Applying Incidental Learning to Vocabulary Memorization

--- Is Vocabulary Learning through Reading Useful for L2 Learners in Memorizing the Meanings of Adjectives and Verbs?

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1. Introduction

More and more Chinese people are becoming aware of the importance of English, which is due to the increasingly global communications in the English language. However, it is known to us that words play an indispensable role in human communication. Without words, the language for us would be inane, just as a building cannot be constructed without bricks. The methods for learning English vocabulary well are always heatedly discussed in China and it is quite a problem for those who take English as a second language. Since Chinese and English are from different language families, the shape, meaning and grammar of them are not similar at all. As a result, learning English words is difficult for most Chinese students.

However, many students still use traditional methods to learn English vocabulary, such as learning new words through explicit instruction. Furthermore, many English teachers use traditional strategies to teach vocabulary, such as repeating the new words and reciting the new words. This method of learning and teaching English vocabulary can be realized as intentional learning, in other words, explicit learning. In a short term views, this vocabulary learning called rote learning may immediately bring some benefits and be helpful for the vocabulary acquisition. Furthermore, China is not an English-speaking country and its cultural background, ideology and educational philosophy are totally different from the westerns. Students in China cannot acquire the English knowledge from other places than classrooms and they are limited by the instructional conditions, in which they have to learn the vocabulary mechanically. Hereby, rote learning is common and popular in China. However, in other linguists research, for instance Read, he finds that “many native speakers acquire 70% of their native language incidentally as they meet with new words in the speech and writing of others.” (2000: 43) This means incidental learning is very useful for language acquisition. “Incidental learning means learners acquire vocabulary unconsciously when they are using language for communicative purpose.” (Schmitt, 2000: 120).
In all, this study investigates the memorization strategies used in acquiring new vocabulary. It compares different strategies and discusses the implications of these from the learning perspectives.

1.1 Aim
The present study investigates whether incidental vocabulary learning through reading helps the Chinese middle school students to memorize the contextualized meanings of adjectives and verbs. Some pedagogical implications for learners and teachers based on the results of the investigation and related theories are discussed in relation to vocabulary acquisition.

1.2 Material and Method
To carry out this investigation, both subjects and materials are selected with deliberation. Moreover the primary material in this study are the test paper (see the Appendix One) and a questionnaire (see the Appendix Two), which was adopted into the study in order to complete this research. More details are presented in the following. Both of them are done by the subjects after a self-learning period.

1.2.1 Subjects
The subjects of this survey are students in Grade One of Chinese public middle school. They are all Second Language Learners and they have all studied English for three years. Thirty students are selected as the participants of this study. They are selected to have the same English level according to their normal examination results (usually, all of these thirty subjects can achieve around 80% in an examination). Then, to find the difference between the method of vocabulary learning thorough reading and Chinese traditional learning strategy (rote memorization), the thirty students will be divided into two groups: Group A and Group B. Each group has chosen one strategy to memorize vocabulary (The strategies had already been supplied and one of the groups was asked to use one method by the researcher). What is more, each group has fifteen students.
Additionally, Teacher A is the English teacher of both Group A and Group B. Teacher A also is the one who handed out the test papers and questionnaires to the subjects in the classroom, and then collected them and sent them to the researcher.

1.2.2 Reading Material and Target Words

The reading material used in the study is a fairy tale The Frog Prince with 555 words. Before decided which specific reading materials to give to the subjects, ten passages were given to the subjects and they were asked to choose one of them as the reading material. Afterwards, the fairy tale The Frog Prince was selected. The benefits for selecting this tale are its readability and it’s suitable level for the participants from Grade One in middle school.

To begin with, Nation (2001: 161) introduces a formula about readability (The Flesch Reading Ease Formula):

$$RE = 0.4 \times \frac{\text{words}}{\text{sentences}} + 12 \times \frac{\text{syllables}}{\text{words}} - 16$$

This means that with this formula the readability of a text is calculated by seeing how long the sentences are and how long the words are. As regards to the fairy tale The Frog Prince’s readability, based on the formula above, the RE is 8.31. The Figure 1 below is about the RE of other nine reading materials.
<table>
<thead>
<tr>
<th>Reading material</th>
<th>RE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text A</td>
<td>5.46</td>
</tr>
<tr>
<td>Text B</td>
<td>6.32</td>
</tr>
<tr>
<td>Text C</td>
<td>7.13</td>
</tr>
<tr>
<td>Text D</td>
<td>5.78</td>
</tr>
<tr>
<td>Text E</td>
<td>4.89</td>
</tr>
<tr>
<td>Text F</td>
<td>8.26</td>
</tr>
<tr>
<td>Text G</td>
<td>7.59</td>
</tr>
<tr>
<td>Text H</td>
<td>5.53</td>
</tr>
<tr>
<td>Text I</td>
<td>6.94</td>
</tr>
</tbody>
</table>

Figure 1 above shows the companion between other nine reading materials about the different numbers of RE. Since the RE of the fairy tale *The Frog Prince* is 8.31, Nation (2001) points out that the Re is the higher the better. This fairy tale *The Frog Prince* could be believed readability for the subjects.

Moreover, because the subjects are students in Grade One of Chinese public middle school, they can not read and understand complicated and deep articles. The fairy tale fits their level and motivates them to read.

After the reading material has been selected, ten words were chose from the fairy tale, which are almost new words for English learners, according to the research of Webb (1962), he found that learners could cover 10-15 words per hour, have been selected out as target words. The 10 target words from the reading material are selected out by the researcher based on the result of a pre-test (see the part 1.2.3). Moreover, every word is glossed with the Chinese meaning according to the Advanced Learner’s English-Chinese Dictionary (2005). The target words are verbs and adjectives, because Read (2000) believes that it is better to focus on content words when doing...
vocabulary research. “Nouns are the easiest word class to learn, adverbs the most
difficult and verbs and adjectives are in the middle.”(Schmitt, 2000: 60) That means it
is better to use verbs and adjectives as study material, because nouns are too easy
while adverbs are too difficult for the sampled learners.

