the four-minute mark, the tape recorder was stopped. Aural reviewing of the recorded data shows that all of the subjects were able to complete the task within the four-minute time limit. Thus, the median length of the narratives provides one insight into the subjects' language attrition because it reveals the amount of oral language that the subject could produce for each task. The median length of each narrative was determined by counting the number of characters the subjects produced in each of the memorized and open-ended narratives at T1 and T2.

Measuring the length of Chinese oral narratives is somewhat problematic. Christensen (1994) pointed out that because most Chinese words consist of more than one character and that many characters only indicate a syntactic function, a mere character count is not enough. Similarly, a simple sentence count will not do because oral data often lacks complete coherent sentences. Although Christensen used Chafe's idea units as a unit of measurement in his study, he admitted that "to get a general feel for the total length of the narratives a simple count of the number of characters in each narrative is sufficient" (p. 75). The researcher feels that because the written language is a representation of the spoken language, each character found in the transcribed oral narratives represents linguistic ability that has not been lost. Therefore, with some exceptions, each character found in the transcribed narratives was counted in calculating the total length of the narrative.

Some characters in the subjects' transcribed oral production were not counted as part of the median length analysis. For example, all usages of English by the subjects were not included in the character tally. Similarly, hesitation words were not counted.

The transcriptions, especially the T2 transcriptions, were full of hesitation words that had been transcribed in either English, *huh*, *eh*, *hmm* or in Chinese *e*, *he*, *a* (呃 呵 啊). Additionally, transcriptions of laughs such as *haha* or *hehe* were also not counted. Conversely, numbers that had been transcribed into Arabic numbers such as 1,2,3, 57, or dates like 1820, were counted for the number of characters that were said in the original Chinese. Therefore a single digit number such as 3, was counted as one character, the character *san* (三), *three*. However a two digit number such as 57, was counted as three characters following the way the number is expressed orally in Chinese, which accounts for the ten's place, *wu shi qi* (五十七), *five ten seven*. Dates in Chinese are expressed without the thousand, hundred, and ten place holders, therefore a date such as 1820 was counted as four characters, *yi ba er ling* (一八二零), *one eight two zero*. False starts, such as the ungrammatical *bu*, *buyou zhenshi de* (不，不有真实的) (S-4, T2) were counted normally. The researcher calculated the median length for each narrative. Results of this analysis can be found in Table 4.1 located in chapter four.

3.6 Aspect Marker Analysis: Number, Variety, Usage

One of the purposes of this study was to investigate the attrition of grammatical aspect markers over a 12-year period and to see if attrition levels differ between the memorized narrative and the open-ended narrative. In order to do so, it was necessary to calculate the total numbers of each marker used, the variety of markers used, and the correct or incorrect usage. These tabulations were completed for both the memorized and open-ended narratives, at T1 and T2, to see if differences exist between the two types of

narratives over the 12-year interval. Through this, the researcher can attempt to determine whether rote memorization has an effect on the attrition of aspect marking by the subjects.

Two native Mandarin speaking graduate students (one from China and one from Taiwan) at the University of Arizona who have studied the Chinese aspect system coded aspect markers in each of the narratives. Discrepancies between coding were then settled by a third native speaker with a similar background in Chinese linguistics. The graduate students were given a data packet and instructed to color code each of the following aspect markers. An example of each marker in context was also provided.

1. Perfective LE (also known as –le)
2. Experiential GUO
3. Durative ZAI
4. Durative NE
5. Stative ZHE
6. Delimitative V+V; V+*yi*+V

The graduate students were instructed that once they finished coding the data, they must go back and rate each aspect marker usage as being either correct or incorrect. The researcher then tallied the total number, variety, and usage of the markers for each narrative. The variety of aspect usage was calculated by noting the number of different markers used out of the six total possible. Aspect usage refers to either correct or incorrect usage, which was judged by the native-speaking graduate students. Zero marking, or the omission of aspect markers was not investigated. For the purposes of statistical analysis, one point was given for a correct usage, while zero points was given

for an incorrect aspect marker usage. Several relationships using these variables were tested for significance. Results for the memorized narrative were compared to the number and variety found in the original text. Usage at T1 and T2 were then compared to correct usage at T1 and T2. Correct usage at T1 was also compared to correct usage at T2. Details and results for this investigation can be found in chapter four. For the complete aspect marker coding instructions, please refer to Appendix A.

In order to standardize the results of the computation and analysis of aspect marker attrition it is necessary to tie them back to some constant feature. The features might include the relative length of the produced narrative, the number of sentences in the narrative, or the number of potential positions in which an aspect marker could be used. For the purposes of this study, the researcher compares the number and variety of aspect markers produced by the subjects on the memorized narrative task, at T1 and T2, with the actual number found in the memorized narrative. This provides an indication of the amount of aspect markers retained as compared to the original amount found in the text. Additionally, it is important to note that the attrition of aspect markers in this study is standardized by the method in which the data was collected. This holds true for both the memorized and open-ended oral narrative tasks. The oral situation tasks used to elicit the data were exactly the same over T1 and T2. The four-minute time restriction also contextualizes the results of the aspect investigation, by showing the number, variety, and usage of aspect markers that can be produced by the subjects in the allotment time at T1 and T2. Finally, instead of only investigating a single type of aspect, this study will investigate five types of aspect looking at six different markers. This helps determine if

the type of aspect used by the subject changes over the 12-year interval changes, given the consistent test parameters.

3.7 List of Variables

The research methodology described above outlined the identification of 18 variables related to language attrition that will be used in this study. These variables are listed below. Details and results of the data analysis can in chapter four found below.

A. Character Counts

1. T1 Memorized Narrative Median Length – Character count

2. T2 Memorized Narrative Median Length – Character count

3. T1 Open-ended Narrative Median Length – Character count

4. T2 Open-ended Narrative Median Length – Character count

B. Content Score

5. T1 Memorized Narrative Content Analysis – Content Score

6. T2 Memorized Narrative Content Analysis – Content Score

C. Aspect Marker Counts

7. T1 Memorized Narrative Aspect Marker Analysis - Aspect Marker Counts

8. T2 Memorized Narrative Aspect Marker Analysis - Aspect Marker Counts

9. T1 Open-ended Narrative Aspect Marker Analysis - Aspect Marker Counts

10. T2 Open-ended Narrative Aspect Marker Analysis - Aspect Marker Counts

D. Aspect Marker Variety Counts

11. T1 Memorized Narrative Aspect Marker Analysis - Aspect Marker Variety Counts

12. T2 Memorized Narrative Aspect Marker Analysis - Aspect Marker Variety Counts

4. RESULTS AND DISCUSSION

As stated above, the purpose of this study is to investigate the effect that rote memorization has on language attrition. Specifically, the loss of grammatical aspect markers is the focus of the investigation. The rich and complex relationship between data sets in this study lead to both a quantitative and qualitative analysis of the data. While relatively simple two-sample two-tailed *t*-tests, scatter plots, and simple linear regressions are used to show relationships between variables in the study, a closer look at the subjects' actual production is necessary to understand these relationships. Below are the formal research questions addressed in this study including the quantitative analyses used to answer the research questions. An additional qualitative discussion, including examples from the data is provided for each question.

4.1 Research Question One

The purpose of the first research question is to establish a baseline attrition level for the memorized narrative. As described above, the memorized narrative consists of the subjects' oral production in response to the first oral situation task. To accomplish this task, the subjects could rely on their knowledge of a story found in missionary lessons that the subjects had been required to memorize while in Taiwan. This baseline attrition level of the memorized narrative will then be compared to the attrition of a non-memorized narrative, to see if differences in these two types of speaking performances. The first research question asks how much language attrition of the memorized narratives occurred over a 12-year period, as measured by a content and median length analysis of subject production at T1 and T2.

This first research question is comprised of two parts and will be treated as such. Part A investigates language loss as measured by the change in narrative length between T1 and T2. The researcher assumes that after a 12-year period of non-use, the subjects' Chinese language production abilities will decrease and consequently the length of narrative will also decrease. Part B investigates language loss in the memorized narrative by the change in content score between T1 and T2. Again it is assumed that the content score will decrease between T1 and T2.

Table 4.1 below contains the raw data counts for the Part A of the first research question. The left column contains the subject identifiers. The center column includes the median length of the T1 memorized narrative while the right hand column includes the length for T2.

Table 4.1

Memorized Narrative Median Length

	Variable 1	Variable 2
Subject Identifier	Memorized Narrative Character Count T1	Memorized Narrative Character Count T2
S-1	662	392
S-2	286	55
S-3	537	523
S-4	145	110
S-5	643	324
S-6	399	0
S-7	176	86
S-8	692	178
S-9	160	4
S-10	422	69
S-11	357	188
S-12	318	348
S-13	683	359

S-14	512	472
S-15	337	237
S-16	485	322
S-17	387	234
S-18	643	441
S-19	316	81
S-20	333	196
S-21	460	688
S-22	539	274
S-23	438	191

Notice that for most subjects the T2 value is somewhat smaller than the T1 value and in the case of subject S-6, the score falls to zero. This zero count indicates that this subject was unable to complete the task or did not even attempt it. Conversely, the median length of subjects S-12 and S-21 actually increased at T2. This increase is surprising and prompted the researcher to review the subjects' questionnaire to be sure that the subjects had not had subsequent formal Chinese language study or spent regular or extended time in China or Taiwan. This subsequent review of the subject background questionnaires showed that neither subject had self-reported that they had participated in any of these language maintenance activities. That being said, it is possible that these two subjects had maintained their language in other more informal ways not asked about on the questionnaire. For a sample questionnaire please refer to Appendix E.

Table 4.2 contains the raw data counts for Part B of the first research question. Again, the left column contains the subject identifiers, while the center column includes the content score of the T1 memorized narrative. The right hand column includes the content score for T2 narrative. Again, generally speaking, the T2 scores are lower than the T1 scores. The content scores of three subjects (S-12, S-21, S-3) were higher at T2.

Table 4.2

Memorized Narrative Content Score

	Variable 5	Variable 6
Subject Identifier	Memorized Narrative Content Score T1	Memorized Narrative Content Score T2
S-1	36.5	29.5
S-2	20.5	3
S-3	29.5	32
S-4	10	9.5
S-5	34	25
S-6	18	0
S-7	23	8.5
S-8	28	14
S-9	9	1
S-10	8.5	8
S-11	31	18
S-12	16	21
S-13	24.5	20
S-14	30	25
S-15	31.5	24.5
S-16	34.5	28
S-17	23.5	12
S-18	33.5	28
S-19	21.5	10
S-20	19	11.5
S-21	28.5	30.5
S-22	23.5	15
S-23	24.5	12.5

Although there are many ways to measure language loss, for the purposes of this study, the baseline attrition level was determined by comparing T1 and T2 scores. As described in chapter three, a content analysis and a median length analysis was completed for T1 and T2 data for each of the subjects' memorized narratives. To answer this question, two-sample two-tailed *t*-tests (afterwards referred to as two-sample *t*-test) were

utilized to compare T1 and T2 scores. By setting the alpha level at 0.05, any result less than that would be considered statistically significant, meaning that there is a statistically proven difference between groups and it could not have happened by chance. This alpha level is the standard used for all statistical analysis in this study.

Table 4.3 shows the relevant statistics for the Part A two-sample *t*-test. Results of the analysis show the p-value is less than 0.0005 (values less than 0.0005 are rounded to 0.000 in the statistical tables below). This level, which is less than .05, suggests a statistically significant difference between the two variables. In other words, the median length of the subject-produced memorized narratives decreased significantly between T1 and T2. This difference is also evident by examining the mean length of the two tests. At T1, the mean length of the groups' narratives was 431.7391, while at T2 it was only 250.9565.

Table 4.3

Memorized Narrative T1 and T2 Median Length Analysis

	Mean	N	Std. Deviation	Std. Error Mean	Sig. (2-tailed)
Variable 2	250.9565	23	177.06072	36.91971	
Variable 1	431.7391	23	165.46991	34.50286	.000

Table 4.4 shows the relevant statistics for the Part B (content analysis) two-sample *t*-test. Results of the analysis show that the p-value is less than .0005. Therefore a statistically significant difference exists between variables five and six meaning that the content score was significantly lower at T2 than at T1. Looking at the mean value for each variable we can see that the mean score dropped from 24.2826 at T1 to 16.8043 at

T2. This nearly seven and a half-point drop over the 12-year interval suggest that the subjects lost quite a bit of language production ability over time.

Table 4.4

Memorized Narrative T1 and T2 Content Analysis

	Mean	N	Std. Deviation	Std. Error Mean	Sig. (2-tailed)
Variable 6	16.8043	23	9.77676	2.03859	
Variable 5	24.2826	23	8.17261	1.70411	.000

4.1.1 answering research question one.

The subjects lost a statistically significant amount of their language ability over a 12-year period as measured by a median length and content analysis. At first glance, these results seem to contradict Bahrick's (1984) "initial plateau" theory, which explains that after an initial period, subjects do not lose much language for several decades. Bahrick refers to this retained linguistic knowledge as "permastore-content" and that the amount of content is related to the level or original training.

While the results of this first research question appear to contradict initial plateau theory, they actually might support it. Bahrick describes that the initial period of attrition lasts from three to six years. The T1 data used in this study was collected in 1986, anywhere from six months to five years after the subjects had completed their missionary service in Taiwan. Consequently, the subjects were possibly in the middle of this 'initial period' of language loss when they participated in the T1 test. It is possible that they continued their language loss for some time after T1 before their attrition stabilized. The other important thing to keep in mind is that Bahrick did not study the attrition of oral

skills in his research. It is quite possible that L2 oral skills are lost at a different rate than are L2 reading skills.

4.2 Research Question Two

The purpose of the second research question is similar to that of the first: measuring attrition. However, instead of establishing a baseline attrition level for a memorized narrative, the question seeks to determine the attrition level for an oral task not related to what the subjects had memorized as part of their missionary experience. The second research question asks how much language attrition of the open-ended narratives occurred over a 12-year period, as measured by the median length of subject production at T1 and T2. Notice that the only measurement of attrition used in this question is the median length analysis because there is no original memorized text with which to compare the subjects' response. Therefore, to answer this question the researcher only examines the change in length between T1 and T2 open-ended narratives.

Table 4.5 contains the data counts for the second research question. In the middle column are the T1 character counts, which equal the length of each narrative. In the right hand column are the T2 character counts for each open-ended narrative. Generally speaking, the T2 narratives were much shorter than the T1 narratives. Notice that subject S-6 was again unable to complete or even attempt the task at T2, even though this subject's T1 open-ended narrative was the third longest at 551 characters. Subject S-12's T2 open-ended narrative was longer than his T1 narrative. This result is similar to the memorized narrative. On the other hand, subject S-21 who had a longer T2 memorized narrative, produced a T2 open-ended narrative that was 171 characters shorter

than T1 open-ended narrative. This suggests that the subject was better able to speak on the religious topic that mirrored previously memorized material, than on the open-ended task unrelated to any material that they had memorized.

Table 4.5

Open-ended Narrative Content Score

	Variable 3	Variable 4
Identifier	Open-ended Narrative Character Count T1	Open-ended Narrative Character Count T2
S-1	262	77
S-2	177	67
S-3	486	355
S-4	244	73
S-5	411	353
S-6	551	0
S-7	70	8
S-8	428	88
S-9	83	37
S-10	287	197
S-11	461	216
S-12	316	386
S-13	478	226
S-14	517	306
S-15	223	106
S-16	727	227
S-17	371	107
S-18	534	203
S-19	313	56
S-20	71	50
S-21	554	383
S-22	335	169
S-23	254	199

Similar to question one, a two-sample *t*-test was used to see if significant differences exist between median length of T1 and T2 open-ended narratives. Again, the

p-value is less than 0.0005 so it is assumed that there is a statistically significant difference between the two variables and that attrition between T1 and T2 has occurred. Table 4.6 shows the relevant values for the analysis.

Table 4.6

Open-ended Narrative T1 and T2 Median Length Analysis

	Mean	N	Std. Deviation	Std. Error Mean	Sig. (2-tailed)
Variable 4	169.0870	23	123.04135	25.65590	
Variable 3	354.4783	23	172.07025	35.87913	.000

It is interesting to note the difference in mean length scores between the two oral tasks. The memorized T1 narrative mean length was 431.7391 and the T2 length 250.9565. This equals a mean difference of 180.7826. In other words, on the memorized narrative task, the subjects, on average, lost the ability to articulate 181 characters over the 12-year interval for this specific oral task. Of course some lost much more, and others much less. The open-ended T1 narrative mean length was 354.4783 and the T2 length was 169.0870. The mean difference between them equals 185.3913. This indicates that the subjects lost the ability to articulate approximately 185 characters over the 12-year period between tests. It is remarkable that the level of oral language loss, as measured by this study's median length analysis, is so similar between the two tasks.

Comparing the two tasks, it is clear that the subjects retained fewer than five characters more in the oral task based on the memorized narrative, than in the opened-ended narrative. This suggests that the subjects' attrition of Chinese language production

was similar for the two different tasks, at least as it was measured in these to research questions.

There are several possible explanations for why the mean length attrition levels are so close for the two oral tasks. One possible explanation is that the attrition levels are the same for both tasks regardless of whether one is based on previously memorized materials or not. A twelve-year length of time might have blurred any differences between the ability to produce oral language for the two different tasks. Additionally, the manner in which the oral tasks were elicited might have affected the outcomes. The oral tasks were given in the exact same manner, one right after the other, with the exact same four-minute time constraints.

In examining the attrition data from the memorized and open-ended oral tasks, the data of subject S-6 stands out and deserves further discussion. This subject was the only one unable to produce any Chinese at T2 for both oral tasks. This is somewhat surprising considering the length of this subject's T1 narratives. For the memorized narrative and open-ended narratives, this subject orally produced 399 and 551charcters respectively. Furthermore, of these 399 characters in the memorized narrative, this subject only used six phrases (36 characters total) exactly as they were used in the missionary lessons to accomplish this oral task. Other subjects seemed to utilize more phrases directly from what they had previously memorized. Perhaps this is one reason why this subject had a content score of 18, while the group mean was 24.3. It is unclear if subject S-6 was trying to put the founder's story into his own words, or whether he just didn't have it well memorized. After stating the topic in English at T2, this subject said, "I can't remember

any of it. Do you want me to think for a minute? I can't remember anything." Although it's possible to assume that the subject knows the content necessary to complete the oral task in English, because the story is central to the religion, he is unable to produce any of it in Chinese. Perhaps what he means by "I can't remember any of it" is that he cannot remember any of that part of the missionary lessons.

One feature of subject S-6's oral production is that, although he produces a lot at T1, it is not very fluent and is often nearly incomprehensible. The following sentences provide examples of his production in the open-ended narrative exactly how it was transcribed:

我喜欢，eh，跳山，跳伞，开，开飞机, 都非常好的，兴趣。

Wo xihuan, eh, tiaoshan, tiaosan, kai, kai feiji, dou feichang hao de, xingqu.

I like, eh, jump mountain, parachuting, fly, fly airplane, all extremely well, interest.

我也喜欢，游泳，he, 骑脚踏车。

Wo ye xihuan, youyong, he, qi jiaotache.

I also like, swimming, and, ride bicycle. (S-6, Open-ended Narrative, T1)

Perhaps this type of production is an indicator of generally low proficiency. At the T2 open-ended narrative this subject only said, "I can't remember any of it." At this point, his statement couldn't have been referring to the missionary lessons because they are unrelated to the task, but must have referred to the Chinese language in general. It is plausible that this subject did not reach a proficiency "threshold" necessary to retain any

amount of Chinese over the 12-year period, although other subjects with poor Chinese ability were still able to produce some language at T2.

4.2.1 answering researching question two.

Results of the statistical analysis show that there is indeed a significant difference between the median length of T1 and T2 open-ended memorized narratives. The mean scores reveal that the T2 narratives are less than half as long as the T1 narratives. As described above, the difference in the attrition of narrative length is very similar between the memorized and open-ended narratives.

