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**WORKING MEMORY CAPACITY AND
THE RETENTION OF L2 VOCABULARY**

por

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To
my beloved family

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ABSTRACT

WORKING MEMORY CAPACITY AND
THE RETENTION OF L2 VOCABULARY

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The present study investigated (1) the relationship between working memory capacity, as measured by the Speaking Span Test (Daneman & Green, 1986; Daneman, 1991), and vocabulary acquisition in an L2, as assessed by the production of a narrative and by a receptive test and (2) the strategies higher and lower span individuals make use of to learn L2 vocabulary, as revealed by an interview with the individuals of this study. Seventeen graduate students of the Graduate Program in English Language and Literature at the Federal University of Santa Catarina (UFSC) were assigned to participate in this study. Participants' working memory capacity was assessed by means of the Speaking Span Test, which required them to recall words and produce a sentence for each recalled word. Vocabulary acquisition was assessed by the production of a narrative in which individuals attempted to recall and use 20 words and by a receptive test, in which individuals attempted to recognize the 20 taught words given in a list, either translating or providing the definitions of these words. In addition, an interview was used as a means of unfolding what strategies participants used to learn the new L2 words. Statistical results revealed that

working memory capacity, as assessed by the Speaking Span Test, correlates with L2 vocabulary retention, as assessed by the Productive and the Receptive Tasks. The results indicated that higher spans are better able to both comprehend and produce new vocabulary items in an L2 than lower span individuals. The results also indicated that both higher and lower spans present better performance when recognizing new vocabulary than when producing it. Furthermore, the results showed that higher spans, as measured by the Speaking Span Test, have no particular strategy to make use of to retain new vocabulary items, but the strategies that higher spans use are better manipulated and more consistent and effective than lower spans (Lawson & Hogben, 1996). The results also revealed that higher spans, as measured by the Speaking Span Test, are better able to learn verbs than lower spans, as measured by the Speaking Span Test. Finally, the findings showed that *reading several times the text* where the word was found is the most frequent strategy used by both higher and lower spans to learn a new L2 word. In other words, most individuals, regardless of their working memory capacity, make use of the context to remember word meaning.

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RESUMO

WORKING MEMORY CAPACITY AND
THE RETENTION OF L2 VOCABULARY

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O presente estudo investiga (1) a relação entre a capacidade de memória operacional, mensurada pelo Speaking Span Test (Daneman & Green, 1986; Daneman, 1991), e a aquisição de vocabulário em uma língua estrangeira, avaliado pela produção de uma narrativa e por um teste de vocabulário receptivo e (2) as estratégias que os indivíduos com maior e menor capacidade de memória operacional utilizam para aprender vocabulário em uma língua estrangeira, reveladas através de uma entrevista. Dezesete alunos de pós-graduação do Programa de Pós-Graduação em Inglês e Literatura Correspondente da Universidade Federal de Santa Catarina (UFSC) participaram deste estudo. A capacidade de memória operacional dos participantes foi mensurada pelo Speaking Span Test, no qual tiveram que recuperar as palavras apresentadas e produzir uma sentença para cada palavra. A aquisição de vocabulário foi avaliada através da produção de uma narrativa em que os indivíduos tentaram lembrar e utilizar as vinte palavras ensinadas e, através do teste Receptivo em que os sujeitos tentaram reconhecer as vinte palavras apresentadas em uma lista, traduzindo ou definindo estas palavras. Uma entrevista também foi aplicada como um

meio de conhecer quais estratégias os indivíduos utilizaram para aprender as novas palavras previamente ensinadas. Resultados estatísticos revelaram que a capacidade de memória operacional, avaliada pelo Speaking Span Test, correlaciona-se com a retenção de vocabulário em uma língua estrangeira, mensurado pelos testes Produtivo e Receptivo. Os resultados indicaram que indivíduos com maior capacidade de memória operacional são mais capazes de compreender e produzir novas palavras em uma língua estrangeira do que indivíduos de menor capacidade de memória operacional. Os resultados também indicaram que tanto os indivíduos com maior e menor capacidade de memória operacional apresentam melhor desempenho no reconhecimento de novas palavras do que na produção de novas palavras. Além disto, os resultados mostraram que indivíduos com maior capacidade de memória operacional, mensurado pelo Speaking Span Test, não utilizam nenhuma estratégia específica para reter novas palavras. Porém, as estratégias que os indivíduos que têm maior capacidade de memória operacional utilizam são melhores manipuladas, mais consistentes, e mais efetivas do que as estratégias usadas pelos indivíduos de menor capacidade de memória operacional (Lawson & Hogben, 1996). Os resultados também revelaram que os indivíduos de maior capacidade de memória operacional, são mais capazes de aprender verbos do que os indivíduos de menor capacidade de memória operacional, mensurado pelo Speaking Span Test. Finalmente, as descobertas mostraram que *ler o texto* onde a palavra foi encontrada por várias vezes é a estratégia de aprendizagem de vocabulário mais freqüentemente utilizada, tanto pelos indivíduos com maior capacidade de memória operacional quanto por aqueles com menor capacidade de memória. Em outras palavras, a maioria dos indivíduos aproveita o contexto para reter o significado da palavra.

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CHAPTER 1

Introduction

1.1 Preliminaries

As a foreign language (L2) teacher and researcher, I have noticed that foreign language learners tend to explain their problems for communicating in the L2 due to the lack of vocabulary knowledge or to the difficulty in remembering words to express their ideas. Learners' comments concerning their difficulty in vocabulary production have called my attention and motivated me to investigate why some L2 learners seem to retain more L2 vocabulary than others.

Research on L2 vocabulary acquisition¹ has been developed in terms of vocabulary size (Waring & Nation, in Schmitt & McCarthy, 1997), receptive and productive vocabulary (Melka, in Schmitt & McCarthy, 1997), the mother tongue influence on the learning of L2 (Swan, in Schmitt & McCarthy, 1997), L2 vocabulary teaching (Sökmen, in Schmitt & McCarthy, 1997), vocabulary testing (Read, in Schmitt & McCarthy, 1997; Read, 2000), strategies to learn vocabulary (Schmitt, in Schmitt & McCarthy, 1997), among other issues. Nevertheless, to the best of my knowledge, no research has been carried out on the relationship between individual differences in working memory capacity and L2 vocabulary retention.

Working memory is considered to be the main system of human cognition (Ashcraft, 1994). It is where human cognitive processes occur (Harrington, 1992; Just & Carpenter, 1992). These cognitive processes are responsible for manipulating incoming information and storing it for a limited period of time during the performance of demanding cognitive tasks (Ashcraft, 1994). Ashcraft claims that limitations on working memory

¹ The terms *acquisition*, *learning*, and *retention* are used interchangeably in this study.

capacity determine the amount of cognitive work it is possible to be done as well as the amount of information that can be stored in a period of time (Ashcraft, 1994).

Studies on L1 reading demonstrate that individuals vary in their working memory capacity, and their working memory capacity affects their performance on tasks such as reading comprehension (Daneman & Carpenter, 1980, 1983; Daneman & Green, 1986; Tomitch, 1995; among others), writing (Benton, Kraft, Glover, & Pale, 1984, cited in Fortkamp, 2000, p.5), and speech production (Daneman, 1991). Despite the existing research on individuals' working memory in L2, there is a gap in the literature related to working memory capacity and L2 vocabulary acquisition. Given the importance of this cognitive system in the performance of complex tasks, it seems to be possible to propose that working memory might be involved in the acquisition of L2 vocabulary.

1.2 Statement of purpose

The present study sets out to investigate the relationship between individual differences in working memory capacity (WMC) and the retention of second language (L2) vocabulary. A great amount of research has been carried out on L2 vocabulary acquisition as well as on working memory capacity. However, more studies that examine the relationship between working memory capacity and L2 vocabulary learning are needed. Due to this gap in research, the objectives of the present study are: (1) to examine whether those individuals with a larger working memory capacity are better able to retain L2 lexical items in long-term memory than those individuals with a smaller working memory capacity, and (2) the strategies higher and lower working memory capacity individuals make use of to retain L2 vocabulary. The present study has the following hypotheses: (1) Individuals with a larger working memory capacity are better able to transfer items to long-

term memory than individuals with a smaller working memory capacity, and (2) the vocabulary learning strategies applied by individuals with a larger working memory capacity are quantitatively and qualitatively different from those applied by individuals with a smaller working memory capacity. The investigation was conducted with seventeen graduate learners of the Graduate Program in English Language and Literature at the Federal University of Santa Catarina from February to June, 2002.

1.3 Significance of the study

The importance of the present study to current research on working memory capacity and on L2 vocabulary acquisition lies on two facts. To the best of my knowledge, no study has been carried out on the relationship between working memory capacity and L2 vocabulary acquisition. Second, in the field of L2 vocabulary acquisition, the present study is pioneer to address L2 vocabulary acquisition from an individual differences' perspective. Therefore, the results found in this study might contribute to further research by shedding light on future theories of L2 vocabulary acquisition and by providing further evidence for individual differences in working memory capacity.

1.4 Organization of the thesis

This thesis consists of five chapters. The first chapter is the Introduction in which the objectives and the hypotheses of the study are presented. The second chapter reviews the literature on (1) working memory and (2) vocabulary acquisition. This chapter provides the reader with a background on both topics, bringing up some relevant issues discussed in each area such as the human memory system, working memory capacity and its measurement, the concept of a word, word knowledge and vocabulary testing. The third

chapter presents the method used in the data collection. The fourth chapter provides the results and the discussion of the results in the light of the existing literature of working memory and vocabulary acquisition. Finally, the fifth chapter summarizes the most relevant findings of this study, presents its limitations, provides suggestions for further research and indicates pedagogical implications obtained from the results.

CHAPTER 2

Review of the Literature on Working Memory and Vocabulary Acquisition

This review of the literature will cover two main issues: working memory (section 2.1) and L2 vocabulary acquisition (section 2.2). The working memory section is divided into five subsections. The first subsection refers to the “Human Memory System” (2.1.1); the second subsection provides an overview of “Long-Term Memory and Short-Term Memory” (2.1.2); the third subsection deals more specifically with “Working Memory” (2.1.3); the fourth subsection covers “The psychometric correlational approach” (2.1.4); the fifth subsection examines two “Working Memory Capacity Measurements” (2.1.5); and finally, the sixth section discusses the issues of the “Two views of working memory capacity: task-specific and domain-free” (2.1.6).

The Vocabulary Acquisition section has the following subdivision. The first section discusses the different definitions of the term “word” (2.2.1). The second section discusses word knowledge (2.2.2). The third subdivision reviews learner’s strategies to learn vocabulary (2.2.3). Finally, the fourth subdivision deals with tests used to assess vocabulary acquisition (2.2.4).

2.1 Working memory

2.1.1 The human memory system

Since the ancient times, researchers and philosophers have been interested in knowing how the human mind functioned and in its functioning can be improved (Ashcraft, 1994). Philosophers such as Aristotle, Plato, and Socrates, among others (Ashcraft, 1994,

pp. 14-15) were concerned with the nature of thought and memory. This interest triggered them to attempt to observe human beings' thoughts and minds (Ashcraft, 1994, p.15).

In order to better understand human memory, it is important to clarify what the term *memory* refers to. For the purposes of the present study, memory is defined as “the mental processes of acquiring and retaining information for later retrieval, and the mental storage system that enables these processes” (Ashcraft, 1994, p.11). According to Ashcraft (1994, p.11), three important aspects of human memory are included in this definition: (1) initial acquisition of information, also called learning or encoding; (2) subsequent retention of information; and (3) recall of information. The human memory has two main systems: the transitory duration system named short-term memory, and the longer period of duration system called the long-term memory (Ashcraft, 1994).

Some evidence for the existence of two separate memory systems is provided by Brown (1958, cited in Baddeley, 1990), and Peterson and Peterson (1959, cited in Baddeley, 1990). They found that incoming information is forgotten in seconds if rehearsal is avoided. In other words, these researchers showed that there are at least two stores to keep information: a short-term store in which information is kept for a temporary period of time if rehearsal is prevented; and a long-term store in which information would be maintained for a longer period of time (Baddeley, 1990).

A number of studies also show further evidence of the two existing memory systems. First, there are the classic studies in which participants, after being given lists of unrelated words, were asked to recall these unrelated words in any order. Results showed that when there was immediate recall, the recency effect¹ occurred. When recall was

¹ The recency effect can be defined as the enhanced recall, that is, elevated recall of the last items that were recently presented (Ashcraft, 1994, p.158).

postponed, the recency effect faded away. These results suggested that for immediate recall, items were kept in a momentary storage and for delayed recall items were recalled from a long-term storage (Baddeley, 1992). Second, results of research done in coding during immediate and delayed recall (Baddeley, 1992) demonstrated the existence of interference in immediate recall when there was acoustic similarity in the material to be acquired (Conrad & Hull, 1964, cited in Ashcraft, 1994) whereas studies such as Baddeley (1966) demonstrated that when the material was similar in meaning, interference decreased.

Evidence for the existence of the two systems is also provided by Scoville and Milner (1957, cited in Richardson, 1996), with a patient who suffered from amnesia as a result of brain surgery to control epileptical fits. In this surgery, some parts of his brain were removed, resulting in the patient's incapacity to acquire new knowledge related to events after the surgery. Nevertheless, he could remember events from his childhood and happenings two years before the surgery. Furthermore, neither his immediate memory, nor his linguistic and intellectual skills were affected. This is another example of two separate memory systems: the events from the past the patient could remember are in the long-term system whereas the events that happened after the surgery are stored in the short-term memory. Among other studies are Shallice & Warrington's (1970) who enforced the view that neurological patients who presented deficiency in their short-term memory did not present any deficiency in their long-term learning.

2.1.2 Long-term memory and short-term memory

One of the most influential and classical models of memory was devised by Atkinson and Shiffrin (1968). This memory system model was unitary and comprised three

memory buffers - sensory memory, short-term memory and long-term memory - in addition to the control processes which transferred information from one buffer to the other.

Sensory memory is the first stage through which the perception of incoming information enters. This memory has limited storage capacity, and is able to keep information up to 300 milliseconds. Two varieties of the sensory memory are greatly studied in cognitive psychology - the visual and the auditory sensory memory (Ashcraft, 1994, p.53).

Visual sensory memory, also termed iconic memory (Neisser, 1967, cited in Ashcraft, 1994, p.55), can be defined as “a brief-duration, sensory memory system specially designed to receive and hold visual stimulation” (Ashcraft, 1994, p.55). Other mental processes related to attention occur while visual stimulation is kept in this memory. The estimation of the functional duration of information kept in the visual sensory memory is up to one-half of a second after which other mental processes such as cognitive and attentional processes have to enter into action (Ashcraft, 1994, pp.54-55).

Auditory sensory memory, also named echoic memory (Neisser, 1967, cited in Ashcraft, 1994, p.54), is defined as “the sensory memory component that receives auditory stimulation from the external environment” (Ashcraft, 1994, p.54). That is, any or all stimuli that are hearable enter or encode into the auditory sensory memory. This input process seems to occur automatically and the period of time that information lasts in auditory sensory system is no longer than two or three seconds (for speech sounds), beyond the physical duration of the stimulus (Ashcraft, 1994, p.54).

Long-term memory can be understood as “the memory system responsible for storing information on a relatively permanent basis” (Ashcraft, 1994, p.58). The system has unlimited storage capacity (Atkinson & Shiffrin, 1968). Currently there are three main

approaches to the study of long-term memory, as conceptualized by cognitive psychology researchers.

The other component of the human memory system proposed by Atkinson and Shiffrin (1968) is short-term memory, which is responsible for storing information for a brief period of time and for controlling processes such as rehearsal. In this model, information, which is in the short-term store, is sent to long-term memory through rehearsal and other cognitive procedures. The more an item is rehearsed, the more likely it is to be transferred from short-term memory to long-term memory. Short-term memory stands out for being part of the process of acquisition and use of information and for its limited capacity (Atkinson & Shiffrin, 1968).

2.1.3 Working memory

In the research on short-term memory, Baddelley and Hitch (1974) found that more than one cognitive pole was used when individuals processed information. In their view, the system responsible for the temporary storage of information was not a unitary system, as proposed by Atkinson and Shiffrin (1968). Thus, Baddeley and Hitch (1974) decided to devise a multicomponent memory model of short-term memory. They termed this model working memory, from the previous concept of short-term memory (Engle & Oransky, 1999). Both terms - short-term memory and working memory - were used to refer to a limited capacity system which retained information temporarily. However, the two terms differ in at least two aspects: (1) short-term memory refers to a unitary system whereas working memory refers to a multicomponent system; (2) short-term memory is a passive storage buffer whereas working memory is a controlling system which is crucial in higher level cognitive processes (Fortkamp, 2000; Baddeley, 1990; Richardson, 1996). Ashcraft

(1994) differs short-term memory from working memory by stating that the former has a limited storage capacity, while the latter is where mental activity actually takes place, its limitation being related not only to storage capacity, but also to the amount of processes that can take place simultaneously.

The working memory model proposed by Baddeley and Hitch (1974), Baddeley (1990, 1992, 1996, 1999), and Baddeley and Logie (1999) consists of a central executive and two subcomponents or slave systems: a phonological loop and a visuospatial sketchpad. Recently, Baddeley (2000) has added a fourth component: the episodic buffer.

The central executive is the most important part of the working memory system devised by Baddeley and Hitch (1974). It is responsible for controlling attention and mental resources, for the rehearsal process when needed, for making decisions. It is also in charge of a great deal of reasoning activities (Ashcraft, 1994, p.185) and of controlling operations in working memory, such as the organization of the slave systems, the capacity of controlling attention, and the activation of information from long-term store (Ashcraft, 1994, p.185). According to Baddeley and Logie (1999), the central executive is basically an attentional system which does not have capacity to store information.

The two other components of the Baddeley and Hitch working memory model are the phonological loop and the visual sketchpad. The phonological loop has two components: the phonological store and a rehearsal system in charge of transforming visual information into phonological code (Baddeley & Logie, 1999). The phonological store holds phonological information that decays after a few seconds. Thus, the rehearsal system is in charge of refreshing decaying traces and of converting items that are presented visually into a phonological code in order to be retained in the phonological store (Baddeley & Logie, 1999).

The second slave memory system, the visuospatial sketchpad, is responsible for keeping visual and/or spatial information in a skillful manner. This system is unfolded into three components: the visual, the spatial and the kinaesthetic component proposed by Logie (1995). Various researchers (e.g. Logie, Zucco, & Baddeley, 1990) show evidence of the subdivision presented above.

The fourth component, the episodic buffer, proposed by Baddeley (2000), was based on neuropsychological evidence. The episodic buffer draws information from the slave systems and from the long-term store, and maintains the integration of this information. This buffer is controlled by the central executive, its capacity is limited and has temporary storage. According to Baddeley (2000), the episodic buffer has some similarity to the episodic long-term memory concept. Nevertheless, the episodic buffer differs from long-term memory in the sense that it is temporary in nature and does not present any damage in amnesic patients who have impaired episodic long-term memory.

To summarize, Baddeley and Logie (1999, pp. 28-29) define working memory as follows:

“It comprises those functional components of cognition that allow humans to comprehend and mentally represent their immediate environment, to retain information about their immediate past experience, to support the acquisition of new knowledge, to solve problems, and to formulate, relate, and act on current goals”.

Thus, working memory can be seen as a limited capacity system in nature and the center where cognitive actions take place.

2.1.4 The psychometric correlational approach

According to Baddeley (1992), working memory research has developed under two approaches that are different, but complementary. The first approach is named by Baddeley

(1992) the dual-task and neuropsychological approach. The focus of this approach is the analysis of the structure of working memory (Baddeley & Hitch, 1974), which emphasizes the slave subsystems. Its methodology includes the study of evidence of neuropsychology and the application of dual tasks.

The second approach, the psychometric correlational, focuses on the correlation between individual differences in working memory capacity and performance of cognitive abilities (Daneman & Carpenter, 1980, 1983). Researchers in this approach believe that working memory capacity is a good predictor of individual differences and that individuals with larger working memory capacity perform better in cognitive tasks than those individuals with smaller working memory capacity. In this view, the two functions of working memory - storage and processing of information (Baddeley, 1992; Daneman, 1991) - compete while high cognitive skills are performed (Daneman & Carpenter, 1980, 1983). The methodology used in this approach is to elaborate laboratory tasks and correlate performance in these tasks with performance in high cognitive tasks. Research on the psychometric correlational approach basically focuses on the central executive system where mental resources are allocated in the processing and integration of information (Baddeley, 1992).

Since the psychometric correlational approach emphasizes that individual differences in working memory capacity are good predictors of performance, many studies on individual differences have been developed in the fields of reasoning and reading comprehension in first language (Baddeley, 1992). The most classic and relevant study within the psychometric correlational approach was conducted by Daneman and Carpenter (1980) in the language domain. These researchers investigated the correlation between

working memory capacity and reading, resulting in the development of the reading span task, a complex measure of working memory span that is dealt with in the next section.

2.1.5 Working memory capacity measurements

Research shows that there are individual differences in how individuals perform a complex cognitive activity (Engle, 1996). According to the psychometric correlational approach, this difference is due to individuals' different ability to simultaneously process and store information. The individuals who have larger working memory capacity tend to have a better cognitive performance than those individuals who have smaller working memory capacity due to the larger capacity they have to store information.

A common method of measuring the size of a person's working memory is the "span" method. The Reading Span Test (Daneman & Carpenter, 1980) was the first span task to be devised and is a very important performance predictor of several reading abilities. The Reading Span Test (RST) was elaborated to investigate the processing and storage of information during reading comprehension tasks. In the RST, participants are presented with unrelated sentences containing from thirteen to sixteen words. After reading the sentences, participants have to recall the last word of each sentence. The sentences are organized into three sets of sentences: each set of two, three, four, five, and six sentences. The participants' reading span is defined as the number of words correctly recalled (Daneman & Carpenter, 1980) in total or in sets.

Another means to assess working memory capacity is the Speaking Span Test (Daneman & Green, 1986; Daneman, 1991). This test measures the processing and storage of information in working memory during sentence production. This test comprises

unrelated words, arranged in sets of two, three, four and five words. First, participants are presented the words individually on a computer screen, one second per word. The interval between the removal of one word on the screen and the appearance of the next word is ten milliseconds. When a blank screen appears on the screen, the participant has to produce sentences aloud for each word shown on the screen. Participants are required to produce one sentence per word. The sentences can have any length, and have to be grammatically correct. The participant's span is assessed according to the number of words that are retrieved in the correct form and order. The main idea of this task is to check the participants' ability to process and store information during production.

A number of studies have shown correlations between working memory capacity and first language cognitive skills, including spelling (Ormrod & Cochran, 1988, cited in Fortkamp, 2000), writing (Benton, Kraft, Glover, & Plake, 1984, cited in Fortkamp, 2000), following directions (Engle, Carullo & Collins, 1991), taking notes (Kiewra & Benton, 1988), and L1 vocabulary learning (Daneman & Green, 1986), among others. In other words, individuals with larger memory spans in both reading and speaking span tasks are more prone to keeping different stimuli active, and this seems to give them an advantage for a wide variety of cognitive tasks, among them vocabulary acquisition, which is the topic I will be dealing in section 2.2.

The major studies on working memory capacity have been developed in L1 reading comprehension (eg: Dixon, LeFevre, & Twilley, 1988). Nevertheless, research has also been developed on the relationship between working memory capacity and L2 abilities, focusing on speech production, reading comprehension, and syntactic acquisition and comprehension.

Harrington (1991) found a strong correlation between working memory capacity and measures of L2 lexicon, grammar, and L2 reading. Harrington (1991) examined to what extent lexical and grammatical knowledge affects the relationship between L2 working memory capacity and L2 measures of reading. The most relevant aspect of the correlation between working memory capacity and the measures of L2 reading comprehension was kept even after vocabulary and grammatical knowledge contributions were partialled out. According to Harrington (1992), this finding shows evidence that the L2 reading span test is an important measure of L2 reading comprehension and of lexical and grammatical knowledge. Findings also provide evidence, like in the studies carried out in L1 reading comprehension, that the reading span test investigates other processes besides lexical knowledge (Dixon, LeFevre, & Twilley, 1988; Engle, Nations, & Cantor, 1990).

Berquist (1998) tapped the relationship between L1 and L2 working memory reading, and L2 proficiency. The researcher applied two memory tests: a word span test and a reading span test. Both tests were applied in French and in English. The participants' proficiency was assessed through sections of reading and listening of the Test of English for International Communication (TOEIC). A cloze test was applied in order to control for processing of the L2 sentences chosen from the reading span test. Results showed strong correlations between L1 and L2 reading spans, L1 and L2 word spans, and among word span, reading span, and L2 proficiency. Significant correlations were found among L2 word and reading spans and L2 proficiency. The most significant result was the strong correlation between the L2 cloze test and L2 proficiency. Berquist (1998) concludes that these results show evidence of L2 working memory to be a good predictor of L2 proficiency. He also suggests that L2 working memory does not seem to be superior to L2 short-term memory in predicting L2 proficiency, differently from the view presented in L1 research that

performance in cognitive tasks that demand more complexity is predicted by working memory, and not short-term memory.

Mota (1995) investigated the correlation between working memory capacity and L2 speech rate and articulation. The researcher applied a set of seven experiments, adapted from Daneman (1991), to sixteen learners of English as a foreign language. Two memory tests were administered: the Speaking Span Test (Daneman & Green, 1986; Daneman, 1991) and the Reading Span Test (Daneman & Carpenter, 1980, 1983; Harrington & Sawyer, 1992). Participants were given a task to describe a picture, an oral reading task, and the Oral Slip Task (Motley & Baars, 1976) in order to assess speech production. Results reveal that there was a significant correlation between L1 and L2 working memory when individuals' working memory capacity was assessed by the Reading Span Tests. No correlation was found between L1 and L2 Speaking Span Tests. Furthermore, results did not show any correlation between L2 working memory for speaking and L2 working memory for reading. In the Speaking Span Test, L2 working memory capacity correlated significantly with fluency and articulation errors. In other words, individuals who have larger memory capacity speak faster and are more likely not to commit articulation errors in the L2. In the Speaking Span Test, however, working memory capacity did not show correlation with oral reading rate. However, in the Reading Span Tests in English and Portuguese, working memory capacity correlated significantly with oral reading rates. The results presented above can be taken as evidence that working memory capacity is task-specific, rather than domain free.

