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Depth of lexical knowledge in learners of English as a foreign language and in native speakers of English

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1. Introduction

Applied Linguistics started to develop in Europe in the 1950's as a discipline which embraces psycholinguistic and sociolinguistic theory, along with social practice and language acquisition. Thus, it focuses not only on First Language Acquisition but on Second Language Acquisition (SLA) as well, and on the variety of contexts in which these processes may take place. Kramsch (1999) defines Applied Linguistics as an interdisciplinary field that mediates between the theory and the practice of language study, investigating the relationship between language forms and use, and between different kinds of discourse. Initially, Applied Linguistics has focused on developing principles and practices for language description, but since the 1970's it has included second language acquisition as a research area (Bygate 2005).

Second language acquisition studies are rooted in linguistics, psychology, sociology, and education. According to Kramsch (2000), these studies were motivated by two reasons: early children's language acquisition and the need of teaching English as a second language. 'Second language acquisition' is a term which refers to the process of learning any language other than the mother tongue. Ellis (1994), among many other applied linguists, makes an important distinction between a second and a foreign Language. While a second language plays an institutional and social role in a community, a foreign language is the one that has no major impact on the community, and it is primarily learnt in the classroom. Another distinction made by experts is between naturalistic and instructed second language acquisition. This is related to the processes of learning a language in natural communication contexts and learning it through classroom instruction, with the guidance of teachers and teaching materials.

Second language acquisition studies have developed in different areas, all of them interrelated. Ellis (1994) has paid special attention to three main areas: (1) the development of grammatical competence and the performance of speech acts; (2) the attention paid by SLA research to linguistic theory; and (3) the increase in theory-led research. According to Chomsky (1965), competence is the mental representation of linguistic rules that constitute the speaker-hearer internal grammar whereas performance is the use of this grammar in the comprehension and production of language. We can relate these two terms with second

language acquisition in the sense that the main goal of this sub-discipline of linguistics is to describe and explain L2 learners' competence through their performance.

Van Pattern (1999 in Kramsch 2000: 313) states:

> "SLA is concerned with how people learn a language other than their first (...). This can be any language in any context. SLA focuses on both the processes and products of this learning and draws on the disciplines of linguistics (…), Cognitive Psychology and Psycholinguistics (…), Educational Psychology (...), and others. (...) SLA is not language-specific (...) many of the questions [it investigates] ignore any classroom-versus-non-classroom distinction in that the internally driven development of a second language does not change with the context. As a theory-building enterprise (...) SLA research is largely concerned with the Psycholinguistic, Cognitive, and Sociolinguistic aspects of acquisition that shape a learner's developing linguistic system."

This definition views SLA as an internally driven phenomenon that is independent of the context in which it takes place, and whose goal is to build a theory of second linguistic system development in learners.

The present study is inserted in the field of Applied Linguistics and SLA. Its main goal is to assess depth of individual word knowledge, specifically word associations, in two different groups of subjects, native and non-native speakers of English. For this purpose, data were elicited through a word association test which included 40 prompt words. The data obtained were analyzed, described, and compared quantitatively and qualitatively in order to answer the research questions. Finally, conclusions were drawn from the research findings.

In relation to the formal arrangement of the present report, it consists of seven sections. The first section, Introduction, is followed by a Literature Review, which includes topics belonging to the field of SLA, such as the nature of vocabulary, the mental lexicon,

as well as a brief overview of research on the assessment of vocabulary knowledge of L2 learners. The third section is subdivided into Theoretical-descriptive Framework, Objectives, Research Questions, and Methodology. Finally, the Discussion of the Results is presented, followed by the conclusions of the study. The last two sections correspond to the Bibliographical References and the Appendixes.

2. Literature review

In order to establish a detailed theoretical basis for research on vocabulary learning, precise definitions of the concepts related to vocabulary learning and assessment are necessary. In this section, an account will be given of the most important perspectives of different authors related to the nature of vocabulary, the mental lexicon and vocabulary assessment research.