4.3 Research Question Three

The purpose of this research question is to see if the content score of the memorized narrative at T1 predicts the change in content score between T1 and T2. In other words, does the subjects' ability to relate the memorized narrative at T1 predict the attrition of the linguistic ability to relate the contents of the memorized narrative at T2? This purpose is accomplished by comparing the T1 content scores to the change in content score between T1 and T2. This research question is important because it tests the assumption that if the subjects had the narrative better memorized at T1 and thus were better able to articulate the content found in the narrative, they would consequently be able to articulate more of it at T2. The research question asks, is the attrition level of each memorized narrative at T2, related to how well the narrative was memorized at T1, as measured by a content analysis?

As described in the last chapter, the content analysis scores were measured by dividing the memorized narrative into modified pausal units. The subjects' oral narrative

was then transcribed and matched to the pausal units and scored according to a one-point scale. Points (1, 0.5, 0) were awarded depending on how well the subjects' production accounted for the ideas expressed in the original. The subjects' scores were not compared to the total possible score, but rather T1 scores were compared to T2 scores. Below is a table with the subjects' T1 and T2 content scores for the memorized narrative.

Table 4.7

Memorized Narrative T1 and T2 Content Scores

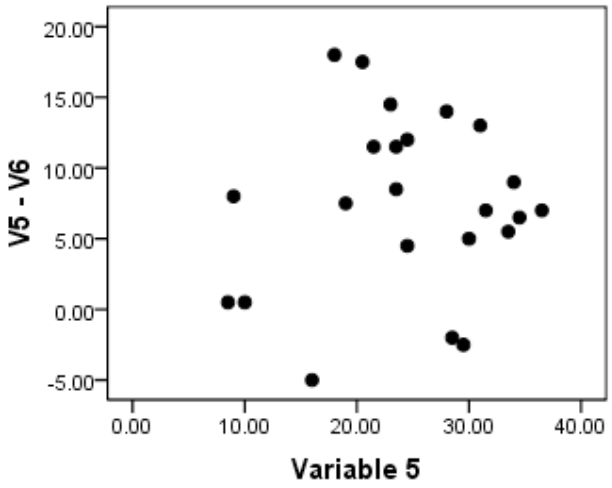
	Variable 5	Variable 6
Identifier	Memorized Narrative Content Score T1	Memorized Narrative Content Score T2
S-1	36.5	29.5
S-2	20.5	3
S-3	29.5	32
S-4	10	9.5
S-5	34	25
S-6	18	0
S-7	23	8.5
S-8	28	14
S-9	9	1
S-10	8.5	8
S-11	31	18
S-12	16	21
S-13	24.5	20
S-14	30	25
S-15	31.5	24.5
S-16	34.5	28
S-17	23.5	12
S-18	33.5	28
S-19	21.5	10
S-20	19	11.5
S-21	28.5	30.5
S-22	23.5	15
S-23	24.5	12.5

As introduced above, two variables are involved in the answering of this question. First, the predictor variable, used to predict or estimate a dependant variable. For the purposes of this question, variable number five, the content score of the T1 memorized narrative, is used to predict the dependant variable. In this case, the dependent variable is the change between T1 and T2 content scores. Therefore, subtracting the T2 content score from the T1 content score forms the dependent variable.

In order to see if the T1 content score of the memorized narrative is a good predictor of content score change over time, the predictor and independent variables were displayed on a scatter plot. With a scatter plot, "data is displayed as a collection of points, each having the value of one variable determining the position on the horizontal axis and the value of the other variable determining the position on the vertical axis" (Utts, 2005, pp. 166-167). Scatter plots are used to suggest positive (rising), negative (falling), or null (uncorrelated) correlations between variables. Scatter plots can also show nonlinear relationships, which are visually evident as patterns. As is evident from the scatter plot in Table 4.8 below, no clear linear pattern exists in the data. This suggests that one variable is not a predictor of the other.

Table 4.8

T1 Scatter Plot: Content Score as Predictor of Content Attrition



The horizontal axis represents the T1 content score, while the vertical axis represents the change in content score between T1 and T2. The positive numbers on the vertical axis represent the drop in content score between T1 and T2 tests, while negative numbers at the bottom of the graph show an increase in score between the two tests. From the scatter plot above you can see that two of the subjects had nearly unchanged content scores that were both fairly low (~10). Three of the subjects had content scores at T2 that were higher than scores at T1. As described above, this is a somewhat surprising and remarkable result.

In order to determine, statistically, if the content score at T1 predicts the change in score between T1 and T2, a simple linear regression was utilized. A simple linear regression is used to evaluate the linear relationship between two variables where there is only one predictor variable. A summary of the regression can be found in Table 4.9.

Table 4.9

Linear Regression: Content Score as Predictor of Content Attrition

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	**.098**[a]	.010	-.038	6.34169

a. Predictor Variable: Variable 5
b. Dependent Variable: Variable 5 minus Variable 6

The .098 R-value (An R-value closer to zero indicates no correlation between variables and a value closer to one indicates a strong correlation between variables), combined with the results of the scatter plot reveal that there is not a strong correlation between the content score at T1 and the change in content score between T1 and T2. In other words, the quality of a subject's memorization at T1 does not predict attrition over the 12-year period.

4.3.1 answering research question three.

Research question number three asked if the attrition level of the memorized narrative at T2 is related to how well the narrative was memorized at T1. In other words, is it possible to predict language loss at T2 by how well the subject had the narrative memorized at T1? First the data was displayed on a scatter plot to see if an obvious linear or nonlinear relationship existed between the two variables. Additionally, a simple linear regression was also used for the same purpose. Results of both analyses suggest that T1 content score does not predict the attrition of content score between T1 and T2.

4.4 Research Question Four

One purpose of this study is to look at CFL oral attrition over a 12-year interval. The first three research questions address this purpose. This fourth research question

addresses the second purpose of this research study, which is to look specifically at the attrition of aspect marking in memorized oral narratives over a 12-interval. The fourth research question asks, in the memorized narratives, did the subjects show attrition in the number, variety, and usage of grammatical aspect markers between T1 and T2, as measured by an analysis of grammatical aspect markers?

As described in chapter three, the number of aspect markers is simply the sum of all aspect markers used in each narrative. Variety of aspect markers refers to the number of different markers used in a narrative out of the possible six examined in this study. Usage refers to the correct or incorrect usage of each grammatical marker as determined by two native speakers of Mandarin. For this research question, the number, variety and correct usage of aspect markers found in the T1 memorized narrative are compared to those in the T2 narrative. This will help determine if significant attrition of aspect marking occurred of the 12-year interval. The same analysis is done with the open-ended narratives in research question five. Finally, aspect usage in both types of narratives is compared in research question six.

Because of the complexity of this research question, the discussion of the analysis is divided into the five sections listed below. These include aspect marker usage, variety and correct usage counts.

Part A: Aspect Marker Usage Attrition.

Part B: Aspect Marker Correct Usage.

Part C: Aspect Marker Variety.

Part D: Aspect Marker Usage at T1 compared to Correct Usage at T1.

Part E: Aspect Marker Usage at T2 compared to Correct Usage at T2.

Table 4.10 contains the data counts for each of the variables involved in answering this research question.

Table 4.10

Variables Involved in Answering Research Question Four

	Variable 7	Variable 8	Variable 11	Variable 12	Variable 15	Variable 16
Identifier	Memorized Narrative Aspect Counts T1	Memorized Narrative Aspect Counts T2	Memorized Narrative Aspect Variety T1	Memorized Narrative Aspect Variety T2	Memorized Narrative Aspect Correct Usage T1	Memorized Narrative Aspect Correct Usage T2
S-1	7	2	3	2	7	2
S-2	3	0	3	0	2	0
S-3	3	5	2	3	3	5
S-4	3	2	1	2	1	1
S-5	3	0	2	0	3	0
S-6	6	0	2	0	4	0
S-7	1	1	1	1	1	1
S-8	2	3	1	1	2	2
S-9	0	0	0	0	0	0
S-10	1	0	1	0	1	0
S-11	4	2	3	1	4	2
S-12	2	1	2	1	1	1
S-13	7	3	2	2	6	2
S-14	4	6	2	3	4	5
S-15	3	3	2	3	3	3
S-16	2	2	2	2	2	1
S-17	4	0	3	0	4	0
S-18	7	7	2	3	6	7
S-19	2	1	2	1	1	0
S-20	6	2	3	2	5	2
S-21	3	9	2	4	3	8
S-22	2	5	2	1	2	1
S-23	3	0	3	0	3	0

In order to look at general trends in aspect marker attrition a brief discussion of each pair of variables is provided below.

Examining the aspect marker usage in the second and third columns of the table above reveals a general decrease in the total number of aspect markers used between T1 and T2. However, five of the 23 subjects (S-3, 8, 14, 21, 22) actually used more aspect markers at T2, than at T1. For a discussion of the change in aspect marker usage, variety, and correct usage between T1 and T2, please see the qualitative analysis found in chapter five.

In the right two columns are the T1 and T2 aspect marker correct usage counts. Again, while there appears to be a general decrease in the subjects' correct usage of aspect markers, four subjects (S-3, 14, 18, 21) actually used a larger number of aspect markers correctly at T2 than at T1

The center two data columns contain the data related to the variety of aspect markers used by the subjects in the memorized narratives at T1 and T2. The variety was calculated by tallying the types of aspect markers used out of the six types investigated in this study. The data in the table suggest a general decrease in the variety of markers used at T2. It is interesting to note that at T1 the greatest variety of markers used was three, out of a possible six. At T2, subject S-21 used four different markers. Subject S-9 did not use any aspect markers in either the T1 or T2 memorized narrative. Looking ahead at the open-ended narrative, this subject used markers at T1, but not at T2.

To compare the aspect marker usage with the correct usage at T1 in the memorized narratives it is necessary to examine the first and fifth data columns

(Variables 7 and 15). From looking at the numbers, there appears to be a slight difference between usage and correct usage at T1. Whether this difference is statistically significant is determined in the statistical analysis below. Only one subject did not use any aspect markers at T1. Fourteen subjects had all of their aspect usages rated as correct by the native speaking graduate students. Indicating that in the memorized narrative, the majority of the subjects used aspect markers with complete accuracy.

To compare the total number of aspect markers used with the correct number of usages at T2 we can examine the second and last data columns (Variables 8 and 16). Again there seems to be a difference between usage and correct usage at T2. Only eight of the subjects had error free aspect usage as compared to 14 for T1. Similarly, seven subjects did not use any aspect markers at T2 as compared to only one at T1. These results suggest that the subjects are losing their ability to mark aspect and what aspect markers are being used, are being used more incorrectly, over the 12-year period.

Rather than using paired *t*-tests for the five parts of this research question, one-sided *t*-tests were used to measure the significance between the variables in this question because the researcher is assuming that attrition has taken place in each relationship investigated in this research question. Below are the results to the five *t*-tests used to answer this research question divided up by the five relationships being investigated in this question. P-values for each *t*-test have been divided in half in order to make them one-sided. P-values are bolded in each table.

The first relationship tested is the number of aspect markers used at T1 and T2. The means scores indicate that the subjects did not use very many markers at either T1 or

T2. However, a difference of approximately one did exist between the two tests. Notice that the p-value of 0.044 is significant indicating that the number of aspect markers used by the subjects declined a statistically significant amount between T1 and T2. However, if this had run as a two-sample t-test, the p-value of 0.088 would have not been significant. This suggests there is not a huge difference in scores, although the difference is greater than chance would permit.

Table 4.11

Memorized Narrative T1 and T2 Aspect Marker Usage Attrition

	Mean	N	Std. Deviation	Std. Error Mean	Sig. (1-tailed)
Variable 8	2.3478	23	2.51556	.52453	
Variable 7	3.3913	23	1.99406	.41579	.088/2 =**0.044**

The next relationship examined is the number of correct aspect marker usages at T1 and T2. Again the mean scores between the two variables are similar and the numbers quite small. The p-value of 0.0165 is statistically significant indicating that the number of correct aspect marker usages decreased over time. The subjects made more errors in their aspect marking after the period of Chinese language disuse.

Table 4.12

Memorized Narrative T1 and T2 Aspect Marker Correct Usage Attrition

	Mean	N	Std. Deviation	Std. Error Mean	Sig. (1-tailed)
Variable 16	1.8696	23	2.30226	.48005	
Variable 15	2.9565	23	1.84584	.38488	.033/2 = **.0165**

The next relationship tested is the variety of aspect marker usage at T1 and T2

memorized narratives. Again the means are very similar and low indicating that the population of subjects, as a whole, did not use a wide variety of aspect markers at T1 and consequently, T2. The relationship between these two variables is also significant, although not by very much. This suggests that the subjects did decrease in the variety of aspect markers used over time.

Table 4.13

Memorized Narrative T1 and T2 Aspect Marker Variety Attrition

	Mean	N	Std. Deviation	Std. Error Mean	Sig. (1-tailed)
Variable 12	1.3913	23	1.23359	.25722	
Variable 11	2.0000	23	.79772	.16634	.055/2 = **0.0275**

The fourth relationship tested is the number of aspect markers used at T1 compared to the number correctly used at T1. This relationship reveals how correctly the subjects were able to mark aspect. Part E investigates the same relationship at T2. Results of the T1 *t*-test show that there is indeed a statistically significant difference between usage and correct usage at T1. The p-value for this analysis equals 0.0025.

Table 4.14

Memorized Narrative Aspect Marker Usage at T1 compared to Correct Usage at T1

	Mean	N	Std. Deviation	Std. Error Mean	Sig. (1-tailed)
Variable 15	2.9565	23	1.84584	.38488	
Variable 7	3.3913	23	1.99406	.41579	.005/2= **.0025**

The last relationship tested in this research question is the total number of aspect

markers used at T2 compared to the correct usage at T2. Results show a p-value of 0.009, which indicates a statistically significant relationship between variables. Comparing this value to the one from Part D reveals that the subjects are using aspect markers incorrectly at both T1 and T2, but that there are proportionally more incorrect usages at T2.

Table 4.15

Memorized Narrative Aspect Marker Usage at T2 compared to Correct Usage at T2

	Mean	N	Std. Deviation	Std. Error Mean	Sig. (1-tailed)
Variable 16	1.8696	23	2.30226	.48005	
Variable 8	2.3478	23	2.51556	.52453	.018/2 = **0.009**

4.4.1 answering research question four.

Research question four sought to determine if, in the memorized narratives, attrition occurred in the number, variety and correct or incorrect usage of aspect markers over the 12-year period. Because the research assumed that there would be attrition in aspect marker usage, one-sided *t*-tests were used to measure significance of five relationships measured in the question. Results of the five one-sided *t*-tests show that each relationship was significant suggesting the subjects, as a whole, did experience loss in the ability to produce aspect markers and produce them correctly over time. At T2, the subjects used fewer markers, less variety of markers, and used them less correctly. Additionally, there was a significant difference between the number of markers used at T1 and T2 and their correct usage at T1 and T2, indicating that subjects had not mastered aspect marker usage even at T1. At T2, the subjects were still using markers, albeit at a decreased frequency and variety, and they were still using them incorrectly.

4.5 Research Question Five

In the fifth research question, aspect marker usage, variety, and correct usage are investigated, but this time in the open-ended narratives. The exact same qualitative and quantitative analysis will be done here, as with the fourth research question described above. The total number of aspect markers used at T1 and T2 will be compared to see how much attrition occurred over the period of disuse. A similar comparison will be done for the variety and correct usage of the aspect markers. The research question asks, in the open-ended narratives, did the subjects show attrition in the number, variety, and usage of grammatical aspect markers between T1 and T2, as measured by an analysis of grammatical aspect markers?

Similar to research question number four above, the complexity of this research question necessitates that the analysis will be divided into the five sections listed below. These include the aspect marker usage, variety and correct usage counts found in the T1 and T2 open-ended narratives.

Part A: Aspect Marker Usage Attrition.

Part B: Aspect Marker Variety.

Part C: Aspect Marker Correct Usage.

Part D: Aspect Marker Usage at T1 compared to Correct Usage at T1.

Part E: Aspect Marker Usage at T2 compared to Correct Usage at T2.

Table 4.16 below contains the data counts for each of the variables involved in answering this research question.

Table 4.16

Variables Involved in Answering Research Question Five

	Variable 9	Variable 10	Variable 13	Variable 14	Variable 17	Variable 18
Identifier	Open-ended Narrative Aspect Counts T1	Open-ended Narrative Aspect Counts T2	Open-ended Narrative Aspect Variety T1	Open-ended Narrative Aspect Variety T2	Open-ended Narrative Aspect Correct Usage T1	Open-ended Narrative Aspect Correct usage T2
S-1	1	1	1	1	1	1
S-2	3	0	2	0	1	0
S-3	2	2	2	1	2	1
S-4	3	0	1	0	2	0
S-5	3	4	2	1	2	2
S-6	4	0	2	0	2	0
S-7	1	0	1	0	1	0
S-8	5	1	2	1	4	1
S-9	4	0	2	0	2	0
S-10	4	1	2	1	3	1
S-11	2	4	2	1	2	2
S-12	3	1	1	1	2	1
S-13	4	3	3	2	3	2
S-14	4	1	2	1	2	1
S-15	0	1	0	1	0	0
S-16	5	0	2	0	4	0
S-17	0	1	0	1	0	1
S-18	8	1	3	1	8	1
S-19	0	1	0	1	0	1
S-20	0	0	0	0	0	0
S-21	3	3	2	2	3	3
S-22	3	2	3	2	3	1
S-23	3	0	2	0	2	0

The second and third columns include the data counts for the total number of aspect markers used for T1 and T2 open-ended narratives. Notice the general decreasing trend in marker usage over time. Fourteen of the subjects had a decrease in the number of markers used between T1 and T2. Of those 14 subjects, exactly half did not use any

markers at T2, suggesting that they might have lost the ability to use them in an open-ended narrative. Comparing this number to the aspect counts in the memorized narrative shows that 13 of the subjects had decreased usage between T1 and T2. Of those, six did not use any markers at T2. Only two of the subjects, S-2 and S-23, did not use any aspect markers in both the memorized and open-ended narrative. Additionally, four of the subjects used the same number of aspect markers at T1 and T2, and five used more at T2. This last number matches the results of the memorized narrative precisely. Comparing the two types of narratives reveals that in the memorized narrative five subjects used the same number of markers at both T1 and T2, and five used an increased number of markers at T2. These results appear so similar that it will be necessary to compare the data in a statistical analysis to see if any differences exist between the memorized and open-ended narrative results. For a detailed discussion of specific aspect marker usage, variety, and correct usage between T1 and T2, please refer to the discussion of research question number seven.

The center two data columns contain the T1 and T2 aspect marker variety data. A simple visual comparison of the data reveals a clear downward trend in the variety of aspect markers used at T2. A closer look reveals that that at T1 the greatest variety of markers used was three and at T2 the number dropped down to two, with three subjects using the greatest amount at both times. Only two subjects increased their variety of markers at T2 and both of those went from zero usages at T1, to one usage at T2, and so consequently their variety of usage increased from zero to one. A closer look reveals that one subject used the stative aspect marker *zhe* at T2, while the other subjects used the

experiential aspect marker *guo* at T2.

In the right two columns are the T1 and T2 aspect marker correct usage counts. Again, while there appears to be a general decrease in the subjects' correct usage of aspect markers. Four of the subjects used the same number of aspect markers at T1 and T2 and five used more at T2. This last number matches the results of the memorized narrative exactly. Comparing the two types of narratives indicates that in the memorized narrative five subjects used the same number of markers at both T1 and T2, and five used an increased number of markers at T2. These results appear so similar that it will be necessary to compare the data in a statistical analysis to see if any differences exist between the memorized and open-ended narrative results.

To compare the aspect marker usage with the correct usage at T1 in the open-ended narratives it is necessary to examine the first and fifth data columns (Variables 9 and 17). Again there appears to be a slight difference in the numbers, indicating some incorrect usage of aspect markers at T1. Whether this difference is statistically significant will be determined below. Four subjects did not use any aspect markers at T1. Seven subjects had all of their aspect usages rated as correct by the native speaking graduate students. This means that each time they used an aspect marker they used it correctly.

