

English Language Skills Attrition in Speed and In-depth Reading Comprehension among EFL Learners

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ABSTRACT

This study aimed to identify if learners experience any skills attrition in speed and in-depth reading comprehension over a two-month non-use of English language. One hundred and twenty-seven tertiary participants received both a pre-test and a post-test, whose contents were adapted from China's College English Test, Band 4 and Band 6, made up of four short passages to measure proficiency change in in-depth reading comprehension (DR) and one long passage to determine the proficiency change in speed reading comprehension (SR). The results did not indicate any statistically significant skills attrition in both modes of reading comprehension, though slight increase was found in SR, while slight skills attrition was obtained in DR. The results questioned the threshold theory in terms of subcategories and provided some possibly beneficial suggestions for English language learners.

Keywords: Attrition, in-depth reading, speed reading, threshold hypothesis

INTRODUCTION

In China, after a two-month summer holiday, many university students feel hard to understand the documents carrying modern science and technology since they may have lost much of their English knowledge once gained in their universities or colleges. Thus, this situation is worrying and has led scholars to commit themselves to research into language attrition, which plays a significant role in language learning.

Language attrition, in this study, is defined as the process in which the acquired language knowledge degrades when bilinguals or

multilinguals suspend or decrease their language learning. This process should be physiological rather than pathological. In other words, this process should belong to natural decline rather than unnatural decline (Ni, 2007b).

Four areas of language attrition are often discussed. They can be categorized based on what language (L1 or L2) is attrited and where (L1 or L2 context) the language is attrited. Based on these criteria, the description of language attrition is known as the "van Els taxonomy" ("language attrition," n.d.) (see Table 1). As illustrated in Table 1, L1 loss in an L1 environment can be observed among people with

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dementia or those with aphasia in the situation of native language. L1 loss in an L2 setting can be observed amongst immigrants who lose their first language in their new environment. L2 loss in an L1 setting is usually observed in individuals who have lost the ability to use an L2 that was perhaps studied at school in their L1 setting. Finally, L2 loss in an L2 environment is most commonly observed amongst immigrant communities without any formal training in their L2 who lose that L2 as they age and revert to their L1 (“language attrition,” n.d.). This study mainly focused on the attrition of L2 (English) learners in an L1 (Chinese mandarin) language environment.

There are a number of hypotheses in the area of language attrition. One well-known hypothesis, which is referred to as *threshold theory*, has been heatedly discussed and corroborated in literature. Neisser (1984) suggested that Bahrick’s participants might have overcome a “critical threshold” which helped them to become more resistant against attrition, implying that there was “a critical point in *overall language proficiency*, below which attrition is rapid and extensive, but above which a large proportion of the initially acquired material is retained” (Clark, 1982, p. 58). The findings in Bahrick’s study showed that after the first years in which all subjects lost equal amounts, the subjects who had received higher levels of training lost a progressively smaller proportion of their knowledge. Thus, it can be said that higher levels of proficiency in the long run aid retention (Xu, 2007, p. 6). So far, there has been a great deal of research devoted to this hypothesis, arguing that the threshold hypothesis should be taken into consideration in future attrition research (Grendel, 1993; Weltens and Grendel, 1993; Weltens, van Els and Shils, 1989;

Hansen, 1999; Murtagh, 2003). It is argued that those who have passed the threshold must have shaped a systematic ability to understand and internalize the knowledge structures, which is called a schema by Neisser (1984). He explained that this schema was much more resistant to attrition than isolated pieces of information.

An amount of research into language attrition over a holiday has been conducted in various linguistic elements. Smythe *et al.* (1973) conducted a study to investigate second language attrition over a summer vacation, during which no SL instruction was provided. 220 students from three secondary schools in Ontario were tested for the amount of loss in French skills they might suffer during the summer vacation between grades nine and ten. It was concluded that the loss in reading comprehension was slight but significant, while there was also a slight but significant gain in listening comprehension.

Cohen (1974) investigated the effect of summer vacation on Spanish oral skills. The selected 14 participants were Anglo children from the Culver City Spanish Immersion Programme. These children were taught exclusively in Spanish when they were in kindergarten and then gradually introduced into Mandarin in the 1st grade. The effect of summer vacation between the first and second grades on their spoken Spanish was studied, and it showed that a three-month summer vacation had reduced the children’s Spanish oral skills. Utterances became shorter. At least one grammatical class (preposition) was slightly less used, while another (verbs) was more frequently applied. After the vacation, the participants made more errors than they had done before the vacation. Problems with articles and adjectives which learners used to misuse remained.