A word is not an easy concept to define; nevertheless there are some basic points that need to be taken into account when dealing with vocabulary studies. According to Cruse (2006), it is necessary to set a prototypical approach in which a word is characterized as a 'minimal permutable element', having the following properties: (1) it is the smallest grammatical unit that can be moved around in a sentence or be separated from other words by the insertion of new material, (2) it is the largest unit which cannot be interrupted and whose elements cannot be reordered, and (3) it consists of a single root, either alone or with one or more affixes, e.g. 'order, re/order, re/order/ing'.

Concerning categories of words, Read (2000) distinguishes two different classes: 'tokens' and 'types'. Token refers to the total amount of word forms in a certain text, whereas a type is the amount of different word forms in a text source. The relative proportion between these two classifications (type-token ratio) has been used by researchers to measure the language development of native speakers and second language learners.

Additionally, the same author states that words can also be classified as 'function' or as 'content' words. The function words include: articles, prepositions, pronouns, etc., and they are seen as part of the grammar rather than the vocabulary of a language. Unlike content words, function words have little meaning in isolation. Content words such as nouns, verbs, or adjectives, may have a variety of forms by adding inflections to the base form. The base of a word is known as 'lemma'. From a single lemma, a set of words can be formed; a set of words sharing the same lemma, and conveying the same meanings, form a word family.

When trying to measure a learner's or a native speaker's vocabulary size, some issues concerning words might be problematic. Relating to the previous concept, distinguishing word forms and families is of great importance, due to their feature of

sharing the same meaning. Should a word family be counted as a whole, or should it be counted by each of its components? A further complication in the classification and definition of what a word is are homographs, mainly because in text content, we cannot take for granted that if a learner knows the meaning of a word, he or she has acquired the other meanings of that certain word as well.

Another important aspect of words study is their organization in the mind. According to Aitchinson (2003), words are organized into an intricate, interlocking system whose underlying principles can be discovered. Words are systematically stored in the mind because they are easily accessed, in a split second. Speakers are able to conduct an orderly search through their mental word-store in a surprisingly short time. When somebody is not able to find a word, there are plenty of other available options in the mind; this search is not randomly but systematically structured. In the same respect, Richards and Schmidt (2002) also refer to a person's mental store of words and their meanings and associations, as the mental lexicon.

The mental lexicon has been compared to a dictionary; however some differences are established. Words' sound structure is likely to play a role in the mental lexicon organization, along with meaning. The content of the mental lexicon is not fixed; we are always adding, removing or changing words, meanings and pronunciations, and we often coin new words. The mental lexicon contains more information than just meaning. In this respect, the mental lexicon is not fixed as a dictionary, but modifiable in time.

Peppard (2007) points out how the mental lexicon can be explored basing his proposals on Aitchison's assumptions (2003); thus, he lists four main methods for doing research on it : (1) Word Searches (tip-of-the-tongue or TOT states) and slips of the tongue; (2) Linguistics and Linguistic Corpora; (3) Speech Disorders and Brain Scans; (4) Psycholinguistic Experiments. In addition, Peppard (2007) finds it important to give answers to the question of how the L2 mental lexicon is organized and to explore the relationships between the L1 and L2 mental lexicon, since the research that has been done in this area has produced conflicting results, with some studies pointing to separate word stores and others finding evidence to support a single one. Although previous studies did not find any substantial evidence that the L1 and L2 mental lexicon are organized in the

same manner, newer research like the one made by Wolter (2001), is demonstrating the contrary, that is to say, that they are similarly organized.

Another approach to word research is the one developed by John Read (2000), who focuses on second language vocabulary acquisition and use. This author provides three reasons for dealing with this subject. Firstly, researchers are significant users of vocabulary tests; hence, vocabulary assessment shows to be useful to improve the understanding of vocabulary acquisition processes. Secondly, second language acquisition researchers have to deal with assessment issues when devising research instrument due to the little interest in vocabulary on the part of language testers. Lastly, the results of their research can contribute to understanding the nature of the construct of vocabulary ability, which is an essential construct for the validation of vocabulary tests.

Furthermore, Read (2000) refers to the lack of coherence of the second language vocabulary acquisition field, despite the increasing amount of research in this area. In order to look into the matters concerned with second language vocabulary, Read (2000) draws attention to four topic areas which are strongly related to vocabulary assessment: (1) systematic vocabulary learning; (2) incidental vocabulary learning; (3) inferring word meanings from context (lexical inferencing) and (4) communicative strategies.