To compare the total number of aspect markers used with the correct number of usages at T2 it is necessary to examine the second and last data columns (Variables 10 and 18). A quick review of the numbers shows that eight of the subjects did not use any markers at T2. Nine subjects had 100 percent accuracy in their marker usage and six subjects had errors in their aspect marker usage, with one of the six subjects not using

any markers correctly.

Statistical analysis for this research question mirrors the analysis done for research question number four. Again, rather than using a paired *t*-test, one-sided *t*-tests were used to measure the significance between the variables in this question because the researcher is assuming that attrition has taken place in each relationship investigated in this research question.

The first relationship tested in this research question is the number of aspect markers used at T1 and T2. The mean scores indicate that the subjects did not use very many markers at either T1 or T2; however, a difference just over 1.6 did exist between the two tests, meaning that the subjects on average used one and a half fewer aspect markers at T2. Notice that the p-value of 0.015 is significant, indicating that the number of aspect markers used by the subjects declined a statistically significant amount between T1 and T2.

Table 4.17

Open-ended Narrative T1 and T2 Aspect Marker Usage Attrition

	Mean	N	Std. Deviation	Std. Error Mean	Sig. (1-tailed)
Variable10	1.1739	23	1.26678	.26414	
Variable 9	2.8261	23	1.94591	.40575	.003/2 **= .0015**

The next relationship tested is the variety of aspect marker usage at T1 and T2 memorized narratives. Again the means are very similar and low, indicating that the population of subjects, as a whole, did not use a wide variety of aspect markers at T1 and, consequently, at T2. This relationship between these two variables is also significant,

with a p-value of 0.0005. This suggests that the subjects did decrease in the variety of aspect markers used over time.

Table 4.18

Open-ended Narrative T1 and T2 Aspect Marker Variety Attrition

	Mean	N	Std. Deviation	Std. Error Mean	Sig. (1-tailed)
Variable 14	.7826	23	.67126	.13997	
Variable 13	1.6087	23	.94094	.19620	.001/2 = **.0005**

The next relationship tested is the number of correct aspect marker usages at T1 and T2. Again the mean scores between the two variables are similar and the numbers are quite small with a difference of just 1.3 between the time periods. The p-value of 0.001 is statistically significant, indicating that the number of correct aspect marker usages decreased over time. The subjects made more errors in their aspect marking after the period of Chinese language disuse.

Table 4.19

Open-ended Narrative T1 and T2 Aspect Marker Correct Usage

	Mean	N	Std. Deviation	Std. Error Mean	Sig. (1-tailed)
Variable 18	.8261	23	.83406	.17391	
Variable 17	2.1304	23	1.74002	.36282	.002/2 = **.001**

The fourth relationship tested is the number of aspect markers used at T1 compared to the number correctly used at T1. This relationship reveals how correctly the subjects were able to mark aspect. Part E will investigate the same relationship at T2. Results of the T1 one-sample *t*-test show that there is indeed a statistically significant

difference is usage and correct usage at T1. The p-value for this analysis equals 0.000.

Table 4.20

Open-ended Narrative Aspect Marker Usage at T1 Compared to Correct Usage at T1

	Mean	N	Std. Deviation	Std. Error Mean	Sig. (1-tailed)
Variable 17	2.1304	23	1.74002	.36282	
Variable 9	2.8261	23	1.94591	.40575	.000/2 = **.000**

The last relationship tested in this research question is the total number of aspect markers used at T2 compared to the correct usage at T2. Results show a p-value of 0.0085, which indicates a statistically significant relationship between variables. Comparing this value to the one from Part D above discloses that the subjects are using aspect markers incorrectly at both T1 and T2, but that there are proportionally more incorrect usages at T2. These results mirror those found in research question four, which examined the same variables but in the memorized narratives.

Table 4.21

Open-ended Narrative Aspect Marker Usage at T2 Compared to Correct Usage at T2

	Mean	N	Std. Deviation	Std. Error Mean	Sig. (1-tailed)
Variable 18	.8261	23	.83406	.17391	
Variable 10	1.1739	23	1.26678	.26414	.017/2 = **.0085**

4.5.1 answering researching question five.

Research question five investigated the attrition in the number, variety and correct usage of aspect markers over time in the open-ended narratives. Results of this question mirror those of research question number four, but the level of significance is somewhat

higher. This suggests that more attrition of aspect marker usage occurred in the open-ended narratives than in the memorized narratives. Whether this slight difference in attrition can be explained by differences in oral tasks (i.e. one was closely related to the memorized missionary lessons and the other wasn't) is difficult to know. It might be one possible explanation.

4.6 Research Question Six

The rationale behind the sixth research question is that since both versions of the memorized narrative found in the missionary discussions include aspect marking, it is possible that if the subjects had the narrative better memorized at T1, they would have better acquired the ability to mark aspect and thus would retain that ability over time. It is also possible that the subjects would be able to transfer their knowledge of aspect marking from the memorized narratives to the open-ended narratives. Unfortunately, the results of research question number three show that the content score of the memorized narrative is not a good predictor of content attrition at T2. Additionally, the results of research question four and five suggest that aspect attrition is significant in both narratives. With these previous results in mind, research question six asks, is there a relationship between how well the memorized narrative was memorized at T1 and the attrition of grammatical aspect markers in both the memorized and open-ended narratives, as measured by an analysis of grammatical aspect markers?

The complexity of this research question necessitates that the analysis be divided into the six parts listed below. They are listed below with the accompanying variables.

Part A: Content Score Compared to Aspect Marker Attrition in Memorized Narrative

Variable 5: T1 Memorized Narrative Content Analysis – Content Score

Variable 7: T1 Memorized Narrative Aspect Marker Analysis - Aspect Marker Counts

Variable 8: T2 Memorized Narrative Aspect Marker Analysis - Aspect Marker Counts

Part B: Content Score Compared to Aspect Marker Attrition in Open-ended Narrative

Variable 5: T1 Memorized Narrative Content Analysis – Content Score

Variable 9: T1 Open-ended Narrative Aspect Marker Analysis - Aspect Marker Counts

Variable 10: T2 Open-ended Narrative Aspect Marker Analysis - Aspect Marker Counts

Part C: Content Score Compared to Aspect Marker Variety in Memorized Narrative

Variable 5: T1 Memorized Narrative Content Analysis – Content Score

Variable 11: T1 Memorized Narrative Aspect Marker Analysis - Aspect Marker Variety Counts

Variable 12: T2 Memorized Narrative Aspect Marker Analysis - Aspect Marker Variety Counts

Part D: Content Score Compared to Aspect Marker Variety in Open-ended Narrative

Variable 5: T1 Memorized Narrative Content Analysis – Content Score

Variable 13: T1 Open-ended Narrative Aspect Marker Analysis - Aspect Marker Variety Counts

Variable 14: T2 Open-ended Narrative Aspect Marker Analysis - Aspect Marker Variety Counts

Part E: Content Score Compared to Correct Aspect Marker Usage in Memorized Narrative

Variable 5: T1 Memorized Narrative Content Analysis – Content Score

Variable 15: T1 Memorized Narrative Aspect Usage Analysis – Correct Usage Marker Counts

Variable 16: T2 Memorized Narrative Aspect Usage Analysis – Correct Usage Marker Counts

Part F: Content Score Compared to Correct Aspect Marker Usage in Open-ended Narrative

Variable 5: T1 Memorized Narrative Content Analysis – Content Score

Variable 17: T1 Open-ended Narrative Aspect Usage Analysis – Correct Usage Marker Counts

Variable 18: T1 Open-ended Narrative Aspect Usage Analysis – Correct Usage Marker Counts

Table 4.22 contains the data counts for each of the variables involved in answering this research question.

Table 4.22

Variables Involved in Answering Research Question Six

	Variable 5	Variable 7	Variable 8	Variable 9	Variable 10	Variable 11	Variable 12
Identifier	Memorized Narrative Content Score T1	Memorized Narrative Aspect Counts T1	Memorized Narrative Aspect Counts T2	Open-ended Narrative Aspect Counts T1	Open-ended Narrative Aspect Counts T2	Memorized Narrative Aspect Variety T1	Memorized Narrative Aspect Variety T2
S-1	36.5	7	2	1	1	3	2
S-2	20.5	3	0	3	0	3	0
S-3	29.5	3	5	2	2	2	3
S-4	10	3	2	3	0	1	2
S-5	34	3	0	3	4	2	0
S-6	18	6	0	4	0	2	0
S-7	23	1	1	1	0	1	1
S-8	28	2	3	5	1	1	1
S-9	9	0	0	4	0	0	0
S-10	8.5	1	0	4	1	1	0
S-11	31	4	2	2	4	3	1
S-12	16	2	1	3	1	2	1
S-13	24.5	7	3	4	3	2	2
S-14	30	4	6	4	1	2	3
S-15	31.5	3	3	0	1	2	3
S-16	34.5	2	2	5	0	2	2
S-17	23.5	4	0	0	1	3	0
S-18	33.5	7	7	8	1	2	3
S-19	21.5	2	1	0	1	2	1
S-20	19	6	2	0	0	3	2
S-21	28.5	3	9	3	3	2	4
S-22	23.5	2	5	3	2	2	1
S-23	24.5	3	0	3	0	3	0

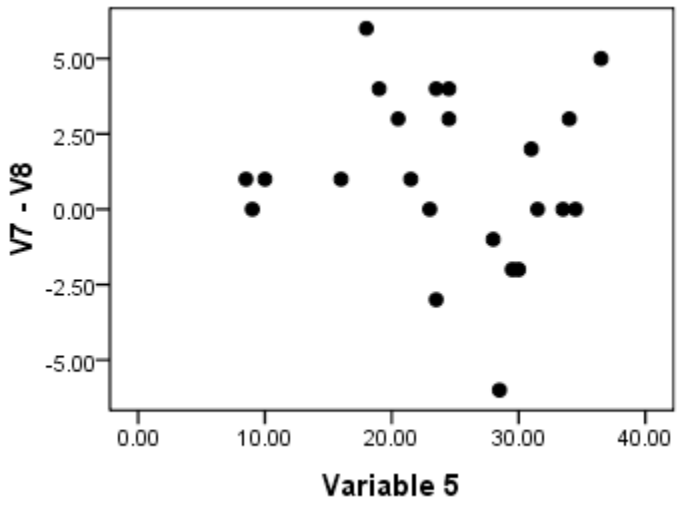
	Variable 5	Variable 13	Variable 14	Variable 15	Variable 16	Variable 17	Variable 18
Identifier	Memorized Narrative Content Score T1	Open-ended Narrative Aspect Variety T1	Open-ended Narrative Aspect Variety T2	Memorized Narrative Aspect Correct Usage T1	Memorized Narrative Aspect Correct Usage T2	Open-ended Narrative Aspect Correct Usage T1	Open-ended Narrative Aspect Correct usage T2
S-1	36.5	1	1	7	2	1	1
S-2	20.5	2	0	2	0	1	0
S-3	29.5	2	1	3	5	2	1
S-4	10	1	0	1	1	2	0
S-5	34	2	1	3	0	2	2
S-6	18	2	0	4	0	2	0
S-7	23	1	0	1	1	1	0
S-8	28	2	1	2	2	4	1
S-9	9	2	0	0	0	2	0
S-10	8.5	2	1	1	0	3	1
S-11	31	2	1	4	2	2	2
S-12	16	1	1	1	1	2	1
S-13	24.5	3	2	6	2	3	2
S-14	30	2	1	4	5	2	1
S-15	31.5	0	1	3	3	0	0
S-16	34.5	2	0	2	1	4	0
S-17	23.5	0	1	4	0	0	1
S-18	33.5	3	1	6	7	8	1
S-19	21.5	0	1	1	0	0	1
S-20	19	0	0	5	2	0	0
S-21	28.5	2	2	3	8	3	3
S-22	23.5	3	2	2	1	3	1
S-23	24.5	2	0	3	0	2	0

The analysis for this research question is similar to that used for research question number three. First a scatter plot is used, followed by two simple linear regressions testing the relationship between the memorized narrative at T1 and either the attrition of the memorized narrative, or the attrition of the open-ended narrative. This analysis was completed for each of the six relationships examined for this question.

For Part A of the research question the T1 content score (variable 5) of the memorized narrative is used to predict the change in aspect marker counts in the same narrative at T1 and T2 (variable 7 minus variable 8). The relevant data is graphed on scatter plot Table 4.23 below. Notice that no clear linear pattern exists in the data. This suggests that T1 content score is not a good predictor of aspect marker count attrition.

Table 4.23

Scatter Plot: Content Score as Predictor of Aspect Marker Count Attrition in the Memorized Narratives



For each of the following scatter plots used in this question, the horizontal axis represents the T1 content score, while the vertical axis represents the change in aspect counts, variety, or correct usage between T1 and T2. The positive numbers on the vertical axis represent the drop in aspect counts between T1 and T2 tests, while negative numbers at the bottom of the graph show an increase in score between the two tests. The scatter

plot indicates that five of the subjects had nearly unchanged content scores and five of the subjects had aspect counts at T2 that were higher than scores at T1.

In order to determine, statistically, if the content score at T1 predicts the change in aspect counts between T1 and T2, a simple linear regression was utilized. A summary of the regression can be found in Table 4.24.

Table 4.24

Linear Regression: Content Score as Predictor of Aspect Marker Count Attrition in the Memorized Narratives

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	**.115**[a]	.013	-.034	2.85093

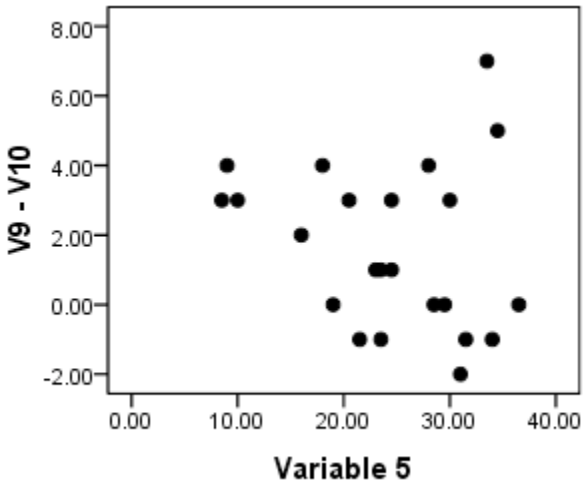
a. Predictor Variable: Variable 5
b. Dependent Variable: Variable 7 minus Variable 8

The R-value generated from the linear regression and the scatter plot reveal that there is not a strong correlation between the content score at T1 and the attrition of aspect marker counts. In other words, the quality of a subject's memorization at T1 does not predict the attrition of aspect marker usage over the 12-year period.

For Part B of the research question the T1 content score (variable 5) on the memorized narrative is used to predict the attrition of aspect marker counts in the open-ended narrative at T1 and T2 (variable 9 minus variable 10). The relevant data is graphed on scatter plot Table 4.25.

Table 4.25

Scatter Plot: Content Score as Predictor of Aspect Marker Count Attrition in the Open-ended Narratives



Notice that, again, no clear linear pattern exists in the data. This suggests that T1 content score is not a good predictor of aspect marker count attrition in the open-ended narrative. To statistically test this assumption, another simple linear aggression was used to test the strength of the predictor variable. Results of the analysis are found in Table 4.26.

Table 4.26

Linear Regression: Content Score as Predictor of Aspect Marker Count Attrition in the Open-ended Narratives

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.202[a]	.041	-.005	2.33331

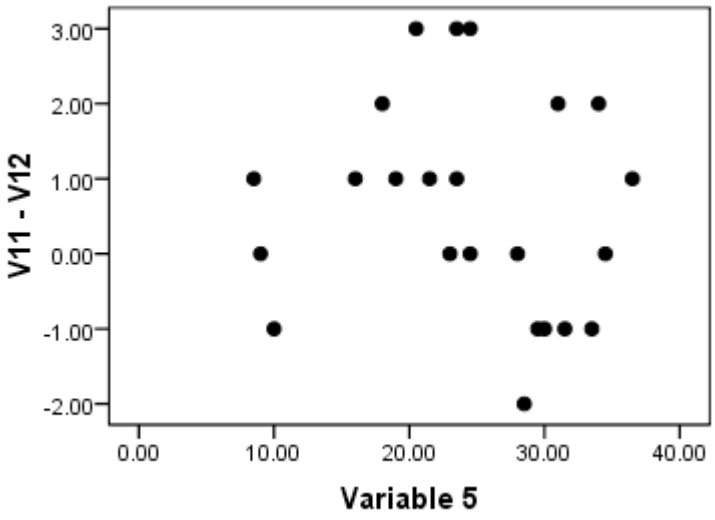
a. Predictor Variable: Variable 5
b. Dependent Variable: Variable 9 minus Variable 10

The R-value generated from the linear regression and results of the scatter plot indicate that there is not a strong correlation between the content score at T1 and the attrition of aspect marker counts in the open-ended narrative.

For Part C of the sixth research question the T1 content score (variable 5) on the memorized narrative is used to predict the attrition of the aspect marker variety in the memorized narratives at T1 and T2 (variable 11 minus variable 12). The relevant data is graphed on scatter plot Table 4.26 below.

Table 4.27

Scatter Plot: Content Score as Predictor of Aspect Marker Variety Attrition in the Memorized Narratives



Notice that, again, no clear linear pattern exists in the data, thus indicating a lack of strong relationship between the predictor and dependant variable. Table 4.28 includes the relevant values from the regression analysis.

Table 4.28

Linear Regression: Content Score as Predictor of Aspect Marker Variety Attrition in the Memorized Narratives

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.135[a]	.018	-.028	1.45809

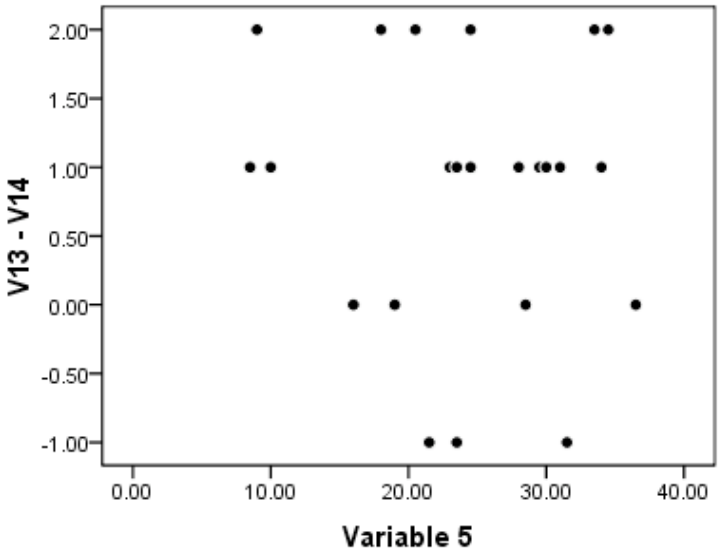
a. Predictor Variable: Variable 5
b. Dependent Variable: Variable 11 minus Variable 12

The linear regression analysis resulted in an R-value of 0.135. A value this close to zero indicates that there is not a strong correlation between the predictor and dependent variable. Consequently, the content score of the memorized narrative at T1 is not a good predictor of the aspect marker variety in the memorized narratives at T1 and T2.

For Part D of the research question the T1 content score (variable 5) on the memorized narrative is used to predict the attrition of aspect marker variety counts in the open-ended narrative at T1 and T2 (variable 13 minus variable 14). The relevant data is graphed on scatter plot Table 4.29.

Table 4.29

Scatter Plot: Content Score as Predictor of Aspect Marker Variety Attrition in the Open-ended Narratives



Notice that the data plots in this table and table 4.27 above appear to have a horizontal pattern. This pattern, however, does not suggest a linear relationship. The variables represent the variety scores, which are all whole numbers and in this case range from negative one to two, thus giving the appearance of three horizontal lines in the case of Table 4.29. Table 4.30 includes the relevant values from the accompanying regression analysis.