TABLE 1
Attrition taxonomy

Van Els terminology: Possible attrition		
X	Language environment (L1)	Language environment (L2)
L1 loss	L1 (e.g. aphasia)	L1 (e.g. minority communities or immigrants)
L2 loss	L2 (e.g. language students)	L2 (e.g. older immigrants who revert to their L1)

However, there are also different voices in the literature. For example, it was argued that the participants generally demonstrated little language attrition over eight months of non-use of Spanish. Although high retention of receptive abilities, such as reading and listening, was expected, the participants' productive sub-abilities, such as phonology, vocabulary and syntax, were better than expected (Mehotcheva, 2007).

In China, there has also been some literature regarding language attrition. Wang (2008) explored the vocabulary attrition and argued that vocabulary attrition was a significant phenomenon in language attrition. Moreover, according to the empirical investigation on the factors influencing foreign language attrition, it was proven that the Argument for the Superiority of Younger Learners in foreign language acquisition was a one-sided view (Cao, 2007). Cao (2007) argued that learners need to learn a foreign language only after they have possessed the basic skills of their mother tongue. It is not true that the younger the learners are, the more competent they will be in learning a foreign language. Young learners are vulnerable to foreign language attrition, especially in the contexts of their native language. The attributes of foreign language attrition were also summarized from eight aspects: exclusive inducement, physiological mechanism, independent attriter, selected linguistic elements, regressive attriting course, ununiformity speed, obscure performance, and accelerated relearning (Ni, 2007a).

Despite the fact that plentiful research into language attrition has been carried out, to the author's knowledge, there has not been any research devoted to language attrition in terms of speed and in-depth reading comprehension. Most of the research regarding reading comprehension only took the overall reading comprehension proficiency into account, instead of further subcategories. Accordingly, this study, which dipped into the attrition in reading comprehension at different rates, i.e. speed and in-depth reading comprehension, would possibly

open a new window to further exploration of language attrition in reading comprehension.

The dawn of the new century is witnessing much research concerning the processes of reading comprehension, among which Steinberg's (Steinberg *et al.*, 2001) Universal Four-Phase Reading Program seems convincing and interesting. The programme comprises four phases, namely, the Word Familiarization, Word Identification, Phrase and Sentence Identification, and Book Reading. This programme focused on meaning-oriented reading activities. In this study, reading comprehension was measured through standardized tests rather than other instruments that could identify the four phases, so the four phases would be integrated into a whole, i.e. the overall reading comprehension ability, rather than the specific four phases, would statistically be measured in order to determine if the learners experienced any attrition in reading comprehension during the two-month break. Gough and Tunmer (1986) proposed the *simple view* of reading, in which reading comprehension is seen as the product of *Word Decoding* and *Listening Comprehension*. The formula is as follows:

$$\text{Reading comprehension} = \text{Word Decoding} \times \text{Listening Comprehension}$$

Though simple, this approach does a remarkably good job of accounting for the data (e.g. Johnston and Kirby, 2006), and it indicates that the abilities to decode words and to understand oral language greatly impact reading comprehension ability. Learners whose word decoding ability is very poor or those with very low listening comprehension ability tend to be poor readers. In other words, in case that learners' listening comprehension is significantly raised and their word decoding ability remains stable, it is possible that they gain in reading comprehension. On the other hand, if learners' word decoding ability rises and listening comprehension ability remains the same, their reading comprehension ability may also climb up. This study would firstly identify

whether attrition occurs during the holiday and then analyze the results with this widely accepted formula.

This study aimed to explore if students, namely; tertiary students of Nanjing University of Posts and Telecommunications (NJUPT) experienced attrition in speed and in-depth English reading comprehension. The purpose of this study was to test the theory of language attrition that relates time span to English reading comprehension for the undergraduates at NJUPT. The time span, one independent variable, is generally defined as the period when participants receive no specific language training and have no immediate access to language use. The possibly attrited reading comprehension, the dependent variable, is deemed as the reading proficiency after the participants are beyond English learning for a certain period. The intervening variables such as testing environment and scoring criteria were statistically and properly controlled in the study. Apparently, there were some deficits in this study. On one hand, the sample group selected was merely from NUPT in China. This sample group might not represent all of the tertiary students in China since other tertiary students in different universities were not included. This might also cause or lead to biased results although the sample group was randomly selected from a large population, which was considered a compensation for this limitation. On the other hand, the time span between both tests was merely two months, and this might have left residues in the participants' mind and thus influenced the results obtained. In order to achieve the research purpose, a research question was raised, "Will students experience attrition in both speed and in-depth reading comprehension over a two-month holiday break?"