Torres (1998) investigated the relationship among previous knowledge, L2 working memory capacity, and L2 reading comprehension. The Reading Span Test, devised by Daneman and Carpenter (1980), and reading comprehension tests, namely, free written

recall and comprehension questions, were applied. Results showed that due to the heavy burden of the information processing in L2 on working memory capacity, the participants' reading span was smaller. There were higher scores on the span tests and reading comprehension tests when domain knowledge was high. Torres claims that it seems possible to assume that processing difficulties in L2 can be, to a certain point, compensated by knowledge activation. Torres also sustains that the processing efficiency of the participants has an effect on their working memory capacity and on their comprehension and retrieval abilities.

Fortkamp (2000) set out to investigate whether working memory capacity is related to L2 speech production, and whether this relation is task-specific or domain-free. The measurements applied to the participants - thirteen English learners as a second language - were the Speaking Span Test (Daneman, 1991) and the Operation Span Test (Turner & Engle, 1989), devised in English. The participants' L2 speech production was assessed through a picture description test and a narrative task. Through these tasks, participants' fluency, accuracy, complexity, and weighted lexical density were measured. Statistical analyses showed that there is a positive correlation between working memory capacity and fluency, accuracy, complexity, and a negative correlation between working memory capacity and weighted lexical density. Findings demonstrate that the Speaking Span Test is a good predictor of L2 fluency, accuracy, and complexity. Findings also demonstrate that there was a methodological error in the Operation-word Span Test, resulting in inappropriate data to discuss whether the relationship between working memory capacity and L2 speech production is task-specific or domain-free. Finally, it was suggested that the encoding of L2 grammar is a complex subtask of L2 speech production, which demands the "control and regulation of attention" (Fortkamp, 2000, vii).

2.1.6 Two views of working memory capacity: task-specific and domain-free

The task-specific view originates from Daneman and Carpenter's work (1980) on individual differences in working memory capacity, in the reading comprehension area. The researchers claim that during reading comprehension, the limited sources of working memory have to be allocated to the demands of storage and processing. Daneman and Merikle (1996) found that good readers have higher working memory capacity due to their ability of allocating a greater amount of their resources to the retention of items and not to the processes. Daneman and Carpenter (1980) claim that working memory capacity is functional and that it varies according to each individual's processing efficiency in each task. The relevance of the task-specific view is that there is variation in individuals' working memory capacity according to his/her efficiency in the processing of each complex task.

In later studies on the task-specific view, Daneman and Tardiff (1987) postulate that there are general abilities applied in any task requiring language manipulation. In this view, processing efficiency itself can account for individual differences in working memory capacity in a task. Daneman and Tardiff (1987) investigated the relationship between three span tasks, namely, verbal span, math span, and spatial span, and comprehension. The three span tasks had a storage and processing component. The researchers found correlations between the verbal and math span tasks and verbal skills, differently from the spatial span task, which was not found to correlate with verbal skills. These results showed evidence of the existence of at least two systems: one that represents and processes spatial information, and the other that represents and processes spoken and symbolic information. Daneman and Tardiff went further in their studies and attempted to show that processing efficiency was the determining variable in individual differences. Thus, they decided to add three storage-

free span tasks in order to test only processing. Findings showed that these tasks and comprehension correlated, which could be interpreted as evidence for the assumption that language skills can be explained by individual differences in processing efficiency only.

Turner and Engle (1989), on the other hand, claim that working memory capacity is not functional and that good readers have a larger working memory capacity for general tasks, not specifically for reading. In order to verify their hypothesis, they devised a working memory span task coined as Operation-word Span Test. The task was performed through the presentation of sets of strings of pairs of math-operation words, which increased in length. Then, participants were required to check the correctness of the operation result, and finally, they had to read the word which followed the operation. Participants' memory span was determined as the number of words retrieved. Turner and Engle (1989) found a correlation between the number of words retrieved and performance in reading comprehension. These results can be assumed as evidence for the hypothesis of general capacity, contrary to Daneman and Carpenter's (1980, 1983) argument that the processing component of the span task needs to be related to reading comprehension for a correlation between working memory capacity and language comprehension to emerge. Thus, Turner and Engle (1989) understand working memory capacity as a limited-capacity unitary resource independent of the type of the activity being performed (Engle & Oransky, 1999; Engle, Kane, & Tuholski, 1999).

More research has been carried out by Engle and a group of researchers (Cantor & Engle, 1993; Engle, Cantor, & Carullo, 1992; Conway & Engle, 1996; Engle & Conway, 1998; among others) on whether working memory capacity is task-specific or domain free over the last ten years. Results have shown that the operation-word span is a good predictor of reading comprehension (Cantor & Engle, 1993; Engle, Cantor & Carullo, 1992; among

others). This finding provides evidence to the general capacity view of working memory. As can be seen, except for Daneman and Green (1986), no other studies in the psychometric correlational approach to working memory capacity has addressed L2 vocabulary acquisition. In the next section, a review of the literature on L2 vocabulary acquisition is presented.

2.2 Vocabulary Acquisition

Vocabulary acquisition was viewed as an unimportant and neglected area of second language learning. Nevertheless, this scenario has changed impressively throughout the years, as studies and publications have increased enormously (Meara, in Anderman & Rodgers, 1996). This section is subdivided into four parts in order to deal with (1) the concept of “word”, (2) word knowledge, (3) strategies learners use to acquire words, and (4) tests that can be used to assess individuals’ vocabulary acquisition.

2.2.1 What is a word?

When the term *vocabulary* is used, it is crucial to have a notion of what it consists of in order to understand the complexity and the broad idea it entails. It is believed that vocabulary consists of individual words (Schmitt & Carter, 2000). Nevertheless, this belief is not adequate because words may consist of more than just one single lexical item. Here are some examples: the compound verb *put away*, despite having two lexical items, conveys only one meaning and, therefore, consists of only one word; *high-class* is also an adjective that comprises two lexical items, but has one meaning as well; and the idiomatic expression *play with fire*, which has three lexical items, conveys only one idea: to deal with

dangerous things without thinking of the consequences. Thus, a word can be understood both as a single unit and as lexical phrases that convey one single meaning (Read, 2000).

Much of the English language is composed of lexical phrases (Nattinger & DeCarrico, 1992), which can be phrasal verbs, from two to three words, and prefabricated expressions (Lewis, 1993, 1997). Lexical phrases are ubiquitous in the English language and frequently learned as single units. Due to their frequency, lexical phrases have received various other names such as *lexical chunks*, *lexicalized sentence stems*, *ready made units*, although the most used one is the lexical phrase. The term lexical phrase was adopted by many researchers, including Schmitt (in Schmitt & Carter, 2000). In Schmitt's studies, he posits the question of whether lexical phrases are stored in the mind as single units. Aitchison (in Anderman & Rogers, 1996) asserts that single units can either be stored as chunks of words or be connected to affixes and stems. As can be seen, the definition of what a word is includes not only single items, but also larger lexical items, composed of two, three, four items. The next subsection discusses what involves knowing a word.

2.2.2 What is to know a word?

One of the most important issues in studies on second language vocabulary acquisition concerns the definition of what it is to know a word. Read (2000) asserts that knowing a word implies not only being aware of only one of its meanings but also its other meanings, its associations with other lexical items, derivations, collocations, frequency, and grammatical rules. According to Nation (1990) and Richards (1976), knowing a word includes what Read (2000) defines, in addition to the mastering of the orthographical and phonological forms.

For Eckle and Garret (1998) and Channell (in Carter & McCarthy, 1988), acquiring vocabulary in a foreign language comprises (a) the ability to recognize the meaning of the word; and (b) the recall of the word and the ability of producing it in speech. According to these authors, the learning of L2 vocabulary takes time and needs practice to be developed and acquired.

Meara (in Anderman & Rodgers, 1996) assumes that learning L2 words is the same process as learning L1, no matter what stage the learner is at. He also posits that individual differences affect the way one learns vocabulary. Good learners, for instance, use a variety of techniques in the process of acquiring vocabulary whereas poor learners apply just a few strategies, often in a very restricted manner.

2.2.3 Learners' strategies to learn vocabulary

There are various ways of learning a word. One of them is to memorize words from a list (Stern, 1975). This strategy has received some attention on the part of researchers. For instance, in the Basic English project, which was “a project devised to provide learners basic minimum vocabulary for the learning of English” (Carter & McCarthy, 1988, p.2), learners were given a list of 850 words to be memorized. The main flaw of this project, among others, was that it was not devised to increase social interaction through language. Three decades after the Basic English project was devised, Michael West (1953) published “A General Service List” (GLS). This list was developed from the Basic English list for the purpose of teaching. Nowadays, the GLS is used as the most important design principle of the Longman Dictionary of Contemporary English (1978) rather than a word list to be memorized (Carter & McCarthy, 1988).

List of paired words are advisable for early stages of language learning (Carter & McCarthy, 1988). These lists have the L2 word and include either a translation in the L1 (mother tongue), a synonym, an explanation of the L2 word, a picture, a graphic or other memory symbols so that words can be learned quickly and efficiently. Despite not being much used any longer, Nation (1982) states that word lists are effective to acquire a great amount of vocabulary in a short period of time, mainly for beginners who are involved in shallower tasks (Cohen & Apeh, 1981).

It was only in the 1970s that research on vocabulary learning strategies started to be developed under the teaching-oriented perspective (Schmitt, in Schmitt & McCarthy, 1997). At that same period of time, it was claimed that language learning success did not depend on aptitude, but on the learner's efforts. This triggered more research on individual learners' approach to controlling their own learning and use of language (Oxford, 1990; McDonough, 1995).

Stern (1975) was one of the first researchers to carry out a study on the development of language learning strategies. Stern (1975) organized a list of ten strategies, based on a learners' introspection. At that time, scholars started to get interested in the language learning strategies that good learners rely on (Rubin, 1975; Wong-Fillmore, 1979; among others).

Some researchers have attempted to categorize the strategies L2 learners use. O'Malley and Chamot (1990) subdivided these strategies into three categories: metacognitive, cognitive, and social/affective strategies. Metacognitive strategies refer to the control the learner has of his/her language use and learning (O'Malley & Chamot, 1990). Cognitive strategies refer to the manipulation of information in order to acquire and store that information. Finally, social/affective strategies are concerned with interpersonal

relationships and with control of one's emotional difficulties (O'Malley & Chamot, 1990). Oxford (1990) categorized language strategies into six types, namely, Memory, Cognitive, Compensation, Metacognitive, Affective and Social. Recently, a study carried out by Stoffer (1995) proposes that vocabulary strategies be divided into nine groups:

1. *Strategies for authentic language use*
2. *Strategies for creative activities*
3. *Strategies for self-motivation*
4. *Strategies for the creation of mental linkages*
5. *Memory strategies*
6. *Visual/auditory strategies*
7. *Strategies for physical action*
8. *Strategies to overcoming anxiety and*
9. *Strategies to organizing words.*" (p.205)

In spite of the several subdivisions of vocabulary strategies, not many studies have been carried out in depth, except for studies on guessing from context (Huckin, Haynes, & Coady, 1993) and on memory strategies such as the Keyword Method (Pressley, Levin, & Miller, 1982).

Studies on vocabulary strategies show that learners do apply strategies to acquire vocabulary. In a study carried out in 1987, Chamot noticed that English as Second Language (ESL) learners who were in high school used more strategies for acquiring vocabulary, compared to other tasks, such as listening comprehension, oral presentation, and social communication. This may occur due to the discrete nature of the tasks involved in acquiring vocabulary in comparison to the other activities that involve L2 learners' more integration. The other reason might be learners' awareness of the importance of vocabulary knowledge. Horwitz's research (1988) corroborates the idea of how important vocabulary

learning is based on a questionnaire in which ESL learners indicated that the core of a L2 is the learning of vocabulary.

Some other strategies used by L2 learners revealed in the literature are: (1) memorization of unknown words (Cohen & Aphek, 1981); (2) notetaking on vocabulary and/or notetaking in the book margins (Ahmed, 1989); (3) repetition combined to activities that require more manipulation of the information such as inferencing, imagery, the Keyword Method (O'Malley & Chamot, 1990); (4) guessing from the context; (5) applying memory strategies; (6) using parts of the words (Nation, 1990).

Studies in cognitive psychology reveal that the deeper and the more manipulated information is, the more effective learning is (Craik & Lockhart, 1972; Craik & Tulving, 1975). Craik and Lockhart (1972) have proposed that there are two different levels of processing incoming information - shallow and deep processing - and these levels of processing tend to develop very gradually. The shallow processing deals with the physical and sensory features of objects, whereas the deep processing tends to deal with the analysis of the word meaning. This analysis involves associating, imagining and thinking about the previous experiences with the incoming information. An example of a shallow level of processing is when one analyzes whether a particular word was written in capital letters or not. The deep processing of information leads to a more consistent learning than shallow processing (Craik & Lockhart, 1972). Craik and Lockhart (1972) claimed that deeper the levels of processing lead to a better recall, thus to a better learning. An example of a deep level of processing is when one analyzes whether a word belongs to a meaning category.

Research has also demonstrated that some deeper level of strategies of vocabulary learning such as making associations (Cohen & Aphek, 1981), and the keyword Method (Pressley, Levin, & Miller, 1982) increase the retention of new L2 words. It is important to

keep in mind that simple cognitive activities might be effective as well, mainly in the use of word lists for beginners.

Ahmed (1989) analyzed five learners while researching vocabulary learning strategies. He found that good vocabulary learners applied several strategies, showed awareness of their learning, of the importance of learning words in context and of the relationship of the meanings between the L2 new word and the L2 word learned previously. On the other hand, poor vocabulary learners applied a limited number of strategies and did not show much awareness concerning the learning of a new word and the relationship between the knowledge of an old word and the new word. Similarly, Sanaoui (1995) distinguishes two types of learners of vocabulary: the learners who organize, review, and practice their vocabulary learning, and the learners who simply do not.

Vocabulary acquisition may also occur through accidental learning when listening to (Elley, 1989) or reading an unknown word or words. Learners can also infer the meaning of the unknown lexical item from the context. According to Read (2000), the latter leads the learner to a deeper process that will help him/her learn the lexical item. Some learners, mainly beginners, use mnemonic techniques to help them remember words more effectively. A very well-known technique is the use of a bilingual dictionary. Also, the repetition of words orally, checking spelling and pronouncing them loudly are techniques applied with much frequency (Schmitt, in Schmitt & McCarthy, 1997). Other ways of retaining vocabulary are putting a great deal of mental effort to understand the meaning of unknown words as well as negotiating the meaning of unknown words when an activity is being performed (Nation & Newton, in Coady & Huckin, 1997). A very efficient technique to enhance learners' word acquisition is the use of communicative activities, such as pictures and games for beginners and simplified readings for intermediate learners, and

dictionary use, practice on morphology, and reading comprehension for advanced learners (Coady, in Coady & Huckin, 1997).

Politzer and McGroarty (1985) point out that strategies are not always good. They may vary according to the context they are applied. Besides the context, there are some other factors involved in vocabulary learning, such as the learner's level of proficiency, the activity, the text, the modality, previous knowledge, the learning context, the L2, and the learner's features (Chamot & Rubin, 1994, cited in Schmitt & McCarthy, 1997). Another important and relevant variable is culture. The learner's background affects the way he/she sees the importance of several vocabulary learning strategies. Also, when choosing the strategy, it is important to take into consideration the frequency with which the words occur. Since low-frequent words are not frequently met, the teaching of some strategies is necessary, in order to avoid spending too much time on the words that do not merit explicit teaching (Nation, 1994).

2.2.4 Testing vocabulary acquisition

In order to verify learners' acquisition of vocabulary, there are a number of tests that can be applied. In most vocabulary tests, words are either isolated, limited or independent from any context. The choice of the test to be applied varies according to what is investigated (Read, 2000). The existing models of tests to assess learners' knowledge of vocabulary can be summarized into four tests: The Vocabulary Levels Test; The Eurocentres Vocabulary Size Test (EVST); The Vocabulary Knowledge Scale (VKS); and The Test of English as a Foreign Language (TOEFL). These tests assess both the receptive vocabulary and the productive vocabulary.

Receptive vocabulary is postulated as the vocabulary one can recognize and comprehend, whereas productive vocabulary is the lexical item that one can not only recognize and comprehend, but also produce either in speaking or writing (Oxford, 1990). Thus, the Receptive Vocabulary Test or Receptive Test (RT) assesses the recognition and comprehension of a target word, usually by means of reading and/or listening tasks whereas the Productive Vocabulary Test or Productive Test (PT) measures the production of a target word, usually by means of speaking and/or writing tasks.

Practice and findings reveal that none of the tests presented above are perfect (Read, 2000). Instead, there are flaws in each one. Therefore Read (2000) suggests the construction of second language vocabulary tests according to what the researcher is investigating. Meara (in Anderman & Rodgers, 1996) also suggests standardization of the tasks in order for researchers to construct further 'real world tasks' and applicable theory. The next section presents the method used to verify whether working memory capacity correlates with the retention of L2 vocabulary.

CHAPTER 3

Method

This section describes how the study was carried out in order to attempt to answer the research questions it addresses: (1) Is there a relationship between working memory capacity and the retention of L2 vocabulary?, and (2) What strategies do higher and lower working memory capacity individuals make use of to retain L2 vocabulary?

This section is subdivided into five main subsections: (a) the participants of the study and the location in which the study was carried out, (b) the materials used in the data collection and the procedures for collecting data from the participants, (c) the transcription of the data collection, (d) the statistical analysis of the data collected, and (e) the pilot study carried out before the actual experiment

3.1 Participants

This study was experimental. Although twenty-four graduate students of the Graduate Program in English Language and Literature at the Federal University of Santa Catarina (UFSC) were invited to participate in the study (Appendix A), only seventeen remained as participants. One of the subjects, who was pregnant, was threatened to have a miscarriage, so after completing the first vocabulary task, she decided not to participate in the next stages of the data collection. After the first activity, three of the subjects did not show interest in taking part in this study and did not show up in any of the appointments set by the researcher, two of the subjects demonstrated enough knowledge of the words presented in the first vocabulary task, as a consequence they were not allowed to follow the

next step of the data collection which was to learn twenty of the sixty unknown words from the first vocabulary task. One subject was discarded after the Speaking Span Test was administered. This participant did not respect the instructions of waiting until the words disappeared on the screen for him to produce sentences, consequently, he scored higher than the estimated score. Out of seventeen participants – 12 female and 5 male - there were sixteen Brazilian native speakers of Portuguese and one Mexican native speaker of Spanish. All seventeen participants had a high level of competence in English, that is, they were able to listen, read, write and speak in English fluently. The reason why proficient participants were preferred is that it was assumed that they are better able to recognize their strategies for learning new vocabulary in English. The purpose of having subjects from the same level of proficiency is to be certain that the results were not affected by differences in knowledge of the language. Fourteen participants, enrolled in 2002, were in the first semester of their Master of Arts (M.A.) course, and three participants were in the third semester of their M.A course, in the thesis phase. None of the participants of this study were paid.

3.2 Instruments

3.2.1 Materials and equipment

The experiment was unfolded into six tasks: five tasks to assess vocabulary retention and one task to assess working memory capacity. These tasks will be discussed in the order they were applied.

The first task to be applied was devised to determine the words to be selected for this study. The second task was the Speaking Span Test (SST), aimed at assessing participants' working memory capacity in productive tasks. The third one was the teaching of twenty unknown words in English. The fourth task was the production of a narrative

(Productive Test) whose objective was to verify participants' learning of the words taught in the third task. The fifth task was a Receptive Test whose goal was to compare its results to the productive test. Finally, an interview with the participants aimed at identifying which strategies they apply to retain and use vocabulary, in general, and those they applied to retain the words taught in task 3 of this experiment.

3.2.2 Vocabulary and memory assessment

The tasks below are unfolded into two main tasks: the vocabulary assessment task and the memory assessment task. These tasks will be described in the order they were applied. Tasks 1, 3, 4, and 5 are related to vocabulary assessment and task 2 is related to memory assessment. Task 6 refers to the strategies participants use to retain new vocabulary.

3.2.2.1 The first vocabulary task

For the first task in this study, a questionnaire (Appendix B) with sixty supposedly unknown words in English was applied to twenty-four participants in order to assess which words these participants were not familiar with. This task was applied to all participants in a classroom of the Graduate Program in English, located on the third floor of the Building CCE-B at the Federal University of Santa Catarina (UFSC). Participants had to complete the task providing either the definition or/and the translation of the word in Portuguese in the gap given next to each word. Participants were instructed to give definitions to or translate only those words that they already knew rather than attempt to guess the unknown words. Participants had no time limit to complete the task. After the subjects completed this task, this researcher could identify the words that were unknown to the majority of the

participants. It was also possible to select the individuals that could participate in the study. In order to choose the participants of this study during the first vocabulary task, the following criterion was followed: the common unknown words would determine which participants should be chosen, since only the unfamiliar words were relevant for the study. Thus, two subjects that already knew almost all of the sixty words presented in the questionnaire were excluded. Therefore, only 22 subjects were selected to join the data collection for the next tasks¹. Through the analysis of the results of this first task, this researcher could identify twenty unknown words that were not translated or defined by any of the participants. The unknown words – seven nouns, three adjectives, ten verbs - were the following: abbot (noun), chasm (noun), composure (noun), contemptuous (adjective), mien (noun), nonchalance (noun), sweeping (adjective), thrust (noun), to amass (verb), to deploy (verb), to dispel (verb), to engender (verb), to espouse (verb), to ingratiate (verb), to preclude (verb), to proffer (verb), to proscribe (verb), to sidetrack (verb), trade-off (noun), ubiquitous (adjective). These words were selected to be taught in the third task.

3.2.2.2 The speaking span test

The second task of the data collection, and the only memory assessment task, was the Speaking Span Test (SST) adapted from Daneman (1991), which comprised sixty words. In the present study, the SST comprised forty words organized in sets of two, three, four, five, and six words. The Speaking Span Test, which is a computer-based test, was applied individually to the eighteen participants that remained in the study. This is a memory test which aimed at assessing participants' working memory capacity during speech production. Four of the twenty-one participants were excluded in this stage of the

¹ However, from the 22 individuals selected to participate in this study, only 17 actually remained.

data collection. Three participants did not show up in the meetings set by the researcher, and one participant was excluded for not following the instructions given by the researcher while doing the test. Thus, out of the twenty-one participants, only seventeen – twelve female and five male - remained as participants of the data collection process.

For the application of this task, the following materials were used: a computer from the laboratory of the Graduate Program in English Language and Literature, located on the third floor of the Building CCE-B, at the Federal University of Santa Catarina (UFSC), a diskette containing the working memory capacity test, a BROKSONIC stereo radio cassette recorder, and seven Ferro Extra I 60-minute cassettes. The Speaking Span Test and the interview were carried out in a separate room at the computer laboratory.

In the Speaking Span Test, the participants were first instructed (Appendix C) and then were given sets of words. They were asked to recall each word separately and produce one sentence for each word presented. There were two sets of two, three, four, five and six words shown in a row on the computer screen. Participants' responses in the SST were tape-recorded. The interval between the words presented within a set was of ten milliseconds and the following word of the set only appeared when the previous one of the same set was removed. Each word of the set was presented on the screen for one second. For a sentence to be considered correct, the participant had to produce it with the word given on the screen in the same order presented in the test. As regards the form, individuals were allowed to use any form of the words given to produce sentences. For instance, individuals could use the word *rain* as either a verb or a noun, as in *It rains a lot* or *I love the rain*. This sentence had also to be easily understood and to be grammatically and semantically appropriate. The total number of correct sentences to be produced by a participant was forty. According to the scores of the Speaking Span test, the seventeen

participants were divided into two groups: the higher cognitive processors, or higher spans, and the lower cognitive processors, or the lower spans.

3.2.2.3 Teaching vocabulary

The third task consisted of the teaching of vocabulary. Twenty unknown words chosen from the first task – abbot, chasm, composure, contemptuous, mien, nonchalance, sweeping, thrust, to amass, to deploy, to dispel, to engender, to espouse, to ingratiate, to preclude, to proffer, to proscribe, to sidetrack, trade-off, ubiquitous - were selected to be taught in a 1-hour class. The classroom used was from the Graduate Program in English, located on the third floor of the CCE-B Building at the Federal University of Santa Catarina (UFSC). Three different tasks were prepared for the class. The first task was the presentation of twenty unknown words within a text (Appendix D) as suggested by Elley (1989), Brett, Rothlein and Hurley (1996). The second task was to match these new words with their appropriate definitions. The third task was to produce sentences orally with these new words written in cards. Due to the difficulty of gathering participants on the very same day, the class for the teaching of vocabulary was done on three different days. On the first day five participants (participants 4, 5, 8, 12, 14) attended the class. On the second day five other participants – 3, 6, 11, 13, 15 - were present in class. On the third and last day, there were seven participants (participants 1, 2, 7, 9, 10, 16, 17) in class. It is noteworthy that the procedures for vocabulary teaching, the tasks proposed and the order of presentation of all three classes were the same for each group.