Table 4.30

Linear Regression: Content Score as Predictor of Aspect Marker Variety Attrition in the Open-ended Narratives

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.090[a]	.008	-.039	1.00316

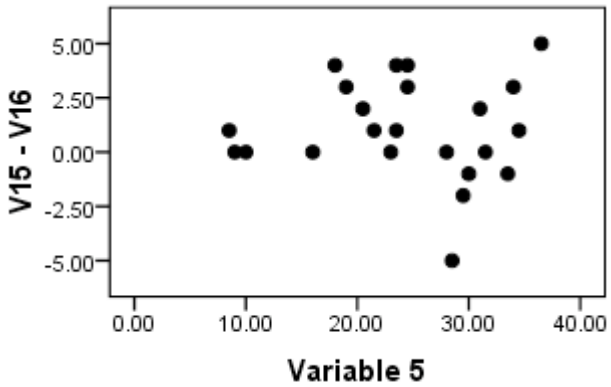
a. Predictor Variable: Variable 5
b. Dependent Variable: Variable 13 minus Variable 14

Based on the 0.09 R-value generated from the linear regression and the scatter plot above, there is not a strong correlation between the content score at T1 and the attrition of aspect marker variety counts in the open-ended narratives.

For Part E the T1 content score (variable 5) on the memorized narrative is used to predict the attrition of correct usage of aspect markers in the memorized narrative at T1 and T2 (variable 15 minus variable 16). The relevant data is graphed on scatter plot Table 4.31 below.

Table 4.31

Scatter Plot: Content Score as Predictor of Correct Aspect Marker Usage Attrition in the Memorized Narratives



Again, there is no clear pattern on the scatter plot. Table 4.32 contains the relevant values from the simple linear regression analysis.

Table 4.32

Linear Regression: Content Score as Predictor of Correct Aspect Marker Usage Attrition in the Memorized Narratives

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.005[a]	.000	-.048	2.34849

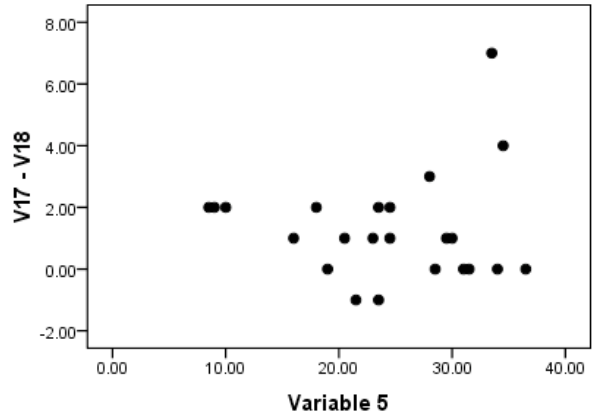
a. Predictor Variable: Variable 5
b. Dependent Variable: Variable 15 minus Variable 16

Similar to the other parts of this research question, the content score of the memorized narrative at T1 is not a good predictor of correct aspect marker usage attrition in the memorized narratives. The R-value of 0.005 is simply too small to show a strong relation between the variables.

The final part of research question six seeks to determine if the T1 content score (variable 5) on the memorized narrative is a good predictor of the attrition of correct usage of aspect markers in the open-ended narrative at T1 and T2 (variable 17 minus variable 18). The relevant data is graphed on scatter plot Table 4.33.

Table 4.33

Scatter Plot: Content Score as Predictor of Correct Aspect Marker Usage Attrition in the Open-ended Narratives



Again, no clear linear pattern can be seen in the scatter plot. Table 4.34 contains the relevant values for the accompanying linear regression.

Table 4.34

Linear Regression: Content Score as Predictor of Correct Aspect Marker Usage Attrition in the Open-ended Narratives

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.043[a]	.002	-.046	1.78279

a. Predictor Variable: Variable 5
b. Dependent Variable: Variable 17 minus Variable 18

The 0.043 R-value generated from the linear regression, and the scatter plot above show that there is not a strong correlation between the content score at T1 and the attrition of correct aspect marker usage counts in the open-ended narratives.

4.6.1 answering research question six.

With this question the researcher seeks to determine if the T1 content score of the

memorized narrative could be used to predict the attrition of aspect marking, variety and correct usage in both the memorized and open-ended narratives. Attrition was calculated by subtracting the T1 and T2 scores. Results of the each analysis were similar. The content score at T1 was not a strong predictor of aspect marker attrition. This suggests that the quality of a subject's memorization at T1 was not related to how much aspect marking ability was lost over the 12-year period in either the memorized or open-ended narratives.

4.7 Research Question Seven

The final research question in this study seeks to determine if there is a difference in the attrition of grammatical aspect marker attrition in the two types of narratives. Although not stated in the research question, a difference in attrition levels could suggest that the memorization and use of the missionary lessons had an affect on language loss. For example, if the attrition levels are different between the two types of narratives, with less loss taking place in the memorized narratives than in the open-ended narratives, we might conclude that memorizing and using the markers in context helped the subjects retain the markers in that specific context and not in the other. This type of result might shed light on the long-term benefits of rote memorization at the beginning levels of study. With these purposes in mind the research question states, is there a relationship between the attrition of grammatical aspect markers found in the memorized narratives and the attrition of the grammatical aspect markers found in the open-ended narrative?

In order to answer this research question it is necessary to compare the three areas of aspect marking between the two types of narratives. Because the researcher wishes to

see if attrition levels differ, it was necessary to subtract T2 from T1 scores from both the memorized and open-ended narratives and then compare the two in order to see if significant attrition differences exist. If they do, rote-memorization might be one factor that caused the difference. Research question seven is examined in three parts:

Part A: Aspect Marker Count Comparison

Variable 7: T1 Memorized Narrative - Aspect Marker Counts

Variable 8: T2 Memorized Narrative - Aspect Marker Counts

Variable 9: T1 Open-ended Narrative - Aspect Marker Counts

Variable 10: T2 Open-ended Narrative - Aspect Marker Counts

Part B: Aspect Marker Variety Comparison

Variable 11: T1 Memorized Narrative - Aspect Marker Variety Counts

Variable 12: T2 Memorized Narrative - Aspect Marker Variety Counts

Variable 13: T1 Open-ended Narrative - Aspect Marker Variety Counts

Variable 14: T2 Open-ended Narrative - Aspect Marker Variety Counts

Part C: Aspect Marker Correct Usage Comparison

Variable 15: T1 Memorized Narrative – Correct Usage Marker Counts

Variable 16: T2 Memorized Narrative – Correct Usage Marker Counts

Variable 17: T1 Open-ended Narrative – Correct Usage Marker Counts

Variable 18: T1 Open-ended Narrative – Correct Usage Marker Counts

The data counts for each of the variables used in answering this research question are located below in tables 4.35, 4.36 and 4.37.

Table 4.35

Variables Involved in Answering Research Question Seven: Part A

	Variable 7	Variable 8	Variable 9	Variable 10
Identifier	Memorized Narrative Aspect Counts T1	Memorized Narrative Aspect Counts T2	Open-ended Narrative Aspect Counts T1	Open-ended Narrative Aspect Counts T2
S-1	7	2	1	1
S-2	3	0	3	0
S-3	3	5	2	2
S-4	3	2	3	0
S-5	3	0	3	4
S-6	6	0	4	0
S-7	1	1	1	0
S-8	2	3	5	1
S-9	0	0	4	0
S-10	1	0	4	1
S-11	4	2	2	4
S-12	2	1	3	1
S-13	7	3	4	3
S-14	4	6	4	1
S-15	3	3	0	1
S-16	2	2	5	0
S-17	4	0	0	1
S-18	7	7	8	1
S-19	2	1	0	1
S-20	6	2	0	0
S-21	3	9	3	3
S-22	2	5	3	2
S-23	3	0	3	0

Table 3.36

Variables Involved in Answering Research Question Seven: Part B

	Variable 11	Variable 12	Variable 13	Variable 14
Identifier	Memorized Narrative Aspect Variety T1	Memorized Narrative Aspect Variety T2	Open-ended Narrative Aspect Variety T1	Open-ended Narrative Aspect Variety T2

S-1	3	2	1	1
S-2	3	0	2	0
S-3	2	3	2	1
S-4	1	2	1	0
S-5	2	0	2	1
S-6	2	0	2	0
S-7	1	1	1	0
S-8	1	1	2	1
S-9	0	0	2	0
S-10	1	0	2	1
S-11	3	1	2	1
S-12	2	1	1	1
S-13	2	2	3	2
S-14	2	3	2	1
S-15	2	3	0	1
S-16	2	2	2	0
S-17	3	0	0	1
S-18	2	3	3	1
S-19	2	1	0	1
S-20	3	2	0	0
S-21	2	4	2	2
S-22	2	1	3	2
S-23	3	0	2	0

Table 4.37

Variables Involved in Answering Research Question Seven: Part C

	Variable 15	Variable 16	Variable 17	Variable 18
Identifier	Memorized Narrative Aspect Correct Usage T1	Memorized Narrative Aspect Correct Usage T2	Open-ended Narrative Aspect Correct Usage T1	Open-ended Narrative Aspect Correct usage T2
S-1	7	2	1	1
S-2	2	0	1	0
S-3	3	5	2	1
S-4	1	1	2	0
S-5	3	0	2	2
S-6	4	0	2	0
S-7	1	1	1	0
S-8	2	2	4	1

S-9	0	0	2	0
S-10	1	0	3	1
S-11	4	2	2	2
S-12	1	1	2	1
S-13	6	2	3	2
S-14	4	5	2	1
S-15	3	3	0	0
S-16	2	1	4	0
S-17	4	0	0	1
S-18	6	7	8	1
S-19	1	0	0	1
S-20	5	2	0	0
S-21	3	8	3	3
S-22	2	1	3	1
S-23	3	0	2	0

Since a simple visual comparison is insufficient to determine if differences exist between attrition in the memorized and open-ended narratives, it is necessary to run a statistical analysis. Two-sample *t*-tests were used to see if significant differences in attrition exist between the two types of narratives.

For this section the researcher compared the attrition of aspect marker count between the memorized and open-ended narratives. Attrition for each narrative was done by subtracting the T2 score from the T1 score to come up with a new attrition variable used for this analysis. Table 4.38 below contains results of the *t*-test used for Part A of the question.

Table 4.38

Memorized Narrative Aspect Marker Attrition Compared to Open-ended Narrative Aspect Marker Attrition

	Mean	N	Std. Deviation	Std. Error Mean	Sig. (2-tailed)
Attrition2 (V7-V8)	1.0435	23	2.80387	.58465	
Attrition3 (V9-V10)	1.6522	23	2.32787	.48539	.448

Results of the analysis show a p-value of 0.448, which is not significant. However, looking at the mean reveals that a small difference does exist in the attrition of aspect marker counts between the two narrative types. Although the difference is not statistically significant, slightly more attrition occurred in the open-ended narratives. In other words, the subjects used slightly fewer markers in the open-ended narrative between T1 and T2 than they did between T1 and T2 in the memorized narrative task.

Another way to answer Part A of this research question is to compare the sum totals of markers used at T1 and T2 in both types of narratives to see if differences in loss exist. In the analysis above, only the mean scores were compared. In the memorized narratives, 78 aspect markers were used at T1 and 54 markers were used at T2. In the open-ended narratives, 65 markers were used at T1 and 27 markers were used at T2. Calculating the number of markers retained at T2 for both narratives we see that in the memorized narratives 69% of the T1 markers were used at T2 compared to just 41% in the open-ended narratives. This 28% difference between narratives does suggest some differences between performances of the two oral tasks. It is unclear if the memorization of missionary lessons caused this difference or not, and if means instead of sums are

compared, this difference becomes statistically non-significant. For a more detailed look at differences in aspect marker usage between narratives please consult the qualitative analysis in chapter five.

For Part B, the attrition of aspect marker variety was compared between narrative types. Table 4.39 contains the results of the *t*-test. The p-value of 0.541 is not significant, suggesting that there is no statistical difference between the attrition of aspect marker variety used in the memorized and open-ended narratives.

Table 4.39

Memorized Narrative Aspect Marker Variety Attrition Compared to Open-ended Narrative Aspect Marker Variety Attrition

	Mean	N	Std. Deviation	Std. Error Mean	Sig. (2-tailed)
Attrition4 (V11-V12)	.6087	23	1.43777	.29980	
Attrition5 (V13-V14)	.8261	23	.98406	.20519	.541

In Part C the attrition of correct usage aspect marker counts were compared between the memorized and open-ended narratives. Table 4.40 contains the results of the two-sample *t*-test. The p-value of 0.746 is again not significant meaning that there was not a statistically significant difference between the attrition of correct aspect marker usage found in the memorized narrative and that found in the open-ended narrative.

Table 4.40

Memorized Narrative Correct Aspect Marker Usage Attrition Compared to Open-ended Narrative Correct Aspect Marker Usage Attrition

	Mean	N	Std. Deviation	Std. Error Mean	Sig. (2-tailed)
Attrition6 (V15-V16)	1.0870	23	2.29452	.47844	
Attrition7 (V17-V18)	1.3043	23	1.74342	.36353	.746

4.7.1 answering researching question seven.

The purpose of this research question is to determine if any differences exist between attrition of aspect marker counts, variety, and correct usage in the memorized and open-ended narratives. Two-sample *t*-tests were used to see if any differences in attrition were statistically significant. No significant differences resulted for any of the relationships although slight differences in mean values did exist. This suggests that the rates of aspect marking attrition are similar for both the memorized narrative and open-ended narrative oral tasks.

5. QUALITATIVE ANALYSIS

In light of the fact that no statistical difference was measured in the count, variety and correct usage between the two types of narratives in research question number seven, and to better understand the data as a whole, this section will focus in greater detail on the actual usage of aspect markers and the verbs they mark. First, an examination of the subjects' correct aspect marker usage at T1 and T2 is provided. Then, verbs marked only by -LE are investigated to see if correct and incorrect marking resulted from differences in verb and predicate telicity. Third, patterns of -LE usage errors are explained, along with other interesting incorrect usages. Finally, a brief discussion of the Aspect Hypothesis' ability to predict aspect marker acquisition is given, including how this concept relates to the attrition identified in this study.

5.1 Correct Marker Usage at T1 and T2

In order to determine which aspect markers the subjects used more correctly at T1 and T2, it is helpful look at the actual marker usage counts in both the memorized and open-ended narratives as well as the total count in both narratives. In tables 4.41, 4.42, and 4.43 the aspect marker counts are provided according to their correct and incorrect usage. As described in chapter three, two native-speaking graduate students of linguistics determined correctness of usage. Percentages for correct and incorrect usage are also provided for ease of comparison. Separate counts for both types of narrative and a total for both are provided.

In this section, the focus is on the aspect markers that the subjects used more correctly at T1 and T2. Examining the T1 aspect marker usage in Table 4.41 reveals that

in the memorized narrative, subjects used the markers GUO, ZAI and V+V correctly 100% of the time. ZHE was used correctly 90% of the time and -LE was used correctly 69.7% of the time. There were no usages of NE. In the open-ended narratives, GUO and V+V markers were used 100% correctly. ZAI was used with 81% correctness and -LE with 62.9% correctness. Subjects did not use NE or ZHE in the T1 open-ended narratives.

It is interesting to note the differences in aspect marker use between the two oral tasks at T1. Subjects used ZHE in the memorized narrative, but not in the open-ended one. Additionally, ZAI was used with perfect accuracy in the memorized narratives, but with only 81% accuracy in the open-ended narratives. It might be possible that the subjects were relying on their previous memorized knowledge of the missionary lessons and using these markers in the same way and context they had memorized. In the open-ended narrative the subjects were unable to rely on contextualized knowledge and so did not use ZHE and used ZAI more incorrectly compared to the memorized narrative.

The total correct and incorrect usages for both narratives at T1 follow the trends of the results for the two narratives individually. Again, GUO and V+V were used with perfect accuracy, while ZAI and ZHE usage was 90.5% and 90% correct. Zero marking of aspect (when subjects did not use an aspect marker when they should have) was not investigated in this study. -LE usage contained the most inaccuracies and was used 66.2% correctly in both types of narratives.

Table 5.1

T1 Aspect Marker Usages: Correct and Incorrect

	-LE Correctly	-LE Incorrectly	GUO Correctly	GUO Incorrectly	ZAI Correctly	ZAI Incorrectly

	Used	Used	Used	Used	Used	Used
Memorized Narrative	23 (69.7%)	10 (30.3%)	2 (100%)	0 (0%)	21 (100%)	0 (%)
Open-ended Narrative	22 (62.9%)	13 (37.1%)	6 (100%)	0 (0%)	17 (81%)	4 (19%)
Totals – Both Narratives	45 (66.2%) Correct	23 (33.8%) Incorrect	8 (100%) Correct	0 (0%) Incorrect	38 (90.5%) Correct	4 (9.5%) Incorrect

T1 Aspect Marker Usages: Correct and Incorrect Continued

	NE Correctly Used	NE Incorrectly Used	ZHE Correctly Used	ZHE Incorrectly Used	V+V Correctly Used	V+V Incorrectly Used
Memorized Narrative	0 (0%)	0 (0%)	18 (90%)	2 (10%)	4 (100%)	0 (0%)
Open-ended Narrative	0 (0%)	0 (0%)	0 (0%)	0 (%)	4 (100%)	0 (0%)
Totals – Both Narratives	0 (0%) Correct	0 (0%) Incorrect	18 (90%) Correct	2 (10%) Incorrect	8 (100%) Correct	0 (0%) Incorrect

*Note: All percentages rounded to the nearest tenth decimal place.

Usage at T2 was somewhat similar to T1 usage. Table 5.2 shows the various counts and percentages for T2 aspect marker usage. On the memorized narrative task, the markers ZAI, ZHE and V+V were used with perfect accuracy. GUO was used with 80% accuracy and -LE with 56.5% accuracy. Again, NE was not used. In the open-ended narrative GUO, ZAI, and V+V, while used sparingly, were used with 100% correctness. The one usage of ZHE was incorrect. -LE was used with 65% accuracy and there were no usages of NE. The total for both narratives shows that only ZAI and V+V were used perfectly. GUO was used with 88.9% accuracy and ZHE with 87.5% accuracy.

It is interesting that every usage of GUO, ZAI, and V+V was correct in the T2 open-ended narratives. Perhaps the subjects only used the markers in contexts they knew to be correct.

Table 5.2

T2 Aspect Marker Usages: Correct and Incorrect

	-LE Correctly Used	-LE Incorrectly Used	GUO Correctly Used	GUO Incorrectly Used	ZAI Correctly Used	ZAI Incorrectly Used
Memorized Narrative	13 (56.5%)	10 (43.5%)	4 (80%)	1 (20%)	11 (100%)	0 (0%)
Open-ended Narrative	13 (65%)	7 (35%)	4 (100%)	0 (0%)	1 (100%)	0 (0%)
Totals – Both Narratives	26 (60.5%) Correct	17 (39.5%) Incorrect	8 (88.9%) Correct	1 (11.1%) Incorrect	12 (100%) Correct	0 (0%) Incorrect

T2 Aspect Marker Usages: Correct and Incorrect cont.

	NE Correctly Used	NE Incorrectly Used	ZHE Correctly Used	ZHE Incorrectly Used	V+V Correctly Used	V+V Incorrectly Used
Memorized Narrative	0 (0%)	0 (0%)	7 (100%)	0 (0%)	8 (100%)	0 (0%)
Open-ended Narrative	0 (0%)	0 (0%)	0 (0%)	1 (100%)	2 (100%)	0 (0%)
Totals – Both Narratives	0 (0%) Correct	0 (0%) Incorrect	7 (87.5%) Correct	1 (12.5%) Incorrect	10 (100%) Correct	0 (0%) Incorrect

*Note: All percentages rounded to the nearest tenth decimal place.