Regarding systematic vocabulary learning, Read (2000) points out that the starting point of this area is the approach to vocabulary learning through L2 word lists together with L1 translations so as to be memorized in correlative pairs by learners. The questions that arise from this kind of learning have to do with the nature of words and the way they are presented, and with word characteristics that tend to make the learning process easy or difficult. The other question has to do with the effectiveness of memorization techniques, thus bringing up the discussion on whether there are better techniques than resorting to memory. The author reviews the findings made by Ellis and Beaton (1993), who assert that nouns are easier to learn than verbs, because learners can form mental images of them more readily. Also, mnemonic techniques are very effective methods for gaining initial knowledge of word meanings in L2 (Cohen 1987, Hulstijn 1997). However, Read (2000) points out Meara's (1980, 1994) reservations as regards the limitations of this research area, since the designs are mainly experimental, having been made under laboratory conditions.

In addition, Meara states that findings in this area do not offer a conclusive answer as to how real language learners actually learn new words.

The assessment issues that Read (2000) has dealt with have to do with the results of tests and test designs**.** He has postulated that since the learning task is limited, the design of tests is straightforward and the test format is narrowed down to measure context-independent vocabulary.

The survey made by the author concerning incidental vocabulary learning is very significant. As regards vocabulary acquisition by native speakers, it has become quite evident to most researchers that a major occurrence of this acquisition process takes place at a very fast rate from childhood throughout formal education and at a slower pace in adult life. Thus, a large proportion of the words learnt is not taught by parents or teachers, but more plausibly, acquired incidentally as native speakers encounter them in the speech and writing of other people (by 'incidentally' it is not necessarily meant unconsciously; this distinction has brought up further discussion among some authors).

In relation to second language research, Read (2000) has stated that**,** among other researchers, Dupuy and Krashen (1993) carried out a study involving American students of French reading part of a French film script with colloquial expressions they were not familiar with. They showed some understanding during the experiment, which shows that there is incidental vocabulary learning, for the students were not told to pay attention to vocabulary and yet demonstrated some understanding of the previously unknown words.

Regarding vocabulary learning from listening, Ellis (1994) carried out a listening study in which Japanese high school students listened to a set of directions in English. One group heard pre-modified directions (so to make them more understandable) while the other group heard the native-like directions and had the chance to ask for clarification. The results showed that the latter group obtained consistently higher post-test scores.

Concerning assessment issues arisen from this account, Read (2000) has arrived at the following conclusion: there is need for a pre-test. This would allow researchers to select from a set of potential target words ones that none of the subjects are familiar with. Also, timing is relevant to the post-tests, in order to clearly distinguish actual learning. Indeed, Read (2000) posed the following question: if the post-test is given immediately after the task, the results will really indicate the subject learnt the items? He has answered this

question by stating that there is no indication of whether the subjects will remember them on a longer term basis.

In relation to lexical inferencing (inferring word meanings from context), the same author states that as learners' main focus is to understand spoken or written discourse in natural communicative settings, they have to be able to work out the meaning of items that will be in most of the cases inevitably unfamiliar. On the one hand, teachers are aware of this and have devised some techniques to cope with this problem; however learners are the ones who must be able to choose and apply their own strategies for dealing with words in an outside-the-class context for example. The most important strategy is inferring meaning from information available in the text itself. It involves deeper processing that may contribute to better comprehension and may result in some learning of the lexical item that would not otherwise occur. For instance, the Clarke and Nation Strategy (1990 in Read 2000) includes steps such as identifying the word class of the unknown word and analyzing the structure of the word itself into prefix, root and suffix.

On the other hand, some scholars have focused on the processes that foreign language learners go through when inferring the meanings of unknown words in a text. Van Parreren (1981 in Read 2000) asked Dutch learners of foreign languages to think aloud in Dutch as they dealt with unfamiliar words in a reading passage. They identified four linguistic levels at which the learners could operate: (1) syntactic: the sentence structure in which the word occurred; (2) semantic: meaning found in the immediate and wider context of the word; (3) lexical: the form of the word; and (4) stylistic: the exact usage of the word in its context.