3.2.2.3.1 Presentation of vocabulary

A text was designed with the twenty unknown words selected from the first task of this data collection (Appendix B). One participant of the group was asked to read the text aloud (Nation, 2001), clearly and slowly. Then the researcher went through the whole story again, stopping where there was a new word (Nation, 2001). Participants were asked to guess the meaning of that unknown word within the story (Paribakht & Wesche, 1996). If the guessing were correct, the researcher would confirm and add other examples to increase participants' understanding of the word (Newton, 1995; Ellis, Tanaka, & Yamazaki, 1994). If participants did not have any clue about the new word, the researcher would explain it in the L2, in this case, English, and would give examples to assure that they understood the meaning of the word (Anderson, Stevens, Shiffrin & Osborn, 1978). The last resource was the translation into Portuguese. When this researcher ended reading and explaining the meaning of the new words given in the text, she went through all the twenty new words again and asked participants the meaning of each word (Nation, 2001). After this task, participants were given some comprehension exercises, which are further described in the next sub-section.

3.2.2.3.2 Comprehension exercises

Two exercises of matching words with their corresponding definition were designed to help participants retain the words taught in the reading task. In the first exercise (Appendix E), participants had to match (Gass, 1988) ten of the new words – abbot, chasm, composure, contemptuous, mien, nonchalance, sweeping, thrust, to amass, to deploy - to their appropriate definition. In the second exercise, participants had to choose one definition out of three alternatives to match each given word (Gass, 1988). The new words

for this second exercise were to dispel, to engender, to espouse, to ingratiate, to preclude, to proffer, to proscribe, to sidetrack, trade-off, and ubiquitous. For the correction of both exercises, the researcher randomly chose participants to give the correct definition for each word. It is noteworthy that participants were taught the grammatical function of each word in the matching exercises. Once the comprehension exercises task was completed, a productive task was carried out, which is described in the sub-section 3.2.2.3.3.

3.2.2.3.3 Productive task

In the third task, participants were divided into groups of either two or three people and then given twenty cards containing each new word (Nation, 2001). Participants were asked to produce a sentence aloud with each word. These sentences had to conform to the meaning and grammatical function taught by the researcher. This task was based on Hall (1991, 1992, cited in Nation, 2001), who claims that learners who produce sentences with the given words from the written tasks will have superior learning.

At the end of the class with each group, the researcher set an appointment, with each participant individually, so that in a week's time it would be possible to check whether they had learned the new words or not. They were supposed to study the twenty words during this week interval.

3.2.2.4 Production of a narrative (Productive test)

In the fourth task, participants were assessed by a Recall/Productive Test (Nation, 1983, 1990). A Recall Test is frequently assessed either by an L1 or an L2 translation, by a gap completion or by some other cued recall tasks. One week after the third task, participants were individually required to construct a narrative using the words taught in

class the week before. This task was tape-recorded, and its objective was to assess participants' vocabulary retrieval for production. Participants were presented with a poster whose pictures depicted most of the words taught in class (Appendix F). Participants were given two minutes to plan the narrative (Nation, 2001) mentally. They were not allowed to jot down any word or idea they had in mind or consult any material. They were told that they did not need to use all the pictures to construct the narrative (Nation, 2001), or to follow the order of the pictures. They had at most five minutes to narrate. In case they decided to stop the narrative before time was over, they were allowed to. This researcher indicated to the participants when they had only one minute left to finish their narration. Timing was important to provide the same opportunities for all participants to produce the narrative. Their narratives were transcribed and the number of taught words recalled in the narratives was counted, the maximum score being 20 words.

3.2.2.5 Receptive test

In the fifth task, a Receptive Test (Appendix G) was devised with the objective of comparing the results of the participants' production in the narrative task and the Receptive Test (Myers, 1914; Palmer, 1921; West, 1938; Crow, 1986). In the production of a narrative, which is a productive task (as mentioned in the review of the literature), participants had to recall the L2 words and produce them in a sentence whereas in the Receptive Test, participants had to recognize the L2 words and translate them into his or her first language (Palmer, 1921; West, 1938; Crow, 1986). In this test, participants had to provide either the definition and/or the translation of the twenty words taught. Again, the maximum score was 20.

3.2.2.6 Interview

Concerning the sixth task, which followed an interview format and was performed right after the production of the narrative, participants were asked to report the strategies they applied to learn and recall the items taught in the class given by the researcher as well as in other contexts besides this study. This task was tape-recorded. Participants were asked seven questions: (1) How do you usually learn/retain unknown words you come across? (2) What do you usually do to understand the meaning of any unknown word? (3) What procedures do you use to remember word form and meanings? (4) How did you learn the twenty words taught last meeting? (5) What words did you find difficult to remember? Why? (6) In which moment did you notice you had learned these twenty new words?, and (7) What helps you learn words better and faster: dictionary, cards, rehearsal, dictation, word lists, words in context, or other strategies? This interview allowed the researcher to assess the strategies higher and lower working memory capacity participants applied to learn the new words taught, and the type of words that were more difficult to learn for higher and lower spans.

3.3 Transcription of the data

The Speaking Span Test, the production of the narrative and the interview done with the participants of this study were tape-recorded in fourteen Ferro Extra IEC-I 60-minute cassettes. The researcher used each side of the cassette for each participant in the Speaking Span Test, and one side of the cassette for each participant in both tasks together: the production of the narrative, and the interview.

As soon as the researcher finished collecting the data, she started transcribing the whole information registered in cassettes to her own computer. As the SST was the first

data recorded in this study, it was also the first one to be transcribed (Appendix H), followed by the production of the narrative (Appendix I), and the interview (Appendix J). All sentences produced by the participants were transcribed in the sequence that they performed in the test. The researcher double-checked all the information she transcribed through the use of two sound systems: first, through the use of a SHARP Compact Disc Stereo Music System CD-X12, and second, through the use of an AIWA CSD-A110 Compact Disc Stereo Radio Cassette Recorder.

3.4 Statistical analysis

The data collected in tasks 2, 4 and 5 were submitted to statistical analysis, using STASTITICA StatSoft CD-ROM (1993). Task 2 consisted of the measures of working memory span in productive tasks. Task 4 consisted of the number of words participants recalled during the production of the narrative (Productive Test). Task 5 concerned the number of words participants were able to define the meaning of and/or translate during the Receptive Test.

The program STASTITICA StatSoft CD-ROM (1993) verified whether there was a statistically significant correlation between the measures of the Speaking Span Test and the Productive Test (words recalled in the narrative), whether there was a significant correlation between the Speaking Span Test and the Receptive Test, and whether there was correlation between the Productive Test (production of a narrative) and the Receptive Test. Another statistical test, the T-test, was applied to verify whether the differences between higher and lower spans in the Speaking Span Test, in the Productive Test (Nation, 1983, 1990, 2001), and in the Receptive Test (Myers, 1914) were statistically significant.

3.5 Pilot study

A pilot study of the Speaking Span Test was carried out in November, 2001 with eighteen graduate students of the Applied Linguistics and Literature course at the Federal University of Santa Catarina (UFSC) in the first semester of 2001. This pilot study was conducted with the objective of assessing the procedures to be applied in the present study. The participants were Brazilian native speakers of Portuguese who had a high level of competence in English. The pilot study had to be conducted at the researchers' house rather than in the computer laboratory of the university due to the strike that was taking place at the university.

Observing the performance and the results of these participants, special attention was given to two aspects. First, in the pilot study, the participants were given general instructions concerning the procedures to be followed. I observed that some participants did not wait until the words disappeared from the video screen so that they could then produce the sentences that they were asked to. Thus, in the actual study, participants were instructed to wait until the words disappeared to produce sentences using the given words. When the instructions were not followed, the participants were discarded from the study. Second, in the pilot study, the Speaking Span Test was carried out in the researcher's house due to the strike that was taking place at the Federal University of Santa Catarina. Thus, some participants found it difficult to do the tasks in the researcher's home and decided not to continue participating in the study. For this reason, in this study, I decided that all the experiment would be carried out at the Federal University of Santa Catarina, a location where all participants were acquainted with.

CHAPTER 4

Results and discussion

The objective of this study is to investigate (1) whether those individuals with a larger working memory capacity are better able to retain L2 lexical items in long-term memory than those individuals with a smaller working memory capacity; and (2) what strategies higher and lower working memory capacity individuals make use of to retain L2 vocabulary. This chapter presents the results of the statistical analyses of the Speaking Span Test (SST), the Productive Test (PT), the Receptive Test (RT) scores, as well as the results of the interview conducted with seventeen participants. Results are discussed in the light of important existing studies in the field of working memory capacity and L2 vocabulary acquisition.

The thrust of this research proposal lies on the assumption that higher spans, measured by the Speaking Span Test, are better able to retain vocabulary items in an L2, measured by the Productive Test and the Receptive Test. Also, based on the existing literature on working memory capacity and vocabulary acquisition, I claim that higher spans, as measured by the Speaking Span Test - use a greater deal of strategies than lower spans, as measured by the Speaking Span Test. I also claim that higher spans, as measured by the Speaking Span Test – also associate these strategies to acquire vocabulary items, as reported in the interview carried out with both higher and lower spans.

As mentioned in chapter 3, the seventeen participants were separated into two main groups: higher spans, or higher processors, and lower spans, or lower processors, as assessed by the Speaking Span Test (Daneman, 1991) (see Chapter 3 – Method, subsection

3.2.2.2). All participants were randomly taught 20 (twenty) unknown words, in one hour (see Chapter 3 – Method, subsection 3.2.2.3). Written and oral exercises were administered in this task (see Chapter 3 – Method, subsection 3.2.2.3.2 and 3.2.2.3.3). A week later, all participants were asked to produce a narrative using those twenty words taught the prior week - measured by the Productive Test - and were asked to provide either the definition or the translation of those 20 words - measured by the Receptive Test (see Chapter 3 – Method, subsection 3.2.2.4 and 3.2.2.5). On the very same day, right after the administration of both tests, an interview was conducted in order to find out what strategies participants used to learn the words previously taught (see Chapter 3 – Method, subsection 3.2.2.6).

The results will be presented in two main sections. In Section 4.1, I present and discuss the descriptive and inferential statistics of the Speaking Span Test (SST), the Productive Test (PT), and the Receptive Test (RT). In Section 4.2, I present the descriptive statistics of the T-test, the participants' scores on the Speaking Span Test, the Productive Test, and the Receptive Test, as well as the strategies they used to learn L2 vocabulary.

4.1 Descriptive and inferential statistics of the SST, the PT, and the RT

Table 4.1 presents the descriptive statistics of individuals' Speaking Span Test, the Productive Test, and the Receptive Test.

Table 4.1: Descriptive Statistics for the Speaking Span Test (SST), the Productive Test (PT) and the Receptive Test (RT)

	N	Minimum	Maximum	Mean	Std. Deviation
SST	17	14	27	19.7647	2.8401
PT	17	3	11	6.5882	2.717
RT	17	10	20	16.4118	3.2415
Valid N (listwise)	17				

As can be seen in Table 4.1, the number of participants in this study was seventeen. The maximum number of sentences produced in the Speaking Span Test was 27, whereas the minimum was 14, with a mean of 19.76.

In the Productive Test, the highest score participants could reach was 20, which was the number of words they had to recall and produce from the class taught the week before the test. Table 4.1 shows that the maximum score reached by participants in the Productive Test was 11, and the minimum was 3, with a mean of 6.58.

The Receptive Test measured how many words participants were able to either translate into Portuguese – most participants' mother tongue - or provide the definition. In the Receptive Test, the highest score a participant could reach was 20, and the scores found in this test ranged from 10 to 20, with a mean of 16.41. This variability in the scores provided conditions to find correlations in the data of this study. Table 4.2 shows the results

of each participant's performance on the Speaking Span Test, the Productive Test and the Receptive Test.

Table 4.2: Participants' performance on the Speaking Span Test, the Productive Test and the Receptive Test

	SST*	Productive test	Receptive test
	40 words	# words recalled (20)	# words recalled (20)
PART 1	21	7	19
PART 2	20	11	20
PART 3	22	10	20
PART 4	20	9	16
PART 5	19	5	13
PART 6	20	6	18
PART 7	18	3	20
PART 8	18	4	17
PART 9	18	6	17
PART 10	27	7	16
PART 11	17	3	11
PART 12	23	9	17
PART 13	22	8	15
PART 14	20	11	20
PART 15	19	5	18
PART 16	14	3	10
PART 17	18	5	12

•

- (1) PART stands for participants selected to take part in this study.
- (2) The numbers presented in the SST are the number of grammatically correct sentences that each participant produced for each word shown on the video screen.
- (3) The numbers presented in the Productive Test represent the number of words taught that were retrieved and used by each participant while producing the narrative.
- (4) The numbers shown in the Receptive Test represent the number of words taught that were recognized by each participant through defining or translating each word into the mother

tongue (L1) (Palmer, 1921; West, 1938; Crow, 1986), in this case, Brazilian Portuguese which was the common L1 for most of the participants.

The Speaking Span Test (Daneman & Green, 1986; Daneman, 1991) measured the participants' working memory capacity during language production. In this test, participants had to accomplish a processing task while trying to hold the just-presented word. Thus, processing and storage of the working memory system could be taxed. The highest score participants could reach was 40.

The Productive Test (Nation, 1983, 1990, 2001), also coined as a 'recall test', is a test that measures 'active' knowledge, that is, the ability participants have to retrieve and use vocabulary items in sentences. The highest score participants could obtain in this productive test was 20.

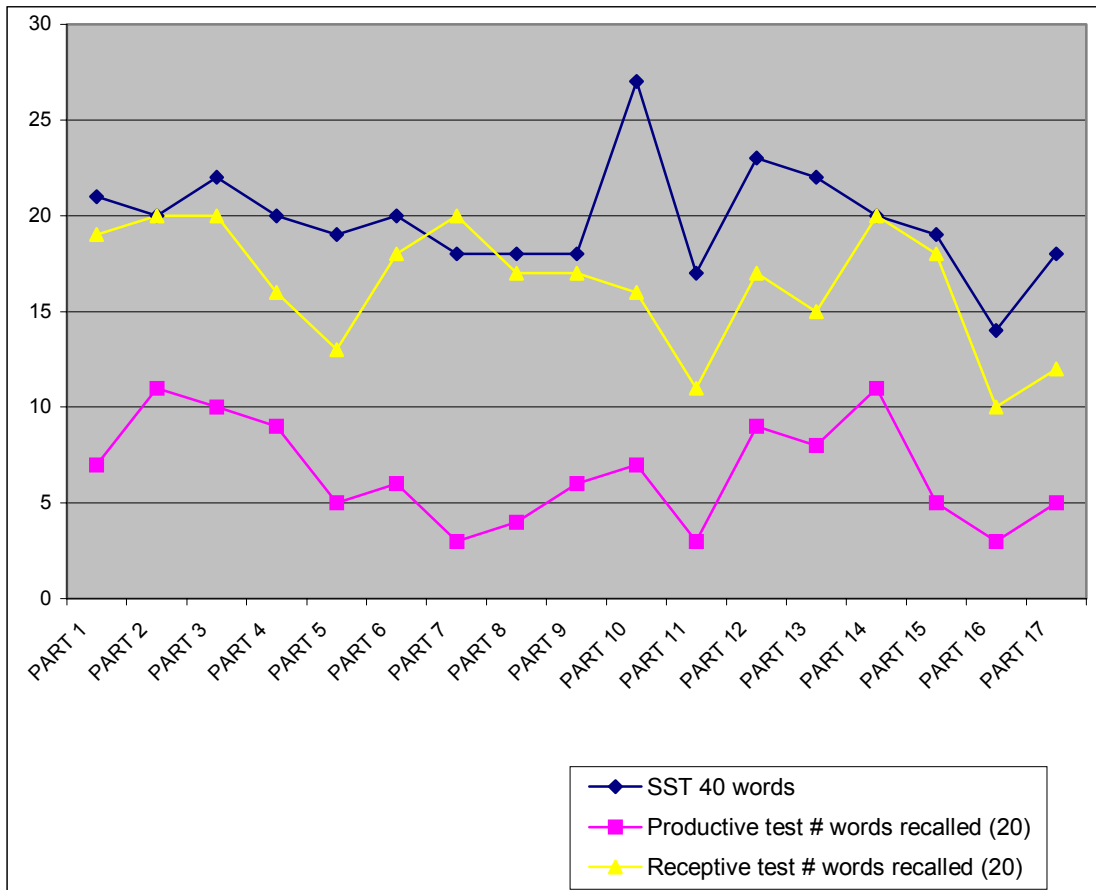
The Receptive Test (Palmer, 1921; West, 1938; Crow, 1986), also known as 'recognition type test', is a kind of test that measures 'passive' knowledge. This test assesses how many words can be recognized through the means of translation of given words in the participants' L1 or the definition of the given word. The maximum score participants could obtain in this Receptive Test was 20.

The Speaking Span Test was applied in order to divide the participants into two groups: the participants who scored more than 50 per cent in the Speaking Span Test were named 'higher cognitive processors' or/and 'higher spans', and the participants who scored less than 50 per cent in the Speaking Span Test were called 'lower cognitive processors' or/and 'lower spans'. Out of 17 participants, nine were selected to be 'higher spans' and eight to be 'lower spans'.

The Productive Test was applied in order to find out (1) whether participants' working memory capacity in production, as measured by the SST, correlated with participants' ability to retrieve and recall vocabulary items, and (2) verify which words higher and lower spans could recall.

The Receptive Test, as a recognition test, was applied (1) to verify whether participants' working memory capacity in production, as measured by the Speaking Span Test, correlated with participants' ability to recognize word meaning and/or translation, and (2) to verify which words and word category higher and lower processors were able to comprehend.

Figure 4.1: Participants' scores on the Speaking Span Test (SST), on the Productive Test, and on the Receptive Test



As can be seen in Table 4.2 and Figure 4.1, both higher and lower spans presented very high scores in the Receptive test. Higher spans also presented high scores in the Productive Test whereas lower spans had low performance in the Productive Test. Table 4.3 presents the results of the Pearson Product Moment Coefficient of Correlation between the Speaking Span Test (SST) scores and the Productive Test (PT) scores.

Table 4.3: Pearson Product Moment Coefficient of Correlation between the Speaking Span Test (SST) scores and the Productive Test (PT) scores

	SST	PT
SST Pearson Correlation	1	.586*
Sig. (2-tailed)	.	.013
N	17	17
PT Pearson Correlation	.586*	1
Sig. (2-tailed)	.013	.
N	17	17

* Correlation is significant at the .05 level (2-tailed).

Table 4.3 presents the results of the Pearson Product Moment Coefficient of Correlation which verified whether there was a correlation between the SST scores and the PT scores. The table above shows a 2-tailed positive correlation ($r = .586$) between the SST and the PT scores at the .05 level (2-tailed). These results might indicate that the participants who presented higher performance in the working memory capacity test were also more prone to recalling and producing vocabulary items in the productive task, the narrative that participants were asked to produce orally. These results might also indicate that the participants who obtained lower scores in the working memory capacity test were less prone to recalling and producing vocabulary items in the productive task.

Table 4.4 presents the results of the Pearson Product Moment Coefficient of Correlation which verified whether there was a correlation between the SST and the RT.

Table 4.4: Pearson Product Moment Coefficient of Correlation between the participants' Speaking Span Test (SST) scores and the Receptive Test (RT) scores

	SST	RT
SST Pearson Correlation	1	.419*
Sig. (2-tailed)	.	.095
N	17	17
RT Pearson Correlation	.419*	1
Sig. (2-tailed)	.095	.
N	17	17

* Correlation is significant at .05 level (2-tailed)

The table above shows a 2-tailed positive correlation ($r = .419$) between the SST and the RT scores. These results might indicate that higher spans, as measured by the Speaking Span Test, presented better performance in the language comprehension task than lower spans. Taken together, the results shown in Tables 4.3 and 4.4 might also indicate that the Speaking Span Test, originally devised to tax working memory capacity in language production, was also able to capture processes involved in word recognition. In fact, Melka (in Schmitt & McCarthy, 1997) has stated that vocabulary productive processes are difficult to be distinguished from receptive processes in relation to conceptualization and assessment. Thus, it could be that upon translating and giving definition to the words in the Receptive Test, participants activated productive processes.

Hypothesis 1 predicted that individuals with larger working memory capacity in production, as measured by the Speaking Span Test, would also be more able to retain new

vocabulary items, as measured by the Productive Test and the Receptive Test. Results from Pearson Product Moment Coefficient of Correlation showed correlations at the .05 level (2-tailed) between the Speaking Span Test scores and the Productive ($r = .586$) and Receptive ($r = .419$) Tests scores (see Tables 4.3 and 4.4). These results lend support to hypothesis 1. Individuals who presented higher scores in the working memory span measure, as assessed by the Speaking Span Test, were also more prone to retaining more vocabulary items, as assessed by the Productive and Receptive Tests. In turn, individuals who presented lower scores in the working memory span measure, as assessed by the Speaking Span Test, tended to retain fewer vocabulary items, as assessed by the Productive and Receptive Tests.

In the next section, I will present the T-test scores, higher and lower span participants' scores on the Speaking Span Test (SST), on the Productive Test (PT), and on the Receptive Test (RT), as well as the strategies participants used to retain L2 vocabulary.

4.2 Descriptive statistics of the T-test, the participants' scores on the Speaking span test, the Productive test, and the Receptive test, as well as the strategies they used to learn L2 vocabulary

In order to verify whether the quantitative data of higher and lower span score groups were significantly different in the Speaking Span Test (SST) scores, in the Productive Test (PT) scores, and in the Receptive Test (RT) scores, the 'T-test' was applied (Barbetta, 1994). Results are presented in Table 4.5.

Table 4.5: T-test: independent sample for the SST, PT, and RT

	Participants	N	Mean	Std. Deviation
SST	Lower spans	8	17.63	1.60
	Higher spans	9	21.67	2.29
Productive test	Lower spans	8	4.25	1.16
	Higher spans	9	8.67	1.80
Receptive test	Lower spans	8	14.75	3.69
	Higher spans	9	17.89	1.96
* Correlation is significant at .001 level (2-tailed)				

The T-test is a statistical test which takes into account the means of both groups, in this case, the means of the higher and the lower spans, as well as the number of participants of each group (Barbetta, 1994) to measure whether they have significant differences or not.

The first column of Table 4.5 presents the three tests participants were applied. The second column shows the two groups into which participants were divided: the higher spans and the lower spans. The third column shows the number of individuals of each group analyzed: nine individuals belonged in the higher span group, and eight individuals belonged in the lower span group. The fourth column presents the mean of higher and lower spans in the SST, the PT, and the RT, respectively. Finally, the fifth column reports the standard deviation of higher and lower spans in the SST, the PT, and the RT.

As can be seen in Table 4.5, the mean scores of higher spans and lower spans in the SST (2.29 and 1.6, respectively), the PT (1.8 and 1.16, respectively), and the RT (1.96 and 3.69, respectively) shown in the T-test gives us room to assert that both groups are

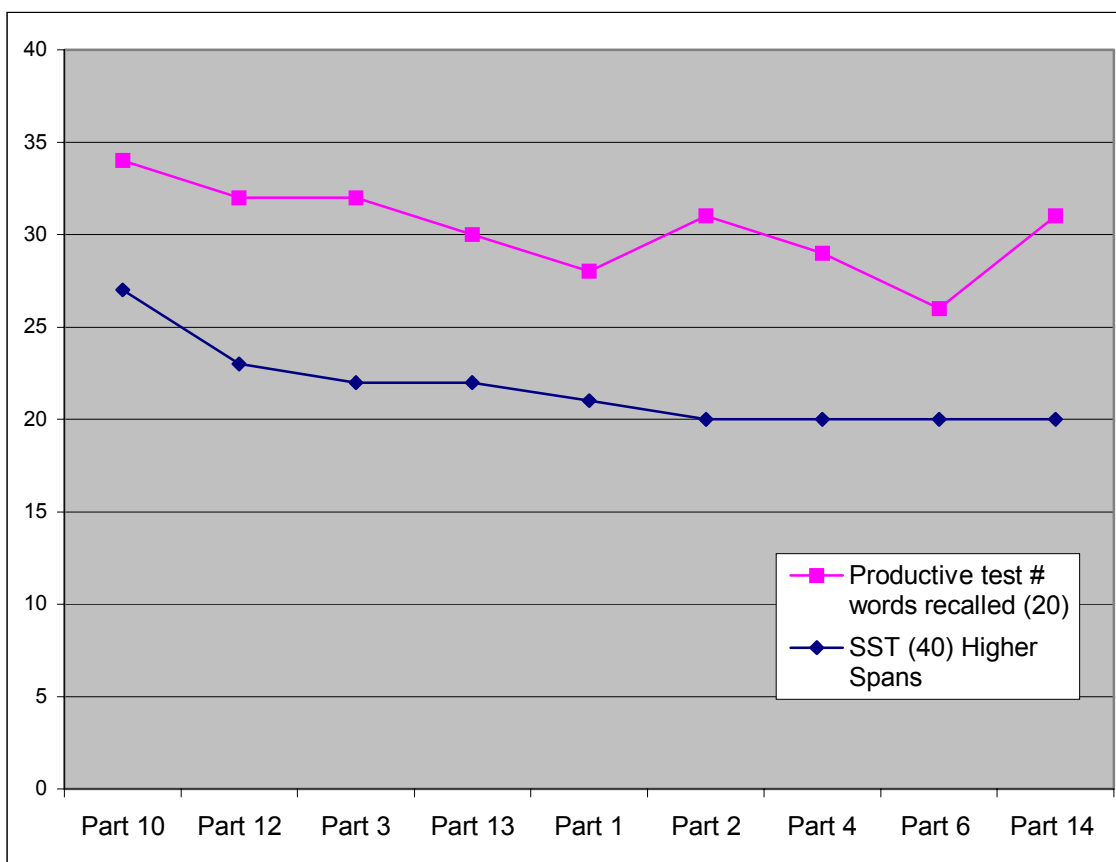
significantly different ($p = .001$), thus different scores and behaviors can be expected from both groups. In the following subsection, I will explore the behavior of higher and lower spans in the Speaking Span Test and the Productive Test.