1.2.3 Pre-test
The aim of the pre-test is to measure their respondents’ knowledge of target words.
Here it is necessary to emphasize that in this test, if a word is known by most students,
this word should be excluded from the target words’ list, because these words may
affect the objectiveness of the study results. This test contains 16 words come from
the selected fairy tale which the subjects have not read before. The subjects (the
number is 50) here are not from the two groups and they are the same English
knowledge level as the two groups’ students. Hence it is reasonable to believe that the
words which would be selected are completely new words for the two groups’
students. The test is English to Chinese translation, in other words, students should
give the meaning either in L1 (Chinese) or L2 (English). The figure below shows the
results of the pre-test.

<table>
<thead>
<tr>
<th>Vocabulary from The Frog Prince</th>
<th>Number of correct recognition</th>
<th>Vocabulary from The Frog Prince</th>
<th>Number of correct recognition</th>
</tr>
</thead>
<tbody>
<tr>
<td>live</td>
<td>3</td>
<td>full</td>
<td>36</td>
</tr>
<tr>
<td>many</td>
<td>31</td>
<td>young</td>
<td>14</td>
</tr>
<tr>
<td>beautiful</td>
<td>6</td>
<td>cry</td>
<td>35</td>
</tr>
<tr>
<td>follow</td>
<td>9</td>
<td>lovely</td>
<td>9</td>
</tr>
<tr>
<td>disappear</td>
<td>7</td>
<td>open</td>
<td>8</td>
</tr>
<tr>
<td>reply</td>
<td>11</td>
<td>bring</td>
<td>41</td>
</tr>
<tr>
<td>golden</td>
<td>8</td>
<td>take</td>
<td>42</td>
</tr>
<tr>
<td>drink</td>
<td>38</td>
<td>ugly</td>
<td>2</td>
</tr>
</tbody>
</table>
According to the Figure.2 above, the target words have been selected based on the result of pre-test. The final target words are live, beautiful, follow, disappear, reply, golden, young, lovely, open, ugly and the words which were excluded based on the results of pre-test are many, drink, full, cry, bring and take.

1.2.4 Questionnaire

The questionnaire (see the Appendix Two) involves three questions to which the respondents are asked to answer A or B (part of them are open questions and needed the subjects to answer very clearly) At last, the data from the questionnaire is collected by Teacher A and analyzed by researcher in discussion part. After finishing the delayed post-tests, all of the subjects should answer the questionnaire immediately.

1.2.5 Post-test

The aim of this test is to compare the results gave by the students in Group A and Group B and to find out whether it is effective to memorize vocabulary incidentally through reading. Moreover, according to Schmitt (2000) and Ebbinghaus (Baddeley, A., Eysenck, M. W., & Anderson, 2009), on the one hand, memory has a key interface with vocabulary learning, and memory comes in two basic types: short-term memory and long-term memory (see section 2.3); on the other hand, Ebbinghaus also points out that the most forgetting is done in the first week (see section 2.3.2.1). Therefore, the same test is given to the participants from the two groups in different stages of experiment: one of them is test immediately after the class and the other one week later.

The test only contains of one part: supply the Chinese meaning of the marked words in the given fairy tale: The Frog Prince. Thus, the test contains the ten words and 10 points for each word and the total score is 100. Each test takes 15 minutes, and Teacher A is in the examination room to monitor them to ensure that no student can
cheat on the test. When students had completed the post-tests, Teacher A collected them and sent them to me.

1.2.6 Procedure
The experimental procedure consists of several stages (See Figure 3). In stage 1, Group A students were asked to read the fairy tale The Frog Prince, with the target words are marked with *. The words are glossed in Chinese. Afterwards, they were mainly asked to focus on explaining the general meaning of the tale and repeat the tale. Finally, the words were tested immediately. Then teacher A gathered the grades of the test and calculated the average grade. Moreover, the students in the Group A are asked to write a summary about the fairy tale in the immediate post-tests. This was done to make sure that the students memorized the target words after reading them in context, rather than memorizing them directly.

In stage 2, Group B students were the same target words were given to the students without the fairy tale and they directly learn the contextualized meanings of the words and memorize the words mechanically. At last, the words were tested immediately, and the grades were gathered and the average grade calculated.

In stage 3, the two groups were asked to do the same test a week later without reviewing the words which have been taught. The grades of the test were gathered according to their different classes and average grades were calculated. When this was done, Teacher A gave the questionnaire to the subjects and collected them back 15 minutes later.

In addition, all the materials used in this investigation were E-mailed to Teacher A and he printed them out and then handed out to his students. The results were collected also by him and e-mailed back to the researcher.
Figure 3: Experimental procedure

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>Day 1</th>
<th>Group A</th>
<th>Subjects memorize the word meaning through reading the given texts.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Group B</td>
<td>Subjects learn the word with the method of rote memorization.</td>
</tr>
<tr>
<td></td>
<td>Day 1</td>
<td>Group A and Group B</td>
<td>Subjects take the immediate post-tests</td>
</tr>
<tr>
<td>Stage 2</td>
<td>Day 8</td>
<td>Group A and Group B</td>
<td>Subjects take the delayed post-tests for testing word retention.</td>
</tr>
<tr>
<td>Stage 3</td>
<td>Day 8</td>
<td>Group A and Group B</td>
<td>Subjects are asked to answer the questionnaires.</td>
</tr>
</tbody>
</table>

2. Theoretical background

This section provides some previous research related to vocabulary memorizing. Besides various strategies of learning vocabulary, incidental learning through reading is mainly discussed as well as factors which affect vocabulary memorization.

2.1 Vocabulary

Before investigating incidental vocabulary learning through reading, it is necessary to make clear the nature and importance of the vocabulary in advance.

Generally speaking, Read (2000) believes that vocabulary is considered as an
inventory of individual words, with their associated meanings. “A word, in most linguistic analyses, is described as a set of properties, or features, each word is the combination of its meaning, register, association, collocation, grammatical behavior, written form (spelling), spoken form (pronunciation) and frequency. To master a word is not only to learn its meaning but also to learn seven other aspects. All these properties are called word knowledge” (Schmitt 2000:5).

In addition, Nation (2001) presents a figure below to explain what a word is.