As a final consideration with regard to lexical inferencing assessment, Read (2000) asserts that the convenience of scoring objective test items has to be balanced against the more time-consuming process of rating responses composed by test-takers. Also, test-takers should have little if any knowledge of the words when they take the test. This would yield results that more validly reflect the quality of the learners' inferences.

Another topic that Read (2000) emphasizes is the relation between language and communication. The author points out that within the field of SLA there is an active tradition of research on Communication Strategies (CS). Its main concern is related to the

way in which learners deal with lexical gaps, for example, words or phrases in the L2 that they need to express their intended meanings but do not know.

The most influential early research on CS has been developed by Tarone (1978 in Read 2000). She conducted a study to determine how her subjects would cope with the problem of identifying objects they could not directly name in the L2. Her classification brought about a type of taxonomy of five communication strategies: either the subjects avoided referring to the word; used other words in the L2; drew on the vocabulary of their L1 by literal translation; asked the interlocutor for help in supplying the word, or resorted to non-verbal communication.

Moreover, Read (2000) points to the question of whether communicative strategies should be taught to learners. He states that there has been much controversy over this point, since some researchers argue these strategies have been acquired by the learners in their L1, and this might be transferred to their L2 learning process, thus proving strategy teaching unnecessary.

According to the same author, there are two possible approaches to assess lexical communication strategies. The first option is to have an embedded, comprehensive measure of the learner's performance of a speaking task, such as telling a story. The measure should take the form of a scale in which to judge the learner's effectiveness in using strategies to communicate their meanings. However, this kind of measure is impractical unless the speaking task is designed specifically to create communication problems. Thus, the second option is to have discrete, selective test tasks which require learners to use at least one kind of communication strategy.

On the whole, the conclusions drawn by Read (2000) from his comprehensive survey on vocabulary assessment indicate that research on SLA normally employs discrete tests, because of the fact that the researchers are investigating a construct that can be labeled either 'vocabulary knowledge', 'vocabulary skill' or 'vocabulary learning ability'. Despite the apparently broad scope of the topic area, the focus is mainly on lexical strategies and tests that force learners to deal with their lack of knowledge of particular vocabulary items. Secondly, selective rather comprehensive measures are used in vocabulary acquisition research.

As for context-dependence, there are variables according to what aspect of vocabulary is being investigated. Tests of systematic vocabulary learning are normally context-dependent, whereas incidental vocabulary learning is assessed mainly in context-independent tests. By contrast, context is crucial when assessing lexical inferencing.

In this same respect, Mukarto (2005) states that the focus on second language vocabulary acquisition has been so far aimed to quantity more than quality of knowledge. This tendency undoubtedly affects the accuracy of the information, and it occurs most probably due to the lack of elements or instruments to measure quality.

Before presenting possible methods for measuring vocabulary, we need to clarify the concept of vocabulary knowledge. Some authors have attempted to develop this construct, for example Cronbach (1942 in Read 2000), presents five aspects of word knowledge: generalization, application, breadth of meaning, precision of meaning, and availability. Another proposal is the one from Richards (1976), who claims that knowing a word implies knowledge of its relative frequency and its collocations, the limitation imposed on its use, its syntactic behavior, its basic forms and derivations, its association with other words, its semantic value, and many of the different meanings associated with the word. Nation (1990) takes these previous assumptions concerning word knowledge and adds the receptive and productive dimensions, and also categorizes them into form, position, function and meaning.

According to Mukarto (2005), vocabulary learning is complex in nature and it should be regarded as an incremental process, from recognition of potential vocabulary to the ability to use it. As a matter of fact, Bogaards (2000 in Mukarto 2005) postulates that L2 learners may learn certain vocabulary dimensions: form, meaning, morphology, syntax, collocation, and discourse. Due to the complexity of vocabulary knowledge, doing research on this field has been a challenging issue for linguists, especially in terms of depth of knowledge, since there are too many to cover and every one of these areas is still complex and not sufficiently known.