4.2.1 Higher and lower spans on the Speaking span test and the Productive test

Table 4.6 and Figure 4.2 present higher spans' scores on the Speaking Span Test and the Productive Test and Table 4.7 and Figure 4.3 present lower spans' scores on the Speaking Span Test and the Productive Test.

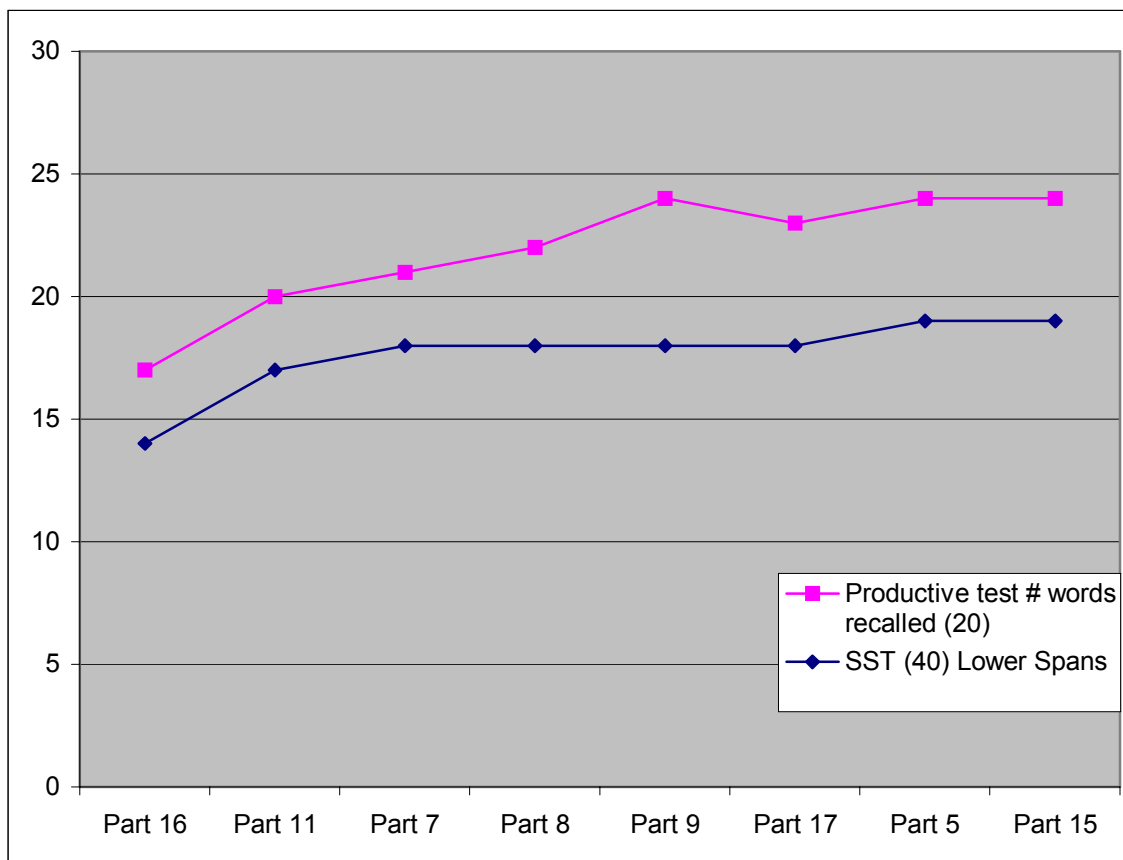
Table 4.6 Higher Span's scores on the Speaking Span Test and the Productive Test

	SST (40) Higher Spans	Productive test # words recalled (20)
Part 10	27	7
Part 12	23	9
Part 3	22	10
Part 13	22	8
Part 1	21	7
Part 2	20	11
Part 4	20	9
Part 6	20	6
Part 14	20	11

Figure 4.2: Higher Spans' scores on the Speaking Span Test and the Productive Test**Table 4.7: Lower Spans' scores on the Speaking Span Test and the Productive Test**

	SST (40) Lower Spans	Productive test # words recalled (20)
Part 16	14	3
Part 11	17	3
Part 7	18	3
Part 8	18	4
Part 9	18	6
Part 17	18	5
Part 5	19	5
Part 15	19	5

Figure 4.3 Lower Spans' scores on the Speaking Span Test and the Productive Test



Tables 4.6 and 4.7 and Figures 4.2 and 4.3 illustrate the behavior of higher and lower spans, as measured by the Speaking Span Test, in the Productive Test. Higher processors were better able to recall more vocabulary if compared to the lower processors. Participants 1, 2, 3, 4, 6, 10, 12, 13, 14 presented higher scores on the Speaking Span Test as well as in the Productive Test where they had to recall the words taught one week before the performance of this task and put them into a context. However, participants 5, 7, 8, 9, 11, 15, 16, and 17 scored fewer words in the Speaking Span Test as well as in the Productive Test than higher spans. The number of words recalled by the higher spans in the Productive Test ranged from 6 to 11. That is, higher processors' scores ranged five points

and they were able to recall from 30% to 55% of the words taught the week before the application of the Productive Test.

Table 4.7 and Figure 4.3 present the lower spans' performance on the Speaking Span Test and the Productive Test. As can be seen, the number of words recalled had a variation of three points, that is, they varied from three to six words, out of 20 words taught in the week before the Productive Test. In other words, lower spans were able to recall from only 15% to 30% of the words taught the week before the Productive Test was applied. These results lend support to Hypothesis 1 of this study, which states that individuals with a larger working memory capacity are better able to transfer vocabulary items to long-term memory, since higher processors, as measured by the Speaking Span Test, recalled more vocabulary items in the Productive Test if compared to the lower processors who recalled fewer vocabulary items. In other words, the higher the working memory capacity, the more prone participants are to recalling and producing L2 vocabulary items in a productive task, involving making up a narrative with the twenty words previously taught. In turn, the lower the working memory capacity, the less prone participants seem to be to recalling and producing vocabulary items in a productive task, such as producing a narrative with previously taught words. The means are revealing. Higher spans' mean score in the productive test was 8.6 words whereas lower spans' mean score was 4.25 words. That is, higher spans memorized twice as much the number of words as compared to lower spans, in the productive test. In the next subsection, I will present higher and lower spans' scores on the Speaking Span Test and the Receptive Test.

4.2.2 Higher and lower Spans on the Speaking span test and the Receptive test

Table 4.8 and Figure 4.4 illustrate the behavior of higher spans in the Speaking Span Test and the Receptive Test whereas Table 4.9 and Figure 4.5 illustrate the behavior of lower spans in the Speaking Span Test and the Receptive Test.

Table 4.8: Higher spans' scores on the Speaking Span Test and the Receptive Test

	SST (40) Higher Spans	Receptive test # words recalled (20)
Part 10	27	16
Part 12	23	17
Part 3	22	20
Part 13	22	15
Part 1	21	19
Part 2	20	20
Part 4	20	16
Part 6	20	18
Part 14	20	20

Figure 4.4: Higher spans' scores on the Speaking Span Test and the Receptive Test

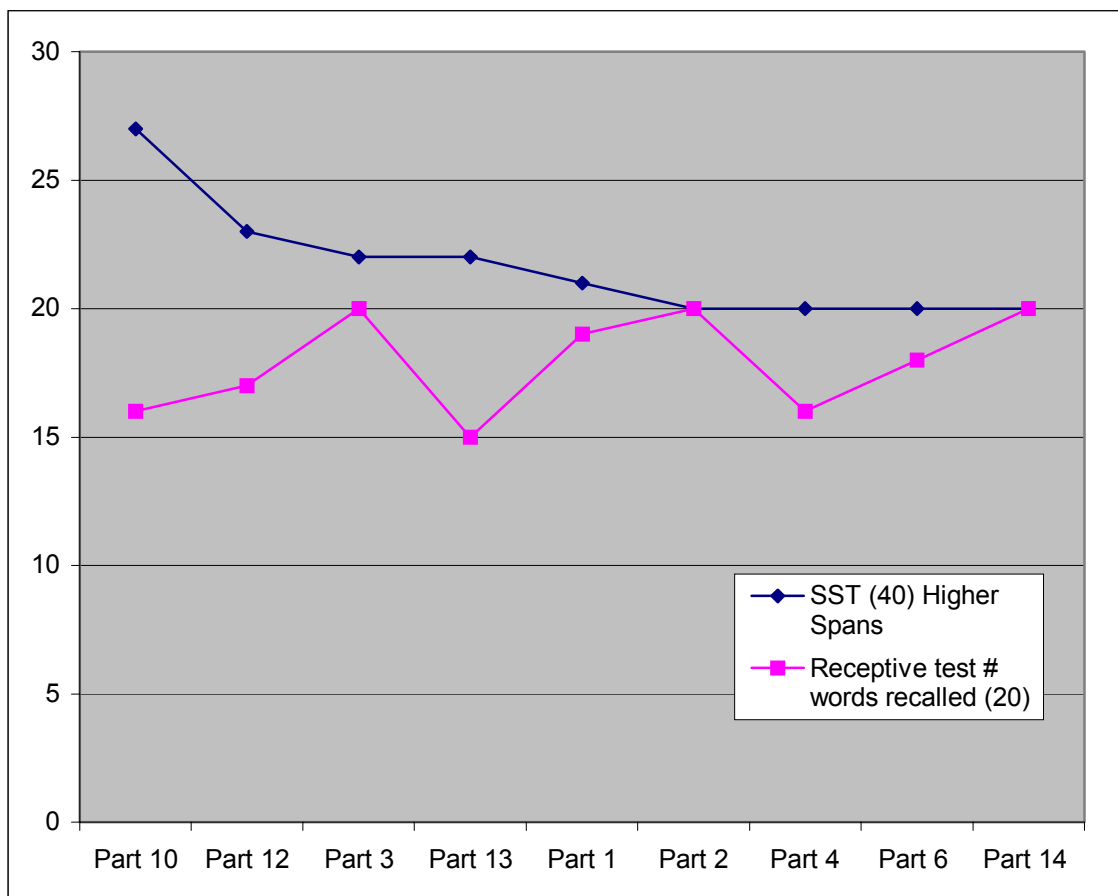
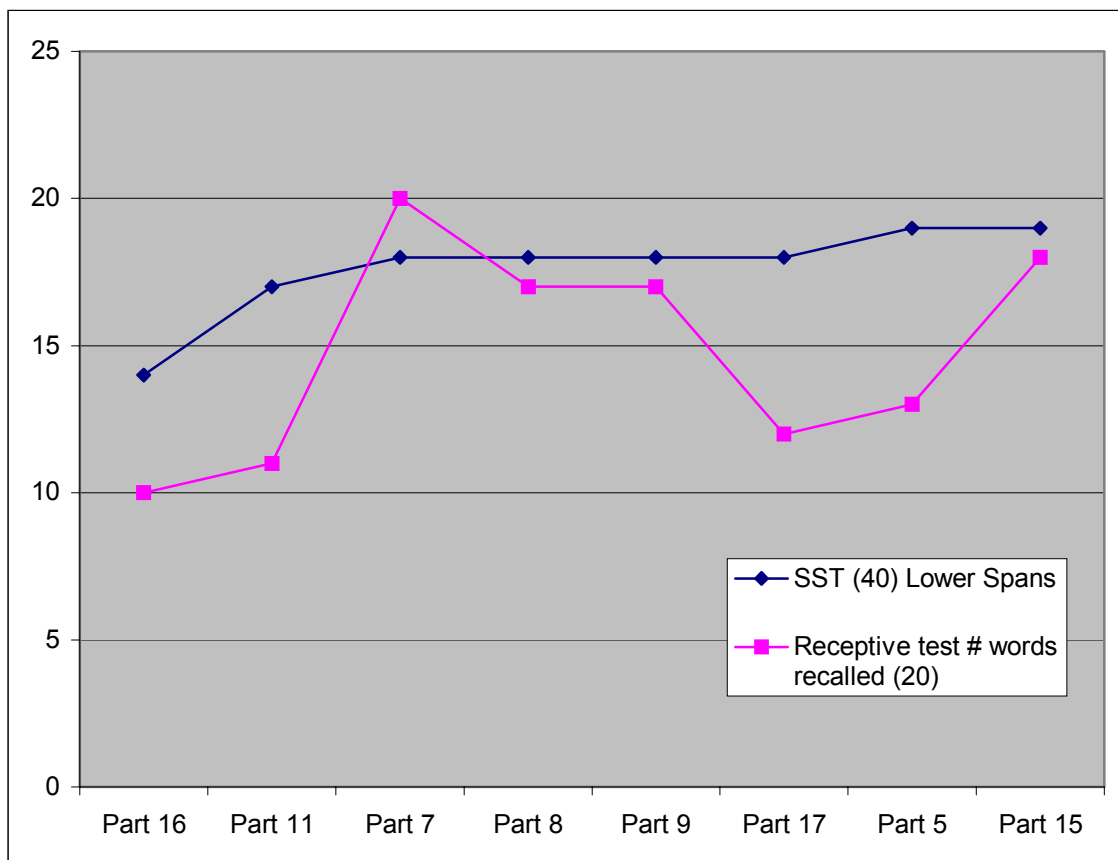


Table 4.9: Lower spans' scores on the Speaking Span Test and the Receptive Test

	SST (40) Lower Spans	Receptive test # words recalled (20)
Part 16	14	10
Part 11	17	11
Part 7	18	20
Part 8	18	17
Part 9	18	17
Part 17	18	12
Part 5	19	13
Part 15	19	18

Figure 4.5 Lower Spans' scores on the Speaking Span Test and the Receptive Test



Tables 4.8 and 4.9 and Figures 4.4 and 4.5 present higher and lower spans' scores on the Speaking Span Test and the Receptive Test. Out of forty words presented in the Speaking Span Test to all participants, the words recalled in this test varied 13 points, from 14 to 27 words, that is, participants were able to recall from 35% to 67.5% of the words given in the SST. Regarding the Receptive Test, out of the twenty words presented in English to be recognized by all participants in the Receptive Test, the scores varied nine points, from 10 to 20 words. That is, participants were able to identify from 50% to 100% of the words taught the week before the test.

Table 4.8 and Figure 4.4 present higher spans' scores on the Receptive Test. Out of 20 words, higher spans' scores showed a variation of five points, with the lowest score being 15 words and the highest score, 20 words. In other words, higher spans were able to recognize from 75% to 100% of the words taught one week before taking the Receptive Test.

As can be seen in Table 4.9 and Figure 4.5, out of a total of 20 words, results from lower spans regarding the Receptive Test show scores which varied from 10 to 20 words recognized. In other words, lower spans were able to recognize from 50% to 100% of the words taught one week before the test. If compared to higher spans' scores, described in Table 4.8 and Figure 4.4, it can be noticed that the highest scores obtained in the Receptive Test are shared by both groups. However, the lowest scores, which are 50% of the words recognized, were produced to by the lower spans, as the higher spans' lowest scores were 75%. Higher spans' mean score was 17.8 words whereas lower spans' mean score was 14.7 words, in the Receptive Test. This difference of means in the receptive test might indicate that despite the high scores obtained by higher and lower spans, higher spans still have more working memory capacity to recognize vocabulary items.

Given the results of the Productive Test and the Receptive Test above, it is possible to argue that a difference between the participants' scores in both tests can be noticed. Considering the behavior of all participants, their recalling of vocabulary items in the Productive Test varied from 15% to 55% whereas their recognition of vocabulary items in the Receptive Test varied from 55% to 100%. The mean number of words that higher spans were able to recognize was 17.8, in the receptive test whereas they were able to produce the mean of 8.6 words, in the Productive Test. The mean number of words that lower spans were able to recognize was 14.7, in the Receptive Test whereas they were able to produce

the mean of 4.2 words, in the productive test. In other words, it seems that the number of vocabulary items that participants were able to recognize was twice (higher spans) and three times (lower spans) as higher the number of items they were able to produce.

These results are in line with previous studies that the Receptive Tests are less difficult than Productive Tests (Stoddard, 1929; Nation, 2001). In the Receptive Tests, subjects do not need to be acquainted with many characteristics of the form of the vocabulary item whereas in the Productive Tests they have to know how to use the vocabulary item more precisely. Stoddard's studies (1929) reveal that participants' scores are twice as higher in the Receptive Test than in the Productive Test. Waring (1997) also found that his subjects' scores, after three months of having learned vocabulary items, were higher on the Receptive Test than on the Productive Test. Nation (2001) points out that it is more time consuming to learn words for speaking and writing, that involve production, than for listening and reading that only involve the comprehension of words. Nation (2001) sums up asserting that learning receptive vocabulary is far easier than learning productive vocabulary.

4.3 Higher and Lower spans and their strategies to learn vocabulary

This subsection is two-folded. First, the most frequent words used in the Productive Test and in the Receptive Test recalled by the higher and lower spans are presented both together and separately. Second, a comparison is made between higher and lower spans' scores in both tests.

Table 4.10: Participants' recall of the words taught in the Productive Test

	Productive test		
	Most frequent words recalled by all partic.(17)	Most frequent words recalled by Higher Spans (9)	Most frequent words recalled by Lower Spans (8)
Abbot	8	6	2
Chasm	15	8	7
Composure	4	4	0
Contemptuous	5	3	2
Mien	6	6	0
Nonchalance	9	4	5
Sweeping	10	6	4
Thrust	7	5	2
To amass	2	1	1
To deploy	4	2	2
To dispel	4	4	0
To engender	4	3	1
To espouse	2	2	0
To ingratiate	4	2	2
To preclude	3	2	1
To proffer	6	6	0
To proscribe	4	4	0
To sidetrack	3	3	0
Trade-off	2	1	1
Ubiquitous	10	6	4

As can be seen in Table 4.10, the most frequent L2 words recalled by both higher and lower spans in the Productive Test were adjectives – *sweeping* (10), *ubiquitous* (10) - and nouns – *chasm* (15), *nonchalance* (9), when compared to verbs. According to Stoffer (1995), these two types of words are probably retained through visual strategies, imagery (O'Malley & Chamot, 1990), and associations (Cohen & Aphek, 1981). Nouns are

unfolded into subclasses of proper nouns, common nouns, abstract nouns, concrete nouns, count nouns, mass nouns, and group nouns (Hatch & Brown, 1995 p.219). Concrete nouns are words most prone to being retained due to the ease of being visualized (Hatch & Brown, 1995), such as the word *chasm*. The noun *nonchalance* is abstract, and according to Hatch and Brown (1995), this type of noun can be easily visualized, since it is simple to imagine the way that a nonchalant person behaves. These results are in line with the idea that some of the strategies to learn words are creating mental connections and using visual strategies (Stoffer, 1995).

Adjectives have the objective of emphasizing or of providing the description of particular nouns (Hatch & Brown, 1995). Adjectives may describe positive or negative qualities (Hatch & Brown, 1995). Hatch and Brown (1995) posit that positive adjectives are acquired more easily because individuals tend to pay attention to new and pleasant qualities of stimuli. Examples of positive adjectives are *sweeping* and *ubiquitous*. Rodgers (1969) claims that “nouns are easiest to learn, followed by adjectives; on the other hand, verbs and adverbs [are] the most difficult” (p. 40). Ellis and Beaton (1993) also claim that “nouns are easier than verbs, because learners can form mental images of them more readily” (p.40). Thus, one can visualize nouns as something concrete and relate qualities for these nouns, contrary to verbs which are more abstract and are less likely to be visualized when they are retrieved (Nation, 2001). Higher spans were able to recall mostly nouns such as *abbot* (6), *chasm* (8), *mien* (6), *thrust* (5), adjectives such as *sweeping* (6) and *ubiquitous* (6), and the verb *to proffer* (6) whereas lower spans were able to recall nouns, such as *chasm* (7) and *nonchalance* (5) and adjectives such as *sweeping* (4) and *ubiquitous* (4).

It is noteworthy that verbs are vocabulary items that demonstrate action and states (Hatch & Brown, 1995). Verbs can be categorized into 4 (four) groups: activities,

accomplishments, achievements, and states (Hatch & Brown, 1995). The verb *to proffer* fits into the accomplishment category due to its meaning that stands for “to offer something to someone, especially by holding in one’s hands; to give someone advice, explanation” (Longman Dictionary of Contemporary English, 1978). Taken together the results of the present study might indicate that higher spans seem to take advantage of the features of nouns and adjectives, and thus, use their remaining working memory capacity to learn more complex words, such as verbs.

Regarding lower spans’ performance in the Productive Test, the most frequent words recalled were the adjectives *sweeping* (4) and *ubiquitous* (4), and the nouns *chasm* (7) and *nonchalance* (5). The recalling of these words might indicate that lower spans use all of their working memory capacity in an attempt to learn vocabulary items. As a result, lower spans are more prone to learning adjectives and nouns, considered to be easier to be acquired for their features and for not requiring as much manipulation as vocabulary items that belong to other different word classes, such as verbs. Thus, higher spans are better able to recall verbs, in addition to nouns and adjectives, as compared to lower spans. The participants’ recognition of the words taught on the Receptive Test will be shown in the next sub-section.

Table 4.11: Participants' recognition of the words taught in the Receptive Test

	Receptive Test		
	Most frequent words recognized by all partic.(17)	Most frequent words recognized by Higher Spans (9)	Most frequent words recognized by Lower Spans (8)
Abbot	16	9	7
Chasm	17	9	8
Composure	13	7	6
Contemptuous	12	7	5
Mien	14	9	5
Nonchalance	15	7	8
Sweeping	17	9	8
Thrust	15	9	6
To amass	17	9	8
To deploy	13	8	5
To dispel	11	7	4
To engender	11	7	4
To espouse	10	7	3
To ingratiate	16	9	7
To preclude	10	7	3
To proffer	12	7	5
To proscribe	10	6	4
To sidetrack	16	9	7
Trade-off	16	9	7
Ubiquitous	16	8	8

Table 4.11 presents the results obtained in the Receptive Test with regard to the words identified by the higher spans and the lower spans that participated in this study. The first column of the table shows the twenty words taught and, one week later, given to the participants in order to recognize these word meaning and/or definition in the Receptive Test. The second column of the table reports the number of participants – both higher and

lower spans - that were able to recognize each word shown in the table. The third column presents the number of higher spans – out of nine - that were able to recognize each given L2 word in the table. Finally, the fourth column displays the number of higher spans – out of eight – that were able to identify each provided L2 word in the table.

The most frequent words recognized by all participants of this study are shown in the second column of Table 4.13, in red, as follows: *nonchalance* (15), *thrust* (15), *abbot* (16), *to ingratiate* (16), *to sidetrack* (16), *trade-off* (16), *ubiquitous* (16), *chasm* (17), *sweeping* (17), *to amass* (17). It seems that again all participants recognized many nouns and adjectives.

Higher spans' scores in the Receptive Test, presented in the third column of Table 4.11, reveal that not only nouns and adjectives, but also verbs – *to amass*, *to deploy*, and *to ingratiate* - were easily recognized. All the higher spans identified *abbot*, *chasm*, *mien*, *sweeping*, *thrust*, *to amass*, *to ingratiate*, *to sidetrack*, and *trade-off*, and eight of them recognized the words *to deploy* and *ubiquitous*.

Concerning lower spans' recognition of words in the Receptive Test, shown in the fourth column of Table 4.11, lower spans' performance was much higher on the Receptive Test than their performance on the Productive Test. Nevertheless, if compared to the higher spans, a slight difference can be noticed when lower spans had to recognize verbs. This difference might indicate that higher spans present a more efficient phonological processing that, in turn, contributes to the consolidation of the memory trace. For instance, while eight higher spans (out of nine) identified the verb *to deploy*, only five lower spans identified the same word. Seven higher spans (from nine) identified the verbs *to dispel* and *to engender*, whereas only four lower spans (from eight) identified these verbs. In general, it can be argued that regardless of the word class, higher spans were able to recognize a great amount

of words. This might indicate, as predicted in hypothesis 2, that higher spans seem to apply higher level strategies to retain vocabulary. Despite this difference, it can be asserted that subjects present higher performance in comprehension tasks, such as the Receptive Test, rather than productive tasks, such as the Productive Test, as mentioned in the existing literature of vocabulary learning (Nation, 2001).

The next section will present the interview conducted with the seventeen participants of this study after they had participated in the Speaking Span Test, in the class, in the productive test, and in the receptive test. This interview was intended to find out what strategies the participants used to learn L2 vocabulary.

4.4 Interview: Higher and lower spans and their strategies to learn vocabulary

An interview consisting of seven questions was conducted with the higher and lower span participants in order to answer the second research question of this study. The interview questions are listed below:

1. *How do you usually learn unknown words you come across?*
2. *What do you usually do to figure out/comprehend the meaning of an unknown word?*
3. *What procedures do you use to remember word form and meanings?*
4. *How did you learn the twenty words taught last meeting?*
5. *What words did you find difficult to remember? Why?*
6. *In which moment did you notice you had learned these new words? (From class to self-study?)*
7. *What helps you learn words better and faster? Dictionary? Cards? Rehearsal? Dictation? Mnemonics?*

Concerning Hypothesis 2 of this study, this researcher used the interview questions to examine whether *the vocabulary learning strategies applied by individuals with a larger working memory capacity were quantitatively and qualitatively different from those applied by individuals with a smaller working memory capacity.*

Tables 4.12, 4.13 and 4.14 present the answers given by the participants referring to questions 1 and 4 of the interview. Table 4.12 shows the strategies that all participants commonly applied. Table 4.13 shows the strategies applied by higher spans only. Table 4.14 shows the strategies applied by lower spans only.