![Figure 4: What is involved in knowing a word](image)

As shown in Figure 4 above, Nation indicates that “knowing a word” should involve three levels: form, meaning, and use. Hence learners should not only focus on the form and meaning of a new word but the usage of a new word. Only when these three levels are achieved, we can say that this new word has been acquired.

In addition, vocabulary plays an indispensable role in human communication. When
learning a new language, it is very important to learn as many words as possible. Laufer points out that “no matter how well the students learn grammar, no matter how successful the sounds of L2 are mastered, without words to express a wider range of meaning, communication in a L2 just cannot happen in any meaningful way” (1997: 140-155). A large vocabulary is thus necessary in learning language.

2.2 Vocabulary Learning Strategies

Since vocabulary learning plays an important role in learning English, strategies for how to learn vocabulary are taken into consideration. According to the Nation (2001: 217), a strategy would need to:

1. involve choice, that is, there are several strategies to choose from
2. be complex, that is, there are several steps to learn
3. require knowledge and benefit from training
4. increase the efficiency of vocabulary learning and vocabulary use.

Generally speaking, there are two ways to learn vocabulary: intentional vocabulary learning and incidental vocabulary learning.

2.2.1. Intentional and Incidental Vocabulary Learning

On the one hand, intentional vocabulary learning entails memorizing term after term using respective translations from a list. Incidental learning has been defined as “learning through exposure when one’s attention is focused on the use of language, rather than the learning itself” (Schmitt 2000:116). Intentional learning is quick and therefore usually preferred by learners, but it is also superficial. Learners encounter vocabulary in an isolated form and remain incapable of using it correctly in context. Moreover intentionally learned vocabulary sinks faster into oblivion.

On the other hand, in recent years, incidental learning has been increasingly addressed by researchers, realizing the shortcomings of explicit learning. Furthermore, another
linguistic researcher, Nation (2001:232) defines the incidental vocabulary learning as an important strategy in vocabulary learning. “In practice it usually means that the research subjects are given a reading or listening task without being told to focus on the vocabulary in the input and without being warned that they will be taking a vocabulary test after completing the task” (Read, 2000:44). Schmidt (1990) argues that noticing is generally considered important in second language acquisition.

2.2.2. Learning words from context

Kelly (1990:199-208) claims that “learning vocabulary from context is often seen as something opposed to the direct intentional learning and teaching of vocabulary.” This is an incidental learning strategy. Context sentences and phrases are valuable aids in learning words from contexts.

The studies of researchers in the following show that it is possible to learn words from contexts and especially is the context clues. Nation (2001: 242) claims that “the context clues are to provide a checklist for training learners in the skill of guessing from context.” Another linguists Herman, Anderson, Pearson and Nagy (1987: 263-284) argues that “studies of guessing from context have shown that there are high correlations between guessing skills and vocabulary knowledge”. In common with Nation’s opinion, Judd (1978:73) comments that “words taught in isolation are generally not remembered.” There is evidence that the presence of a sentence context can help with making the word form-word meaning association. “The text provides new vocabulary and a context to help understand it, and the retelling gives learners the chance to productively retrieve the vocabulary and ideally make generative use of it” (Nation, 2001: 135). The studies of researchers above show that it is possible to learn words from contexts and especially is the context clues.

However, Coady & Huckin (1997: 30-31) argue that “one cannot as a rule rely on contextual redundancy since there is no guarantee that a given context is redundant enough to provide clues to precisely those words that are unknown to the reader.”
This does not mean we cannot guess the meaning of an unknown word from the context, but rather that context can provide partial clues that will help the reader to arrive at a general word meaning. Furthermore, Coady & Huckin (1997: 31) also suggest four factors which affect guessing. The four factors are: “availability of clues, familiarity with the clue words, presence of misleading clues and compatibility between the reader’s schemata and the text content.”

**Availability of clues.** In Coady & Huckin’s opinions, the clues in context should not be discovered by the reader and the reader can’t find out the exact clues. It means that clues of a context must be obviously presented to readers, and only under this prerequisite, reader may guess the words with the help of the contextual clues.

**Familiarity with the clue words.** This means that the clue-containing words have to be understood. A high density of unknown words will reduce the usability of clues.

**Presence of misleading clues.** In a context, not every clue seems to be necessary or perhaps helpful.

**Compatibility between the reader’s schemata and the text content.** Namely, it means that the text content must be within the reader’s ability.

### 2.2.3. Learning Vocabulary through Reading

Reading is one kind of context from which vocabulary may be learned.

Research on L1 reading shows that vocabulary knowledge and reading comprehension are very closely related to each other. This relationship is not one directional. Vocabulary knowledge can help reading, and reading can contribute to vocabulary growth.

Nation (2001:144)
The above quotation demonstrates that reading can be beneficial for vocabulary growth. Nation (2001: 150) argues that learners need to read texts that contain little or no unknown vocabulary and the “learners” here is especially English beginners. They may be not interested with the context which involves too many new words and they won’t want to read it. In addition, the effect of extensive reading on acquisition of new second language vocabulary has been discussed by many researchers. Some L2 vocabulary researcher (Krashen, 1989) maintains that reading was the principle source of lexical increase in the L2. There is a strong link between vocabulary knowledge and reading comprehension. This is the case in first language (L1) contexts (Anderson & Freebody, 1981) and in second language (L2) contexts (Laufer, 1991). In studies of L2 learners, which is the focus of this paper, Koda (1989) revealed high correlations between vocabulary knowledge and two measures of reading, close tasks and paragraph comprehension, while Coady, Magoto, Hubbard, Graney and Mokhtari (1993) found that an increase in L2 reading proficiency can be attributed to increased proficiency in vocabulary. There has been a research interest in defining the vocabulary size required for second language reading. A study by Hwang and Nation (1995) showed that knowledge of the 2,000 most frequent word families enables L2 readers to recognize 84% of the words in various types of authentic texts. This falls well short of the 95% of words which Laufer (1991, 1992) indicated needs to be recognized for unassisted reading, and which would require a minimum vocabulary size of 3,000 word families. More recently, Laufer (1997) suggested that the 95% lexical threshold in L2 reading would be required to enable L2 readers to apply their L1 reading strategies.