METHODS

The design of this study involves two tests which were conducted before and after the holiday, respectively (referred to as pre- and post-tests). The performance scores of both the tests were analyzed by means of SPSS, a well-known programme with the full name *Statistical Product and Service Solutions*. Meanwhile,

the theoretical framework was based on the related theories in foreign language attrition and memory science, e.g., threshold theory and reading comprehension theory, which attempted to integrate quantitative with qualitative methods in order to gain reliable and plentiful results to a large extent.

Participants and Their Sampling

First of all, the information on the EFL learners, such as matriculation numbers, and genders, was gathered to define the participants. In this study, 3 out of 9 classes were randomly selected to participate in both the tests and Classes A31, A38 and A 40 were finally chosen. The number of participants was 127, and this was basically representative since they were randomly selected according to their matriculation numbers. All of the participants had received two semesters' English education in NJUPT, in which both intensive and extensive reading courses were involved.

The participants, with Chinese and English as L1 and FL, respectively, were tertiary students from NJUPT. The sample of the study was from non-English major students. They were students from different faculties, majoring in different fields, out of which, male and female students were roughly proportioned (around 70% males to 30% females). Having learned English in NJUPT for two semesters, all the participants began to learn English in their junior middle school. Therefore, all of them have learned English for around seven years in the Chinese context. The age of the participants varied from 18 to 25 years old. Those aged from 18 to 20 accounted for 57.6%, followed by those aged 21 to 23 with 42.4%. The male participants accounted for 44%, and females formed the remaining 56%. There were a total of seven majors among the participants, namely, network engineering (0.8%), logistic management (8.8%), electronic business (22.4%), marketing (26.4%), information management and system (40.0%), communication engineering (imbedded system development) (0.8%) and automation (0.8%).

Procedure

In this study, the required data were collected longitudinally. At NJUPT, English is a compulsory course for students to register. Most of the students in the same grade select the same English course. Students are required to register for the same English courses during the first 4 to 5 semesters without exception. At the end of the semesters, they tend to take the same tests for the same English courses. Therefore, it is more convenient to conduct the tests twice on the same participants.

The two-month holiday is considered as an incubation time when students receive no formal training and have no immediate access to English knowledge. The timeline is graphically presented in *Fig. 1*, showing the specific time when the data were collected. The participants went through the pre-test in July 2008 (i.e. before the summer holiday) and the post-test in September 2008 (i.e. after the summer holiday) in the same classroom invigilated by the same two lecturers.

There are two pairs of pre- and post-tests. Pair 1 includes pre- and post-SR, and Pair 2 is made up of pre- and post-DR. Both pairs have different test items. They, however, are at the same difficulty level. The difficulty levels are set via sampled test takers' performance scores by the committee in charge of CET4 and CET6 every year. Both were adapted from the same CET 4 (China's College English Test Band 4) and CET 6 (China's College English Test Band 6). Furthermore, the number of words in both tests was almost the same. As for the pre-test, there were a total of 2459 words for the in-depth reading and 1299 words for the speed reading.

Similarly, the number of words for the in-depth reading in the post-test was 2461 and this was 1296 for the speed reading of the post-test. Another factor to support the same difficulty level is that both tests should be finished within the same time span, i.e. 50 minutes, during which 35 minutes is allotted to in-depth reading and 15 minutes to speed reading.

Considering the deficit that there might be some information remaining in participants' mind over the holiday, 127 participants took the Pair 2 tests with different test items but at the same difficulty level with Pair 1 tests. After both tests, the same two lecturers marked them under the same guidelines and using the same scoring criteria. All of the answers to both tests were objective, except for the last three blank filling in the part of speed reading. The answers to the last three blanks were also restricted to several words. In order to validate the scoring, the scorers were strictly trained to use the same judging criteria and the biased scorers were screened. In this way, the scores should be able to make unbiased judgments.

Pre- and Post-tests

In this study, two test papers, adapted from both CET 6 and CET 4, were used for both the pre- and post-tests. CET 6 and CET 4 should have strong reliability to test the participants' speed and in-depth reading comprehension. They have gone through approximately 20 years of validation ever since they were set in the 20th century. They are nation-wide, large-scale, and standardized tests in the charge of the Chinese Ministry of Education, whose aim is to objectively and precisely measure students'



Fig. 1: Timeline of the study

overall English proficiency, including speed and in-depth reading comprehension (Yang and Weir, 1998). To ensure that the difficulty level is the same each time, pilot studies were conducted before they could be taken as formal tests, which can guarantee that test takers' same score means the same level of English proficiency. Therefore, graduates with high scores in CET 6 and CET 4 are widely acknowledged and accepted by employers in China since they can objectively and indiscriminatingly show their overall English proficiency. It has also been evidenced that CET6 and CET4, internally and externally, are both highly reliable and valid to test participants' reading skills (Yang and Weir, 1998).