4.5 The strategies that participants asserted they tend to use to learn new words, and the strategies they used to learn the 20 words of this study

Table 4.12: Strategies the participants asserted they tend to use to learn new words, and the strategies they used to learn the 20 words of this study

-
- a. Writing down the new L2 word
 - b. Reading the text several times
 - c. Reading the exercises several times
 - d. Imagining either the new L2 word or the context
 - e. Making cards
 - f. Producing sentences and putting the L2 words in a context
 - g. Looking up new L2 words in a dictionary
-

Table 4.13: Strategies higher spans asserted they tend to use to learn new words, and the strategies they used to learn the 20 words of this study

-
- a. Making several kinds of associations
 - b. Working out spelling of the new L2 word
-

- c. Drawing or making pictures of the target L2 word
 - d. Memorizing the sentence which contained the new words as well as Memorizing the new L2 word
 - e. Attempting to remember the target word
 - f. Retelling the story
-

Table 4.14: Strategies lower spans asserted they tend to use to learn new words, and the strategies they used to learn the 20 words of this study

- a. Visualizing the new word
 - b. Verifying the word form and attempting to recall its meaning and vice-versa
 - c. Remembering the context
-

4.5.1 Higher and lower spans

Table 4.12 shows the strategies that both higher and lower span participants cited they use: (a) writing down the new L2 word, (b) reading the text several times, (c) reading the exercises several times, (d) imagining either the new L2 word or the context, (e) making cards, (f) producing sentences and using the L2 new word in a context, and (g) looking up the new L2 word in a dictionary (Schmitt & McCarthy, 1997).

A number of researchers have reported the use of these strategies by L2 learners. Schmitt and Schmitt (1995), for instance, state that writing down the new L2 words in a kind of notebook in order to register new words and to gather the necessary information of its features is one of the vocabulary learning strategies used by L2 learners. Nation (2001) puts forward that repetition is crucial for learning new words due to the fact that an individual may not learn the great array of information a word has in just one meeting. Nation (2001, p. 66) claims that “first language translations are probably the simplest kind

of definition in that they are short and draw directly on familiar experience” (p. 66). Thus, Nation (2001) emphasizes that the use of cards which have the word translation in the individuals’ mother tongue contribute to their faster vocabulary learning. Nation (2001) mentions Judd’s study (1978), which shows that words presented *out* of context are not usually recalled. Judd’s study (1978) also shows evidence that the words presented *in* context were found to be easier to associate to the word form-word meaning (Laufer & Shmueli, 1997). Nation (2001) points that consulting a dictionary demands time, and learners tend to spend more time looking up in the dictionary than they need to. However, Nation (2001) states that dictionaries are a great help for learning as well as for comprehension, mainly to those learners who are not very skilled in guessing from context.

Despite having some strategies in common, findings in this study corroborate Lawson and Hogben’s (1996) conclusion that weaker students (or ‘weaker language learners’) tend to have limited use of strategies, which are sometimes inconsistent. Likewise, Ahmed (1989) claims that better language learners use a variety of strategies and they use these strategies much more frequently and consistently when compared to weaker language learners that most often make use of simple rehearsal (also Lawson & Hogben, 1996). From the results obtained in this study, this researcher might posit that higher spans can be considered the “good vocabulary learners” of Ahmed’s study (1989) and the lower spans can be considered the “poor vocabulary learners” of Ahmed’s study (1989). As already mentioned in the review of the literature, Ahmed (1989) claims that good vocabulary learners are the individuals which make use efficiently of a variety of vocabulary strategies to retain vocabulary whereas the poor vocabulary learners are the ones which use a very limited number of strategies to learned the target vocabulary.

4.5.2 Higher spans

Table 4.13 presents the strategies only higher span individuals indicated they use are: (a) making several kinds of associations, (b) working out the spelling of the new L2 word, (c) drawing or making pictures of the target L2 word, (d) memorizing (Cohen & Aphon, 1981) the sentences which contained the new L2 word as well as memorizing the new L2 word, (e) attempting to remember the target word, and (f) retelling the story.

Studies on vocabulary acquisition have shown that the strategies used by the higher span individuals of the present study are also found in the existing literature. Oxford (1990) states that associations help to reinforce comprehension and make information easier to be recalled. For instance, participant 1 – a higher span – reports that

“...[I] try to make up sentences and I associate these with very strange things in order to trying to kind of shock me and then, I will remember the word. For example, for me, the word in the story, when I was studying them this afternoon, and then I was imagining the whole scene ... It is not usual to talk about this all the time and so, if you visualize what’s going on and associate the words with images, then, I guess, it’s better for me to learn them. I’ll remember them later on.”

In relation to recalling, based on theories of human memory, Baddeley (1990, p.156) elucidates the following:

“... the act of successfully recalling an item increases the chance that item will be remembered. This is not simply because it acts as another learning trial, since recalling the item leads to better retention than presenting it again; it appears that the retrieval route to that item is in some way strengthened by being successfully used.”

Results presented above reveal that the higher spans strongly used imagery and visualization to recall word meanings in both Productive (Nation, 1983, 1990, 2001) and Receptive Tests (Myers, 1914; Palmer, 1921; West, 1938; Crow, 1986). These results are supported by the existing literature on vocabulary acquisition that claims that individuals make use of visual memory to acquire vocabulary (Read, 2000; Nation, 2001). For

instance, participant 2 – a higher span - reported that she had linked the word *chasm* with its image, being unnecessary to have any word definition to learn it. For many higher processors, one strategy to recall the word meaning taught was rereading the story given by the researcher several times. Some higher processors referred to some particular strategies, such as producing sentences with the new words, memorizing the target words and sentences, retelling the story, making cards of the new words, and reading them whenever possible as a means of having different and several encounters with the target words, thus helping learners effectively retain these words. For instance, Nagy (in Schmitt & McCarthy, 1997) stresses that there is little possibility that one will get vocabulary meaning in just one encounter. Nation (1990) claims that several studies point out that one has to come across a word from 5-16 times in order for her/him to effectively acquire it. Sökmen (in Schmitt & McCarthy, 1997) states that when individuals run into a target word in several contexts and activities, they will consequently obtain a more precise understanding of the meaning and use of this word. Thus, the more the target word is encountered and practiced, the more chances it has to be acquired.

4.5.3 Lower spans

Table 4.14 presents the strategies lower span individuals posited as a means of learning new L2 vocabulary: (a) visualizing the written word, (b) verifying the word form and attempting to recall its meaning and vice-versa, and (c) remembering the context.

As can be seen, lower spans seem to use mostly receptive learning strategies, that is, strategies that do not involve word production. These strategies might prevent learners from actually knowing whether they are able to recall or produce the target word properly, in terms of semantic meaning, spelling, pronunciation, context use. For instance, participant 8

– a lower span - explains the use of his/her strategy: “Ah well, I read the text, so I understood the context within the text and then I remembered, well not all of them, how those words were used in the text”. Besides, the number of strategies that lower spans seem to use are fewer than higher spans. This might indicate that lower spans have a smaller repertoire of strategies than higher spans and that lower spans tend to use the same strategies for learning any kind of word, indistinctively from its class.

4.6 The strategies participants use to understand the meaning of an unknown L2 word

Several strategies were provided by the participants in order to understand the meaning of an unknown word in an L2 (question 2). I will first present the strategies that both higher and lower spans have in common (Table 4.15); second, higher spans’ strategies (Table 4.16), and finally, lower spans’ strategies (Table 4.17).

Table 4.15: Strategies that all participants use to understand the meaning of an unknown L2 word

-
- a. Using contextual clues
 - b. Using a dictionary
-

Table 4.16: Strategies that higher spans use to understand the meaning of an unknown L2 word

-
- a. Associating the target word with other words
 - b. Discussing the target word with another person
 - c. Taking advantage of cognates
-

Table 4.17: Strategies that lower spans use to understand the meaning of an unknown L2 word

a. Observing word formation

4.6.1 Higher and lower spans

Table 4.15 presents two basic strategies all participants of this study assert that they use to understand the meaning of an unknown L2 word: (a) using of contextual clues, and (b) using a dictionary.

Lawson & Hogben's (1996) results also point to contextual clues as the strategy most used by the students in their experiment. Based on Nation (1990), Schmitt and McCarthy (1997) also cite "contextual clues" as a strategy to learn vocabulary items. As regards the use of dictionaries, Nation (1989, 2001) states that dictionaries can aid vocabulary learning through the understanding or decoding of the unknown word, which comprises its comprehension, as well as the encoding the new word that comprises its production. Participant 2 – a higher span - points out her/his preference for using a dictionary when the unknown word is out of context: "Ah if the word is lost, I use the dictionary".

4.6.2 Higher spans

Table 4.16 displays the strategies that only higher span individuals cited they use to understand the meaning of unknown L2 words: (a) associating the target word with other words, (b) discussing the target word with another person, and (c) taking advantage of cognates.

Research on vocabulary acquisition provides the following account in relation to the strategies revealed by higher spans. Concerning making associations, Sökmen (in Schmitt & McCarthy, 1997) asserts that when individuals access words from their schema and link these words with the target word, an association is created, leading to a solid retention of the target word. Newton (1995), and Ellis, Tanaka, and Yamazaki (1994) claim that the words that are discussed or negotiated are more prone to being acquired than those words that are not. Lawson and Hogben's study (1996) lends support to the use of cognates or word similarity as a means of learning a word.

4.6.3 Lower spans

Table 4.17 shows that *observing word formation* was the only strategy mentioned by lower spans to comprehend an L2 word meaning. Nation (2001) clarifies that the objectives of breaking words into parts or observing their formation are connecting form to the target word meaning and learning the target word meaning. Artley (1943) also claims that individuals use typographical clues, such as words in italics, quotation marks, or bolding, word stems, affixes, pictures, and diagrams to aid them to understand word meanings. Taking the results reported above together, it seems possible to assert that higher span individuals tend to make use of a greater number of learning strategies to deal with the meaning of unknown L2 words than individual with a lower working memory capacity.

4.7 Procedures participants used to recall the meaning and form of the twenty L2 words

Concerning the procedures that participants of this study applied to recall the meaning and form of the 20 words previously taught (question 3), first, I will present the

procedures that both higher and lower spans have in common (Table 4.18); second, higher spans' procedures (Table 4.19), and finally, lower spans' procedures (Table 4.20).

Table 4.18: Procedure all participants used to recall the meaning and form of the twenty L2 words

a. Attempting to remember the context

Table 4.19: Procedures higher spans used to recall the meaning and form of the twenty L2 words

a. Creating sentences
 b. Searching for the word category
 c. Attempting to recall the target word meaning
 d. Paying attention to where to use the new word
 e. Memorizing the target word

Table 4.20: Procedures lower spans used to recall the meaning and form of the twenty L2 words

a. Practicing the new word
 b. Reading the context
 c. Looking up the word meaning in a dictionary
 d. Finding an equivalent L1 word
 e. Recalling the sentence produced
 f. Remembering the association

4.7.1 Higher and lower spans

Table 4.18 presents the only strategy commonly cited by both higher and lower spans to recall new L2 word meaning and form: *attempting to remember the context* of which the new word is inserted. Participant 4 – a higher span - reports the only strategy s/he

applied, which seems to be sufficient and efficient to her/his recalling: “Well, ah I ah I try to remember the word in context. That’s it”. Participant 2 – a higher span - strongly relies on context to word recalling:

“Okay. For instance, for this exercise that you told us to study. So this morning I got the papers again and I looked at the words and I tried to remember their meanings. And if I couldn’t remember, I went back to the story. Ok, I preferred to go back to the story than to the exercise. Because in the exercise you have like ah the definitions, but in the story I have the context which helps me remember”.

This strategy also involves recalling the association made when the word was supposedly committed into memory.

4.7.2 Higher spans

Table 4.19 displays the strategies that only higher spans made use of to recall the twenty words taught: (a) creating sentences, (b) searching for the word category, (c) attempting to recall the target word meaning, (d) paying attention to where to use the new word, and (e) memorizing the target word.

Some of these strategies applied by higher spans to recall the twenty words receive support from researchers in the vocabulary learning field. Concerning searching the word category, Aitchison (in Anderman & Rogers, 1996) explains the process by asserting that when an individual is aware of the word category, s/he may search the appropriate category ‘file’ as if s/he were looking for a book in a library. For instance, participant 6 – higher span - reports using alphabetical order to recall vocabulary items:

“To remember them, ah (pause), what I use right now, for this type of words, I rarely use in my language, in my day to day language, I I have a list in my head, especially, I think like in alphabetical order, so I try to I try to, you know, categorize them, I guess, some ah like orders like ah ah, see?”

As could be observed in this study, creating sentences is a strategy that not only aids one to recall the word form, but also that reinforces the word meaning in his/her memory. It also helps using the new word properly in an actual context. Also, attempting to recall the target word meaning, which is a strategy that consists of a mental effort to verify whether the target word was successfully stored or not, seemed to be relevant to higher spans. Furthermore, paying attention to where to use the new word aids to contextualize the vocabulary item and then recall it through context. If this strategy makes word recalling easier, individuals will be more prone to using it more frequently, thus retaining it more rapidly.

4.7.3 Lower spans

Table 4.20 presents the strategies used by lower span individuals to recall new L2 words: (a) practicing the new word, (b) reading the context, (c) looking up the word meaning in a dictionary, (d) finding an equivalent L1 word, (e) recalling the sentence produced, and (f) remembering the association.

A number of researchers have cited in their studies the strategies mentioned by lower spans. Nation (2001) suggests that for individuals to enhance vocabulary learning, they should practice the new words, introducing the new words to other individuals through the means of writing the words on the board, providing sentences containing these new words, and giving their definition. Hatch and Brown (1995) claim that practicing the new word is an ineffective strategy if the individual's goal is receptive knowledge, that is, just comprehend word meaning. Nation (1982) states that encountering a word that can be easily translated to the learner's mother tongue (L1) facilitates word retention.

As can be seen in the results presented above, lower spans tend to use receptive learning strategies to retain L2 vocabulary. Some lower spans reported that they read the new word or the sentence where the word was inserted several times, others make an effort to recall the sentence produced with the new L2 word or to recall the new word by searching a similar word in their mother tongue, in this case, Portuguese, such as the verb *to dispel*, which means *dissipar* in their first language. Finally, there are also those lower spans that stated they rely on remembering the word association, for instance, they attempt to recall words that start with the same first letter, thus aiding them to recall both the word itself and its meaning.

4.8 The words participants found most difficult to learn

This subsection will present the answers given by higher spans and lower spans concerning of the most difficult words to recall (question 5) as well as the explanations provided by the participants of why they found it difficult to learn such words.

4.8.1 Higher spans

The vocabulary items that higher spans reported finding most difficult to recall were mostly verbs, words less likely to be visualized (Read, 2000; Nation, 2001), such as the verbs *to amass*, *to deploy*, *to dispel*, *to ingratiate*, *to preclude*, and *to proscribe*. Higher spans believe that their difficulty in recalling such words lies on: (a) the lack of clear association of the new word with something else; (b) the words that cannot be visualized, such as verbs, (c) those unknown words whose initial letters are the same and/or have the same kind of phoneme, and (d) the impossibility of writing meaningful sentences with the new word.

Words that are easier to be visualized, such as nouns and adjectives, are more prone to being stored and recalled (Hatch & Brown, 1995). Thus, it can be assumed that word classes also have a direct relationship with vocabulary learning. For instance, the noun *bridge* is more likely to be transferred to long-term memory than the verb *to build*. As put forward by Clark and Paivio's (1991) dual coding theory of human memory, the human mind comprises a complex of verbal and figure representations for vocabulary items. When individuals picture the target word, the chance of recalling this word is much higher than when they only associate this word verbally (Sökmen, in Schmitt & McCarthy, 1997).

4.8.2 Lower spans

The vocabulary items that lower spans reported finding most difficult to recall were mostly *abbot*, *contemptuous*, *to deploy*, *to dispel*, *to engender*, *to preclude*, *to proscribe*, and *to espouse*. As can be seen, there is a great number of verbs that are difficult to be recalled. Verbs are words found to be more difficult to be visualized for being more abstract rather than concrete (Clark & Paivio, 1991). These results corroborate previous studies that claim that individuals' visualization of the new word contributes to its learning (Clark & Paivio, 1991; Nattinger & DeCarrico, 1992; Sökmen, in Schmitt & McCarthy, 1997; Read, 2000; Nation, 2001).

The verb *to preclude* and the adjective *contemptuous*, also mentioned as difficult by higher spans, were found hard to learn by lower spans. Participant 8 – a lower span - vindicates that this is due to the lack of association with an L1 word: “This word which means excluded, I found difficult, because I didn't know the equivalent word in Portuguese. If I don't find the equivalent in Portuguese, it's difficult to keep it”. Another word that lower spans allege difficulty of associating with another thing is the word *abbot* pointed by participant 7

– a lower span: “Abbot’. I thought it was very difficult because I couldn’t make any relation with this word and another similar...”

Participant 5 – a lower span - encountered difficulty to store the words *to ingratiate* and *to espouse* due to the fact that they may be considered false cognates:

“Maybe ‘ingratiate’, ‘ingratiate’ is to please, you see, now I remember that I am not telling the story, I remember because I’m not being tested. Maybe because ah because of some similarities with Portuguese or because they might mean or they always seem, I don’t know why, but they sometimes seem something else, but the real meaning”.

Moreover, lower span participants face difficulties when they cannot make connection with another word or something else and when they do not find an equivalent word in their mother tongue – Portuguese. Other less frequent responses provided in this study were: (a) lack of familiarity with the word background, (b) existence of false cognates, and (c) wrong approach, that is, memorization of the word meaning rather than the word itself.

4.9 When participants noticed they had learned the 20 new words

Question 6 of the questionnaire assessed whether or not the participants of this study were aware of their learning of the 20 words taught the week prior to the interview. Results show that higher and lower span participants behave very differently. As higher and lower spans diverged in their responses, I will first report higher spans’ responses, and then, I will show when lower spans perceived they had learned their L2 target words.

Table 4. 21 When higher spans noticed they had learned the 20 new words

-
- a. reading the text several times and being able to recall the word meaning
 - b. recognizing the new word elsewhere
-

- c. beginning to think about the new words
 - d. being able to produce sentences
 - e. recognizing a synonym or a similar word
 - f. visualizing the target word within a context
-

Table 4.22 When lower spans noticed they had learned the 20 new words

- a. after practicing the new words, such as writing sentences
 - b. while visualizing the new word
 - c. when being able to write down the word and its definition
 - d. while discussing the new word with someone
 - e. after understanding the story
-

4.9.1 Higher spans

A great variety of responses were given by higher spans who reported learning both consciously and accidentally. Participants who applied conscious effort to verify their learning were those who studied the words, attempted to think of them, checked their learning, and went through the story in order to visualize the taught words. Participants who noticed their vocabulary learning accidentally were those who came across the words in songs, and word lists. Higher spans noticed that they had learned the word meaning after the information of the word had been manipulated. This included (a) reading the text several times and being able to recall the word meaning, (b) recognizing the new word elsewhere, (c) beginning to think about the new words, (d) being able to produce sentences, (e) recognizing a synonym or a similar word, and (f) visualizing the target word within a context.

According to the results obtained, I found that the responses given by the higher span individuals were consistent. When higher spans declared that they had perceived their

word acquisition, they were able to not only recognize the new L2 words in different contexts, but also to use them correctly.

4.9.2 Lower spans

According to the responses given by the lower spans to the sixth question, it is possible to state that, like higher spans, they believe to have realized word learning after the information of the word had been somehow manipulated. According to lower spans' responses, their noticing occurred: (a) after practicing the new words, such as writing sentences, (b) while visualizing the new word, (c) when being able to write down the word and its definition, (d) while discussing the new word with someone, and (e) after understanding the story.

As could be seen from the results obtained in this study, although lower spans believed they had retained the target L2 words, they did not actually acquire the words to the point of being capable of producing them in sentences. Rather, lower span individuals were only able to recognize the L2 word meanings.

From the answers provided by the higher and lower spans, it can be concluded that there is no relationship between awareness of L2 words acquired and working memory capacity. Both higher and lower spans were able to notice when they had supposedly acquired the new L2 word or not.

4.10 The vocabulary learning strategies participants suggest in order to acquire vocabulary in an L2

The objective of asking participants of this study the seventh question was to find out which learning strategies they believe contribute to their faster and more consistent

vocabulary acquisition. I will first present the suggestions that both higher and lower spans have in common; second, higher spans' suggestions, and finally, lower spans' suggestions.

Table 4.23 Suggestions on strategies all participants have in common in order to acquire vocabulary in an L2

-
- a. Introducing the new word in a context
 - b. Practicing the target word
 - c. Looking up word meaning in a dictionary
-

Table 4.24 Higher spans' suggestions on strategies to acquire vocabulary in an L2

-
- a. Doing exercises with the target word
 - b. Drawing the picture of the target word and using sticky cards
-

Table 4.25 Lower spans' suggestion on strategies to acquire vocabulary in an L2

-
- a. Visualizing the L2 word
-

4.10.1 Higher and lower spans

One of the most recommended strategies by both higher and lower spans was introducing the new word in a context, either writing or/and speaking it. Participant 1 – a higher span - declares that providing a text followed by exercises in which the target word is included reinforces the chances of learning this new L2 word. Also, participant 12 – a higher span - emphasizes the learning strategy of reading the context several times:

“Reading, just reading. I think that’s the best way to a person to learn to acquire ah ah ah the meaning of the word with reading and, if possible, using that word repeatedly otherwise reading is the best ah the best ah the best way to do”.

Another very common response given by the participants to this question was practicing the target word. Participant 3 – a higher span - indicates this strategy as the key for learning:

“...I practice these words, then I can acquire the words, but if I if I ah encounter a word and I see this word means this, and I don’t work with these words for a long time, I forget those these ah these words, so I have to practice them in order to make them, you know, in order to acquire them”.

Participant 6 – a higher span - compares practicing the target word to the number of times one may look up the word meaning in a dictionary:

“... And even the dictionary, but I don’t even think of so much whether you use the dictionary or not, but the ah like the quantity of times you are gonna come across a word or you’re gonna use a word. So it’s not gonna make a difference by looking up once in the dictionary. It’s gonna make a difference if I use the word and I keep writing the words. Otherwise, it’s gonna be useless”.

Looking up the word meaning in the dictionary comprises one of the strategies that both higher and lower spans proposed in order to have a better and more solid vocabulary acquisition. Participant 15 – a lower span - posits the practical use of a dictionary: “... There are some words that I just go to the dictionary and I read the meaning and that’s all, that’s all that I need. So, it depends on the words”.

4.10.2 Higher spans

The strategies that only higher span participants posited as a suggestion for learning L2 vocabulary items better and faster are: (a) doing exercises with the target word, and (b) drawing the picture of the target word and using sticky cards.

Concerning the strategy of doing exercises with the target L2 word, participant 13 – a higher span - advises doing exercises of gap filling, using cards and taking dictations as a means of practicing and storing the target word. In relation to the strategy of drawing the picture of the target word and using sticky cards, higher spans claim that they are able to visualize the to-be-learned word. Thus, participant 2 – a higher span - emphasizes the use of visual tools: “Texts and ah pictures. They are important, like, the ‘chasm’ I drew on the paper that you gave us. That’s why I don’t need another word, just the picture I could recall the word”.

Finally, participant 14 – a higher span - compiled several suggestions of strategies in one single sentence: “Rehearsal, practicing, saying it aloud, and reading it many times or explaining it to someone else”.

4.10.3 Lower spans

A strategy that only lower span individuals advised was *visualizing the L2 word*. Participant 9 – a lower span - puts in plain words: “I think, yes, combination of image and word, ok?” Participant 16 – a lower span - suggests how s/he can visualize the target word: “...Visualize through card, for example”. Participant 8 – a lower span - makes a combination of two strategies: “Ah, first thing, seeing the words, that visual side of it. Looking at the words and use them. Seeing first, and then, using”.

Lower spans do not seem to have an expanded repertoire of strategies. They seem to have a limited number of strategies which they apply to all situations. The consequence is that, for instance, the strategy of visualizing works for certain types of words – concrete nouns and adjectives – but not for the verbs one had as stimulus. Hence their non-learning of these words.

Summarizing, results of this study reveal that there is a crucial difference between higher and lower spans as regards L2 vocabulary retention. Results reveal that higher spans tend to use productive learning strategies to retain L2 vocabulary items, that is, higher spans attempt to use the target word, either writing it or speaking it, in several types of tasks. Contrary to higher spans, lower span individuals tend to apply receptive learning strategies to retain L2 words, that is, lower spans are prone to reading or listening to the target word. Results also reveal that that higher span individuals might display a greater repertoire of strategies to manipulate the words to the extent of being able to use them.

Lower spans, on the other hand, seem to use fewer strategies, and they tend to use the same strategies independent of the word class to learn new L2 vocabulary items. This study also shows that higher spans have enough working memory capacity to deal with verbs, in addition to nouns and adjectives, whereas lower spans tend to use their working memory span to learn nouns and adjectives. In other words, higher spans tend to memorize more vocabulary items than lower spans.

Considering the results obtained in this study, it seems possible to argue that working memory is involved in the acquisition of L2 vocabulary and that working memory capacity affects learners' vocabulary retention.

In the next chapter, I will present the conclusions obtained from the results of the present study, and the limitations encountered while I was developing this study. I will also make some suggestions for further research and present some pedagogical implications.

CHAPTER 5

Final remarks, limitations, suggestions, and pedagogical implications

5.1 Final remarks

The main objective of the present study was to investigate (a) whether there was a relationship between working memory capacity, as measured by the Speaking Span Test (Daneman & Green, 1986; Daneman, 1991), and vocabulary acquisition in an L2, as assessed by the production of a narrative (Productive Test) and by a Receptive Test; and (b) what strategies higher and lower span individuals made use of to learn L2 vocabulary, as revealed by an interview with the individuals of this study.

All participants' working memory capacity was assessed by means of the Speaking Span Test, where all participants had to recall each word and produce one sentence for each given word. Vocabulary acquisition was assessed by the production of a narrative (Productive Test), where individuals attempted to recall and use 20 words, and by the Receptive Test, where individuals attempted to recognize the same 20 words, on either translating or providing the definitions of these words. The results, which are summarized below, revealed differences in the performance of higher spans and lower spans when transferring L2 vocabulary items to long-term memory.