Furthermore, Pigada and Schmitt argues that “researchers were so obsessed with the role of extensive reading in acquiring meaning of new vocabulary that they overlooked its other potential benefits, such as facilitating learners in spelling and recognizing grammatical characteristics of certain types of words” (2006:34). Moreover, Nation (2001:150-151) also states the reasons why learners can improve their vocabulary learning through extensive reading. Firstly, since reading is an
individual activity, learners at different English levels could learn at their own levels without difficulty. Secondly, it allows learners to follow their interests in choosing what to read and thus increase their interest in learning. Thirdly, vocabulary learning through reading can occur outside the classroom. For the reasons stated above, it can be believed that it is advisable to acquire new words through reading.

However, Nation also points out that “vocabulary learning from the extensive reading is fragile” (2001: 155), and the reason is if the word learned from extensive reading is not soon reinforced, the learning of this word would be lost.

How might reading comprehension lead to the acquisition of new vocabulary knowledge? Coady and Huckin argue that “reading comprehension involves complex interaction between reader and text in which the reader uses information from the surrounding text to verify and elaborate the mental textual representation” (1997: 176). What is more, Coady and Huckin (1997) also claim that different levels of text comprehension can involve differential analysis of individual words. The comprehension of a text is dependent on the familiarity of the words which appear in the text. Nation claims that “there is a language knowledge threshold which marks the boundary between not having and having enough language knowledge for successful language use” (2001: 144). He explains if a learner has not crossed the threshold, then adequate comprehension is not possible.

2.3. Memory
In vocabulary learning process, it consists one main part: memorizing. It is related to memory.

From the psychology perspective, memory is an organism's ability to store, retain, and recall information. Then, how do humans store information? According to Klimesch (1994: 3), “encoding or coding is the transformation of sensory information into a certain format of a memory representation, resulting in the formation of a memory
code.” According to his views, the coding format is “a result of that particular cognitive structure that determined the run of information processing during encoding.” This definition shows very clearly that a code depends not only on the physical characteristics of the stimulus, but is equally dependent on the processing principles of the cognitive system. Klimesch (1994:37) shows a Figure as follows about a hypothetical example of a component code representing a word.

Figure 5 Processing and encoding a visually presented word.

Klimesch also points out that the individual components refer to different aspects and are to a great extent redundant. As long as all components of a code are available and each component is directly accessible, “then- even if individual components are already decayed-they can be reconstructed” (1994:37).

Furthermore, three different memory systems discussed by Klimesch (1994: 32): the sensory register, short-term memory (STM) and long-term memory (LTM).

At last, Baddeley, A., Eysenck, M. W., & Anderson, M. C. (2009: 102) demonstrates that deeper coding is better and the deeper coding is a comparative speaking, as Figure 5 shows above, the deepest coding is “semantic code”. According to this view,
it can be believed that when learner want to memorize the vocabulary, it is better to use the deeper coding in the processing of vocabulary of acquisition.

2.3.1. Short-term Memory
Baddeley, A., Eysenck, M. W., & Anderson. M. C. (2009) present that the “the short-term memory” is a time applied to the retention of small amounts of material over periods of a few seconds. (2009: 9)

Klimesch (1994:35) points that there exist four characteristics which are important in describing STM: it’s limited capacity, its primarily serial way of processing, its importance as temporary-working store and its control processes.

2.3.2 Long-term Memory
Klimesch (1994) point out that Long-term memory (LTM) is memory that can last as little as a few days or as long as decades. It differs structurally and functionally from working memory or short-term memory, which ostensibly stores items for only around 18 seconds

Short-term memory is a temporary potentiating of neural connections that can become long-term memory through the process of rehearsal and meaningful association.

One of Endel Tulving’s (1973) main contributions is his theory of "encoding specificity." The theory emphasizes the fact that memories are retrieved from long-term memory by means of retrieval cues. The theory of encoding specificity states that the most effective retrieval cues are those that were stored along with the memory of the experience itself.

Klimesch (1994:41) claims that LTM is based on three different types of codes: “temporal strings that record the run of events, spatial images, and abstract propositions that serve to represent semantic knowledge.” According to his view,
semantic encoding is the deepest form of encoding in human information processing. “It is plausible to assume that knowledge stored in LTM is essentially structured alongside semantic dimensions.”(1994: 41-42)

2.3.3 Memory Networks
According to the Klimesch (1994:43), he points out that memory networks are inferred structures designed to explain how information is stored and recalled. “They are built on two different classes of elements: nodes and connecting links.” In a network, information is represented by links as well as nodes. As follows, the Figure.4 can demonstrate the memory networks more specifically.

Figure 6 The huffman tree as an example for a binary and strictly hierarchical network.

This well-known binary coding structure is a good example of a redundant network: The links leading from a node carry information which is also represented in that particular node. Klimesch (1994:44) also gives a specific explanation of this figure. “There are two types of links: those carrying the information ‘zero’ and those carrying the information ‘1’.” Each node represents a different number. The structure is hierarchical, so the more encoding stages are encountered; the more complex is the information that can be represented. It demonstrates that information can be represented both by “nodes” and “links”, and that networks become more complex as more information is
stored in them. Here, the loss or forgetting of only one component (a node or link) of the network leads to the loss of stored information. In interconnected structures, there are more links connecting one node with others and thus these structure can be used in reconstruction.

2.4 Forgetting

Memory performance and forgetting are concepts that appear to complement each other.

(Klimesch, 1994: 10)

The aforementioned quotation is stressed that if certain aspects aren’t forgotten, others cannot be strengthened and memorized. Klimesch (1994) also points that there are two competing theories of forgetting: Decay Theory and Interference Theory. “Decay theory assumes that forgetting is caused by a time-dependent autonomous process that becomes increasingly effective the more time elapse and finally leads to the complete loss of stored information and interference theory assumes that there are processes that impede or halt the retrieval, perhaps also the storage” (Klimesch, 1994: 11). Based on the illustration above, there are two factors leading to forgetting: time and interference.