Looking at the differences in correct/incorrect usage at T1 and T2 reveals a slight trend toward more incorrect usage at T2. This is not surprising considering the results of the analysis that showed a statistically significant difference between T1 and T2 aspect

marker counts. -LE usage continues to be problematic at T2 and, generally speaking, the other markers are also used with less accuracy as compared to T1.

Table 5.3 contains the total counts and percentages for both narratives at T1 and T2. The results mirror those described above. Subjects in this study used V+V with 100% accuracy, while GUO and ZAI were used with 94.1% and 92.6 % accuracy respectively. ZHE was used with 89.3% correctness. -LE was used with only 64.5% accuracy and NE was not used at all. It is not surprising that learners struggled with -LE since even linguists have a hard time coming to a consensus regarding its usage and meaning.

Table 5.3

Total (T1/T2) Aspect Marker Usages: Correct and Incorrect

	-LE Correctly Used	-LE Incorrectly Used	GUO Correctly Used	GUO Incorrectly Used	ZAI Correctly Used	ZAI Incorrectly Used
Memorized Narrative	36 (64.3%)	20 (35.7%)	6 (85.7%)	1 (14.3%)	32 (100%)	0 (0%)
Open-ended Narrative	35 (64.8%)	19 (35.2%)	10 (100%)	0 (0%)	18 (81.8%)	4 (18.2%)
Totals – Both Narratives	71 (64.5%) Correct	39 (35.5%) Incorrect	16 (94.1%) Correct	1 (5.9%) Incorrect	50 (92.6%) Correct	4 (7.4%) Incorrect

Total (T1/T2) Aspect Marker Usages: Correct and Incorrect cont.

	NE Correctly Used	NE Incorrectly Used	ZHE Correctly Used	ZHE Incorrectly Used	V+V Correctly Used	V+V Incorrectly Used
Memorized Narrative	0 (0%)	0 (0%)	25 (92.6%)	2 (7.4%)	12 (100%)	0 (0%)
Open-ended Narrative	0 (0%)	0 (0%)	0 (0%)	1 (100%)	6 (100%)	0 (0%)
Totals –	0	0	25	3	18	0

Both Narratives	(0%) Correct	(0%) Incorrect	(89.3%) Correct	(10.7%) Incorrect	(100%) Correct	(0%) Incorrect

*Note: All percentages rounded to the nearest tenth decimal place.

Looking at the portion of the missionary lessons that the subjects might have relied on to complete the oral task may help explain the T1/T2 memorized narrative results. Table 5.4 contains the aspect marker counts found in the founder's story section of the 1973 and 1983 versions of the missionary lessons. As described in chapter three, the subjects in this study used one or both of the versions while completing their missionary service in Taiwan. Both versions are very similar in content. Table 5.4 demonstrates that the 1973 version contains 10 aspect markers, but only two types, -LE and ZHE. The 1983 version contains five aspect markers, but four types, -LE, ZAI, ZHE and V+V. The correctness of each marker found in both versions of the founder's story was judged by the native raters and determined to be correct.

Table 5.4

Founder's Story Aspect Markers

	-LE	GUO	ZAI	NE	ZHE	V+V
1973 Version	6	0	0	0	4	0
1983 Version	1	0	1	0	2	1

These aspect marker counts in the founder's story do not, of course, represent the total number of markers found in the complete missionary lessons memorized by the subjects, nor do they reflect the number of times the subjects would have heard aspect being marked or marked it themselves while residing in Taiwan. However, it is

interesting to note that while GUO was not found in either version of the founder's story, subjects in this study used it a total of seven times (six times correctly) in producing the memorized narratives. The subjects used GUO ten times in the open-ended narratives. The marker NE was not used in either version of the founder's story and was not used by any subject in either the memorized or open-ended narrative. While examining the number of aspect markers used in either version of the founder's story does not provide much insight into aspect marker usage, it is interesting that the subjects' marking of aspect in the memorized narratives does not correspond to what they had previously memorized.

5.2 The Aspect Hypothesis

The discussion of aspect marking in this qualitative analysis would not be complete without mentioning the Aspect Hypothesis, which predicts the acquisition of tense-aspect morphology in both L1 and L2. Ping Li and Yasuhiro Shirai (2000) provide a nice overview of the numerous child L1 and adult L2 aspect acquisition studies that lead to the formation of this hypothesis. They explain,

> The above crosslinguistic L2 data have led some researchers to formulate the Aspect Hypothesis (Anderson and Shirai 1994; Bardovi-Harlig 1995a; Robinson 1995), according to which the following generalizations can be made (Shirai 1991: 9-10; Bardovi-harlig and Bergstrom 1996: 312; Andersen and Shirai 1996: 533).
>
> 1) Learners first use (perfective) past marking on achievements or accomplishment verbs, eventually extending use to activity and state verbs.
> 2) In languages that encode the perfective-imperfective distinction morphologically, imperfective past appears later than perfective past, and imperfect past marking begins with stative and activity (i.e., atelic) verbs, then extends to accomplishment and achievement (i.e., telic) verbs.
> 3) In languages that have progressive aspect, progressive marking

> begins with activity verbs, and then extends to accomplishments/achievement verbs.
> 4) Progressive marking is rarely incorrectly overextended to stative verbs (in L1 acquisition).
>
> (pp. 49-50).

While an in-depth investigation of the four generalizations made by the Aspect Hypothesis would be beyond the scope of this study, these generalizations do help to illuminate the aspect marking found in this study. Since the perfective marker -LE was used the most frequently, yet with the most inaccuracy, it is useful to note that the Aspect Hypothesis does predict that perfective aspect marking will occur earlier than imperfective marking in the acquisition sequence. Additionally, learners will use perfective marking on telic (accomplishment and achievement) verbs before extending it to atelic (stative and activity) verbs. Knowing this order of acquisition can help to understand the attrition data in this study in two ways: First, it can help determine if telicity plays a role in correct and incorrect usage of the perfective aspect. Second, it can help determine if the order of aspect marker attrition is in anyway related to the order of acquisition as predicted by the Aspect Hypothesis.

5.3 Verbs Marked By -LE

Of the six grammatical aspect markers examined in this study, -LE was used the most often, yet proved to be the most difficult for subjects to use correctly. The subjects in this study used -LE a total of 110 times in the four narratives. As described above, 64.5% (71 markers) of the usages were judged to be correct, while 35.5% (39 markers) of usages were rated as incorrect. To better understand the factors affecting -LE usage, verbs marked by -LE, and judged incorrect by the raters are investigated to see if factors

exist that might have affected the subjects' use of this aspect marker. First, the criteria the raters used to determine correctness are reviewed. Second, a list of verb + -LE combinations used by the subjects is provided. Next, a discussion of general patterns of incorrect verb marking, both telic and atelic, is outlined. Finally, the results of this investigation are discussed in terms aspect marker acquisition and attrition.

As described in chapter three, native-speaking graduate students in an East Asian Studies department who had studied aspect markers as part of their graduate level linguistic classes were employed to code the grammatical aspect markers found in the data. They were also instructed to rate each marker's usage as correct or incorrect. A third native Mandarin speaker who had received similar linguistic training decided on any discrepancy between the two raters. Below is the relevant section from the instructions given to the raters. The complete instructions are located in Appendix A.

> Once you have completed identifying and color-coding the aspect markers in the data set, go back and rate each grammatical marker usage as being correct or incorrect. Using a pen, write a **C** for correct usage, or **IC** for incorrect usage. If you are not sure, use your best judgment.

Using these guidelines, the raters might have judged an aspect marker usage to be incorrect for any number of reasons. In the data, usages were judged as incorrect because of reasons including overuse, selecting the incorrect marker, word order problems, verb-object agreement problems and atelic verbs not being quantified correctly, as well as other reasons. Consequently, it is necessary to look at more than just the aspect markers and the verbs they mark to understand why a usage of aspect was judged to be incorrect.

A wide variety of verb + -LE combinations were used by the subjects in this study to complete the oral narrative tasks. These combinations are provided below in tables 5.5 and 5.6. The combinations have been arranged according to those judged as correct and incorrect by the raters. Many of the same combinations fall in both the correct and incorrect columns, indicating that some usages were correct, but other incorrect. The telicity of each verb/predicate is also provided and was determined by a professor of Chinese linguistics. Notice that some of the usages are marked as instances of sentence final LE. This shows disconnect between the native-speaking graduate students' perception of -LE and the professor's. Atelic verb/predicates are bolded in the tables below.

Table 5.5

Memorized Narrative: Verb + -LE Combinations

T1 Correct –le Usage	Telic or Atelic	T1 Incorrect –le Usage	Telic or Atelic
错了呢?	LE	祷告了以后	**atelic**
到了一个小树林	telic	发生了他很伟大的事情	telic
发生了一件大事情	telic	复兴了他的真的教会	telic
发生了一个宗教的骚动	telic	获得了神所应许给他的。	telic
发现了神愿意回答	telic	念了圣殿,圣经。	**atelic**
复兴了教会	telic	学了他应该是去做祷告	**atelic**
过了一段时间	telic	有了一个年轻人	**atelic**
过了一段时间	telic	应该做了什么	**atelic**
过了一段时间	telic		
过了一段时间	telic		
过了几天	telic		
过了三年	telic		
过了三年	telic		
获得了huh 一本写在金页片上的书	telic		

看了很多的教会	telic		
看到了,就是天父,是神跟他的儿子,	telic		
去了一个 huh 树林里祷告	telic		
去世了	LE		
去世了	LE		
消失了	LE		
引起了很大的不安	telic		
做了祷告	**atelic**		
做了祷告	**atelic**		
做了神所告诉他做的事	telic		
T2 Correct –le Usage	Telic or Atelic	T2 Incorrect –le Usage	Telic or Atelic
祷告了	**atelic**	复兴了耶稣基督真实的	telic
发生了一件大事情	telic	复兴了他们的教会?	telic
复兴了他真实的教会	telic	感动了	**atelic**
过了一会儿时间	telic	感动了	**atelic**
过了几天 几年 几年	telic	还要光了	**atelic**
过了几年	telic	看了 huh 经文的时候	**atelic**
过了四年	telic	看了 huh 在雅各书,	**atelic**
看了一个很明亮的光	telic	看了 (pause) 天父和耶稣基督	telic
看了(pause) 雅各书第一章	telic	去了	telic
看见了天父和他的儿子	telic	有了一位人,叫斯密约瑟	**atelic**
去了, huh去做祷告	telic		
死了	telic		
问了他应该 (pause)加入哪一个教会	**atelic**		

Table 5.6

Open-ended Narrative: Verb + -LE Combinations

T1 Correct –le Usage	Telic or Atelic	T1 Incorrect –le Usage	Telic or Atelic
毕业了	LE	毕业了以后	telic
毕业了	LE	从...了	N/A
读完了杨百翰以后	telic	会学完了	telic
读了三年级	telic	一年结婚了	LE

过了一年半, 三个学期	telic	会结婚了	LE
过了,两三年	telic	结婚了以后	telic
过了两年以后	telic	开刀了	telic
过了五六年以后	telic	跟一个很大的公司开始了	telic
怀孕了	telic	留在那里很久了	LE
已经结婚了(s-final LE)	LE	都认识了	LE
结婚了,差不多三年	LE	以前有了	**atelic**
已经结婚了	LE	有两个孩子了	LE
已经结婚了	LE		
就结婚了	LE		
也是结婚了	LE		
结婚了	LE		
把它们看完了	telic		
已经买了 (s-final LE)	telic		
买了几本书	telic		
买了房子以后	telic		
有了	**atelic**		
学了电脑	**atelic**		
T2 Correct –le Usage	Telic or Atelic	T2 Incorrect –le Usage	Telic or Atelic
毕业了	LE	十年以前结婚了	telic
赚够了钱	telic	八年以前结婚了	telic
过了xiao 五年	telic	结束了我,eh,学习	telic
过了, eh, 我, 下年	telic	念够了我的	telic
过了一年	telic	念够了大学的	telic
加入了,eh,三个医生	telic	要关于我的家庭说一点了	telic
已经结婚了	LE	会eh,完了我的,医生学习	N/A
已经结婚了	LE		
已经念完了我的bachelor's	telic		
都忘记了	telic		
都忘记了	telic		
她十七个月了	LE		
赚够了钱	telic		

Simply looking at the tables above reveals a general trend toward the use of telic verbs/predicates at T1 and T2 in both types of narratives. This tendency supports the Aspect Hypothesis, which predicts that learners will tend to associate -LE with telic predicates. However, the number of incorrect telic verb/predicates shows that there is more than just compatibility between telicity and -LE that is needed to master this area of the language.

Focusing on the subjects' usage of atelic verbs (bolded in the two tables above) reveals that the subjects used them almost exclusively in the memorized narratives. The subjects only used three atelic verbs in the open-ended narratives (all at T1), while 15 atelic verbs were used in the memorized narratives (seven at T1 and eight at T2). Additionally, in the memorized narrative, most of the incorrect -LE usages at both T1 and T2 involved atelic verbs.

It is interesting that most of the incorrect -LE usages in the memorized narratives involved marking atelic verbs. Additionally, the number of atelic verbs used at T1 only increased by one at T2. If the Aspect Hypothesis is correct, and learners mark atelic verbs for aspect later in the acquisition sequence, then the high amount of incorrect usage suggests that the subjects had not fully acquired the ability to mark atelic verbs for perfective aspect correctly at T1. It would be expected that incomplete acquisition would result in some attrition over the 12-year period of disuse. Either the number of inaccurate usages would increase, or the number of atelic verbs marked would decrease. However, the number of correct atelic verbs marked by -LE remained constant, and the incorrect usages only increased by one. Conversely, in the open-ended narratives, three atelic verbs

were used at T1 (two correctly and one incorrectly) and no usages were found at T2. It is unclear why the numbers of atelic predicates marked by -LE differ so greatly between the two types of narratives. In order to better understand perfective marking in both telic and atelic verb predicates, -LE usage error patterns and errors with atelic verbs are discussed below.

5.4 -LE Usage Error Patterns

Because many of the same telic verb + -LE combinations fall into both the correct and incorrect columns in Tables 5.5 and 5.6 above, it is necessary to take a closer look at the incorrect combinations in the context of the data in order to understand the types of errors subjects made using -LE. A closer examination of the data reveals three main categories of errors involving the marking of telic verbs for perfective aspect. These include errors in -LE placement, errors in the object of the verb and errors involving the usage of modal verbs.

5.4.1 -LE placement errors.

The most common reason why telic verbs marked by -LE were used incorrectly was that the perfective marker was placed in the wrong position. In the examples provided below, the subject should have placed -LE between the verb and its object. Instead he placed it after the verb-object combination at the end of the clause. This usage is somewhat similar to that of the sentence-final LE.

我十年以前结婚了, hmm, 不是十年, 我八年以前结婚了

Wo shi nian yiqian jiehun le, hmm, bushi shi nian, wo ba nian yiqian jiehun le

I ten year before marry-LE, hmm, not is ten year, I eight year before marry-LE

(S-5, Open-ended Narrative, T2)

我想, (short pause), 我毕业以后, 结婚了以后, 大概要加工作, 加州。

Wo xiang, wo biye yihou, jiuhun le yihou, dagai yao jia gongzuo, jiazhou.

I desire, I graduate after, marry-LE after, probably will add work, California.

(S-12, Open-ended narrative, T1)

Instead of splitting the verb-object combination *jiehun* in the above examples, the subjects placed -LE after the object *hun*. In the following two examples -LE should have been placed between the verb-object combinations *biye* and *kaidao*. It is quite likely that the subjects in this study were simply unaware that verb-object combinations such as *jiehun* and *biye* could be separated and -LE be placed between the two parts.

毕业了以后，大概要搬家

Wo biye le yihou, dagai yao banjia

I graduate-LE after, probably will move

(S-4, Open-ended narrative, T1)

我不会打，因为我被开刀了，开刀后，我不能大橄榄球

Wo bu hui da, yinwei wo bei kaidao le, kaidao hou, wo buneng da ganlanqiu

I NEG will play, because I PASS open knife –LE, open knife after, I NEG able big olive ball.

(S-6, Open-ended narrative, T1)

5.4.2 object errors.

The next category of errors includes telic verbs marked by -LE in which something is wrong with the object. For example:

他(pause)有做这个的祷告，而发生了他很伟大的事情

Ta you zuo zhe ge de daogao, er fasheng-le ta hen weida de shiqing

He (pause) have do this CL NOM pray, CONJ happen-LE he very great NOM thing

(S-2, Memorized narrative, T1)

In this example, the verb *fasheng* 'happen; occur; take place' is a telic verb that was used correctly by other subjects. Here the usage was judged to be incorrect probably because of the pronoun *ta* 'he' directly after the perfective marker. If the subject had used a number and classifier combination to classify the *weida de shiqing* 'great thing' the sentence would be correct. Here is another example,

如果要跟国际贸易公司方面要,要工作的话，必须 (pause)跟一个很大的公司开始了

Ruguo yao gen guoji maoyi gongsi fangmian yao, yao gongzuo de hua, bixu gen yi ge hen da de gongsi kaishi-le

If want with international trade company side want, want work NOM supposition, must with one CL very big NOM company begin-LE

(S-14, Open-ended narrative, T1)

In this example the object of the telic verb *kaishi* 'begin' is missing and therefore the sentence is incorrect. In this final example, the usage of -LE is correct, but the inclusion of the nominalizer *de* is not. Both should be excluded.

我想我已经，念够了我的，念够了大学的。

Wo xiang wo yijing, nian gou-le wo de, nian gou-le daxue de.

I think I already, study enough-LE I POS, study enough-LE college POS.

(S-11, Open-ended narrative, T2)

5.4.3 errors involving modal auxiliary verbs.

The next category of -LE usage errors centers around the subjects' use of modal auxiliary verbs such as *hui*, *yao* and *neng* 'will, have to, able to,' which are used to express potentiality, volition, and obligation. Li and Thompson (1981) explain that these auxiliary verbs differ from regular verbs in Chinese because they cannot take aspect markers, cannot be modified by intensifiers, cannot be nominalized, cannot occur before the subject, and cannot take a direct object (pp. 173-174). These auxiliary verbs can, however, co-occur with a regular verb. In the data being investigated the most common error involving -LE was that a subject would use a modal verb such as *hui* 'will' with a regular verb and then mark that verb for perfective aspect using -LE. This is problematic because the modal auxiliary verb *hui* indicates that the verb 'will occur' sometime in the future. This meaning is incompatible with the perfective aspect marker -LE, which indicates that the verb is perfected, completed or realized. -LE can occur in a future event, but is usually used to mark the first of a series of events (Li and Thompson, 1981, p. 198). Below are several examples from the data showing this type of error. The auxiliary verb, main verb and -LE are underlined.

神就会借着斯密约瑟复兴了他的真的教会

Shen jiu hui jiezhe Simi Yuese fuxing le ta de zhen de jiahui

God then will through Smith Joseph restore-LE GEN true GEN church

(S-20, Memorized Narrative, T1)

In this example the auxiliary modal verb *hui* 'will' modify the verb *fuxing* 'to restore' indicating that God will restore the church. The use of *hui* implies that this has not happened yet, so the verb cannot be marked with -LE. The verb *fuxing*, however, is an atelic verb, which can be marked by -LE. The Aspect Hypothesis predicts that, in the acquisition process, telic verbs will be marked for aspect earlier than atelic verbs, which have to be bounded in some way. The fact that this example from the data was incorrect shows that in order to master -LE, learners need more than compatibility between telicity and -LE. The subject in the following example had not mastered the use of auxiliary modal verbs:

他 (pause) 有在未来 (pause) 会告诉斯密约瑟他应该做了什么

Ta you zai weilai hui gaosu Simi Yuese ta yinggai zuo le shenme

He have in future will tell Smith Joseph he should do-LE what

(S-19, Memorized Narrative, T1)

In this example *hui* 'will' and *yinggai* 'should' modify the verbs *gaosu* 'tell' and *zuo* 'to do.' Both imply that the verbs have not occurred yet and therefore *zuo* cannot be marked with -LE. Looking at the telicity of the verb predicate reveals that *zuo shenme* is atelic. However there is no incompatibility between the verb semantics and -LE because verbs in the event category of activities, such as *zuo*, can occur with -LE and indicate either termination or completion (Smith, 1997, p.264). In this example it is not the semantics of the verb that make the usage of -LE unacceptable, it is the incorrect use of the modals.