(1) Finding 1: Individuals' working memory capacity, as assessed the Speaking Span Test, presents a significant correlation with vocabulary acquisition in an L2, as assessed by means of the Receptive Test (Myers, 1914; Palmer, 1921; West, 1938; Crow, 1986) and the Productive (narrative) Test (Nation, 1983, 1990, 2001). That is, higher spans are better able to both comprehend and produce new vocabulary items in an L2 than lower span

individuals. This finding provides support to Objective 1 and Hypothesis 1 of the present study.

(2) Finding 2: Both higher and lower spans present better performance when recognizing new vocabulary rather than when producing it. This finding is in line with previous studies, such as Stoddard (1929) and Nation (2001), who claim that Productive Tests are more difficult than Receptive Tests.

(3) Finding 3: Higher spans have no particular strategy to make use of to retain new vocabulary items, but the strategies that higher spans use are greater in number, are more consistent, and seem to be more effective (Lawson & Hogben, 1996). Thus, higher spans transfer more L2 vocabulary items to long-term memory than lower spans. This finding also provides support to Objective 1 and Hypothesis 1.

(4) Finding 4: Higher spans are better able to learn verbs than lower spans. In other words, higher spans are better able to learn words that are more difficult to visualize due to their ability of manipulating and using strategies more consistently and effectively (Lawson & Hogben, 1996). This finding also corroborates Objective 1 and Hypothesis 1.

(5) Finding 5: *Reading the text* where the word was found several times was the most frequent strategy used by both higher and lower spans to learn a new L2 word. In other words, most individuals make use of the context to remember word meaning. This finding fulfills the second objective of this study, which was to investigate what strategies higher and lower span individuals make use of to learn new vocabulary items.

(6) Finding 6: As can be seen in this study, higher span individuals are not only better able to transfer L2 vocabulary items to long-term memory in tasks that involve comprehension, but they are also better in the performance of tasks that involve production when compared to lower spans. This may be due to the fact that higher spans, individuals who have larger working memory, take more advantage of, are more conscious of, and manipulate more consistently their existing acquisition strategies. This finding is in line of Hypothesis 1 of this study.

(7) Finding 7: Concerning the strategies, it can be postulated that there are some strategies that are used only by higher spans and some that are used only by lower spans. This means that higher and lower spans behave differently. This finding is in line with Hypothesis 2.

(8) Finding 8: The results reveal that higher spans use more strategies than lower spans and make use of them according to the kind of words presented to them. These strategies demand more involvement and manipulation of the target word. Some of these strategies can be listed below: (a) making several kinds of associations, (b) practicing the spelling of the new L2 word, (c) drawing and/or making pictures of the target L2 word, (d) memorizing the sentence which contained the new words as well as memorizing the new L2 word, (e) attempting to remember target word, and (f) retelling the story where the new words were introduced. This finding supports objective 2 and hypotheses 1 and 2 of the present study.

(9) Finding 9: Higher spans seem to have more suggestions on strategies to learn new L2 words better and faster. Some of these strategies comprise practicing the new words by

means of (a) doing exercises, (b) drawing the picture of the target word and/or using sticky cards, and (c) contextualizing the new word. Again, these finding corroborates Objective 2.

(10) Finding 10: Concerning whether all participants noticed their vocabulary leaning, it can be postulated that both higher and lower span participants realized that they had learned the L2 word meaning when they saw it written both in the text where the word was inserted or elsewhere. It seems to be the case that participants of this study understand that acquiring a word conveys the idea of recalling the word meaning, rather than producing it in a sentence. That is, recognizing the word seems to be enough for these participants to say they have learned a certain vocabulary item. This statement justifies why the great majority of the participants claimed they had learned most of the 20 words taught during the period of data collection. Thus, it might be asserted that many learners believe that they acquire a particular word by just recognizing it, but when they attempt to use this word in a context, they are unable to do so due to the lack of word knowledge for productive tasks, such as speaking and writing. Again, it also justifies why learners posit that activities of reading and listening are easier than activities of speaking and writing.

It is noteworthy that some words are more difficult to learn due to their feature of being abstract, thus being less prone to being visualized and to being transferred to long-term memory. However, higher spans made use of many more strategies in a consistent and effective mode than lower spans in order to overcome this difficulty and succeed in acquiring the new L2 word. This finding is also in line with Hypothesis 2.

(11) Finding 11: Higher spans seem to use mostly productive learning strategies to learn new L2 words, whereas lower spans seem to use receptive learning strategies. This means

that higher spans tend to use and manipulate the target word, leading to a solid word retention, while lower spans tend to recognize the target word and/or translate it to their L1 without any further manipulation of the L2 word, thus not leading to a solid learning. This finding is in line with Objective 2 of this study.

In summary, the findings of this study, described above, fulfill my two objectives and provide support to the two hypotheses which were presented in the Statement of Purpose of my study.

5.2 Limitations of the study and suggestions for further research

In this subsection, I present the limitations of the present study and provide some suggestions for further research.

5.2.1 Limitations of this study

5.2.1.1 Sample size

The seventeen subjects that took part of this study represent a small number of a sample of higher and lower span individuals if compared with the number of participants in the existing literature of cognitive psychology and vocabulary acquisition. In other words, the results cannot be generalized and should be seen as a tendency of the participants of this study.

5.2.1.2 Difficulty to gather all individuals on the very same day

The individuals selected to take part in this study were students of the Graduate Program in English Language and Literature of the Federal University of Santa Catarina (UFSC). These students used to come to the university only on the days that they had to

attend classes. Some of these students lived in nearby cities, being unable to attend the one-hour vocabulary class (third task) on the very same day that other participants were available. Thus, the vocabulary class had to be given on three different days. Bearing in mind that the limitation which follows from that is that the participation of the individuals varied in each class and the discussion and examples of the 20 taught words given by the participants were also different, leading to different ways of abstracting and storing these new words.

5.2.1.3 Uncertainty of what individuals understand by ‘acquisition’

Another factor that limited the analysis of this study was whether the participants had clear in mind what the concept of *acquisition* was. On the one hand, some participants might have thought that vocabulary *acquisition* was limited to the recognition of the word form and/or comprehension of the word meaning. On the other hand, some participants might have thought that vocabulary *acquisition* referred to not only the recognition and/or comprehension of the word, but also to being able to produce the word in a sentence, using its appropriate collocations, applying its appropriate meaning, and being conscious of its grammar function. The latter group of participants seemed to view the knowledge of words and the ability to accurately produce them as an aid to improve individuals’ communication involving some specific vocabulary knowledge and to enable them to interact with other individuals through the means of speaking and writing, whereas the former group of individuals seemed to consider acquired words the ones they are able to recognize through means of listening and reading. In this study I wanted to examine whether participants were able to produce the L2 words taught, as measured by the production of a narrative. So, when participants were asked whether they noticed that they had acquired the target words,

this researcher was uncertain of what these participants understood by word recognition or word production.

5.2.2 Suggestions for further research

As an L2 teacher, I noticed that my English students accounted for their difficulty in communicating in an L2, in my case English, as the lack of vocabulary knowledge. It is known that a good amount of vocabulary is crucial to master a language. Thus, I decided to verify whether individuals' working memory capacity was a factor that exerted influence on vocabulary acquisition, despite bearing in mind that there are other factors that influence individuals in communicating in an L2. I would like to challenge other researchers to carry out studies that aid to find out other factors that might affect L2 vocabulary acquisition and make an attempt to develop on each of these factors in order for us to gain a better understanding of what L2 vocabulary learning involves.

5.3 Pedagogical implications

In this study I have shown that the manner that higher spans used vocabulary learning strategies led them to memorize and produce more L2 words. This general finding is in line with research that shows that successful learners employ a greater number of learning strategies than less successful learners. One thing that teachers can do is to bring their learners the awareness that they can improve their vocabulary learning by employing more effective strategies. Teachers can, for instance, encourage learners' production of the target words by means of (a) asking their learners to use the words in a story and tell this story orally, (b) challenging learners to negotiate the word meaning, and (c) using the target words in several situations in a dialog and presenting them in class.

Teachers can also encourage learners to repeat words using them in different contexts, to make word cards, and to make use of strategies that involve activities of listening, speaking, and writing the target words as well as of reading texts (Schmitt, in Schmitt & McCarthy, 1997).

Teachers also need to be aware of the fact that words are not usually learned at the first meetings (Nagy, in Schmitt & McCarthy, 1997). At first, learners may recognize and comprehend the meaning of the target word. At later meetings, learners become able not only to recognize the target words, but also to produce them in sentences and different contexts. Thus, L2 teachers should insist on providing several encounters with the same new words as to consolidate the word retention (Nagy, in Schmitt & McCarthy, 1997). Here are various kinds of exercises that L2 teachers can provide L2 learners in order to help learners to store a larger number of words in their long-term memory, thus increasing their vocabulary data bank and increasing an array of words to be retrieved: exercises of drawing and describing words, of matching the word and its definition, of filling in the missing words in a text and filling the missing letters, of producing stories, of writing dialogs, of finding synonyms, of unscrambling words, of choosing the appropriate word, of sorting out words, of answering crossword puzzles, of playing tic-tac-toe and hangman, and of dictating. Also, it is important for teachers to know the strategies that their learners prefer, so that this knowledge might help teachers plan their lessons to match or to adapt their teaching and to provide the most appropriate and meaningful tasks to suit a particular group of individuals at different learning levels (Cohen & Apeh, 1981).

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Appendix A
Invitation to participate of the study

UNIVERSIDADE FEDERAL DE SANTA CATARINA

Dear participant,

I would like to thank you for participating in this study. This study will be applied in four days. On the first day, I will apply a questionnaire to identify the words you already know.

On the three other days, I will continue the same investigation with other activities.

Daniela Mendonca

INSTRUCTIONS FOR THE QUESTIONNAIRE:

1. Read the words carefully and give them the definition or the translation.
2. The words that are unfamiliar or you are not sure of, do not answer.

TERM OF AGREEMENT

I, _____ (name of participant), have no objection in participating in this study. I am aware that my name is not going to be mentioned in the researcher's final paper.

Participant's signature

Appendix B
The first vocabulary task

UNIVERSIDADE FEDERAL DE SANTA CATARINA

Name: _____

Write either the definition or the translation of each word:

1. Abbot: _____

2. Albeit: _____

3. Appalling: _____

4. Axiomatic: _____

5. Buffer: _____

6. Catwalk: _____

7. Chasm: _____

8. Clear-cut: _____

9. Compelling: _____

10. Composure: _____

11. Contemptuous: _____

12. Curreant: _____

13. Disparate: _____

14. Distress: _____

15. Hairdo: _____

16. Hindrances: _____

17. Hobgoblin: _____

18. Incongruity: _____

19. Mien: _____

20. Migraine: _____

21. Nonchalance: _____

22. Simile: _____

23. Sleazy: _____

24. Stance: _____

25. Stern: _____

26. Sweeping: _____

27. Template: _____

28. Tentative: _____
29. Thrust: _____
30. To abide: _____
31. To allocate: _____
32. To amass: _____
33. To assess: _____
34. To augment: _____
35. To deem: _____
36. To delude: _____
37. To deploy: _____
38. To digress: _____
39. To dispel: _____
40. To engender: _____
41. To espouse: _____
42. To ingratiate: _____
43. To intertwine: _____
44. To mutter: _____
45. To preclude: _____
46. To proffer: _____
47. To proscribe: _____
48. To render: _____
49. To retrieve: _____
50. To scoff (at): _____
51. To sidetrack: _____
52. To stem (from): _____
53. To stigmatize: _____
54. To swerve: _____
55. To trigger: _____
56. To unravel: _____
57. Trade-off: _____
58. Ubiquitous: _____
59. Vein: _____
60. Vernacular: _____

Appendix C
Instructions for the Speaking span test

INSTRUCTIONS:

The Speaking Span Task

In the Speaking Span Task you will read five sets of words on the computer screen. Each word will appear on the screen for only one second and then a second word will appear on the screen followed by a blank. You will then have some seconds to recall them and produce a sentence orally for each word shown previously on the screen. After producing the first set of words, a second set of three words will be shown on the screen and you will have to repeat the former procedure. Afterwards it will appear a set of four, then five, and finally, six words and you will have to repeat the same procedure explained above.

Appendix D
The text containing twenty new L2 words

MY DREAM

I dreamed that I was entering a SWEEPING landscape. For me to get there I had to pass through a CHASM, a dark and dangerous place. I saw some people there. Everyone there looked happy and very enthusiastic. Suddenly a man approached me and welcomed me with open arms and a peaceful MIEN. At first, I was extremely nervous and CONTEMPTOUS of his NONCHALANCE. I didn't know who the man was – maybe an ABBOT, maybe someone much more special. Through his way of looking and speaking I noticed that he was full of compassion and love. So I kept my COMPOSURE as he came up to me and DISPELLED my fear. So I walked away and suddenly I came across him again. Everywhere I turned this UBIQUITOUS person was blocking my path. I was so overwhelmed by his presence that I wished that moment lasted forever. The more He spoke, the more I could AMASS knowledge about him and the place I was. I simply ESPOUSED everything he was telling me. Everything he spoke ENGENDERED in me the wish to INGRATIATE myself with him. I asked him to DEPLOY angels to help me when I was supposed to do something for his kingdom. He replied: "I certainly don't want to PRECLUDE your help in our kingdom. I simply expect you to help PROSCRIBE evil and proclaim my love to people". I wondered whether there was a TRADE-OFF for preaching goodness and love, but I set my doubts aside and came closer to him and PROFFERED my help: as soon as I woke up, I would do my best to spread his love and goodness among human beings. Soon after, we got SIDETRACKED from this subject and I woke up.

What would you say was the THRUST of my dream?

Appendix E
Exercises of matching

I. Match the columns according to the meaning of each word:

- (1) Abbot (n)
- (2) Nonchalance (n)
- (3) Chasm (n)
- (4) Composure (n)
- (5) Contemptuous (adj)
- (6) Mien (n)
- (7) Sweeping (adj)
- (8) Thrust (n)
- (9) To amass (v)
- (10) To deploy (v)

- () someone's typical expression or way of behaving
- () someone who behaves calmly and seeming not to worry or care about anything
- () a calm feeling which you have when you feel confident about dealing with a situation
- () a very deep space between two high areas of rock, especially one that is dangerous; a big difference between opinions, experience, ways of life, etc of different groups of people, especially when they cannot understand each other
- () a man who is in charge of a monastery
- () to organize people or things, especially soldiers, military equipment etc, so that they are in the right place and ready to be used; to send resources
- () to collect or receive a large quantity (such as money, information, knowledge)
- () massive or complete in scale
- () showing that you feel that someone or something is not important and deserves no respect
- () the main meaning or the most important part of what someone says or does; the main significance

II. Choose the appropriate meaning for each word below:

1. To dispel (v)
 - _____ to cause movement or action
 - _____ to stop someone believing or feeling something, especially because it is wrong or harmful
 - _____ to agree with something

2. To engender (v)
 - _____ to be the cause of a situation or feeling
 - _____ to design
 - _____ to judge by naming or classifying

3. To espouse (v)
 - _____ to speak in an inaudible manner
 - _____ to get married
 - _____ to profess

4. To ingratiate (v)
 - _____ to try hard to get someone's approval, by doing things to please them, expressing admiration etc
 - _____ to weave together separate entities
 - _____ to judge by naming of classifying

5. To preclude (v)
 - _____ to prevent something or make something impossible
 - _____ to move quickly to one side or to the other
 - _____ to cause incorrect or false beliefs or thoughts

6. To proffer (v)
 - _____ to profess
 - _____ to offer something to someone, especially by holding in your hands; to give someone advice, explanation..)
 - _____ to cause indirectly

7. To proscribe (v) _____ to write down a prescription
_____ to send someone away
_____ to try to stop the existence of something such as a political organization)
8. To sidetrack (v) _____ to make someone stop doing what they should be doing, or stop talking about what they started talking about, by making them interested in something else
_____ to make a legal claim about someone, especially for an amount of money, because you have been harmed in some way
_____ to believe in
9. Trade-off (n) _____ an acceptable balance between two opposing things that you want
_____ profitable business
_____ money exchange
10. Ubiquitous (adj) _____ unconscious
_____ seeming to be everywhere
_____ not definite

Appendix F
Picture



Appendix G
Receptive test

Write down the definition and/or the translation of the words below:

- (1) Abbot (n) _____
- (2) Nonchalance (n) _____
- (3) Chasm (n) _____
- (4) Composure (n) _____
- (5) Contemptuous (adj) _____
- (6) Mien (n) _____
- (7) Sweeping (adj) _____
- (8) Thrust (n) _____
- (9) To amass (v) _____
- (10) To deploy (v) _____
- (11) To dispel (v) _____
- (12) To engender (v) _____
- (13) To espouse (v) _____
- (14) To ingratiate (v) _____
- (15) To preclude (v) _____
- (16) To proffer (v) _____
- (17) To proscribe (v) _____
- (18) To sidetrack (v) _____
- (19) Trade-off (n) _____
- (20) Ubiquitous (adj) _____

Appendix H
Transcription of the Speaking span test

Participant 1 (21 words recalled)

1.

1.1 cake: The cake is delicious.

1.2 hand: My hand is dirty.

2.

2.1 duck: The duck is swimming in the lake.

2.2 pen: My pen is red.

3.

3.1 arm: My arm is sore.

3.3 deer: The deer is eating green things.

3.4 ball: The ball is kicking.

4.

4.1 sun: The sun is shining.

4.2 mouth: My mouth is dry.

5.

5.1 clock: The clock is working.

5.2 wave: There are many waves in the sea.

6.

6.1 week: My week is very busy.

6.2 rain: It's not raining today.

7.

7.1 club: The club is crowded.

7.3 knife: The knife is sharp.

8.

8.1 desk: My desk is full of books.

8.2 road: The road is very long.

9.

9.1 bank: The bank is closed.

9.3 egg: The egg is delicious.

10.

10.1 cow: The cow is eating in the pasture.

10.3 drum: The drum is a nice instrument.

Total of words produced: 102

Participant 2 (20)

1.
 - 1.1 cake: I like cakes.
 - 1.2 hand: I put my hand on the desk.
2.
 - 2.1 duck: The duck swims.
 - 2.2 pen: I like to write with a pen.
 - 2.3 gas: There is a gas station near my house.
3.
 - 3.1 arm: My arm is hurting today.
 - 3.2 sky: The sky is completely blue.
 - 3.4 ball: I have a red ball.
4.
 - 4.1 sun: The sun is shining.
5.
 - 5.1 clock: The clock is ticking.
 - 5.5.map: I am looking for a map.
 - 5.6 year: This year I have many classes.
6.
 - 6.1 week: This week I have to travel.
 - 6.2 rain: It is raining today.
7.
 - 7.1 club: I like going to the club on Thursdays.
 - 7.3 knife: There's a knife on the table.
8.
 - 8.1 desk: The book is on the desk.
9.
 - 9.3 egg: I like to eat fried eggs.
 - 9.5 hair: I like people who have long hair.
10.
 - 10.6 west: I don't live in the west of Santa Catarina.

Total of words produced: 117

Participant 3 (22)

1.
 - 1.1 cake: I like chocolate cake.
 - 1.2 hand: I write with my right hand.

2.
 - 2.1 duck: I have a yellow duck.
 - 2.2 pen: I don't like to write with pen.
 - 2.3 gas: I have to go to the gas station.

3.
 - 3.1 arm: My arm is short.
 - 3.2 sky: The sky is blue today.
 - 3.3 deer: I saw a deer yesterday.

4.
 - 4.1 sun: The sun is yellow.
 - 4.3 key: I lost my keys.

5.
 - 5.6 year: Next year I will be in Germany.

6.
 - 6.1 week: I have to study the whole week.
 - 6.2 rain: The rain is colorful.

7.
 - 7.1 club: I went to the club last Sunday.
 - 7.3 knife: I eat with a knife and a fork.

8.
 - 8.1 desk: I don't have a desk in the teacher's room.
 - 8.2 road: This road leads to the university.

9.
 - 9.1 bank: I have to go to the bank.
 - 9.3 egg: I like to eat eggs.

10.
 - 10.3 drum: I don't play the drums.
 - 10.4 sea: The sea is blue.
 - 10.6 west: I used to live in the west part of the city.

Total of words produced: 135

Participant 4 (20)

1.

1.1 cake: I love chocolate cake.

1.2 hand: I am right-handed.

2.

2.1 duck: The duck is swimming in the lake.

2.2 pen: I love writing with pens.

3.

3.1 arm: My arm hurts.

3.2 sky: The sky is blue today.

3.3 deer: The deer is running after you.

4.

4.1 sun: The sun is shining.

4.3 key: I lost my house key.

5.

5.1 clock: There's no clock in this room.

5.5.map: I need a map to find the way around.

6.

6.1 week: It's along week.

6.2 rain: I hope it doesn't rain.

7.

7.1 club: I never go to the club.

7.2 spring: It's now spring time.

8.

8.1 desk: I need a desk.

8.2 road: All roads take to Rome.

9.

9.1 bank: I hate to go to the bank.

9.5 hair: My hair is dyed.

10.

10.1 cow: The cow is very good for farming.

Number of words produced: 106

Participant 5 (19)

1.

1.1 cake: My mother baked the cake.

1.2 hand: I hate my own hands.

2.

2.1 duck: There was a duck in the lake.

3.

3.1 arm: With my arm I pointed the sky.

3.3 deer: I saw a deer.

4.

4.1 sun: The sun was beautiful today.

4.2 mouth: I put my finger in my mouth.

4.5 file: I have some papers to file.

5.

5.1 clock: There's a clock on the wall.

5.5.map: I find my city in the map.

5.6 year: I have to research this year.

6.

6.1 week: My class started last week.

6.2 rain: There was a heavy rain today.

7.

7.1 club: The club that I go is very nice.

7.3 knife: With the knife I cut the cake.

8.

8.1 desk: I put the pen on my desk.

8.3 glass: I broke the glass.

9.

9.1 bank: I go to the bank once a week.

10.

10.1 cow: I bought a cow yesterday.

Number of words produced: 116

Participant 6 (20)

1.

1.1 cake: I love to eat cakes.

1.2 hand: I love to eat with my hands.

2.

2.1 duck: I hate eating ducks.

2.3 gas: I don't have a car, so I don't need gas.

3.

3.1 arm: I have two arms.

4.

4.1 sun: I like to go out in the sun.

4.2 mouth: I like to speak a lot, so I use my mouth.

5.

5.1 clock: I don't have a clock.

5.2 wave: I don't like to go to the beach because I am afraid of the waves.

6.

6.1 week: I go to school every week.

6.2 rain: It doesn't rain very much.

7.

7.1 club: I don't go to the club.

7.3 knife: I cut myself with the knife all the time.

8.

8.1 desk: I have a desk at home.

8.2 road: I walk on the road very often.

9.

9.1 bank: I don't go to the bank because I don't have a bank account in Brazil.

9.2 shirt: My shirt is blue.

9.3 egg: I don't cook eggs.

10.

10.1 cow: My grandpa has a cow.

10.3 drum: I used to play drums when I was in middle school.

Number of words produced: 156

Participant 7 (18)

1.

1.1 cake: I like to eat cake.

1.2 hand: My hand is hurt.

2.

2.1 duck: The duck is on the lake.

2.2 pen: The pen is blue.

3.

3.1 arm: I broke my arm.

3.2 sky: The sky is beautiful today.

4.

4.1 sun: The sun is hot.

4.3 key: I lost my keys.

5.

5.5.map: I can't find my map.

5.6 year: This year I'm gonna travel.

6.

6.1 week: I have things to do this week.

6.2 rain: It's raining.

7.

7.1 club: I'm gonna go to the club tomorrow.

8.

8.1 desk: I have books on my desk.

8.2 road: The road was terrible.

9.

9.1 bank: I went to the bank yesterday.

9.3 egg: I boiled some eggs.

10.

10.5 bus: The bus was full.

Number of words produced: 90

Participant 8 (18)

1.

1.1 cake: I bought a cake.

1.2 hand: Can I give you a hand?

2.

2.1 duck: Where's the duck?

3.

3.2 sky: The sky is blue.

4.

4.1 sun: The sun is shining.

4.2 mouth: My mouth is wide-open.

5.

5.1 clock: Where's the clock?

5.2 wave: There's a quite long wave.

5.5.map: Where's the map?

7.

7.1 club: Let's go to the club.

7.2 spring: I like the spring.

7.3 knife: The knife is sharp.

8.

8.1 desk: Can I go to your desk, please?

8.3 glass: There's a glass of wine.

9.

9.1 bank: Can I go to the bank?

9.5 hair: My hair is long.

10.

10.1 cow: Did you see the cow?

10.6 west: I want to go west.

Number of words produced: 87

Participant 9 (18)

1.

1.1 cake: I baked a cake.

1.2 hand: My hand is hurting.

2.

2.1 duck: I saw a duck.

3.

3.1 arm: I have a long arm.

3.2 sky: The sky is blue.

4.

4.1 sun: The sun is shining.

4.2 mouth: My mouth is opening.

5.

5.1 clock: It's four o'clock.

5.2 wave: There's a big wave in the sea.

6.

6.1 week: I have to hand in a paper this week.

6.2 rain: It's raining today.

7.

7.1 club: I never go to the club.

7.3 knife: There's a knife on the table.

8.

8.1 desk: There's a book on the desk.

9.

9.1 bank: I have to go to the bank.

9.3 egg: I ate an egg for lunch.

10.

10.1 cow: I have a cow.

10.3 drum: I play the drums.

Total of words produced: 95

Participant 10 (27)

1.

1.1 cake: I like to eat cake.

1.2 hand: My hands are sweating.

2.

2.1 duck: I never hunted a duck.

2.2 pen: I use a pen to write.

2.3 gas: Taxis now ride on natural gas.

3.