2.4.1 Forgetting Curve and Decay Theory

The “forgetting curve” (See Figure 7) was discovered by a German Philosopher called Hermann Ebbinghaus in 1885, and he conducted one of the first studies of memory, using himself as the subject. He started off by memorizing a list of nonsense syllables. After memorizing them, he then tested his memory at intervals ranging from 20 minutes to thirty one days. Ebbinghaus noticed that most forgetting happened in the first twenty minutes. He later found that he performed as well in remembering the items after one month as he did at one week. Therefore, through Ebbinghaus’ experiment, it is clear that most forgetting is done in the first week.
L.R. Peterson and M.G. Peterson (1959) have studied the passive decay theory and points that “First of all, it could be demonstrated that within a retention interval of only 18s, memory performance dropped to chance-level.” (Klimesch, 1994:12) Figure 6 can show a result typical of a decay theory.

Figure 8 Idealized results of the Brown-Peterson paradigm.
In this Figure, it can be believed that the more time elapses, the greater the increase of forgetting. That is to say that forgetting is caused by a time-dependent autonomous process that becomes increasingly effective the more time elapse and finally leads to the complete loss of stored information.

2.5. Other Factors Affecting Vocabulary Acquisition

Factors affecting vocabulary acquisition have attracted many linguists’ attention. One of these researchers, Višnja Pavičić Takač (2008) has focused on the following factors which affect vocabulary acquisition. He (2008:4) points that the “factors” are:

Linguistic features of lexical items. The lexical items involves pronounce-ability (phonological features), orthography, length, morphology, similarity of lexical forms (e.g. synforms, homonyms), grammar and semantic features.

“The influence of first and other languages” L2 vocabulary acquisition is different from L1 vocabulary acquisition “because an L2 learner has already developed conceptual and semantic systems linked to the L1” (Takač, 2008, 8) An L2 learner may therefore be affected by the L1 in processing of acquisition.

“The role of memory in vocabulary learning and acquisition” Takač divides the memory into forms: “short-term memory” and “long-term memory” (2008: 10) and he also argues that in both of these two different forms of memory forgetting takes place in a similar way. When obtaining new information, most forgetting just begins. Therefore, Takač suggests that “facilitate” the transfer of the learning material into the long-term memory.” (2008:11)

“Individual learner differences” Takač identifies factors that account for individual learner differences, such as motivation, attitudes toward vocabulary learning, and the language learning aptitude. He presents the Figure below to demonstrate the
relationships among individual learner differences, learner strategies and language learning outcomes.

Figure 9 A framework for illustrating the interaction among individual learner differences, learning strategies and language learning outcomes.

The Figure 9 above shows that: “individual learner differences” play the most fundamental role and the “learner strategies” are up to them and according to Takač (2008), the different strategies may have different “language learning outcomes”. “Individual learner differences” are significant in processing new vocabulary and he demonstrates that the method of vocabulary learning should be used according to the learner’s characteristics.

3. Analysis and Discussion
This essay intends to investigate whether or not incidental vocabulary learning through reading could help the Chinese middle school students in memorizing the contextualized meanings of adjectives and verbs. On the one hand, based on the
aforementioned sections, two tests (immediate post-test and delayed post-test) are adopted in the study and the data of the results of the two tests are collected and analyzed. On the other hand, as mentioned in material section, a questionnaire is used this study to figure out the specific individual differences about the vocabulary learning. Finally, some pedagogical implications about vocabulary acquisition are provided.

3.1 Test

Above all, as the part of method aforementioned, the tests are divided into immediate post-test and delayed post-test. Furthermore, according to the different kinds of methods of vocabulary acquisition (incidental vocabulary learning in Group A and intentional vocabulary learning in Group B), the data of the test is divided and analyzed separately. Finally, this research focuses on the comparisons between the data of the immediate post-test from Group A and the data of the immediate post-test from Group B, and also compares the difference between the data of the delayed post-test from Group A and the data of the delayed post-test from Group B.

3.1.1 Immediate post-test

As mentioned above, 30 test papers of the immediate post-test were collected. The average number of correct answers which Group A and Group B gave is presented in the figures below.
As it is shown in Figure 10 above, in Group A, there are 5 students in Rank A and 10 students in Rank B in the immediate post-tests; in Group B, there are 11 students in Rank A and 4 students in Rank B. Through the comparison between Group A and Group B, the difference is obviously very large, most of Group A students gave the number of correct answers is 5-7 belonging to Rank B while most of Group B students gave the number of correct answers is 8-10 belong to Rank A. It can be believed that in immediate post-test, rote memorization is more helpful for vocabulary learning.

After analyzing the different ranks at which the students were according to the translation accuracy, the average number of correct answers in the immediate post-tests is then calculated to be further discussed. The Figure below is about the average number of correct answers in immediate post-test which are from Group A and Group B.
Figure 11 Data from the immediate post-test

<table>
<thead>
<tr>
<th></th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>The average number of correct</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>answers (there are totally ten</td>
<td></td>
<td></td>
</tr>
<tr>
<td>answers in a test)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rate of accuracy in the</td>
<td>70%</td>
<td>80%</td>
</tr>
<tr>
<td>immediate post-tests</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Figure 11 above shows the average number of correct answers and the percentage of accuracy in a test.)

As is presented in the figure above, the average number of correct answers from Group A is around 7 while the average number of correct answers from group B is 8. Therefore Group B who did mechanical memorization gave more right answers than Group A students, who memorized the vocabulary though reading in immediate post-test. It can be argued that the mechanical memorization in vocabulary acquisition can help students retaining more words than students who acquired the vocabulary in incidental learning through reading in a very short period.

To illustrate the reasons why the outcomes of two groups are different, the outcomes need to be considered from two perspectives: one is the vocabulary learning strategies and the other one is cognitive psychology.

Firstly, these two groups learned the target words in two completely different strategies. On the one hand, in Group A, as mentioned above, the students were asked to acquire the target words which were marked in the fairy tale The Frog Prince. They memorized these target words through reading and repeating the given context. In that way, it can be believed that the way in which the students in Group A used is an incidental learning. According to Read (2000), incidental learning means that “the research subjects are given a reading or listening task without being told to focus on the vocabulary in the input and without being warned that they will be take a vocabulary test after completing the task” (2000:44) Therefore, the term incidental
learning is not a directly learning but a way of acquiring the knowledge subconsciously. It needs to take a long period to play its role in helping vocabulary learning. On the other hand, in Group B, the students were asked to memorize these same target words without a given context only through rote memorizing. In that way, it can be believed the method the students in Group B adopted is an intentional learning. Schmitt (2000) demonstrates that explicit learning of vocabulary focuses attention directly on the information to be learned. As a result, rote memorization may draw Group B students’ attentions directly to the target words. Group B students are able to give more correct translations in the immediate post-test.