Test Description

In-depth reading comprehension

This part is a traditionally long-standing test type in China, which is supposed to be able to measure participants' in-depth reading comprehension. In this study, the participants were required to cover approximately 2500 words and complete 20 questions within 35 minutes. There are four passages in this part. Each passage is followed by five questions or unfinished statements. For each of them, there are four choices marked with A, B, C, and D. The participants should decide on the best choice and mark the corresponding letter on the ANSWER SHEET with a single line through the centre. There are a total of 20 questions in this part, and each question accounts for two points, adding up to the full mark 40 points.

This part requires the participants to read with intensive attention and in great detail, otherwise they may fail to choose the correct answer. Many answers lie in bits of details in the context, which aims to compel the participants to conduct in-depth reading rather than merely skimming and scanning. In addition, the main idea of a passage is also a frequent question, demanding students' holistic comprehension of the passage. There are also some questions concerning inferential abilities. The participants

would not be able to obtain the answer directly from the context, rather, they had to infer from the contexts until they managed to get the correct answer. Thus, this part can possibly test the participants' in-depth reading comprehension.

Speed Reading Comprehension

This part was designed to test the participants' ability to get the main points and obtain the key information by skimming and scanning the passage within a short time. In this part, the participants were given 15 minutes to go over one passage quickly and answer the questions. The number of words for the passage is around 1300, which forms a speed reading task for students to complete within 15 minutes. There are ten questions in total, each question accounting for one point, with a total of ten points. For the first seven questions, the participants were required to mark Y (for YES) if the statement agrees with the information given in the passage; N (for NO) if the statement contradicts the information given in the passage; NG (for NOT GIVEN) if the information is not given in the passage. As for the last three questions, three sentences are supposed to be completed with the information given in the passage. In this part, the participants' certain reading speed is required, which must be much faster than that for in-depth reading. In this way, this test item is supposed to be capable of identifying the participants' speed reading comprehension.

RESULTS AND DISCUSSION

The non-parametric two-related-samples tests compare the distributions of two related variables. If the data are continuous, normally or not normally distributed, the Wilcoxon signed-rank test (one kind of non-parametric two-related-samples tests) can be used because the test incorporates more information about the data, and it is more powerful than the sign test (Muijs, 2004, p. 89). The data in the tests were all found to be continuous, and thus, the non-parametric two-related-samples test (the Wilcoxon signed-rank test) was used to analyze

TABLE 2
A comparison between pre and post tests (N=127)

Test	Mean		Difference (post-pre)	Percentage (%)	Z
	Pre	Post			
SR	5.06	5.17	0.11	2.2/0.97	1.73
DR	21.01	20.86	-0.15	-0.71/0.98	1.37

p<0.05, two-tailed

the data. The test was aimed to test whether the observed differences between the means of the data samples were significant based on the statistical hypothesis testing approach. The analyzed data include two pairs of data. One pair is the pre-speed reading and post-speed reading, and the other is the pre-in-depth reading and post-in-depth reading. The results are shown in Table 2 with the valid number 127, in which SR stands for speed reading comprehension, while DR means in-depth reading comprehension.

This table is quite revealing in several ways. In the first place, the compared results between the pre- SR and post SR did not show any statistically significant change, although learners' SR after the holiday seemed to be slightly gained. This is corroborated with the findings for the overall reading comprehension by Mehotcheva (2007), who argued that receptive skills (listening and reading comprehension) were well retained but not highly gained over 8-month non-use. However, it did not corroborate Smythe's argument (1973), who reported slight but significant attrition in the overall reading comprehension. In the second place (Table 2), it could be inferred that DR went through slight but not statistically significant attrition during the two-month holiday. Since it was not statistically significant, the slight attrition might be due to random errors. Accordingly, it could not be concluded that DR experienced significant attrition during the holiday, which seemed in conformity with Mehotcheva's argument on the overall reading comprehension.