3.1 arm: My arm hurts.

3.2 sky: The sky today is clear.

3.3 deer: I never hunted a deer.

3.4 ball: We play soccer with one ball.

4.

4.1 sun: The sun is out today.

4.2 mouth: My mouth is dry.

4.3 key: I forgot my keys.

4.4 bag: I left my bag at home.

4.5 file: I need to open a file for my home take exams.

5.

5.1 clock: I forgot to look at the clock when I went home.

5.2 wave: There are many waves.

5.3 tool: The computer is a tool for the students.

6.

6.2 rain: It's not going to rain today.

7.

7.1 club: Yesterday I went to the club to play tennis.

7.2 spring: The spring is already over.

7.3 knife: I use a knife to spread butter.

8.

8.1 desk: I'm sitting on the desk.

8.2 road: I came to school through three different roads.

9.

9.1 bank: I'll go to the bank later.

9.2 shirt: My shirt is torn.

9.3 egg: I cooked an egg sunny-side up.

10.

10.1 cow: My grandfather has a cow.

Number of words produced: 162

Participant 11 (17)

1.

1.1 cake: I like cake.

1.2 hand: My hand is sweat.

2.

2.1 duck: Ducks are very cute.

2.2 pen: My pen is in my pencil case.

3.

3.2 sky: The sky is blue today.

3.4 ball: I used to play ball when I was a kid.

4.

4.1 sun: The sun shines beautifully and completely today.

5.

5.3 tool: My father likes to work with tools.

5.5.map: I'm not very good at reading maps.

6.

6.1 week: I was very busy last week.

6.2 rain: It was raining last week.

7.

7.2 spring: Spring is a very beautiful season.

8.

8.3 glass: I'm used to drinking in glasses.

9.

9.1 bank: I went to the bank today.

9.2 shirt: My shirt has stain.

9.3 egg: I like boiled eggs.

10.

10.3 drum: I'm really not good at playing drums.

Total of words produced: 101

Participant 12 (23)

1.

1.1 cake: I ate the cake.

1.2 hand: My hand is dirty.

2.

2.1 duck: The duck is dead.

2.2 pen: The pen is on the table.

3.

3.1 arm: My arm hurts.

3.2 sky: The sky is blue.

3.3 deer: The deer is in front of the car.

4.

4.1 sun: The sun's shining.

4.2 mouth: Shut the mouth.

4.3 key: The key is broken.

5.

5.1 clock: The clock is fast.

5.2 wave: The wave is nice.

6.

6.1 week: This is the first day of the week.

6.2 rain: The rain is very strong.

7.

7.1 club: There's a party at the club.

7.2 spring: This is spring time.

7.3 knife: The knife is sharp.

8.

8.1 desk: This is the wrong desk.

8.2 road: The main road is over there.

9.

9.1 bank: I need to go to the bank.

9.2 shirt: I like that shirt over there.

10.

10.3 drum: The drum isn't yours.

10.5 bus: Where's the bus stop?

Number of words produced: 114

Participant 13 (22)

1.

1.1 cake: I ate cake yesterday.

1.2 hand: I hurt my hand yesterday.

2.

2.1 duck: I watched Donald Duck yesterday.

2.2 pen: I have several pens.

2.3 gas: My car is out of gas.

3.

3.1 arm: My arm is broken.

3.3 deer: I can see a deer.

3.4 ball: I play baseball.

4.

4.1 sun: The sun is hot.

4.3 key: I have several keys.

5.

5.1 clock: It's five o'clock.

5.3 tool: My father has many tools to fix cars.

5.5.map: My sister needs maps for her classes.

6.

6.1 week: I had a terrible week.

6.2 rain: There was much rain yesterday.

7.

7.1 club: I used to go to a club.

7.3 knife: I had a knife.

8.

8.1 desk: I used to have a desk in my room.

9.

9.1 bank: I have an account at the bank.

9.5 hair: My hair is reddish.

10.

10.1 cow: My father has some cows.

10.3 drum: My brother plays the drums.

Number of words recalled: 114

Participant 14 (20)

1.

1.1 cake: I like to bake cakes.

1.2 hand: I wash my hands.

2.

2.1 duck: The duck is yellow.

2.2 pen: The pen is green.

3.

3.1 arm: My arm is hurt.

3.2 sky: The sky is blue.

4.

4.1 sun: The sun is shining.

4.2 mouth: My mouth is open.

5.

5.1 clock: The clock says 1:30.

6.

6.1 week: We are on the first week of the month.

6.2 rain: It's not raining.

7.

7.1 club: The club is closed.

7.2 spring: It's spring time.

8.

8.4 brain: My brain is full of working memory exercises.

9.

9.1 bank: I have no money on the bank.

9.2 shirt: My shirt is blue.

9.3 egg: I like to eat fried eggs.

10.

10.1 cow: The cow is in the field.

10.3 drum: My son plays the drums.

10.4 sea: The sea is blue. 98

Number of words produced: 98

Participant 15 (19)

1.

1.1 cake: I have a birthday cake.

2.

2.1 duck: It's a duck.

2.2 pen: I have a pen.

2.3 gas: I ran out of gas.

3.

3.2 sky: The sky is blue.

3.4 ball: I threw the ball to you.

4.

4.2 mouth: My mouth is open.

4.5 file: I open the file.

5.

5.4 coat: My coat is blue.

5.6 year: I was born in the year of 1973.

6.

6.1 week: Last week I traveled.

7.

7.2 spring: We are in the spring now.

7.3 knife: Do you have a knife?

8.

8.1 desk: Can you leave the books on my desk?

8.4 brain: I can see your brain inside your head.

9.

9.1 bank: I go to the bank everyday.

9.2 shirt: My shirt is white.

9.4 date: I don't have a date.

10.

10.3 drum: I have a friend who plays the drums. 103

Number of words produced: 103

Participant 16 (14)

1.

1.1 cake: I love cake.

1.2 hand: My hand is dirty.

2.

2.1 duck: The duck is yellow.

2.2 pen: The pen is on the table.

3.

3.1 arm: My arm is aching.

4.

4.5 file: My file is full.

5.

5.6 year: This year I intend to go home, not to stay here.

6.

6.1 week: This week I studied a lot.

7.

7.1 club: The club is near my house.

7.3 knife: I have a knife on my table. 55

8.

8.4 brain: I am so tired. My brain is full of things.

9.

9.5 hair: I need to cut my hair.

10.

10.1 cow: The cow is fat.

10.4 sea: The sea is beautiful in Santa Catarina.

Total of words produced: 82

Participant 17 (18)

1.

1.1 cake: I like cake.

1.2 hand: My hand is sweat.

2.

2.1 duck: The duck is white.

3.

3.1 arm: My arm hurts.

3.2 sky: The sky is blue.

3.3 deer: The deer jumps.

4.

4.1 sun: The sun shines.

4.3 key: The key doesn't work.

5.

5.1 clock: The clock is tickling.

6.

6.1 week: This week I traveled.

6.2 rain: The rain is hard.

7.

7.1 club: I didn't go to the club.

8.

8.1 desk: Don't write on the desk.

8.3 glass: The glass is empty.

9.

9.1 bank: What bank do you go to?

9.2 shirt: Her shirt is wet.

10.

10.1 cow: I have a cow.

10.2 pair: There are two pairs.

Number of words produced: 76

Appendix I
Transcription of the production of a narrative

Participant 1

“This is a narrative about ah about Mary and John. Mary ah had some feeling about John that she could not understand. So everyday she thinks about this feeling and tries to figure out what it was. Every time she meets him, she she was meet him, she would feel ah strange ah in a way. Every time she would see him, he would be with that friendly MIEN. (pause) Ah she tried sometimes ah avoid his presence, but he seemed to be UBIQUITOUS, he was everywhere. Everywhere she was, he would be. It was amazing. Once, one night, she went to bed, and she had that strange dream. Then guess what? It was about him. She couldn’t even understand the dream. The dream was, guess what? John was very happy in the dream and he was taking part in a competition. Well, in the competition he had to get to the castle, but he had to go through a very very very strange and deep CHASM. He did not know how to go through there, so and then in her dream she PROSCRIBED some angels to help him to pass the CHASM. Those angels ah did not help him. Then he got to the castle and got a first place in the competition. When she woke up, she couldn’t understand what it was about. What is the THRUST of her dream? Anyways, more than ever she wanted to meet John. Then she started walking and her way, on her way she ah it was very very very long. It was so so so so so so so vast that she could not understand why she was taking so long to get there. It was strange because she could not see him. She would have seen him already, and then she started to think about her feelings towards him: probably love? When she met him, she told him about the dream and he was happier than never and PROFFERED her a gift, and she was so happy. And then she finally discovered: she loved him and she SIDETRACKED this thought”.

Number of words recalled: 7

Participant 2

“So this little girl was dreaming at night and the first image she could see in her dreams was the SWEEPING landscape and she was on the edge of a CHASM. Ah she started walking and walking, and suddenly, she had ah think kind of fork, and she had to decide which way to take. Suddenly, she saw this ABBOT in the middle of her track and she asked for help. And the guy said that she should follow the the left ah because she would meet someone special. And ah when she was walking she suddenly came across a boy and the boy PROFFERED her a present. She accepted the present and continued walking. And it was amazing. She could see the boy everywhere and she thought: “Oh, what an UBI ... UBIQUITOUS, UBIQUITOUS guy”. And ah she continued walking. Ah suddenly she in danger, she could feel like ah some evil forces around her and ah the guy was again there and he DISPELLED all her fear. Ah but he didn’t say anything about himself, so she didn’t know who he was, and why he was in her dreams, so she continued walking and walking and (pause) ah then she found this castle, and then she went inside this castle, but there was nobody there, only an old man. He told her that the king had DEPLOYED all the soldiers to go to this war in another kingdom, so that’s why nobody was in the castle. So she decided she would continue walking and she saw the boy again. Then he started talking to her and telling his ideas, and it was amazing, she could ESPOUSE all of his ideas. It was like she had met him much before, and she could understand him very well, so they continued talking (pause) ah, ok. The THRUST of his talking was that she should PROSCRIBE all evil from her life and be a good girl, and be a good girl and suddenly she woke up and she couldn’t understand why she had such a

strange dream. This dream ENGENDERED her to to to do some community work, because of the ideas the boy said to her about helping others. Ah what else? (pause) And everybody could see now a different meaning in her face. She was always smiling and trying to do different and good things”.

Number of words recalled: 11

Participant 3

“So ah my uncle is an ABBOT and he used to live in a (pause) SWEEPING place in the countryside, ah but ah as he was oh he had oh he is a very nice person and he has ah ah a peaceful MIEN, ah but sometimes ah he uses he used he used to be ah humm humm well ah I forget the word ah CONTEMPTUOUS person because some people ENGENDERED in him that behavior. Anyway, he was a nice person and his presence ah INGRATIATES me. Ah he told me that ah God and his UBIQUITOUS entity and that ah God would DISPELL all my fears ah what else ah that God could PROFFER ah could PROFFER some help, because I was in a sinful way. Well, but I ah PRECLUDED his ah offer or his PROFFER because I was too young and I couldn’t be reasonable sometimes. (Pause) Ah ah Well, I think that’s all. I really don’t remember anything else”.

Number of words recalled: 10

Participant 4

“This is a story of a girl and this girl has a dream and as soon as she wakes up, she starts recalling this dream. She was walking by ah a track and meant to get somewhere as she was walking on this track. And she came across two different roads and she had to be careful not to be SIDETRACKED of her destination. She walked for a long time and then

she reached a beautiful valley. As she approached the middle of it, she realized there was a CHASM ah she couldn't trespass. She thought of DISPELL her fears ah because she knew she had to go on, because she wanted to get to the other side. She ah she knew she wanted ah (pause) to meet a man of her dream and she could only get ah it if she tried to overcome her fears, so she tried to keep her COMPOSURE ah and after think how she could get to the other side, she had to be NONCHALANCE to go. Ah she walked back a bit and she started learning that she need a lot of energy for her movements and so she got close to the edge, she jumped across the CHASM, and well she didn't know how to enter, but I mean, she managed, she managed to get to the other side. And ah as soon as she accomplished that, she talked to her mind, that by doing that she was close to her beloved. During her jump, ah she thought of a TRADE-OFF between love and COMPOSURE. And it was only when she realized how how great it is. She continued her dream and very soon she saw a castle. She felt tempted to go into this castle because she remembered the castles from the bad time stories when granny used to tell her. Again she couldn't get SIDETRACKED and so she just ah she just PRECLUDED the idea of going there. Ah now she was beginning to get tired and thirsty because of the effort she had aimed and the MIEN of the boy came back to her mind and that it would be her prize. So she decided to use all the energy she had left and used it. Because she was tired and had a lot of information, her beloved seemed to be UBIQUITOUS. She could see him in all of different places. After sometime, images began to get blurred and this is when she started to realize that it was about the dream she was having, so eventually, she woke up and then she met someone and started telling him about her dream and he found very amusing. It was her birthday, so he decided to give her a present after the conversation. He decided to give her a present and then when she opened the present, she almost fainted because the present was the picture, the painting, in fact,

where the very valley she had dreamed of was there. She was very happy about it and, at the end, they decided to go to a picnic together to celebrate the girl's birthday".

Total of words recalled: 9

Participant 5

"So, let's call Mary and John, ok? Mary met John in the garden, ok? Ah John told her about a SWEEPING landscape that he had already seen before. And her look was CONTEMPTUOUS, ok? Ah, right. Ah first, she didn't believe and she was CONTEMPTUOUS to his idea but then slowly he convinced her that this landscape he passed through was good, ok? So, so she ah she thought of going to that landscape but she didn't want to go alone, so she thought of recruiting people to go with her, ok? And ah she went to bed and she was still in doubt whether she could go alone or or ah ah with these people, ok? So she dreamt about this landscape she would visit. Ah in her dream ah she was in this SWEEPING landscape, but there was also a deep CHASM, OK? And ah but although the CHASM looked as it was a really dangerous obstacle for her, she was ah her look was NONCHALANCE. She was not really worried about it, ok? Right ah ah she also, I mean, in her dream she thought of John, ok, she dreamt... ah dreamt of John ah when he won first prize medal, ok, but since then, she always dreams, sometimes unconnected things she couldn't explain why she was having this dream, all right? Ah, although ah since she loved John, she had this ah attractions towards him, he was a kind of ah omnipresent, UBIQUITOUS thing in her her dreams, ok? So that's maybe where she made the connections between the CHASM and his presence. Maybe the obstacle she had to to ah trespass ah her affections towards John, ok? Humm ah her ah the next day she she went to school and she got happy to win the big prize. Ok, the next day John surprised her ah by

giving her a big present. Ah she was really happy, right? Ah (pause) ah well she's thought about this present she had received, because she's thought of John's attitude and ah she had to think of a balance between this feeling. It was of goodness and love or it was a feeling of anything else that she could think of at that moment or whether this present would be something dangerous, but she tried to ah to get rid of these thoughts because nothing coming from John could be dangerous, ok? But also she could not expect big things because ah that wouldn't be John's normal attitude to give her a big present or to mean something deeper or something more significant by giving her a simple present".

Total of words recalled: 5

Participant 6

"Ah there was a girl. Ah I was in a dream, dreaming that she was in a ah ah what's the word for that ah I cannot remember the word. Okay, she was in this SWEEPING place, a very large area where there were castles and ah and it seems like a strange place, so she kept walking and after seeing the castle, she saw that she was in a CHASM and on the other side of the area there were a lot of trees, ok? And all of a sudden she came across this guy who seemed happy and she was so CONTEMPTUOUS to him for no apparent reason. Ah and that there was UBIQUITOUS in the place were just trees, nothing else, ok? And ah (pause) when she asked him something about ah finding hope ah when she finally thought in this path she had to choose one road, he seemed NONCHALANCE about the whole situation so she was so CONTEMPTUOUS towards his attitude. Ah (pause) so when she woke up, she was trying to find the THRUST of the dream. She was wondering whether there was real significance to everything, but she realized that it was just a dream".

Number of the words recalled: 6

Participant 7

“Ah yesterday I was, ah yesterday I was ah walking through a forest then I, suddenly, I saw a big CHASM. Then I started to think what I could do to ah pass through it. Ah then I ah I gave up I came back and I ah and I saw a ah ABBOT near ah an old house in the forest. And ah I went to talk to him and (pause) ah I asked him how he could help me. But when I, I got closer, I, I feel, I felt a little bit nervous because I, he was, he seems strange. Then I stopped and looked at him and asked: “Could you help me? Ah because I am lost here.” Ah and he said: “Where are you going?” And I said: “I’d like to (pause) ah I’d like to pass through this ah (pause) CHASM, but I can’t. How could you help me?” He was ah CONTEMPTUOUS at this moment. He looked at me and ah he he seemed to feel ah superior than me. He couldn’t help me, so ah I decided to continue walking in the forest and, but I was completely lost. I didn’t know what to do, so I saw a river and a small boat and I took the boat and, and continued my trip, but ah ah it started raining a lot and ah I had some problems with my boat, so I had to continue swimming ah until the other side of the river. Ah when I arrived there, ah I found a small child near trees. She was, it was a girl. She was crying a lot. Then ah I, I asked her: “Why are you crying, little girl?” And she told me she was very sad and unhappy. And she couldn’t answer my question. But ah I stayed there and started to talk with her, but ah she didn’t say a word. I took her hand and we ah we continued walking together and suddenly she said ah: “I’m sad because my ah I lost my dog. I don’t know where it is. Could you help me find my dog?” I said: “Okay. So, do you have an idea where is your dog?” And then she didn’t know. So we looked for the dog for a long time, but we couldn’t find it. And then ah and then I told her, ah ah: “Are you lost in the forest? Where do you live?” And then she told me: “Oh, I live near near here. And I know how to get home”.

Number of words recalled: 3

Participant 8

“Ah this is ah a story, this story that ah Alice’s father was telling her about this SWEEPING landscape that ah had had seen ah ah when he went to Malaysia ah and she was quiet listening to his account and he went on telling her about the things ah and that happened in this ah this ah wild place while he went on a ah on a tour. And she went on imagining all the different people he met in this place following his description of of this this narrative of this story. Ah when she went to bed at night. She couldn’t stop thinking of the exciting story and the ah exciting details he has given to the story. Ah and then when she slept, she dreamt of this ah SWEEPING landscape and she was ah standing at the edge of a cliff and there was this CHASM leading to this certain valley down there, just as she had imagined during his father’s account. Ah and then she went down this CHASM, she got to this ah to this road was whether was a bifurcation ah the road would go from the right to the left. She was she was in doubt which road she would take, so as she was ah and she took the right hand side. Ah at the end of the road, she came across a sign showing danger ah which meant ‘no trespassing’ and she was imagining what could be lying beyond that sign and then she thought that maybe there would be a wonderland after that sign and she was wondering whether or not she could reach that wonderland, so she was in doubt about whether or not going through or going on ah and what she would encounter at that end of the road, so she ah went to a process of TRADING OFF the pros and cons and she decided ah that maybe she would find not danger but goodness and love at the end of the road, so she went on and ah then she thought that she maybe ah if she accomplished and arrived there, she could be the winner of something, but she did not know what yet. Before she

ah she got to the end of the road in her dream, she suddenly woke up, so she went downstairs and then there was dad waiting for her with a birthday present ah that he had bought for her at this special day and his way was NONCHALANCE ah his was sitting downstairs being nonchalant looking at this packet and suddenly she was coming down and he stood up and it was her and he handed her the packed in ah and it was very exciting”.

Total of words recalled: 4

Participant 9

“Ah, yesterday I had a dream and ah in this dream I had to trespass a a CHASM to reach my father who ah who was the other side. Ah besides the CHASM, I had to PRECLUDE some other obstacles. My father was always the first in competitions and everywhere I ah looked at, he was there that UBIQUITUOUS person trying to support my efforts. And I wanted to INGRATIATE him. Ah (pause) every smile, every word ENGENDERED in me much more power. Suddenly, I woke up. Ah ah ah fortunately, it was just a dream, but ah but I’m still thinking what’s the THRUST of all that”.

Number of words recalled: 6

Participant 10

“Ah, Billy and Mary were very good friends. So Billy one day told Mary that he wanted to become an ABBOT. And TO INGRATIATE himself with her, he gave her a present, but she was very sad because he was going to leave. And there was going to be a CHASM between the two and ah Billy was really afraid, so TO DISPELL his fears, Mary gave him so words of encouragement. And ah she PROFFERED to help him in anyway she could. (Pause). So she gave him a present she actually ESPOUSED his ideas, but (pause)

but Mary was trying really hard she supported him ah (pause). Before, after he left, Mary ah was trying to support him, she sent a special delivery man, a delivery boy to give him all the things he would need. (pause) After Billy had left for a while, one of the things that Mary had missed them all was his NONCHALANCE about ah the problems about life and then she thought that he probably would be a good ABBOT or a member of the clergy. So he would understand and help people and DISPELL their fears”.

Number of words recalled: 7

Participant 11

“Well, this story happened yesterday when I was coming to UFSC. During the night, I had this dream about one person which I couldn’t I couldn’t ah recognize. It was a man, but I couldn’t see his face. Ah when I was coming to UFSC I met him on the way and in many other places, ah ah this person seemed so UBIQUITOUS to me. Everywhere I looked, every person who passed through me, ah looked so natural like this, made me ah, I’m sorry, ah remind of my dream. And every person seemed just like him. An then I arrived at UFSC, and ah it stopped, but then I started thinking about this, and I couldn’t figure it out. Ah I just couldn’t AMASS enough information to get the THRUST of this happening”.

Number of words recalled: 3

Participant 12

“Ok. I’m going to tell you a story about a little girl who... ah ... fell asleep and had this dream that she dreamt that she was in ah ah little cold SWEEPING place and full of trees on a sun shinning day. She wanted to enter this place and she has to cross a CHASM

in order to get to this different place. Then she started ah talking to find a place in order to go across the CHASM, ant then find ah this place she meant. Somewhere she met a man and she ah who had a pleasant MIEN on his face, and but she didn't know what exactly he was doing there. She imagined that he was an ABBOT and was ah responsible for that ah that place. And then she ah started to talk to him but, at first, she had a in a CONTEMPTUOS look in her face, a CONTEMPTUOUS attitude because she didn't know ah exactly what ah that man was doing in that place, but as he talked to her, she felt more relaxed and she ah kept her COMPOSURE about him and the place where she was. Then ah they started talking and (pause) and he told her about his ah his ah rush. He told her that he would like to do to win ah a marathon that would happen in that place because he could win after all. And her told her that he would like to be ah the winner in that marathon. (pause) And (pause) she ah the place she was dreaming she realized that the person who really had to win that marathon was really related to her own desire to (pause) to become successful in what she was doing at school. He said that the marathon she had the possibility to get ah ah the first prize for her own ah own dream. That was ah was the THRUST the dream was about and she woke up. She realized that ah the dream was ah his wish that was really related to her own wish. (pause) After she woke up ah she remembered the man who had PROFERRED to help her to (pause) to do a good job and get what she wanted – the first prize that she wanted at school and she told her, and he told her to (pause) to help ah help PROSCRIBE the ah help PROSCRIBE the ah he told her to PROSCRIBE that the thoughts she had in her mind and then everything else would she would believe she would have. She believed this and she would believe she would be under work at school”.

Total of words recalled: 9

Participant 13

“Once upon a time. Ok, this is a fairy tale. Once upon a time, a girl named Maria and a boy named Joseph ah they met each other ah in a dream. At first Maria had a dream with a person she had never seen before, and this was Joseph. He was before a CHASM in a very SWEEPING place, and ah one day they met each other and ah Maria gets very strange at his MIEN because he was very serious and he seems to be ah a good person, but mysterious. And his COMPOSURE reminded her about somebody she has seen a long time before and after they spread apart and Maria just started to think about Joseph and he was just like an UBIQUITOUS person and she was always associating the CHASM, and Joseph ah why he was there before the CHASM, so she started imagining him just like an ABBOT who would be able to win any prize and but, one day when she received ah a gift from Joseph, ah she wanted to DEPLOY him some help and she SIDETRACKED their conversation and and she just refused his gift and she just said good-bye to him”.

Number of words recalled: 8

Participant 14

“Ok. I was dreaming I was dreaming about a very SWEEPING place. Ah in this place there was a CHASM, and I was there in this CHASM and I was with a friend, and this friend behaved in a way NONCHANLANCE and ah she was she was very fond of me and we were talking about ah about the AMASS of knowledge we were getting this semester, and also we were talking about ah about the THRUST between the good and the bad things we were reading during the semester and her MIEN was very was very happy. We can say that she ah she PROFFERED me she PROFFERED me a very a very comfortable, a very beautiful smile and, looking at me, she told me that ah she wouldn't be

feeling PROSCRIBE by the Master's program because it would be very bad for her, it would be very sad for her, and ah (pause). And then she told me that yesterday she went to an ABBOT to talk about these feelings and ah he told her to feel a little comfortable and to not to worry about these things, but and everything gonna be ok and that she ah that he ah should be ENGENDERED, he should be relieved and because she was telling the truth and ah and now she is very she she feels she she kept her COMPOSURE, she felt very very well, very nice today. And so (pause), so I am awake today, and I got up from my bed and I was, even me I was feeling more more comfortable with my life and with my own personality”.