What is more, from the view of cognitive psychology, the short-term memory and long-term memory are at completely different levels, which have already been discussed in the theoretical background section. According to Klimesch (1994), the difference is also displayed in the hypothetical example of a component code representing a word (see the part 2.3.1). In Figure 5, the students in Group B are just at the processing of “identification of letters” and it reflects to a “letter codes” while the students in Group A are at the processing of “identification of meaning” and it reflects to a “semantic code”. This means that the students just focus on the form of the words and the words can be retained in a short time. The students in Group A focus on the meaning of words. On the other hand, according to the interferences theory, Group A students may be interfered by the context information even “impede or halt the retrieval, perhaps also the storage” (Klimesch 1994).

3.1.2 Delayed post-test

The delayed post-tests were handed out to the all students who are the subjects in my research one week later. When the delayed examination was over, Teacher A collected and sent the results to me. In the same way, the average number of correct answers which the Group A and Group B gave is presented in the figures below.
Figure 12  The distribution of the number of students at different ranks in delayed post-tests

(Three are three ranks: the number of correct answers is 8-10 belonging to Rank A; the number of correct answers is 5-7 belonging to Rank B; the number of correct answers is 0-4 belonging to Rank C.)

As is shown in Figure 12 above, in Group A, there are 3 students in Rank A, 7 students in Rank B and 5 students in Rank C in the delayed post-tests; in Group B, there are 2 students in Rank B and 13 students in Rank C. Through the comparison between Group A and Group B, the difference is obviously very large, Group A students gave far more correct answers than Group B students did in the delayed post-test. It can be believed that in delayed post-test, vocabulary learning through reading is more useful.

After analyzing the different ranks at which the students were according to the translation accuracy, the average number of correct answers in the delayed post-tests is then calculated to be further discussed. The Figure below is about the average number of correct answers in the delayed post-test which are from Group A and Group B.
In the Figure 13 above, it can be seen that the average number of correct answers from the Group A is 5 while the average number of correct answers from the Group B is 3. For this reason, the result of the table is totally different from immediate post-test. In delayed post-test the Group B who did mechanical memorization, got fewer correct answers than Group A students who memorized the vocabulary though reading. It can be argued that the strategy of incidental vocabulary learning though reading can help the students remembering vocabulary more than the strategy of rote learning in a long period.

Furthermore, it also concerns about two main perspectives to illustrate that the reasons why the outcomes are different: one is learning strategies and the other one is cognitive psychology.

At first, in the aspects of learning strategies, the students in Group A and Group B learned the target words with two completely different strategies: incidental learning vocabulary though reading and intentional learning vocabulary though rote memorizing. According to these two different learning strategies, the students in Group A can recall the memory of the target words with the help of the fairy tale. The previous researches studied by Laufer, Pigada and Schmitt (2006), emphasizes that new vocabulary can be acquired by the extensive reading. Furthermore, Coady & Huckin (1997) point out that readers can use information from the context to “verify
and elaborate the mental textual representation”. In accordance with Coady & Huckin, Schmidt(1990) holds a similar opinion that learners do not acquire knowledge of words or any other elements of language unless they consciously notice them in some sense. In addition, Judd (1978) reports that “word taught in isolation are generally not remembered.” From these previous researches, vocabulary memorization through reading was proved to be effective. Moreover Coady & Huckin (1997) suggest that one can guess the general meaning of a word with help of contextual clues. This means that the Group A students can guess the word according to its contextual clues. As a whole, for these reasons, the students in Group A may recall the information of the target word with the help of “mental textual representation” in the delayed post-tests. While, the students in Group B tried to recall the meanings of the target words only by their residual retention about the words.

Additionally, in the aspect of cognitive of psychology, it can be concluded that it is the long-term memory that interferes with the results of the delayed post-tests and then how it affects the results are interpreted below.

To begin with, Klimesch (1994) argues that the long-term memory can last as little as a few days or as long as decades. And Endel Tulving (1973) also points out that memories are retrieved from long-term memory by means of retrieval cues. As the results of delayed post-tests explored, students in Group A can retain the target words in long-term time and it can be argues that the kind of students in Group A’s memory is a long-term memory. The theory of encoding specificity states that the most effective retrieval cues are those that were stored along with the memory of the experience itself. Namely, the students in Group A can store the words with “retrieval cues” in the given context and it is possible to recall the meaning of the words in the delayed post-test. Moreover, according to the memory network. Klimesch (1994) emphasizes that information can be represented both by nodes and links, and that networks become more complex as more information is stored. Here, if the loss or forgetting of only one component (a node or link) of the network leads to the loss of
stored information, and in interconnected structures, there are more links connecting one node with others and thus these structures can be used in reconstruction. It means that if the students in Group A may not recall the meaning of the target word, they can infer the meaning of the target words from the given context. Thirdly, it can be considered from the perspective of “component code”. According to the Figure of Klimesch (1994), the strategy the students in Group A used is in common with the “semantic code” and it is the deepest code in that figure. What is more, Baddeley, A., Eysenck, M. W., & Anderson. M. C. (2009) points that the deeper coding is better. And it is difficult to forget. All in all, the interpretations above are very specific and convincing.

3.1.3 Comparison between the immediate post-test and delayed post-test.

The table below offers the comparison between data from Group A and Group B students in the immediate post-tests and the delayed post-tests.

<table>
<thead>
<tr>
<th></th>
<th>Immediate post-test</th>
<th>Delayed post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>7 70%</td>
<td>5 50%</td>
</tr>
<tr>
<td>Group B</td>
<td>8 80%</td>
<td>3 30%</td>
</tr>
</tbody>
</table>

(The number in the above table is the average number of correct answers students gave and the percentage is the average rate of accuracy.)