好, 我, 我, eh, 要关于我的家庭说一点了, 现在我和我的妻子

Hao, wo, wo, *eh*, yao guanyu wo de jiating shuo yidian le, xianzai wo he wo de qizi

Good, I, I, eh, will about I GEN family speak one bit-LE, now I and I GEN wife

(S-3, Open-ended narrative, T2)

In this example the *yao* 'have to' modifies the verb *shuo* 'to speak,' indicating that the subject will speak on the topic of his family, but has not done so. Thus the verb cannot be marked with -LE. This example also contains a typical word order problem not discussed in this study.

Next year, 我会学完了,

Next year wo hui xue wanle,

Next year I will study finish-LE,

(S-9, Open-ended Narrative, T1)

Again the use of *hui* indicates that the verb will occur and so the usage of -LE is incorrect.

我想, 大概在, 一年多之内, 我会结婚了。

Wo xiang, dagai zai, yi nian duo zhinei, wo hui jiehun le.

I desire, probably in, one year many GEN-inside, I will marry-LE.

(S-13, Open-ended Narrative, T1)

This example from the data has two problems. First, related to the discussion of modal verb usage, this sentence was judged as incorrect probably because of wrong modal choice. If the subject had used the auxiliary *jiu yao* 'be about to; be on the point of' in front of the verb, the sentence would be correct. Second, although the raters coded the -

LE as a verbal suffix marker, it can be interpreted as a sentence-final particle, indicating current relevant state.

5.5 Errors with Atelic Verbs

The Aspect Hypothesis predicts that in the acquisition of perfective aspect marking, telic verbs will be marked before atelic verbs. Looking at Table 5.5 and 5.6 above shows that subjects marked fewer atelic verbs for perfective aspect than they did telic verbs. The atelic verbs they did mark were most often used incorrectly. In the two sections below, errors in usage involving atelic verbs are discussed. First, atelic verbs used in RVCs (Resultative Verb Compliments) are examined, followed by instances where the subjects incorrectly bounded atelic verbs marked by -LE.

5.5.1 errors involving resultative atelic verb compliments.

Another category of incorrect -LE usage included atelic verb +-LE usage errors involved resultative verb compliments. A number of subjects replaced the RVC *dao* 'to, towards, until' which indicates the completion of a verbal action, with the perfective aspect marker -LE. The first two examples have atelic verb predicates while the third example is telic. The verb marked by -LE is underlined.

在圣经里, 学了他应该是去做祷告

Zai shengjing li, xue le ta yinggai shi qu zuo daogao

In Bible inside, learn-LE he should is go do prayer

(S-6, Memorized Narrative, T1)

有一天他在看圣经的时候, 他看了 huh 在雅各书, 第一章第五节

You yi tian ta zai kan shengjing de shihou, ta kan le huh zai yage shu, di-yi zhang di-wu jie

Have one day he DUR read Bible GEN time, he read-LE huh in James, number one chapter number five verse.

(S-14, Memorized Narrative T2)

祷告 (pause) 以后 (pause) 他看了(pause) 天父和耶稣基督

Daogao yihou ta kan le Tianfu he Yesu Jidu

Prayer after he read-LE Heavenly Father and Jesus Christ

(S-19 , Memorized Narrative, T2)

It is reasonable that subjects used -LE, instead of the correct RVC *dao,* in the examples above because there is an overlap in meaning and function between the two. Both phonemes indicate that an action is no longer in process, and that it has been completed or realized. Additionally, Li and Thompson (1981) explain that RVCs can function as "perfectivizing expressions" and can be found in sentences where one would expect to find -LE used (p. 206). RVCs can be used because the second element of the compound functions "signals some result of the action or process conveyed by the first element." which is the verb (p. 54).

The above examples are interesting because instead of an RVC being used where one would expect a -LE (as described by Li and Thompson), -LE is being used where an RVC is expected. Because of the similarity of meaning and function, perhaps the subjects were using the two interchangeably. Conversely, since the founder's story describes an event that happened in the past, perhaps the subjects were incorrectly generalizing the

usage of -LE to be a past tense marker and using it in that way. Another possibility may have to do with the sequence of linguistic forms acquired while in Taiwan. Perhaps these subjects had not fully acquired the RVC structure and were substituting -LE, which they had partially acquired.

5.5.2 errors involving incorrect bounding of atelic verbs.

Another group of -LE usage errors found in the data occurred when a subject used -LE with an atelic verb but did not quantify the verb, or bounded it incorrectly. Since atelic verbs have no endpoint inherent in their meaning, they cannot be marked with -LE since the function of -LE would be in contradiction to the meaning of the verb. To overcome this, an atelic verb can be bounded, or quantified by specifying an endpoint to the verb. The examples from the data below show errors subjects made involving atelic verbs and -LE. A short discussion of the error is included after each example.

他, 他心里很感动了

Ta, ta xinli hen gandong le

He, he heart inside HEN move-LE

(S-22, Memorized Narrative, T2)

The verb *gandong* 'move or touch' is atelic because it does not include an endpoint and therefore cannot be followed by -LE unless it is quantified in some way. The above sentence would be correct if the subject would have added a time phrase such as *san tian* 'three days,' or *hen jiu* 'long time' after the -LE. Adding such a time phrase would give *gandong* an endpoint, thus allowing the use of -LE. Conversely, not using -LE in this sentence would also make it correct.

这个斯密约瑟 uh (pause) 很 (pause) um 很感动了

Zhege Simi Yuese uh hen um hen gandong le

This-CL Smith Joseph uh very um very move-LE

(S-22, Memorized Narrative, T2)

他看了huh 在雅各书

Ta kan-le zai Yage shu

He read-LE huh in James Book

(S-14, Memorized Dialogue, T2

In this example involving an atelic verb, the subject included the locative *zai* 'in; at; on' to the object *Yage shu* 'Book of James' thus turning the object into a locative phrase. The sentence would be correct without *zai*.

5.6 Other -LE Usage Errors

These data include many other errors involving -LE. Below are some examples of errors in which the subjects used -LE in sentence patterns where it should not be used, errors in using -LE with time narration devices, errors where -LE is used instead of the correct aspect marker, and errors where -LE is used to replace the second character of a two characters word compound.

我从华盛顿来了

Wo cong Huashengdun lai le

I from Washington come-LE

(S-23, Open-ended, T1)

和现在, 我没有什么男朋友, eh, 有了, 以前有了,

He xianzai, wo meiyou shenme nanpengyou, eh, you le, yiqian you le,

And now, I not have what boyfriend, eh, have-LE, before have-LE,

(S-5, Open-ended, T1)

In these two examples, the subjects have replaced the *de* in the nominalizing *shi…de* construction with -LE. In both examples from the data, the subjects have omitted the optional *shi*.

(S-4, Open-ended Narrative, T1)

但是, 他看了 huh 经文的时候, 他看到

danshi, ta kan le huh jingwen de shihou, ta kandao

But, he read-LE huh scripture GEN time, he read-RVC

(S-13, Memorized Narrative, T2)

In this example the subject has used an atelic verb and -LE in a sentence where time is being narrated with the phrase *deshihou* 'at that point in time.' In this case -LE is not needed and cannot be used.

还要光了

haiyao guang le

still want light-LE

(S-22, Memorized Narrative, T2)

In this example from the memorized narrative, the subject probably meant to say the compound *guanghui* (光辉) 'radiance; brilliance; glory' as used in the missionary lessons, but instead used -LE to replace the *hui* that might have been forgotten. It is not

clear whether this was merely a slip of the tongue, done on purpose to maintain oral fluency or for some other reason.

As shown in these examples, the subjects in this study made a range of errors in their use of -LE both with telic and atelic predicates at T1 and T2. The same variety of errors can also be seen with the other aspect markers. These errors suggest that correct marking of aspect is quite difficult for L2 learners of Chinese regardless of their proficiency level or experience in a Chinese speaking area.

5.7 Order of Aspect Marker Attrition

In their 2003 study, "The Development of Aspect Marking in L1 and L2 Chinese," researchers Jin and Hendriks used the Aspect Hypothesis to predict learners' acquisition sequence of aspect markers. Their L2 findings agree with the Aspect Hypothesis in that telicity plays a central role in the L2 acquisition of Chinese aspect markers but that the learner's English L1 also influences acquisition. The aspect hypothesis predicts that telic verbs will be marked for aspect first, and consequently the post-verbal perfective aspect marker -LE will be acquired first. Jin and Hendriks found that -LE usage was problematic at all proficiency levels with the beginning level learners overusing -LE and the higher-level learners under-using the marker. The researchers go on to hypothesize that the appearance of aspect markers in L2 Chinese will occur in the following order, as predicted by the Aspect Hypothesis: first -LE, second ZAI and lastly ZHE. It is important to note that they did not have any occurrences of GUO in their L2 data.

This -LE>ZAI>ZHE order of acquisition will now be compared to the attrition of the same markers as examined in this study. By doing this, the researcher hopes to

determine if the attrition of aspect marking is in any way related to the order of acquisition found by Jin and Hendriks (2003). In order to accomplish this, it is necessary to examine the attrition of each aspect marker. In table 5.7 the total number of usages for each aspect marker is provided for T1 and T2. The change in data counts is provided, along with the percent drop, either positive or negative, for each marker.

Table 5.7

Percent Change T1/T2: Total Marker Counts

	-LE	GUO	ZAI	NE	ZHE	V+V
Total T1	68	8	42	0	20	8
Total T2	43	9	12	0	8	10
Change	-25	+1	-30	0	-12	+2
Percent Drop	36.8%	-12.5%	71%	0%	60%	-25%

*Note: All percentages rounded to the nearest tenth decimal place.

Only three aspect markers had a drop in usage between T1 and T2. Ranking these in order of largest to smallest drop in usage indicates that ZAI usage dropped 71%, ZHE usage dropped 60% and -LE usage dropped 36.8%. Looking at the difference in usage counts between T1 and T2 and ranking them from largest difference to smallest reveals that ZAI had the biggest change with 30 fewer usages, -LE with 25 fewer usages and ZHE with 12 fewer usages. Comparing these two sequences of attrition, ZAI>ZHE> -LE and ZAI> -LE>ZHE, with Jin and Hendriks' (2003) -LE>ZAI>ZHE proposed order of acquisition revels that they do not match in either forward or reverse order. This suggests that the attrition of aspect marker usage in this data does not relate to the acquisition sequence predicted by the Aspect Hypothesis. It appears that -LE does not

suffer the most attrition, so possibly it would not be the first to be completely lost (suffer complete attrition) by the subjects.

Since the above breakdown of aspect marker attrition did not relate to Jin and Hendriks' (2003) aspect marker acquisition sequence, table 5.8 was created to see if only examining the correct usage counts would reveal a different order of attrition. Looking at the change and percentage drop between T1 and T2 shows the exact same pattern as the table above, with ZAI suffering the most attrition, and with ZHE and -LE following.

Table 5.8

Percent Change T1/T2: Correct Marker Counts

	-LE	GUO	ZAI	NE	ZHE	V+V
Time One Correct Only	45	8	38	0	18	8
Time Two Correct Only	26	8	12	0	7	10
Change	-19	0	-26	0	-11	+2
Percent Drop	42.2%	0%	68.4%	0%	61.1%	-25%

*Note: All percentages rounded to the nearest tenth decimal place.

In table 5.9 the total aspect marker usages, both correct and incorrect, for the memorized narrative are compared at T1 and T2 to see if any differences from the above two tables is apparent. Taking a look at the percent drop between T1 and T2 for the memorized narrative reveals that ZHE had the biggest decrease, followed by ZAI and then -LE. This finding is of interest because it is the exact opposite of Jin and Hendriks' proposed -LE>ZAI>ZHE acquisition sequence. This finding might suggest that the attrition in the ability to produce these three aspect markers is the exact opposite of their acquisition as

predicted by the Aspect Hypothesis. That being said, it's quite possible that the attrition of the memorized narrative does not represent general attrition if the subjects' prior memorization somehow affects the sequence aspect marker attrition that was lost. More research in this area is needed to make the claim that sequence of aspect marker attrition in previously memorized narratives is the exact opposite of aspect marker acquisition.

Table 5.9

Percent Change T1/T2: Total Memorized Narrative Counts

	-LE	GUO	ZAI	NE	ZHE	V+V
Time One Memorized Only	33	2	21	0	20	4
Time Two Memorized Only	23	5	11	0	7	8
Change	-10	+3	-10	0	-13	+4
Percent Drop	30.3%	-60%	47.6%	0%	65%	-100%

*Note: All percentages rounded to the nearest tenth decimal place.

To see if the type of narrative had an affect on the change in usage over time, table 5.10 was created. This table includes marker counts, both correct and incorrect, for the open-ended narrative. Again the results do not relate to Jin and Hendriks' (2003) proposed order of acquisition as predicted by the Aspect Hypothesis.

Table 5.10

Percent Change T1/T2: Total Open-ended Narrative Counts

	-LE	GUO	ZAI	NE	ZHE	V+V
T1 Open-ended	35	6	21	0	0	4
T2 Open-	20	4	1	0	1	2

ended						
Change	-15	-2	-20	0	+1	-2
Percent Drop	42.9%	33.3%	95.2%	0%	-100%	50%

*Note: All percentages rounded to the nearest tenth decimal place.

It is interesting to note that in each of the above breakdowns of aspect marker attrition, ZAI suffers the most loss. The markers GUO and V+V are not used very often at either T1 or T2, yet their usage counts suffer hardly any lost and even increase in some T2 narratives. It appears that in the case of the data examined in this study, the least used does not necessarily mean the first forgotten. Additionally, while the Aspect Hypothesis predicts that -LE will be acquired first, the attrition of -LE is more uncertain. More research into attrition sequencing of aspect markers is needed to better answer this question. Unfortunately, this is beyond the scope of this present study.

6. CONCLUSIONS

The purpose of this study is to investigate the effect that rote memorization has on language attrition. Specifically, the attrition of aspect markers is investigated. Data consisted of two transcribed oral narratives, one closely related to a narrative the subjects had memorized as a beginning learner, and the other not related to the materials the subject had memorized. Data was collected twice. All the subjects who participated in this study had learned Chinese in an intensive formal setting for two months before moving to Taiwan for a year and a half to two years. During their time in Taiwan the subjects studied the language informally on their own. Data collection occurred six months to five years after returning to the United States and again approximately 12 years later. None of the 23 subjects who participated in this study had studied Chinese formally, or used Chinese at home or at work during the 12-year interval between tests. The data was then transcribed and the general content analyzed. Six aspect-markers were examined in detail.

This study reveals that learners of Chinese who spend time in a Chinese-speaking environment and gain a fairly high level of oral proficiency retain much of their oral production abilities over a 12-year period. Many of the subjects were able to accomplish both tasks at T2. Additionally, subjects were able to retain and use, over an extended period of time, syntax and lexicon from narratives they had previously memorized as a beginning-level learner. Looking at language attrition between T1 and T2 data, this study found that significant levels of content and length attrition occurred for both types of

narratives. There was not a significant relationship between how well the subjects produced the memorized narrative at T1 and their performance at T2.

Additionally, the subjects were able to use a variety of aspect markers correctly both at T1 and T2. Post-verbal -LE was used the most frequently by the subjects, but it also had the highest percentage rate of error. The other markers were used less frequently, and had lower percentage rates of error. Attrition in count, variety, and usage of aspect markers was significant between T1 and T2. Finally, there was not a significant relationship between how well the subject produced the memorized narrative at T1 and the attrition of aspect markers in both narratives.

In this chapter the findings are summarized in more detail by looking at each of the research questions, their answers, and results of the qualitative analysis. Then the pedagogical implications of language attrition are discussed, including suggestions for how to teach aspect markers. Next, the limitations of this study are explained. Finally, the researcher suggests possible studies for the future.

6.1 Summary of Findings

After reviewing the literature in Chapter Two and designing the research methodology of this study in Chapter Three, the quantitative and qualitative analysis used to answer the research questions was completed in Chapter Four. In this section each research question is reviewed briefly, the analysis is discussed, and the results are outlined.

The purpose of the first research question was to establish a baseline attrition level for the memorized narrative. The research question asked, “how much language

attrition of the memorized narratives occurred over a 12-year period, as measured by a content and median length analysis of subject production at T1 and T2?" To answer this question the characters in the transcribed T1 and T2 memorized narratives were first counted and the median length was calculated. A two-sample *t*-test was used to compare narrative length variables, and it was determined that there was a significant difference between the median length of T1 and T2 narratives. This decrease between narrative lengths suggests that that the subjects were not able to produce as much language at T2.

The content analysis was completed by matching the content of the subjects' narratives to the original content (the founder's story) from the 1983 missionary lessons. This side-by-side comparison was then scored based on how well the subject's narrative accounted for the content of the original. Another two-sample *t*-test was used to compare the mean T1 and T2 content scores. Again there was a significant difference between variables. This indicates that the subjects lost language production ability over time. The shorter T2 narratives, as compared to the T1 narratives, were interpreted to mean that language production attrition had taken place in the memorized narratives. The numerical results also provided a baseline with which to interpret the results of the other investigations.

The purpose of the second research question was very similar to the first, but instead of measuring attrition of language related to previously memorized material, this question sought to measure attrition of language not related to anything that had been memorized. The question asked, "how much language attrition of the open-ended

narratives occurred over a 12-year period, as measured by the median length of subject production at T1 and T2?"

The only measurement of attrition used in this question is the median length analysis because there is no original memorized text to compare the subjects' response to. Therefore, to answer this question the researcher only examined the change in length between T1 and T2 open-ended narratives. A two-sample *t*-test was used to see if significant differences exist between median length of T1 and T2 open-ended narratives. Results show that indeed a significant difference did exist, indicating that the subjects were not able to produce as much language at T2 as they could at T1.

Comparing the results of the first two research questions shows that the subjects retained less than five characters more in the memorized narrative than in the opened-ended narrative. This implies that the subjects' attrition of Chinese language production was similar for the two different tasks at least as it was measured in these two research questions.

The third research question sought to determine if mastery of the memorized narrative at T1 could predict the attrition of the linguistic ability at T2. The research question asked, is the attrition level of each memorized narrative at T2 related to how well the narrative was memorized at T1, as measured by a content analysis?

This question was answered by comparing the T1 content scores to the change in content score between T1 and T2. The variables were first plotted on a scatterplot to see if a non-linear pattern appeared that would suggest a relationship between variables. No pattern was evident, so a simple linear regression was used to statistically determine if the

content score at T1 predicted the change in score between T1 and T2. No strong correlation was found between T1 content score and the change in content score between T1 and T2. This means that a subject's ability to complete the memorized narrative oral task (how well they had the founder's story memorized at T1) did not predict attrition in the same task over time.

In research question number four the focus of the study changed from examining general attrition to specifically looking at the attrition of marking aspect. The number of aspect markers used, the variety of markers used (out of a possible six examined in this study), and usage accuracy were investigated. The research question asked, "in the memorized narratives, did the subjects show attrition in the number, variety, and usage of grammatical aspect markers between T1 and T2, as measured by an analysis of grammatical aspect markers?" Because of the complexity of answering this question, the following discussion is divided into five parts. They are described below.

First, the number of aspect markers used, both correct and incorrect, was looked at in the T1 and T2 memorized narratives. A one-sided *t*-test was used to compare variables because it was assumed that attrition had taken place. Results of the analysis show that the number of aspect markers used by the subjects declined a statistically significant amount between T1 and T2.

Second, only the number of correct aspect marker usages was examined in the two narratives. A one-sided *t*-test was used again to compare variables and the result was again significant. The subjects had fewer correct usages at T2 than at T1.

Third, the variety of aspect marker usage was calculated by tallying the types of aspect markers used out of the six types investigated in this study. The mean variety for T1 and T2 narratives were tested using a one-sided *t*-test and the result ended up significant, but just barely. This means that at T2 the subjects, as a whole, used a slightly smaller variety of markers than at T1.