Putting the statistical significance aside for a while, the focus can now be shifted to the percentage of the reading comprehension

change. According to Table 2, it could be easily identified that the post-SR gained 0.11 % over the pre-SR, which could be considered as having a slight gain. By contrast, the post-DR lost 0.15 % compared with the pre-DR. In other words, the interesting change found in this study was that learners' SR gained slightly but not significantly, while learners' DR lost slightly but insignificantly either.

It is most likely that some people may argue that the finding of this study is not that convincing. However, the study is at least valid based on the present situation. CET 4 and CET 6 are both standardized tests experiencing long practical operation and validation. Both of them should be qualified to test SR and DR. In addition, the study is also internally valid. By way of Cronbach alpha formula, the internal consistency was also assessed. The coefficient of SR was found to be 0.97, and the coefficient was 0.98 for DR. Integrating SR and DR into a whole, the item-total Cronbach alpha is 0.75. Therefore, the pre- and post-tests seemed to have both reached a satisfactory level in terms of internal and external validity.

It is evidenced that the results of this study are corroborated by some literature. As mentioned above, reading comprehension is affected mainly by two factors, namely, listening comprehension and word decoding. The listening abilities have been reported to slightly but significantly improve over a summer vacation (Smythe *et al.*, 1973). On the condition that the listening abilities have increased, the reading comprehension possibly at least remains stable if the word decoding skills have not fluctuated excessively. Even if the word decoding ability has decreased, the reading comprehension could

still have remained unchanged or resistant to attrition as long as the listening skills increase, as reported by Smythe *et al.* (1973).

Another possible explanation for insignificant attrition in the reading comprehension over a two-month holiday could be explained from the memory theory and threshold hypothesis. In this study, since the participants have learned English for around seven years, they may have arrived at the critical point which made them resistant against forgetting. During the holiday, or when learners have no immediate access to English knowledge or have not received any formal language training, they may still store the acquired knowledge in their mind. When the school began and they received the post-test, their memory might have been stimulated and recovered (Hilgard and Bower, 1966). As a result, their test performance was not significantly poorer than it was before the holiday.

There is another important point worth highlighting. Table 2 indicates that SR increased by 2.2% while DR decreased by 0.71 %. This might reveal that learners had failed to retain DR but successfully retain SR, and this seems surprising and puzzling. One tentative reason is that the thresholds in both the SR and DR are at different levels. Learners might have reached the *critical point* of SR, but still remained away from the *critical point* of DR. The *critical point* of the SR may be somewhat lower than that of the DR. Hence, learners who reached the *critical point* of SR successfully retained SR but forgot the DR since they might have not reached its *critical point*. If this hypothesis is valid, Clark's argument (1982) that learners would become resistant against attrition if they attained to "a critical point in *overall language proficiency*" should possibly be changed to, "a critical point in *language proficiency of a specific linguistic element*."

The threshold levels in different linguistic elements may vary. There may be a threshold level for the SR but a different level for the DR. Besides, the threshold levels in the short-duration and long-duration listening comprehension, as well as different types of writing and speaking,

may also be divergent. Admittedly, because the decrease and increase in both the DR and SR are not statistically significant, the results might have been due to random errors as well.

CONCLUSIONS

It is most likely that ESL learners benefit from this study in that they need not worry about the attrition in reading comprehension too much if they have no adequate language contact during their two-month holiday. They may alternatively become more alert towards other linguistic elements, such as the oral and writing skills, which have been found to suffer attrition (Mehotcheva, 2007), and thus, they can consciously practice and prevent attrition. This study may also be linked to the conceptual idea of the threshold levels in language acquisition. The study has revealed that attrition does not occur across all reading skills at the same time. This heterogeneity in attrition could be explained by the presence of different threshold levels in learning a language. It appears that different threshold levels may need to be established to give a meaningful account of how language is learned and retained. This effort may help to demystify some of the unresolved puzzles in language attrition.

This study also seems pertinent and it is also necessary for further work to be done on how attrition can be minimized or overcome. In order to minimize attrition during the two-month holiday, the authors suggest that a relatively concrete programme be designed to serve as holiday language activities to minimize attrition. Based on the overview of statistically significant results, the activities can be designed to take into account language skills which have attrited or otherwise.

Attrition can be explained from many perspectives. It can be linked to the process in language acquisition, language contact, language shift, code switching, and code mixing. In this study, attrition has been linked to a holiday period and data collection was concentrated on the use of standardized tests which could yield reliable data on language ability. While some

of the data were confirmatory of some existing studies, there were also findings which are rather provocative and peculiar. Thus, the data cannot be claimed as exhaustive but they can be used to attain advanced knowledge with regard to attrition and the learning of English as a foreign language.

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