The table above displays that the students in Group A gave 7 correct answers in the immediate post-tests; while, in the delayed post-test, Group A students gave 5 correct answers. And the students in Group B gave 8 correct answers in the immediate post-tests; while, in delayed post-test, Group B students gave 3 correct answers. Comparison between the results from immediate post-tests and delayed post-tests show that the number of correct answers both Group A and Group B students gave
decreases, and the number of correct answers the Group B students gave decreases more greatly.

The reasons which may attribute to the results shown above are the following: Firstly, the reduction of the number of correct answers along with passing time, is due to forgetting. Referring to the study of Klimesch (1994), he reports that the decay theory “assumes that forgetting is caused by a time-dependent autonomous process.” As time has elapsed, it finally leads to the complete loss of stored information. Therefore, the forgetting of the words stored by both Group A and Group B students is done as the time elapsed. Furthermore, from the focus of attention of the vocabulary learning through reading, Coady & Huckin (1997) argue that learner can not rely on contextual redundancy since there is no guarantee that a given context is redundant enough to provide clues to precisely those unknown words, and Nation (2001) emphasizes that “vocabulary learning from extensive reading is very fragile. If the small amount of learning a word is not soon reinforced by another meeting, then that learning will be lost,” which indicate that students in Group A may not guess out the precise meaning of a new word from the contextual clues and it is not possible that student who want to learn new words only rely on the extensive reading without any other excises or reviewing. Therefore, it can be concluded that the number of correct answers Group A students gave decreases.

Additionally, the reasons why the number of correct answers the Group B students gave decrease more greatly are discussed below. As mentioned in theoretical background, most forgetting is done in the first week and it is also analyzed in discussion part 3.1.2.2, while the students in Group A, who learned vocabulary though reading, can recall some stored information about the target words with the help of contextual clues, anyhow according to the theory of memory networks, students in Group A can recall the words meaning with the help of the reconstruction of incomplete information. For this reasons, Group A students could retain more words than Group B students did.
3.2 Questionnaire

As mentioned in the aim part, this research is to study the incidental learning perspective though reading. Hence, the questionnaires were handed out to the Group A students to find out the points about this research from the students in this group. Furthermore, according to previous research of the theoretical background, the study also illustrates the explanations why they are different.

Item 1 is about the ways of memorizing the Group A students used before. The data of the results of item 1 presents below.

Figure 11 Item 1. In what ways did you memorize the meanings of words before?

<table>
<thead>
<tr>
<th>In what ways did you memorize the meanings of words before?</th>
<th>A. rote memorization</th>
<th>B. incidental learning through reading</th>
<th>C. other ways</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>60%</td>
<td>20%</td>
<td>20%</td>
</tr>
</tbody>
</table>

From the Figure 11 above, it is not difficult to get a conclusion that: most Group A students mechanically memorized vocabulary before and that 20% students in Group A learned vocabulary incidentally though reading and that rest of the Group A students used other ways to memorize vocabulary, such as incidental learning and intentional learning; learning with examples and various contexts;

Item 2 is designed to find out the opinions of the students in Group A on incidental vocabulary learning though reading after the delayed post-tests. There are fifteen answers in total, and the most representative answers are presented in the table below.
Figure 12 Item 2: In your opinion, is incidental learning through reading useful to memorize words’ meaning? Will you adopt this method to memorize words? Please explain your reasons.

| Answer 1: Yes, it is interesting, because I like to read the fairy tale. It is easy for me to memorize new words through reading contexts. | 8 |
| Answer 2: No, it does not work. Because if I still do not remember a new word which I happened on in different contexts many times before, it is meaningless for me. | 2 |
| Answer 3: In my own opinion, it is useful to some extent but I prefer to choose other methods which I think fit for me better to memorize vocabulary. | 5 |

(The numbers in the above table are the number of students holding the similar opinion.)

As the Figure 12 displays above, 8 out of 15 students in Group A believe that it is useful to learn vocabulary though reading and they want to adopt this method in their vocabulary learning. Whereas, only 2 students think it is not helpful at all and 5 students prefer to use other methods which they think are more efficient to memorize vocabulary.

Comparing with the two items, it can be concluded that most of Group A students are well aware that they can acquire vocabulary through reading and they want to adopt the method of vocabulary learning though reading. But not all of them think it is helpful, and some of them prefer to use other methods which they think are more efficient. Therefore, some other factors affecting vocabulary learning must be considered. Takač (2008) points out that individual learner differences may influence vocabulary acquisition and the “individual learner differences” includes many aspects,
such as motivation, attitudes toward vocabulary, and the language learning aptitude. As mentioned in part 2.4, Takač (2008) also presents a Figure (see Figure 7) about the relationships between individual learner differences and learner strategies. Therefore, the learner should use a method suited to his/her individual characteristics. All in all, learners would better not to use the rote memorizing in vocabulary learning and not all of learners are suitable for the method of vocabulary learning though reading, it must be considered of learner’s individual characteristics.

Item 3 is designed to find out whether the Group A students have tried to recall the meanings of the words which they are confused of with the help of contextual clues. As the same to item2, the most representative answers are presented in the table below.

**Figure 13 Item 3** In the post-tests, to figure out the meanings of the words you are confused of, have you tried to recall your memory of the contextual clues of the story and what is the result then?

<table>
<thead>
<tr>
<th>Item 3</th>
<th>In the post-tests, to figure out the meanings of the words you are confused of, have you tried to recall your memory of the contextual clues of the story and what is the result then?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Answer 1:</strong></td>
<td>As words are presented in a meaning context, it will be easy and possible to get inference from the context to understand the words. The context will provide the clues which will contribute to the guess of the unknown words. Words are in connection with its neighboring language segments to be meaningful. Thus, it is an efficient way to master the meaning of words by guessing. 7</td>
</tr>
<tr>
<td><strong>Answer 2:</strong></td>
<td>Yes, I can only guess out the general meaning but not the exact meaning. Maybe I paid more attention on the context rather than the marked words in the context. 5</td>
</tr>
<tr>
<td><strong>Answer 3:</strong></td>
<td>No, I was unable to guess the meaning of these words. 3</td>
</tr>
</tbody>
</table>
The numbers in the above table are the number of students holding the similar opinion.