Total of words recalled: 11

Participant 15

“Rose was very tired that day. She went to bed and she wanted to ah to sleep at least until 10 am the next day. So she started sleeping and dreaming with a CHASM that she had to overcome. Ah, in this dream ah she could not ah cross the CHASM because it was really big. So she started dreaming that ah in the CHASM there was a hero that would try to to help her. It was like ah the number one to her, the champion of her life. This person would try to teach her how to be good and how to ah balance, how to be good and how to be (pause). Ok. She was trying to balance ah what's good and what's not good in her life and then, suddenly, she was like in a path and she had to choose which direction she would follow. Ah and then all of a sudden ah her older sister arrived in her dreams and she showed great love and compassion to her, and they were (pause) walking together and they saw a castle, but they couldn't enter that castle. There was something indicating that there was prohibited for them to go there and to go inside and see what was going on there. Ah

her brother looked like a UBIQUITOUS person and she wanted to INGRATIATE herself with some ah with a gift and then she found a gift near a tree and she was very happy she was able to give something in order for her brother to feel happy. She really loved her brother and (pause) and then it was as if her brother DEPLOYED angels in order to take care of her and then she was feeling ah like in heaven. Ah then she noticed some reaction. Her brother was feeling NONCHALANT with her attitude in giving him a gift. It was another part of her dream. Unfortunately she could wake up and and see that everything was just a dream and she could relax again”.

Number of words recalled: 5

Participant 16

“Well ah, ah I can start here? Ah, one day, once upon a time there was a girl. She was she was walking down walking up the street, yes, ah she was certain about ah the way she should ah follow and ah (pause) ok, but yes, so she had ah a dream and ah it was ah it was about ah a SWEEPING forest, yes, and ah ah between ah there there was ah a CHASM, a CHASM in this forest. CHASM. Ah and so. I forgot. In this ah in her dream (pause), yes. Oh, I forgot. Ah (pause) So she ah met a boy, yes, she was so ah, what’s the word, ah that word, ah that French word, he was very ah ah ah NONCHALANCE. NONCHALANCE, ok? And ah she was ah when she looked at him, she was ah indifferent, yes. She was ah, oh no, ah ah ah (pause) that’s horrible, that’s all”.

Number of words recalled: 3

Participant 17

“Once upon a time there was a girl and a boy. The girl was Sarah and the boy was Bob and ah actually, the girl was very strange because ah ah sometimes she used to (pause) ah to consider him ah as an ABBOT and respected him, but sometimes she used to be ah to feel a NONCHALANCE towards him and then one day she just slept that she was walking on the road and this road was sidetracked and then ah and then she dreamed about a CHASM and she imagined, and later she imagined ah Bob as a person who would DEPLOY her love and goodness and every time she thought of this CHASM, she used to think of Bob and then (pause) and then I think she did not like to ah did not like to think about ah SWEEPING places”.

Number of words recalled: 5

Appendix J
Transcription of the interview

Participant 1

1.

In general, well, ah I try to to have a kind of notebook. It's my dictionary entry book and then I separate and divide the letters, like a dictionary. Ah sometimes I try to make up sentences and I associate this with very strange things in order to trying to kind of shock me and then I'll remember the word. For example, the word for me in the story, when I was studying them this afternoon, and then I was imagining the whole scene. So your text was fascinating. It was a different kind of text. It is not usual to to talk about this all the time and so, if you visualize what's going on and associate the words with images, then, I guess, it's better for me to learn them. I'll remember them later on.

2.

First, I read at least the sentence where it is this word and then I read the whole paragraph. If necessary I need to read more than one paragraph, the words that are near or the context indicates, at least, helps to indicate what is the meaning ah what the meaning of the word is.

3.

Well, most frequently, I try to keep repeating the words several times and then I try to write them. Sometimes, depending what I want to remember, I even write some cards and put them on the walls. Because then, ah, for example, in the fridge or in the bedroom walls, and then it helps me because I can visualize them more frequently. But, depends what I need to

learn. This happened when I was studying the phonetic alphabet for my thesis. Sometimes I had to letters in order to remember how they were written, but in general, I keep repeating the words and I write them in different parts, in different places, so I can visualize more frequently.

4.

First of all, I, I was ah always imagining the context. I reread the text several times and I reread the exercises several times, but there were still some words that I couldn't remember, so I went back to the text, focused on that word again, and payed more attention to the image I had to visualize because then I could remember.

5.

Ah, 'to dispel'. I couldn't I couldn't remember 'to dispel', but I don't know to explain why I couldn't remember. 'Ingratiate', it was something very easy to remember because of your explanation, because you were stressing that you have 'to ingratiate' yourself with something, with someone. I was always remembering that the preposition should be 'with'. So that was it, but 'proscribe' was a little tricky, because it was 'to proscribe' and 'to preclude'. They were in the same sentence and then I remembered, ok, 'preclude' was coming first, and then 'proscribe' then I tried to memorize the situation again, so it helped me to remember.

6.

Oh, when I could ah read the text or just take a look at the words and I put my finger on the top of what I have written, the meaning, and then I took my finger off, ah I removed my finger, I saw it was the same thing I was thinking.

7.

I guess exercises were, like the ones you did, because when you have several contexts where the word is inserted and then it is easier for you to remember several ah explanations for the words. Your system was brilliant in this text, because first you have the context, and then you have the exercises.

Participant 2

1.

In general, I have to write them down, because I am extremely visual and ah I have to make associations, because it helps a lot, like 'espouse' I could remember because last class we were talking about getting married with ideas and 'proffer' I remember because we had 'offer' inside the word 'proffer', and ah ah 'abbot', I make this association with my friend with this last name. It's amazing that I remember 'trade-off' that comes to my mind. Basically I need to write them down and then I need to make associations.

2.

Context helps me a lot, like the story, and if I discuss with another person, like with your explanation, and some of your ideas and examples are still on my mind. Also some of the synonyms you gave. Basically context. Ah if the word is lost, I use the dictionary.

3.

Okay. For instance, for this exercise that you told us to study. So this morning I got the papers again and I looked at the words and I tried to remember their meanings. And if I couldn't remember, I went back to the story. Ok, I preferred to go back to the story than to the exercise. Because in the exercise you have like ah the definitions, but in the story I have the context which helps me remember.

4.

Reading again.

5.

This 'ingratiate', because I am not used to this preposition after it. It's difficult for me. And ah this one was the most difficult, because the one that was 'nonchalance' it was difficult, then I could find it in a song. And also 'preclude'. These words, because I can't make a clear association.

6.

Like when I could recognize the word 'nonchalance' in the song I was listening to, and this morning, when I looked at the words and I could remember them. The others ah the ones that I had to go back to the definition, it means that I didn't learn them.

7.

Texts and ah pictures. They are important, like, the 'chasm' I drew on the paper that you gave us. That's why I don't need another word, just the picture I could recall the word.

Participant 3

1.

Well, well, ah I try to make a link with ah something which makes it easier for me to remember. For example, 'to spouse', I thought 'to spouse' is to agree and 'to spouse', I thought that I ah I always agree with my husband, so that's why I could ah I could remember this word 'spouse'. 'Ubiquitous' is a word that was always on my mind because ah I usually read the Bible every day and ah this link with omnipresent was what made me ah remember this 'ubiquitous' word. But I try to I try to work on the words, right, to work with hardly (she meant hard) with the words, that's what I was doing ah some time before. I was ah trying to create sentences using those words, so that I could ah make it meaningful for me. That's why I could remember all the, because I was expecting that you would ask me to to create sentences and so as ah that story you gave us was not familiar to me, I tried to create sentences which would be more familiar to me than that story you created.

2.

If I don't understand the meaning of the word, I try to ah to see the link between the word that I don't know and the other words in the sentence. For example, if it ends with 'ly' and then I say it is an adverb and then I try to to link this adverb with the the words which come before.

3.

Trying to create sentences and work with these sentences to to remember the words. I try to create as many ah sentences as possible, so I can understand the meaning of of them by

giving examples, right, not just give a synonym, but to to create examples for me to understand better.

4.

I made a sentence with ah each one and then I practiced, I memorized the sentences, so I could remember the meaning of the words.

5.

Ah the most difficult ah words were those which I couldn't ah write ah meaningful sentences, like ah " he's a contemptuous person'. I don't know anyone who is like this, so it was difficult to to to memorize.

6.

Well, as I said before, the only word I knew by heart was 'ubiquitous'. It was the only word. The other nineteen words I I memorized just now, one hour before because I started studying these words. I don't know if next week I am going to remember these words, but by now, by memorizing the meaning of them. I think I noticed that I had learned them yesterday, because yesterday I was thinking of your class, I thought oh tomorrow I'm going to have class with ah ah Daniela and then I started thinking of the words that I could remember and then I couldn't remember any word, except ah 'ubiquitous'. It was yesterday.

7.

I think that that memorization, I think. But, you know, ah if I memorize the words and the meaning of the words and I practice these words, then I can acquire the words, but if I if I ah encounter a word and I see this word means this, and I don't work with these words for a long time, I forget those these ah these words, so I have to practice them in order to make them, you know, in order to acquire them.

Participant 4

1.

Well, depends, I mean, as far as reading is concerned, because of a word that I had seen before either ah I try to get the meaning of this unknown word in context, or I do that anyway, and if I do have the time, I try to check up again in the dictionary, ok? As far as listening, like if I listen to a word, I try to work out the spelling, from the pronunciation, from the from the sound, I try to work out the spelling and then I ah I try to look it up in some kind of source.

2.

Well, years ago, I used to, well, once I had learned a word, I try to use this word in the context. When, I use opportunities, for example, I make conscious effort to use this word as soon as possible in the means of context.

3.

Well, ah I ah I try to remember the word in context. That's it.

4.

I read your story many times and I ah I tried to make new sentences with the new words.

Yes, I wrote sentences with them.

5.

The words that I can't visualize, I mean, the words that are not concrete: verbs, for example.

6.

When I could remember ah the words ah by heart. I ah I think when ah after I read the story

I could make sentences with the words. But now I know that I didn't learn all of them.

7.

Well, ah words in context and dictionary.

Participant 5

1.

Well ah first of all, when I come across a new word, in a sentence, ah it's usually easier for me to determine the meaning of a word, sometimes, depending on the situation you have to go to the dictionary to look up for the word in the dictionary because you need the real meaning, the exact meaning or, at least, the the best meaning of that word in that context.

Whereas if I see a word isolated, I usually when I want to learn the meaning of the word, I'd rather in a sentence, so the picture of the word into a sentence is much better for me to remember the word than having to recollect it the other way around.

2.

By the means of sentence.

3.

To recall them, I have to read the sentence several times and start using them whenever possible.

4.

In that story. It was easier for me to remember because they were in the content of the story because I was imagining those two persons and so it was in the story, right?

5.

Maybe 'ingratiare', 'ingratiare' is to please, you see, now I remember that I am not telling the story, I remember because I'm not being tested. Maybe because ah because of some similarities with Portuguese or because they might mean or they always seem, I don't know why, but they sometimes seem something else, but the real meaning. As I said, if I had a sentence or I kept reading the sentence, somehow I would learn faster.

6.

Well, the 'chasm' was because I had a picture of abyss in my mind, so that was easy. The 'mien', the 'mien', see, I remember the words, the 'mien' was was I don't know why, it was just because when I say the word, the sound of the word is the picture of a face in my mind. And 'nonchalance' because I know and I saw that the use of this word but I never

knew the meaning, I never never looked up for the meaning of that word, and now, that we came across the word last week ah I simply don't forget the meaning.

7.

Keeping the meaning? Yeah, coming across the word I remember. First, it's a passive thing, I see the word and don't know what it is. But when it comes to use the word, when I write or when I speak, that takes longer. But once it is in my mind, it never disappears. It's it's it's ah it keeps in my long-term memory. It's kept in my long term memory.

Participant 6

1.

In general, if I don't know the word, I mean, usually you have to use the contextual clues, but somehow it bothers me not to know all the meanings, so I go and look it up in the dictionary and I use the sentences they use. And ah and I try to come up with some sentences, because even if I know the meaning, it doesn't mean that I will be able to use them when it comes to and to produce the language.

2.

An unknown word, yes? Ah, pretty much, well, I, first of all, I try to see if there is any similarities to Spanish, because it is my first language, so, I mean, if it is a cognate or whatever ah and the second thing, of course, it would be either use the contextual clues or go, actually, I have a list of a bunch of words of SAT words. I have it handy.

3.

To remember them, ah (pause), what I use right now, for this type of words, I rarely use in my language, in my day to day language, I I have a list in my head, especially, I think like in alphabetical order, so I try to I try to, you know, categorize them, I guess, some ah like orders like ah ah, see?

4.

I kinda ah, I guess, by participating in your workshop, and I tried to remember which ones I was I was able to retain, so, as far as going out there and study, I didn't really have time to to ah, but I kinda remember the ones that I were most salient, like 'ubiquitous', and I can't even pronounce it, and I know the meaning of it. And like ah 'nonchalance', I ah I have seen this word many many times, but not until the word was taught, then somehow it is more clear ah ah or more fresh in my mind.

5.

I don't know, well, I don't remember all the twenty. I mean, I can recall the ones that I do remember.

6.

I guess, for example, like I said, I'll give you an example, ah 'nonchalance', I have seen this word many times, ah from SAT, ah preparing for the SAT exam ah, preparing for the GRE that I've been taking, that I can, I would see the word, but like I said, I ah I I think being in the workshop I was just being able to see it in the story within a context, I think it helps. 'Amass', I think, I am very visual, so when I think of 'amass'. I think of different

things like 'accumulate' like on the top of each other. Of course, it is not to amass money, but you cannot find a pile on the top of each other, but to me, in my head, 'amass' for me, it is just a pile of thing.

7.

Ah, that's a good question, because I think I try the dictionary. I used cards, but didn't help much. Well, I used the ones, like those sticky things, sticky cards, where you write words and stick them on the mirror. So, every time you wake up or go to the restroom, you will see them, but it didn't work, because I had too many of them, so ah but I think it works. It can help. And even the dictionary, but I don't even think of so much whether you use the dictionary or not, but the ah like the quantity of times you are gonna come across a word or you're gonna use a word. So it's not gonna make a difference by looking up once in the dictionary. It's gonna make a difference if I use the word and I keep writing the words. Otherwise, it's gonna be useless.

Participant 7

1.

Ok. Ah ah in general, I, I normally read them and then ah sometimes I write them down in a piece of paper to memorize better, and ah just it. I don't divide into categories or ah something like that. I just, I just read.

2.

In the moment, ok, at the moment I see the word, I try to understand by the context. Ah, if it is not possible, I look, ah, I look ah up the word in a dictionary. I look at the dictionary.

3.

Ah, it's difficult to talk about that because ah ah I do it unconsciously. I don't have a specific strategy. I just ah if I don't remember I look again in a dictionary, but most of the times, I can memorize them.

4.

Ok. As I knew I had to come here, so this morning I ah I read them again, and then I wrote down in a piece of paper, ah then I have, you know, I have a kind of visual memory, so I can remember where are the words in the text and then when I when I remember where are they, then I can remember their meaning.

5.

'Abbot'. I thought it was very difficult because I couldn't make any relation with this word and another similar. 'Nonchalance' because I think it's not an English word. I don't know, maybe it comes from another ah ah maybe French. It's different. I think these two were more difficult for me.

6.

Ah, after I wrote down the words this morning, then I, I closed my notebook and then I wrote their definitions. I could remember all of them. So, I think I learned.

7.

Ah, I think, I have ah facility to learn words in context. So, I always try to put the ah ah write a sentence with that word, and then it's better for me than to look at the dictionary all the time.

Participant 8

1.

I have photograph memory, so I remember ah the written word basically. And I remember where the word is distributed ah in the context. It easier the word in the whole sentence, and the words in between rather than words out of the context.

2.

Ah I might associate this word with another one ah that I already know or I associate the word checking the sentence, so I check the right meaning in the sentence.

3.

Ah I use them, basically, I usually use them.

4.

Ah well, I read the text, so I understood the context within the text and then I remembered, well not all of them, how those words were used in the text.

5.

This word which means excluded, I found difficult, because I didn't know the equivalent word in Portuguese. If I don't find the equivalent in Portuguese, it's difficult to keep it.

6.

Oh, just now because I could recollect some words.

7.

Ah, first thing, seeing the words, that visual side of it. Looking at the words and use them. Seeing first, and then using.

Participant 9

1.

Ah, look up the word in the dictionary, and and ah try to contextualize it, or an try to use as much as I can.

2.

Dictionary and try to contextualize the word in the sentence and try to associate the word with a similar word in Portuguese.

3.

I ah I try to look for a similar word in Portuguese, at least, the way the way it is written. For example, ah the word 'dispel' which means dissipar. The three first letters are the same which makes me ah remember the word and its meaning.

4.

The same as the first question: tried to contextualize it, reading your story again and again, and using them as much as I could.

5.

Contemptuous. I couldn't make any association to Portuguese. Yes, contemptuous, and deploy, and dispel. Ah, preclude too.

6.

After practicing the list for four times.

7.

I think, yes, combination of image and word, ok?

Participant 10

1.

I think after I read the word and learn it, I start using it.

2.

I use the dictionary and see how it works in the sentence.

3.

Ah, watching where I use them. Actually, one thing that I know is that after I use them, I am more likely to remember.

4.

Ah, just I just reread the story.

5.

I think it was 'mien', ah 'ingratiates', 'preclude', 'proscribe'.

6.

I think after I looked at the words in the text more than once.

7.

Dictionary and reading the text.

Participant 11

1.

Ah, in general, I use to look up the word and read the meanings many times and I look up the meaning and try to remember the word or I look up the word to remember the meaning. If I have a test of vocabulary, I use to sometimes write the word in some pieces of paper and stick them on the walls around my house, so I look at them and I ah only the words, so I can remember the meaning.

2.

Ah, usually in order for me to understand the word, I need to have a context.

3.

I don't really know what procedures I use to remember. Ah, for example, this 'ubiquitous' one was the one I could I could remember and it is very ah very well internalized, because I took a long time ah to understand ah how to pronounce it. I thought so difficult to pronounce, and then I discussed this word many times with a friend of mine, and and then he pronounced it, and then I pronounced it again, and and now I will not forget it, for sure. But the others ...

4.

How did I learn? Well, I tried to learn ah looking at the words and the meanings, then looking at the words I can't remember the meaning and then I look up the meaning and try to remember the word.

5.

'Abbot'. I don't know. Ah expect for 'ubiquitous' that I remember, the others, all of a sudden, they appear.

6.

Ah, first thing, pronunciation calls my attention and when I discussed this word with my friend, and he was trying to teach me the pronunciation, then I thought: Now I will not forget.

7.

Rehearsal, rehearsal helps me a lot. And when I have the chance to use them. There are ones that I remember you I remember you, then I could put in context. If I relate to the correct meaning, ok, then I will not forget. Those ones that I remembered today are the ones that I will keep in my mind.

Participant 12

1.

Well, it's much easier, well, (pause) I guess I learn the words, I try to get the word, ah the words meanings through the context where I see them that ah even I don't know its meaning, I will try to ah to guess.

2.

That's it. I try to guess from the context I see them.

3.

Well, what I usually do is to make an effort to try to remember what the words mean. I just just try to, ah I I don't make any conscious effort to try to memorize ah to remember words. As I come across them, I ah I try to remember it if I have seen that word before or not, and I try to get its meaning, again from the context. I guess this must be the only strategy: I try to learn words by heart.

4.

Yes, I've learned these words for several times that I came across them because I was doing conscious efforts to memorize words ah just like that.

5.

Well, there's still some words that ah I ah am sure I haven't thought of. Ah at present I can't tell you what the words are. I guess I am unable to reproduce them all. So, ah ubiquitous is a word that I find hard to ah something that it's not very hard to ah to memorize, but it's hard to use, see. There's: Ubiquitous, Contemtuous, Chasm, Mien – these words are not, just ah ah common words, that someone would use every day.

6.

Well, from the ah the chance that I had to take a look at the ah the story.

7.

Reading, just reading. I think that's the best way to a person to learn to acquire ah ah ah the meaning of the word with reading and, if possible, using that word repeatedly otherwise reading is the best ah the best ah the best way to do.

Participant 13

1.

Well, I try to visualize as you did, right? Making pictures, drawing and I think this is the best way to learn unknown words.

2.

Well, if the words come across all by themselves, alone. I think it is easier when it comes in a text, because you can contextualize and you can perform many kinds of reading, many levels of reading, since ah from the title to the layout and the context itself. If the words come only by themselves, alone, I think I, I need to to look for them in a dictionary.

3.

Well, to remember them, I think the, to remember the context which they were used is important, because ah I think the meaning is in relation to something, the meaning of one word is in relation to another word or another situation, ok.

4.

Well, actually, I did not study so much, I just practiced during the text and then I think ah repetitive tasks, just like retell the story is very important, because we just remembered what the, what the previous text was, right. So you can base your story to a previous story ok.

5.

‘Nonchalance’, ah ‘contemptuous, because its base is only difficult for me because ‘contemptuous’ is a false cognate, or not. I don’t know. It’s similar to Portuguese, but it is not the same meaning. Oh, ‘thrust’, I forgot ‘thrust’, but I can remember the meaning of ‘thrust’. ‘Amass’ is difficult for me. ‘Deploy’, ‘deploy’ is a false cognate also. Oh, maybe I made a mistake. ‘to dispel, to preclude, to proffer’. Some of them I can’t remember because

they are false cognate and the others because ah I had to rewrite them ah in a sentence, and I did not do this for this test. But I think the method used by you was good, because it was contextualized, but I think some false cognates were really difficult to understand sometimes.

6.

Well, ah ah it's funny but ah I just noticed that I learned something when saw the words in this list you gave me to tell me which words were difficult to remember, because I could remember the context of the use of the ah each of the word, the ones I could remember. It's strange, but ...

7.

Well, I think ah exercise ah ah just like fill the blank, so fill with the missing words, and how to understand the concept. But I think cards also. It depends on the person. If the person is visual, I think I like the visual very much, because I think it's a very good system for me to understand something. And dictation it's very good for spelling. And so, maybe it's traditional, but sometimes dictations are very traditional kind of exercise, but they are very helpful.

Participant 14

1.

Ah, memorizing, memorizing and making linkings, making connections with another ah ah actually known word.

2.

Making connections, making linkings with something that I I already know.

3.

To memorize.

4.

I made some cards, and I used to carry these cards in my pocket and I was reading these cards everywhere.

5.

Those ones that ah began with the same letter or with the same kind of phonemes or letter: preclude, proscribe, so these ones I found a little doubtful.

6.

When I could make links, when I was reading a different text, I read a synonym, something that could be a synonym that carried the same idea and I could make the link with this new word.

7.

Rehearsal, practicing, saying it aloud, and reading it many times or explaining it to someone else.

Participant 15

1.

Ah, it's difficult. Ah, through the context, I, I just know what it means, but if it doesn't go to my long term memory, I can't access this information. The meaning of the word, I usually write it down and stick it to the wall and look at it every day, so that I can remember.

2.

If I have no context, I look up in the dictionary. Or to see how the word is formed if I don't have a dictionary right away, at hand.

3.

I don't know. I just remember the words. I ah ah I know how to commit them to memory like I put them in a context, ah I write the word in a phrase, so I will remember the phrase too and how to use the word, but how do I pick the word? I don't know, I'm not conscious of that.

4.

I just read the ah ah the tale, the story. Then I wrote all the words down and tried to, without looking, say what they mean. And I did, and I forgot to remember the words and I remember the meaning, not the words.

5.

All of them, because I didn't study the words. I studied the meanings. Wrong approach. I should have studied the words, not the meanings, but also the words themselves. For example, I used to remember 'vast', but it was not 'vast' that the word was. It was 'sweeping'.

6.

I know the words, for me they were not really difficult words to understand, because they were in a context. There are some words here that I am sure I haven't learned, but some of them I have, just because I looked at them and ah I understood their meaning and I said 'okay, they mean this'.

7.

It depends on the words. There are some words that I learn just by reading the context. There are some words that I do need ah mnemonics, ah write them down and see them every day, like I do, to commit to memory. There are some words that I just go to the dictionary and I read the meaning and that's all, that's all that I need. So, it depends on the words.

Participant 16

1.

I need to to see this word, to contextualize these words, ok, I need a concrete thing, not only to imagine abstract things, I need to see this. For example, ah when I read the the story, ah I

read the story many times to keep in my mind the vocabulary. Because if I see ah words in a in ah ah isolated ways, I I I can't keep them, I need to see them in context.

2.

As I told you before I try to put them in context as I did with this text.

3.

Word meanings? Ah, ok, I ah I associate, for example, 'nonchalance', I remember it is a French word, so I, I, normally I do this association.

4.

Reading. Reading the story, yes, I liked the story because I, I think it was really good. And so, ah the words into the story, I could see that they made sense, yes?

5.

Oh, yes. Some of them, for example, to engender, to spouse, yes, spouse, to preclude, proscribe, ah I think so. I don't know why but ah ok 'to preclude', it is a different word, because it seems like one thing, but I know, it is not what I think it is, I imagine. The other one, ah ah ah, 'spouse', for example, would be to get married, but not not in this context. 'Engender', this word was new for me, only through the context I could guess its meaning.

6.

Yes. In the class, I learned them. When I, as I told you, before when I read the story, when I understood the story, the meaning of the story, so I could remember the words.

7.

Association, reading, yes. Association, specially. Visualize through card, for example.

Participant 17

1.

Well, in general, I I actually I try to observe the context and so it is interesting I picture the word in my mind. Ah, I usually rewrite it about three times because I try to memorize the context. I usually ah write ah a very short sentence and I try to memorize this sentence. Sometimes it is very good.

2.

If this word is ah is written in a certain context, I guess, it is easier, but only, I mean, the word alone, I think it is difficult to understand.

3.

Ah, I try to to remember the text, or the context, usually.

4.

I think I did not learn, but ah I just tried to read the exercises again and the two column, I tried to match.

5.

Ah, I think, ah the words that I did not know the ah background.

6.

Ah ah (pause) actually, when I was practicing ah, making sentences during the class, ah some words were easier to understand and learn.

7.

Ah (pause), ah some dictionaries are very good because you have to take ah ah ah the examples, how these words can be used in certain context, some other dictionaries try to translate through synonyms and it is difficult to use, but I think, cards are good also, but I think, specially, the text ah shows ah certain kind of curiosity or or it depends on the text. Certain texts are easier or very difficult to understand, but it depends on how you on how you feel towards this certain subject.