The fourth relationship tested was the number of aspect markers used at T1 compared to the number correctly used at T1. This relationship tells us how accurately the subjects were able to mark aspect. Results of the T1 *t*-test show us that there was indeed a statistically significant difference between usage and correct usage at T1.

The last relationship mirrors the one just described, but it tested the number of aspect markers used at T2 compared to the number correctly used at T2. Results of the analysis are significant by a bigger margin than at T1. This indicates that subjects are using aspect markers more incorrectly at T2 than at T1.

Since each of the relationships tested as part of this research question are significant, it is clear that attrition of aspect marker number, variety and usage did take place in the memorized narrative over the 12-year period of disuse.

The fifth research question was exactly the same as the fourth, except the aspect markers were investigated in the open-ended narrative. The research question asked, "in the open-ended narratives, did the subjects show attrition in the number, variety, and usage of grammatical aspect markers between T1 and T2, as measured by an analysis of grammatical aspect markers?" The exact same analysis was used as in research question number four. The results were also the same, with the numbers, variety, and

correct/incorrect usage all being significantly different between the T1 and T2 open-ended narratives. Interestingly, although the results of this question mirror those of research question number four, the level of significance is somewhat higher. This suggests that more attrition of aspect marker usage occurred in the open-ended narratives than in the memorized narratives.

As stated in chapter four, the rationale behind the sixth research question is that since both versions of the memorized narrative found in the missionary lessons include aspect marking, it is possible that if the subjects had the narrative better memorized at T1, they would have better acquired the ability to mark aspect and thus would retain that ability over time. It is also possible that the subjects would be able to transfer their knowledge of aspect marking from the memorized narratives to the open-ended narratives. The research question asked, "is there a relationship between how well the memorized narrative was memorized at T1 and the attrition of grammatical aspect markers in both the memorized and open-ended narratives, as measured by an analysis of grammatical aspect markers?"

In order to answer this question, it was broken down into six parts, which compare content score to aspect counts, variety, and usage (correct or incorrect) in both types of narratives. Scatter plots and simple linear regressions were used for each of the six relationships tested. Results of the analysis were not significant. The content score at T1 was not a strong predictor of aspect marker attrition. This suggests that the subjects' quality of memorization at T1 is not correlated to how much aspect marking ability they lost over the 12-year period in either the memorized or open-ended narratives.

The final research question sought to determine if there is a difference in the attrition of grammatical aspect markers in the two types of narratives. A difference in attrition levels could suggest that the memorization and use of the missionary lessons had an affect on aspect marker loss. The seventh research question asked, "is there a relationship between the attrition of grammatical aspect markers found in the memorized narratives and the attrition of the grammatical aspect markers found in the open-ended narrative?"

In order to answer this research question it was necessary to compare the three areas of aspect marking (number, variety, correctness) between the two types of narratives. Two-sample *t*-tests were used to test for significance between variables. Results of each analysis were not significant, suggesting that the rates of aspect marking attrition are similar for both the memorized narrative and open-ended narrative oral tasks.

6.2 Qualitative Analysis Summary

A short qualitative analysis was also completed to better understand the subjects' usage of aspect markers. First, it was determined which markers were being used more correctly at T1 and T2. The Aspect Hypothesis was then explained briefly in order to contextualize the remaining discussion. Next, verbs marked by -LE were examined to see if telicity played a role in correct or incorrect usage. Patterns of -LE usage errors were then outlined and examples from the data discussed. Errors involving the marking of atelic verbs were then explained including atelic RVCs and instances of incorrect bounding of atelic verbs. Next, other usage errors involving -LE were explained. Finally,

a brief discussion of the Aspect Hypothesis' ability to predict aspect marker acquisition and how this concept related to attrition identified in this study was discussed.

A simplification of the tables used to determine which aspect markers were used more correctly is found in table 6.1. Notice that V+V was used with complete accuracy in both T1 and T2 narratives, while GUO and ZAI were second and third respectively. ZHE was fourth and -LE was used the most incorrectly. NE was not used in any narrative. It is interesting to note that -LE was the most frequently used aspect marker, but was used the most incorrectly. V+V and GUO were used the least often, but were used the most correctly. ZAI and ZHE fall in the middle for usage and but were still used with fairly high accuracy.

Table 6.1

Aspect Marker Usages Summary

T1/T2 Combined Narratives	Percent Correct Usage
V+V	100%
GUO	94.1%
ZAI	92.6%
ZHE	89.3%
-LE	64.5%
NE	No Usage

*Note: All percentages rounded to the nearest tenth decimal place.

The next section of the qualitative analysis introduces the Aspect Hypothesis and focuses on verbs marked with -LE since it was the most often used aspect marker, but was used the most incorrectly. First, all the verb+-LE combinations were grouped by narrative and by correct/incorrect ratings. The verb/predicate telicity was determined for each usage in the data. Results show a general trend toward the use of telic

verbs/predicates at T1 and T2 in both types of narratives. This tendency supports the Aspect Hypothesis. Atelic verb usage was predominately found in the memorized narratives and most of the usage was incorrect.

Patterns of -LE usage errors were then outlined and examples from the data discussed. It was discovered that most errors involving the perfective marking of telic verbs had to do with errors in -Le placement, errors in the object of the verb or errors involving the usage of modal verbs. Subjects tended to place -LE after the object of VO compound, instead of splitting the compound and putting the marker after the verb. Subjects also struggled to form the objects of telic verbs correctly. Additionally, subjects struggled to use modal verbs correctly in sentences where the main verb was telic.

The Aspect Hypothesis predicts that learners will begin to mark atelic verbs for perfective aspect later than telic verbs. Looking at the perfective marking of atelic verbs it was discovered that a number of subjects replaced the RVC *dao* 'to,' which indicates the completion of a verbal action, with the perfective aspect marker -LE. This is understandable since there is an overlap in meaning and function between the two morphemes. The other common error involving the marking of atelic verbs for perfective aspect was the lack of or incorrect bounding of the verbs.

Many other errors involving the use of -LE were identified in the data, however only one subject usually made them once. Some of these include using -LE in sentence patterns incorrectly, errors in using -LE with time narration devices, errors where -LE is used instead of the correct aspect marker and errors where -LE is used to replace the second character of a two characters word compound.

The final area of the qualitative analysis was a brief discussion of the Aspect Hypothesis' ability to predict L2 learner's sequence of aspect marker acquisition and how the order of attrition might be related to this sequence. While looking at marker attrition levels in individual narrative types did not reveal anything of interest, looking at the data set as a whole revealed a percentage drop in usage between T1 and T2 sequence that was the exact opposite of the predicted LE>ZAI>ZHE acquisition sequence. This finding might suggest that the attrition in the ability to produce these three aspect markers is the exact opposition of their acquisition as predicted by the Aspect Hypothesis. This topic, however, needs more research before claims can be made.

6.3 Pedagogical Implications

The results of this study's analysis suggest that both the general attrition and the specific attrition of aspect markers were similar for both oral tasks. This implies that rote memorization does not have a strong affect on language attrition, at least for the subjects, data, and analysis completed for this study. So the question remains, what implications do these findings have for the CFL classroom? This is not an easy question to answer. If the desire is to see whether or not having students memorize and perform dialogues in the beginning level classroom is worthwhile or not, answering the question from the perspective of language attrition is perhaps not the best way to go about it. Furthermore, because these subjects were not compared to other subjects who had not used memorization in their learning process, it is impossible to assert that memorization has no effect on learners' retention of the language. Perhaps of the subjects in this study had not memorized the founder's story, their attrition in general might have been much worse.

Looking at the question from an acquisition perspective might be more effective. However, this was not the purpose of this study.

A better way to answer this question is to look at what has been learned about the performance of the subjects who have experienced language attrition. One of the most important insights that this study provides is the amount of linguistic ability these learners (who originally obtained a fairly high level of language proficiency) have retained over such a long period of time, both in general language ability, and in the ability to mark aspect. By examining the data, it becomes apparent that the linguistic knowledge has not been 'lost' because, for most subjects, a large quantity and variety has been retained, but they are simply more difficult to retrieve from memory. As one previous learner of Chinese said while listening to two native speakers conversing on a bus, "The tune is familiar but I don't know the words. "

That tune is becoming increasingly popular, however. With the rapidly growing international importance of China, there has been an explosion in Chinese language learning worldwide. This phenomenon is often referred to in Chinese as *hanyu re* 'Chinese hot.' Learning Chinese is indeed hot right now, with K-12 programs springing up around the country and college classrooms bulging at the seams. At the same time there is a renewed interest by many previous learners of Chinese to regain their forgotten linguistic skills for business, education, or other purposes. This research gives hope to those who wish to re-learn what they have forgotten because it shows just how much ability remains. Looking at the combined studies in CFL attrition can inform those designing curriculum to meet the needs of these former students of Chinese.

For example, specific activities could be built into a course that would help students decrease the length of time needed for linguistic retrieval of vocabulary items. Aspect markers could be re-learned by raising the students' awareness of marking aspect through having them listen to a narrative and identify the markers being used. Then they could read the same narrative and identify the verbs being marked for aspect. Speaking tasks could be used to provide contexts in which the learners may mark aspect. Feedback for spontaneous speech and planned written usage could be used to assess re-learning. Finally, since many students of Chinese memorized dialogues while learning in the classroom, a teacher could begin instruction by having the students re-learn the previously memorized dialogues and then use these as a foundation from which to regain production skills.

As described in the summary of findings, three main patterns of incorrect -LE usage were identified in this study. The first involved using modal auxiliary verbs showing potentiality such as *hui* 'will' with a main verb marked for aspect by -LE. This error was common in the data, but it could be addressed in the classroom quite easily. After students are made aware of auxiliary verbs and post-verbal -LE, instructors need to teach these concepts together and help students discover why the two can't be used together. Instructors could then give their students opportunities to produce language in which the two are kept separate.

Another pattern of -LE errors involved marking an atelic verb with -LE, but not providing an endpoint to the verb. For example, some subjects marked the atelic verb *gandong* 'move (to be moved emotionally)' with -LE, but did not quantify the verb with a

time phrase. This error is understandable since often -LE is taught in isolation without discussion of the types of verbs that can be marked by -LE. Additionally, it is probable that most learners, used to the English tense system, have never considered whether the verbs they are using have built-in endpoints. Instructors need to raise learners' awareness of these issues and provide opportunities for learners to apply their new knowledge. Since the subjects in this study had received so little formal instruction and gained most of their proficiency by living in a Chinese-speaking environment it is understandable that such an error was made.

The last error involved subjects using -LE instead of the RVC *dao* 'to,' which indicates the completion of a verbal action. Since intermediate level learners tend to struggle learning correct RVC usage and all levels of learners make many errors using -LE, it is hard to know if classroom instruction would prevent this error, or not. It is possible that the informal nature of the subjects' language learning brought about this type of error and that more typical classroom learners might not have trouble with this error. Classroom instructors might not need to teach this explicitly, but would listen for this type of error and correct it if and when it is encountered. A good rule for instructors teaching -LE is not to teach it in isolation. They should always discuss the verbs being marked. In this way problems with modal verbs, atelic verbs, and RVCs can be prevented.

6.4 Limitations

This study is limited in factors related to the nature of the data used, as well as the research methods employed. The data used for this research has some inherent weaknesses that could not be overcome. First, the number of subjects used in this study is

small. Although it is remarkable that 23 subjects were located after 12 years and none of the subjects used in this research had studied or used Chinese formally in that time, a larger number of subjects would contribute to the validity and reliability of the findings. Similarly, the subjects are somewhat unusual in that they only received two-months of formal language instruction before spending 18 to 22 months in Taiwan where they only studied the language informally on their own. Generally speaking, the oral proficiency was gained while using the language to accomplish daily proselytizing responsibilities. Because the subjects did not attend any language classes or receive any formal or structured feedback on their language production while in Taiwan, it is quite possible that many of their errors fossilized. Consequent to the type of subjects used for this study, the results lack external validity because they cannot be generalized to the typical college level language students who may only spend a summer or two studying abroad.

Another weakness related to the nature of the data used is that it was impossible to measure the proficiency level of the subjects used. Ideally, the subjects' proficiency level would be measured the moment they stepped off the plane from Taiwan, before attrition had begun to take place. Unfortunately, this was impossible to do. The T1 data collection did not take place until six months to five years after the subjects had returned to the United States. Consequently, attrition had already taken place at the time of the T1 data collection. It is quite possible that the subjects were somewhere on the "initial plateau" of attrition that Bahrick (1984) described. T1 therefore is not a pre-attrition, but beginning to mid-attrition measurement. The data is also limited in that it only contains

two snapshots of language production, T1 and T2. A third and fourth collection of data would provide a clearer picture of the attrition landscape.

Other weaknesses in this study are directly related to the research methods used. Of biggest concern is the measurement of attrition itself. While there are many measurements of attrition, for the purposes of this study only content score, narrative length as well as aspect marker count, variety, and usage were examined. This limited number of variables only gives a small glimpse of attrition, and may not provide an accurate one. It has been stated that, "The first sign of language attrition . . . is not the 'loss' of certain items but rather an increase in the length of time needed for their retrieval" (Hansen, 2001, p. 63). Other variables, especially those related to fluency may give a clear picture. Furthermore, the nuances of attrition are missed by the quantitative nature of this study. Russell (2004) explains this idea further, stating, "The data thus suggest that the growth and attrition curves as they relate to fluency, at least, may well be more complex and variational in nature than may easily be accounted for by our, as yet rather simplistic, univariate measures of skill" (p. 240). A much more complex investigation is needed to understand the complexities of attrition.

6.5 Suggestions for Future Study

The field of CFL attrition is quite new and completely wide open for research. Previous to this current study, only six major studies have been completed in the field. Five of these used the same data as this study and of those five, four were MA theses and one was a doctoral dissertation. Furthermore, only Chen (2006) used narrative data, while the others focused on sentence level data. Hayden (2003) is the only major study

not using Taiwan returned missionary data. However, his research was somewhat limited by the short length of language disuse. He examined reading attrition before and after summer vacation. Looking at the list of CFL attrition studies below, it is clear that more research needs to be done in this field. Besides new areas of investigation, the topics already covered should be studied again with changes made to account of the weaknesses in the previous studies and to build off the foundation that has been started. Table 6.2 below outlines previous CFL attrition research.

Table 6.2

CFL Attrition Research

Author	Date	Type	Attrition Topic
Zhang	1988	MA Thesis	Tones
Wang, R.	1999	MA Thesis	Vocabulary
Wang, S.	2002	MA Thesis	Tones
Hayden	2003	Published Paper	Reading
Chen	2006	MA Thesis	Fluency
Wang, S.	2007	PhD Dissertation	Syntax
Present Study	2009	PhD Dissertation	Aspect

This study has been exploratory in nature since no previous studies in CFL, that the researcher is aware of, have investigated the affect of memorization on language attrition. Additionally, as can be seen from the studies listed above, aspect attrition by L2 learners of Chinese has yet to be studied. To build off this study's findings, research in these two areas is needed and welcomed. The effect of memorization of dialogues at the beginning level of learning on language loss was addressed in this study, but not satisfactorily answered in the eyes of the researcher. To address this problem other attrition variables need to be investigated. First, as described above, the variables measured in this study

might not be the best for measuring the effect of memorization on attrition. Investigation of other variables, such as those related to fluency, might be insightful. It is possible that the subject produced memorized narratives more fluently, as compared to the open-ended narrative, because it had been previously memorized. Since the narratives are already transcribed, and Chen (2006) has developed fluency measurement procedures for this data, this type of research would be achievable.

Second, too many uncontrolled variables obscured the potential benefits of memorization. For example, because of the nature of the data and the time periods in which it was collected, it was impossible to measure the subjects' proficiency level although it is assumed that generally speaking, they reached a fairly high level of proficiency by the time they finished their missionary service and left Taiwan. This high proficiency may have confounded the variables in this study. It is likely that the affect of dialogue memorization at the beginning level of study is beneficial at the beginning and intermediate levels of proficiency, but that by the time upper intermediate and advanced levels are reached, the effect is surpassed by general proficiency. In other words, when subjects reach a certain level of proficiency and have the linguistic knowledge associated with that level, they are beyond the point of relying on the structures and sentence patterns they had memorized as a beginning level learner. This may have been a factor in this study.

To better understand the effect of memorization on language attrition, a logical next step would be to understand how memorization affects language acquisition. This could be done by comparing two beginning level groups of students, one that memorized

and performed dialogues and one that did not. Then follow these students over a summer break or other period of disuse and then measure their production abilities again, comparing the two groups to see if the memorization of dialogues had any affect on the language loss that took place over the break.

Another interesting continuation of this current research would be to track subsequent returning missionaries who had served missions in Taiwan. For the last seven years or so, missionaries living in Taiwan have not been using or memorizing formal missionary lessons like the ones described in this study. While this change probably reflects general trends in L2 pedagogy, it is yet to be seen if this has any affect on the proficiency levels attained by the missionaries.

Finally, the next logical step to continue the current research project is to contact the subjects and collect the same set of data again. Oral communication with Dana Bourgerie (December 2007) at Brigham Young University confirms that a third collection of data did take place, but that this data was inadvertently destroyed while being housed at another university. This is a very unfortunate loss. Japanese L2 attrition researcher Robert Russell (2004) warned attrition researchers about a problem of T1/T2 data. He stated,

> A word of caution is in order with regard to time-series designs in general. Three levels of time, as employed in the present study, are already rather minimal for statistical purposes. The results of studies using only two levels of time (like many of those cited above) must be interpreted with even greater caution (p. 240).

Unfortunately, as time goes on it becomes more and more difficult to locate the same group of subjects and so the already small pool of subjects becomes even smaller.

An additional step in improving the investigation of aspect marker attrition in this study would be to examine more marker usage. As described in chapter three, the data set used for this study includes much more oral production then the two narratives used here. The sentence-level data, additional narrative and story retelling data needs to be mined for aspect marker usage. More data would provide a better indication of how the markers are being used in a variety of contexts and allow for stronger statistical analysis. The complete data set is extremely rich and diverse. It needs to be used by more researchers for attrition research.

Despite the limitations, this study has helped illuminate the idea that memorization at the beginning of CFL study doesn't seem to have a major affect on language attrition. If researchers wish to understand the effect of memorization, it would be useful to study it from the perspective of language acquisition, rather than language attrition. Additionally, this study has shown that in regard to aspect marking, subjects seemed to retain the ability to mark aspect even after long periods of language disuse. Perfective marker -LE was used with the most frequency at both T1 and T2, yet it also had the most errors. This means that the subjects in the study who have learned Chinese while living in country might not be acquiring the ability to use that marker correctly in speech. Similar attrition research should be done with students in the classroom to determine whether formal instruction brings better mastery of the suffix -LE. Although the results of this study show that significant levels of attrition occurred over the 12-year interval, many subjects were still able to produce fairly sophisticated and accurate

language. This gives hope to previous CFL learners who wish to re-learn the language. It also informs teachers of several pedagogical issues involved in teaching these students.

Most of all, this study should provide hope for those students who fear that language attrition is their inevitable fate as they embark on the start of their study.

APPENDIX A: CODING INSTRUCTIONS

INSTRUCTIONS:
The purpose of this study is to better understand the effect that rote memorization has on language attrition. More specifically, the loss of grammatical aspect markers will be investigated. Your job is to identify and color code the grammatical aspect markers found on each page of the data packet. Make sure that you only code characters being used to show aspect (even if the usage is incorrect)

As you know, the character 了 can also function as a Current Relevant State (CRS) sentence-final particle. Additionally, when 了comes after a verb at the end of a sentence, it can be difficult to determine whether it is the perfective verb suffix –le, or the CRS sentence-final le. Similarly, the characters 过，在，呢，着 can also have various usages. Only code the ones that show aspect. Please take your time and work carefully.