The Figure 13 in the above shows that 12 out of 15 Group A students can recall the memory of contextual clues to figure out the meaning of the words which they are confused of. Furthermore, 7 out of 12 students can guess out an exact meaning of an unknown word. Whereas, only 3 students were unable to guess the meaning of unknown words with the help of contextual clues.

From the data in the above, it can be concluded that the vocabulary learning through reading plays an important part in memorizing words. But a fairly large number of Group A students can only get a general meaning, and that means, to some extent, some other methods is also considered and needed in vocabulary learning to reinforce the words understanding.

All in all, the analysis and discussion have been done and some initial conclusion could be drawn. To begin with, it is important to emphasize that the method (vocabulary learning through reading) is helpful to vocabulary memorizing and it is better than rote memorizing from the long-term point of view. Furthermore, it is not enough to use one way to memorize words. Various methods should be adopted according to the different periods and parts of speech. At last, learner should use the method according to his/her individual characteristics.

3.3 Pedagogical Implications

In this present study, as analyzed above, incidental learning is an effective method for English learners to facilitate memorizing the meaning of adjectives and verbs in the long-run. Moreover, vocabulary learning through reading, one of the incidental learning which has be analyzed in this investigation, is useful in vocabulary memorization. Based on these finds, two main suggestions for incorporating vocabulary through reading into English vocabulary acquisition are in the following.
3.3.1 Implications for learners

Vocabulary learning through reading can be adopted to teach the English learners how to memorize words more effectively. To begin with, when learners want to learn several new words, it is better to memorize these words incorporating vocabulary through reading. It has been proved to be useful. Furthermore, learners should choose their favorite and suitable contexts to read. Here it is necessary to emphasize that the selection role of context must be related to the learners’ individual reading ability. So, a suitable reading contest can motivate learners to read. The unknown words happened in the contest can be marked to memorize. At last, vocabulary through reading is not an all-purpose method; learning strategies vary from person to person. Maybe some learners prefer to use other methods which they think are more efficient to memorize vocabulary. It is better to memorize the words with the method which they like. Therefore learner factors should be taken into consideration in vocabulary acquisition.

3.3.2 Implications for Teachers

Some implications for teachers from this study lie in the following aspects:

1. English teachers should, firstly, enable the students to realize that vocabulary learning through reading can enhance vocabulary learning (from a long-term view) and the knowledge about the English language itself. Nation (2001) claims that vocabulary knowledge can help reading, and reading can contribute to vocabulary growth, because when learners adopt this method, they do not only remember the meaning of a word but also their reading ability and may be improved. Secondly, English teachers themselves should place much emphasis on guiding and training students how to use this learning strategy correctly. Because not all students can understand what’s the real meaning of this method and use this strategy correctly. Teachers should always follow the right orientation in strategy training and guidance to prevent students’ misconception of the method.
2. As mentioned above, different learning strategies and contests are used according to different learners’ characteristics. Learner factors should be taken into consideration in vocabulary acquisition. In the teaching process, the different levels of contests are given to students according to their abilities and hobbies. Although the vocabulary thorough the reading method has been proved to be helpful to vocabulary growth, it does not mean that all the students are forced to adopt this method as their unique vocabulary learning strategy. Takač (2008) presents a Figure (see Figure7) about the relationships between individual learner differences and learner strategies. Nation (2001) believes that if the learner wants to learn vocabulary in a contest, they must understand this contest first and only under this prerequisite, learning vocabulary through reading could be possible. Therefore, learners should use the method and contest according to their individual characteristics.

4. Conclusion
This paper has attempted to discover the vocabulary strategies, especially vocabulary learning through reading, used by students and their effectiveness in using them. To bring out the conclusion of the present thesis it is reasonable to have a brief review on what has been discussed so far. An introduction of historic perspective of vocabulary learning strategies and cognitive psychology are made. The related experimental researches in the literature of vocabulary learning strategies and cognitive psychology are presented to show what researches have been done in this field.

The study explores 30 junior one students’ vocabulary learning strategies from two groups from the Xuancheng middle school, Anhui. The research tries to find out the vocabulary learning through reading used by the sampled students and discuss why this method is effective for vocabulary memorizing. A questionnaire is used to obtain more specific information. As the descriptive statistics has revealed, the sampled students employed the method of vocabulary learning through reading can retain more
words than students adopted rote memorization in a long-term. The result from this essay maybe limited, such as a limited number of tests and questionnaire questions. But it might come from my careful investigation and analysis at least. If we want to get a definite conclusion, more primary material should be taken into consideration.

After doing the research, we think about pedagogical implications in the area of vocabulary learning and teaching. For vocabulary learning, first, we need to help most of the learners to build positive motivation. Then, we should encourage them to memorize these words incorporating vocabulary through reading. The last but not the least, learner factors should be taken into consideration in vocabulary acquisition. For vocabulary teaching, teachers should take the responsibility to help them adopting this method into teaching process and guide them how to use this method correctly.
Reference


Klimesch, W (1994) The Structure of Long-Term Memory. UK: Lawrence Erlbaum Associates


Appendix One

Post-Test

Translate the following words in Chinese.

1. live

2. beautiful

3. follow,

4. disappear,

5. reply,

6. golden,

7. young,

8. lovely,

9. open,

10. ugly.

If you are in Group A please write the summary of the given text.
1. In what ways did you memorize the meanings of words before?
   A. Rote memorization (机械记忆)  B. Incidental learning through reading (通过阅读来记忆)
   C. If both answer A and B are not your answer, please write your ways to memorize vocabulary: (如果A和B都不是你的学习方式, 请写出你的背单词的途径)

2. In your opinion, is incidental learning through reading useful to memorize words’ meanings? Will you adopt this method to memorize words? Please explain your reasons.
   (你认为通过阅读来学习单词有用吗? 你会采取这个策略去学习吗? 请给出你的原因)

3. In the pose-tests, in order to figure out the meanings of the words you are confused of, have you tried to recall your memory of the contextual clues of the story, and what is the results then?
   (在考试中，为了确定你不清楚的单词，你尝试过回忆文章中的线索吗，那么结果如何?)