Here is a list of the grammatical markers that I would like you to code and the corresponding color with which to mark it. If you make a mistake while coding the data, please circle it with the correct colored highlighter and write the number of the correct aspect marker (1-6) next to the character.

Aspect Markers to Code:

1. Perfective LE (also known as –le)
2. Experiential GUO
3. Durative ZAI
4. Durative NE
5. Stative ZHE
6. Delimitative V+V; V+yi+V

Examples of each Aspect Marker

1。他看了一个电影。
2。他看过那个电影。
3。他在看电影。
4。他(在)吃饭呢。
5。他看着电影。
6。你式(一)式

Once you have completed identifying and color coding the aspect markers in the data set, go back and rate each grammatical marker usage as being correct or incorrect. Using a pen, write a **C** or correct usage, or **IC** for incorrect usage. If you are not sure, use your best judgment.

If you have any questions, please don't hesitate to give me a call or send me an email. Once you are finished coding the data, please send it back to me using the enclosed envelope. Your pay will be sent to Dr. Liu after I receive the correctly coded data packet. Thank you,

Michael Paul
208-496-3488
michaelaaronpaul@gmail.com

APPENDIX B: FOUNDERS STORY 1983 VERSION

3.1
我们要跟你们谈一谈， 一位名叫斯密约瑟的先知

1820 年的时候，斯密约瑟还是个少年， 他住在美国的纽约州

那个时候大家都很关心宗教
每一个牧师都希望人加入他的教会

约瑟希望加入真实的教会
但是每个教会教导的事互相矛盾， 他不知道哪一个教会才是真的
有一天斯密约瑟在读圣经的雅各书

在第一章第五节， 他读到： 一个人如果想知道真理， 他就应该用信心求问神， 神一定让他知道
这个应许深深的打动了约瑟的心
他决定求问神， 到底哪一个教会是对的

有一个春天的早晨， 约瑟到一个小树林去祈祷

在他祈祷的时候， 天父和耶稣基督从天上降下来，向他显现

天父叫著斯密约瑟的名字， 指著耶稣基督说：
这是我的爱子， 听他说！

3.2
基督吩咐斯密约瑟不要加入任何教会
他说他们的教训是人为的， 不是神的教训

APPENDIX C: FOUNDER'S STORY1973 VERSION

传教士：

我们带给你们的信息跟见证， 就是今天神继续由活着的先知引导他的儿女们。我们特别想要你们认识一位名叫斯密约瑟的先知。在一八二零年， 斯密约瑟还是一位在美国纽约州的青年。

他家附近发生了很大的宗教骚动，整个地区似乎都受了影响。 许多人加入各种宗教派系， 在人民之间引起很大的不安 有的人说到这个教会来， 有的人说到那个教会去。并且各宗派的牧师都积极鼓动这种骚动， 希望人人加入他们的教会， 但是当人们分别加入教会以后，掀起了很大的风波， 彼此也厌恶起来了， 牧师反对牧师， 教友反对教友。他们的情感， 由于语言的冲突， 意见的不同， 就完全消失了。

那时候， 他还不满十五岁， 为了这件事， 非常苦恼。虽然他的感情有时候很冲动，但是还抱着客观的态度；只要有机会， 他还是常常去参加教会的聚会。各宗派间的冲突实在是太大了， 使这位对人对事都缺乏认识的青人得不到结论，无法确定哪个

教会事对的， 哪个教会是
错的。

这些教派之间的风波， 使
他非常困扰。 有一天，
斯密约瑟读到圣经， 雅各
书第一章第五节， “你们
中间若有缺少智慧的，应
当求那厚赐与众人，也不
斥责人的神，主就必赐给
他。“

斯密约瑟非常感动。从来
没有任何经文对人有过那
么大的影响。他知道， 如
果有人需要从主而来的智
慧那就是他。因为各宗派
的教师对同样的经文都有
不同的解释，一致使他一
直得不到答案。

他想“要是我不能获得比
以往更多的智慧，就永远
不知道到底哪个教会使对
的，哪个教会是错的。也
许我应遵照圣经的指示
求问神去。“

一八二零年春天，一个
美丽明朗的早晨， 斯密约
瑟走近树林。到达预定的
地方，跪下来全心全意的
祈祷。这是他第一次发出
声音的祷告。

突然，有一道比太阳更
明亮的光渐渐的落在他的
身上；光中他看见两位荣
耀的人。其中一位叫着斯
密约瑟的名字，并且指着
另一位说，“这是我的爱
子，听他说！“

我们见证天父和他的爱子

耶稣基督确曾向斯密约瑟
显现，并和他讲话。事实上
；我们到府上来拜访的目
的，就是要把这美妙的信
息告诉你们，并且向你们
说明， 你们怎么样才能够
知道这件事情是真实的。

(skipping three paragraphs)Start C-13

传教士：
　耶稣基督答复他的问题，
吩咐他不要加入任何教
会，并且告诉他为什么不
要加入教会。他说那些教
会里的人，虽有崇拜神的
形式，却教导人为的教义
，而不是神的教义。王先
生，这些事情是不是帮助
你明白了，为什么现在的
教会里教导这么多互相冲
突的教义？

APPENDIX D: CONTENT ANALYSIS SCORING SHEET

Subject:

1983 Version Idea Units		
1. (3.1) 我们要跟你们谈一谈		
2. 一位名叫斯密约瑟		
3. 的先知		
4. 1820 年的时候，		
5. 斯密约瑟还是个少年，		
6. 他住在美国		
7. 的纽约州		
8. 那个时候大家		
9. 都很关心宗教		
10. 每一个牧师		
11. 都希望人加入他的教会		
12. 约瑟希望加入真实的教会		
13. 但是每个教会教导的事 互相矛盾，		
14.他不知道哪一个教会才是真的		
15. 有一天斯密约瑟在读圣经		
16. 的雅各书		
17. 在第一章		
18. 第五节，		
19. 他读到：		
20. 一个人		
21. 如果想知道真理，		
22. 他就应该用信心		
23. 求问神，		
24. 神一定让他知道		
25. 这个应许		
26. 深深的打动了约瑟的心		
27. 他决定求问神，		
28. 到底哪一个教会是对的		
29. 有一个春天		
30. 的早晨，		
31. 约瑟到一个小树林		

32. 去祈祷		
33. 在他祈祷的时候， 天父		
34. 和耶稣基督		
35. 从天上降下来，		
36. 向他显现		
37. 天父叫著斯密约瑟的名字，		
38. 指著耶稣基督		
39. 说：		
40. 这是我的爱子，		
41. 听他说！		
42. (3.2)基督吩咐斯密约瑟		
43. 不要加入任何教会		
44. 他说他们的教训是人为的，		
45. 不是神的教训		

Remaining content from subject's performance:

APPENDIX E: SUBJECT BACKGROUND QUESTIONNAIRE

CHINESE ATTRITION STUDY
Demographic Data

Name_____ Date _____
Local Phone_____ Address _____
Permanent Phone_____ Address _____
Place of Mission _____
Date of Mission: From _____ To _____

Compared with how well you spoke Chinese during your test in 1986-1987, how well do you feel you speak now? (Circle a number)

Better same worse
1 2 3 4 5 6 7

Compared with how well you understood spoken Chinese during your test in 1986-1987, how well do you feel you understand now? (Circle a number)

Better same worse
1 2 3 4 5 6 7

Compared with how well you read and wrote Chinese during your test in 1986-1987, how well do you feel you understand now? (Circle a number)

Better same worse
1 2 3 4 5 6 7

Have you studied Chinese formally since your last test with us? Yes _____ No _____
If so, how much? _____ Number of semesters _____
When? _____

How many months have you spent in a country where Chinese is spoken since your last test with us? _____

Here in the States, how often have you spoken Chinese since your last test with us?

Almost Never | 1 2 3 4 5 6 7 | Constantly

How often have you read Chinese since your last test with us?

Almost Never | 1 2 3 4 5 6 7 | Constantly

How often have you listened to Chinese TV or radio since your last test with us?

Almost Never | 1 2 3 4 5 6 7 | Constantly

Have you used Chinese in your career? Yes _____ No _____
If yes, how? _____

REFERENCES

Andersen, R. W. (1982). Determining the linguistic attributes of language attrition. In R.D. Lambert & B.F. Freed (Eds.), *The loss of language skills* (pp. 83-118). Rowley, MA: Newbury.

Ausubel, D. P., Novak, J. D., & Hanesian, H. (1978). Educational psychology: A cognitive view (2nd ed.). New York: Holy, Rinehart and Winston.

Bahrick, H. (1984). Fifty years of second language attrition: Implications for programmatic research. *Modern Language Journal, 68*, 105-118.

Berko-Gleason, J. (1982). Insights from child language acquisition for second language loss. In R. D. Lambert & B.F. Freed (Eds.), *The loss of language skills* (pp. 12-23). Rowley, MA: Newbury.

Berman, R. & Olshtain E. (1983). Features of first language transfer in second language attrition. *Applied Linguistics, 4*, 222-234.

Bernhardt, E. B. (1991). *Reading development in a second-language*. Norwood, NJ: Ablex.

Chen, K. D. R. (2006). *Fluency attrition in adult L2 Mandarin speakers*. Unpublished master's thesis, Brigham Young University, Provo, Utah.

Chafe, W. (1980). The pear stories: Cognitive, cultural, and linguistic aspects of narrative production. Norwood, New Jersey: Ablex Publishing Corp.

Christensen, M. B. (1990). *The punctual aspect in Chinese: A study of the perfective and inchoative aspect markers in Mandarin and Cantonese*. Unpublished master's thesis. Ohio State University, Columbus.

Christensen, M. B. (1994). *Variation in spoken and written Mandarin narrative discourse.* Unpublished doctoral dissertation, Ohio State University, Columbus.

Christensen, M. B., & Warnick, J. B. (2006). *Performed culture*. Columbus: Ohio State University Printing Services.

Cohen, A. (1974). The Culver City Spanish immersion program: How does summer recess affect Spanish speaking ability? *Language Learning*, 24, 55-68.

Cohen, A. (1975). Forgetting a second language. *Language Learning*, 25, 127-38.

Ding, Y. (2007). Text memorization and imitation: The practices of successful Chinese learners of English. *System*, *35*, 271-280.

Duff, P., & Li, D. (2002). The acquisition and use of perfective aspect in Mandarin. In R. Salaberry & Y. Shirai (Eds.), *The L2 acquisition of tense-aspect morphology* (pp. 417-453). Amsterdam: John Benjamins.

Edwards, G. (1977). Second language retention in the public service of Canada. *The Canadian Modern Language Review*, 32(3), 305-308.

Fitzpatrick, T. & Wray, A. (2006). Breaking up is not so hard to do: Individual differences in L2 memorization. *The Canadian Modern Language Review*, 63(1), 35-57.

Godsall-Myers, J. (1981). *The attrition of language skills in German classroom bilinguals: A case study.* Unpublished doctoral dissertation, Bryn Mawr College, Bryn Mawr, Pennsylvania.

Hansen, L. (1980). Learning and forgetting a second language: The acquisition, loss and reacquisition of Hindi-Urdu negative structures by English-speaking children. (Doctoral dissertation, University of California Berkeley, 1980). *Dissertation Abstracts International, 42, 193A.*

Hansen, L. (1999). Not a total loss: The attrition of Japanese negation over three decades. In L. Hansen (Ed.), *Second language attrition in Japanese contexts* (pp. 142-153). Oxford: Oxford University Press.

Hansen, L. (2001). Language attrition: The fate of the start. *Annual Review of Applied Linguistics*, 21, 60-73.

Hansen, L., Umeda, Y., & McKinney, M. (2000, March). *Forgotten but not gone: The use of the saving paradigm in the recovery of L2 Japanese and L2 Korean lexical knowledge*. Paper presented at the AAAL conference, Vancouver, B.C.

Hayden, J. J. (2003). Shocking our students to the next level: Language loss and some implications for teaching Chinese as a foreign language. *Journal of the Chinese Language Teachers Association*, 38(3), 1-20.

Hedgcock, J. (1991). Foreign language attrition: a study of the chronological and processing regression models. *Foreign Language Annals, 24*(1), 43-55.

Jin, L. & Hendriks, H. (2003). The development of aspect marking in L1 and L2 Chinese. *Working Papers in English and Applied Linguistics*, 9, 69-100.

Johnson, R. E. (1970). Recall of prose as a function of the structural importance of the linguistic units. *Journal of Verbal Learning and Verbal Behavior*, 9, 12-20.

Ke, C. (2005). Patterns of acquisition of Chinese linguistics features by CFL learners. *Journal of the Chinese Language Teachers Association*, 40(1), 1-24.

Kubler, C. K. (2006). *NFLC guide for basic Chinese language programs* (2nd ed.). Columbus: Ohio State University UniPrint.

Kuhberg, H. (1992). Longitudinal L2-attrition versus L2 acquisition in three Turkish Children-empirical findings, *Second Language Research, 8*(2), 138-154.

Li, C. N. & Thompson, S. A. (1981). *Mandarin Chinese: A functional reference grammar.* Berkeley: University of California Press.

Li, P. & Shirai, Y. (2002). *The acquistion of lexical and grammatical aspect*. Berlin and New York: Mouton de Gruyter.

Ma, L. (2006). *Acquistion of the perfective aspect marker le of mandarin Chinese in discourse by American college learners*. Unpublished doctoral dissertation, The University of Iowa, Iowa City.

Magiste, E. (1979). The competing language systems of the multilingual: A development study of decoding and encoding. *Journal of Verbal Learning and Verbal Behavior, 18,* 79-89.

Mauerman, P. (1985). *Language attrition in French-speaking missionaries*. Unpublished master's thesis, Brigham Young University, Provo, Utah.

Missionary Discussions Mandarin Publication. (1973). Salt Lake City, UT: The Church of Jesus Christ of Latter-day Saints.

Missionary Discussions Mandarin Publication. (1983). Salt Lake City, UT: The Church of Jesus Christ of Latter-day Saints.

Moorcroft, R., & Gardner, R.C. (1987). Linguistics factors in second-language loss. *Language Learning, 37*(3), 327-340.

Meyer, B. J. (1975). Identification of the structure of prose and its implications for the study of reading and memory. *Journal of Reading Behavior*, 7, 7-47.

Nagasawa, S. (1999). The effects of initial achievement, learning experience and classroom instruction on adult attrition/retention of L2 Japanese. In P. Robinson

(Ed.), *Representation and Process: Proceedings of the 3rd Pacific Second Language Research Forum, 1,* 135-156.

Neissser, U. (1984). Interpreting Harry Barhick's discovery: What confers immunity against forgetting? *Journal of Experimental Psychology: General, 113*, 32-35.

Olshtain, E. (1989). Is second language attrition the reversal of second language acquisition? *Studies in Second Language Acquisition, 11*, 151-165.

Paul, M. A. (2005). *The forgotten skill remembered: Identifying reading strategies of intermediate and advanced level Chinese foreign language readers*. Unpublished master's thesis, Brigham Young University, Provo, Utah.

Pino-Silva, J. (1989). *A study of children's language proficiency change over time*. Unpublished doctoral thesis, Indiana University, Bloomington.

Porch, B. E., & Berkeley-Wykes, J. D. (1985). Bilingual aphasia and its implications for cerebral organization and recovery. Proceedings of the *Clinical Aphasiology Conference: Clinical aphasiology conference* (pp. 107-112), Ashland, OR: BRK Publishers

Reetz-Kurashige, A. (1995). *Attrition of Japanese returnees' English speaking skills : Tracking verb usage.* In L. Hansen (ed.), *Second language attrition in Japanese contexts* (pp. 21-58). Oxford: Oxford University Press.

Robison, R. **(**1985). Language attrition in secondary school students of Spanish. In A. Labarca (Ed.), I*ssues in L2: Theory as practice/practice as theory* (pp. 266-278). Norwood, NJ: Ablex.

Russell, R. (1999a). Lexical maintenance and attrition in Japanese as a second language. In L. Hansen (ed.), *Second language attrition in Japanese contexts* (pp. 114-141). Oxford: Oxford University Press.

Russell, R. (1999b). Measuring attrition in L2 Japanese syntactic competence. In P. Robinson (ed.), Representation and process: Proceedings of the 3rd pacific second language research forum. 1, 297-308.

Russell, R. (2004). Fluency-related variables in the loss of L2 Japanese skills. In S. Koyama, K. Otomo & M. Nohara (eds.), *Gengo to Kyooiku: Nihongo o Taisyoo tosite* [Language and Education: Focusing on Japanese] (pp. 229- 245). Tokyo: Kurosio Shuppan.

Scherer, G. A. C. (1957). The forgetting rate in learning German. *German Quarterly, 30*, 275-277.

Smith, C. S. (1997). The parameter of aspect (2nd ed.). Dordrecht, The Netherlands: Kluwer Academic Publishers.

Smith, M. T. (1996). *Tracking verb usage in adult speakers of Spanish as a second language: An attrition study*. Unpublished master's thesis, Brigham Young University, Provo, Utah.

Smythe, P. C., Jutras, G.R., Bramwell, J.R., & Gardner, R.C. (1973). Second language Retention over varying time intervals. *Modern Language Journal, 57*, 400-405.

Sullivan, C. T. (1992). *An analysis of errors and attrition of –wa and –ga particle usage by adult native English-speaking learners of Japanese as a second language.* Unpublished master's thesis. Brigham Young University, Provo, Utah.

Taguchi, N. (2007). Chunk learning and the development of spoken discourse in a Japanese as a foreign language classroom. *Language Teaching Research*, 11(4), 433-457.

Tomiyama, M. (1994, March). *Longitudinal second language attrition: Case studies of Japanese returnees*. Paper presented at the Annual Meeting of the Teachers of English to Speakers of Other Languages, Baltimore, MD.

Utts, J. (2005). *Seeing through statistics (3rd ed.)*. Pacific Grove, CA: Duxbury Press.

Van Els, T. (1986) An overview of European research on language attrition. In B. Weltens, K. de Bot and T. Van Els (eds.), *Language attrition in progress* (pp. 3-18). Dordrecht, The Netherlands: Foris.

Wang, R. (1999). *Vocabulary attrition in intermediate level Mandarin speakers*. Unpublished master's thesis, Brigham Young University, Provo, Utah.

Wang, S. (2002). Chinese tone attrition in adult mandarin speakers. Unpublished master's thesis, Brigham Young University, Provo, Utah.

Wang, S. (2007). *Syntactic attrition in Mandarin speakers*. Unpublished doctoral dissertation, Brigham Young University, Provo, Utah.

Weltens, B. (1989). *The attrition of French as a foreign language*. Dordrecht: The Netherlands: Foris.

Weltens, K. de Bot & T. van Els (Eds.) (1986), *Language Attrition in Progress.* Dordrecht, The Netherlands: Foris.

Weltens, B., Van Els, T. J. M., & Schils, E. (1989). The long-term retention of French by Dutch students. *Studies in Second Language Acquisition, 11*, 204-216.

Wen, X. (1995). Second language acquisition of the Chinese particle 'le.' *Issues in Applied Linguistics*, 5, 45-62.

Yang, J. (2003). Back to the basic: the basic function of particle LE in modern Chinese. *Journal of the Chinese Language Teachers Association,* 38(1), 77–96.

Yoshida, K., Arai, A., Fujita, T., Hattori, T., Nagano, K., Okamura, A. Tanaka, M., Yanaura, K. & Yoshitomi, A. (1989). [A consideration on the retention of foreign language by returnees]. In [*A survey on the foreign language retention of returnees*], Vol.1, 12-28.

Yoshitomi, A. (1992). Towards a model of language attrition: Neurobiological and phychological contributions. *Issues in Applied Linguistics, 3*(2), 319-340.

Yoshitomi, A. (1994). *The Attrition of English As a Second Language of Japanese Returnee Children.* In L. Hansen (ed.), *Second language attrition in Japanese contexts* (pp. 80-113). Oxford: Oxford University Press.

Zhang, J. (1988). *Attrition patterns in learners' use of Mandarin Chinese tones.* Unpublished master's thesis, Brigham Young University, Provo, Utah.