There are two main approaches to measure depth of vocabulary knowledge: a developmental approach, which describes the stages of acquisition, and a dimensional approach, which explains the level of acquisition of the various components of word knowledge. A good example of assessment is the Vocabulary Knowledge Scale, designed

by Paribakht and Wesche (in Schmitt 1998). In the dimensional approach, the Word Associates Test by Read (1998) is a well-known instrument. Some other tests in this area are The Euralex French Test and there are different types of interview formats, the first with a "yes or no" format, and the second test which includes open-ended questions for the learner to elicit diverse aspects of word knowledge.

Some new measures of word knowledge have been designed, for example, the 'Forward Translation Recognition Matrix' (FTRM). This is a self-reported assessment instrument used to measure the depth of meanings of a set of verbs within given semantic fields (Mukarto 2005). The learner's task is to translate from L1 into L2 (that is why the test is called 'Forward Translation'). Another test is 'Sentence Completion Recognition Matrix', which is very similar to the previous one; nevertheless, this does not consider translation. A third measure is 'Acceptability Judgment', in which the subjects have to specify whether the word used in the sentential contexts matches the set of features contained within the sentential context or vice versa, e.g. 'carry', in which the feature direction is important. However, the number of sentential contexts may lead to a wrong judgment because a target word may require a large number of contexts.

Although there are various measuring instruments that have been used, improved, and modified, there is still research work to do in relation to the assessment of vocabulary, since as shown in the review above, the nature of vocabulary knowledge is complex and still relatively unknown.

In measuring the size of a learner's vocabulary, the definition of a word and the classification of words are crucial. When talking about word knowledge, we should point out that there is more than one manner of describing the nature of vocabulary knowledge. An influential statement is the one made by Richards (1976), who proposes eight assumptions about knowledge of a word:

1. Vocabulary knowledge of native speakers continues to expand in adult life, in contrast to the relative stability of their grammatical competence.
2. Knowing a word means knowing the degree of probability of encountering that word in speech or print. For many words we also know the sort of words most likely to be found associated with the word.

3. Knowing a word implies knowing the limitations on the use of the word according to variations of function and situation.
4. Knowing a word means knowing the syntactic behavior associated with the word.
5. Knowing a word entails knowledge of the underlying form of a word and the derivations that can be made from it.
6. Knowing a word entails knowledge of the network of associations between that word and other words in the language.
7. Knowing a word means knowing the semantic value of a word.
8. Knowing a word means knowing many of the different meanings associated with a word.

(Richards 1976: 83)

This set has frequently been taken as a general framework of vocabulary knowledge even though Richards did not intend to.

In the following table, Nation's (2005: 27) model of the distinction between receptive and productive word knowledge is shown, and how these two types of knowledge together configure what knowing a word is. Three main aspects are taken into account: form, meaning and use of the word, and thus it involves formal, associative and grammatical considerations that arise when dealing with a word. In this model, Nation (2005) emphasizes the importance of the parts or aspects involved in knowing a word. Besides, he points out that it is possible to draw a process model that shows the relations between these parts.

Form	Spoken	R What does he word sound like? P How is the word pronounced?
	Written	R What does the word look like? P How is the word written and spelled?
	Word Parts	R What parts are recognizable in this word? P What word parts are needed to express the meaning?
Meaning	Form and meaning	R What meaning does this word form signal? P What word parts are needed to express the meaning?
	Concept and referents	R What is included in the concept? P What items can the concept refer to?
	Associations	R What other words does this make us think of? P What other words could we use instead of this one?
Use	Grammatical Functions	R In what patterns does the word occur? P In what patterns must we use this word?
	Collocations	R What words or types of words occur with this one? P What words or types of words must be use with this one
	Constraints of use (register, frequency…)	R Where, when, and how often would we expect to meet this word? P Where, when, and how often can we use this word?

What is involved in knowing a word.
Note: R= receptive knowledge, P = productive knowledge.

Several authors have suggested different dimensions for the lexical knowledge construct, among them, Meara (1996a), Chapelle (1994), Henriksen (1999). The construct of deep word knowledge is defined as "the decontextualized knowledge of word meanings and word associations" (Schoonen and Verhallen 1998). Previous studies declare that certain levels and qualities of lexical knowledge are important prerequisites for successful language learning and language use (and therefore for school success). As an example of current research, Zareva's model (2005) will be reviewed below.

Zareva (2005) carried out research which follows the tradition of current theoretical frameworks that promote a number of global dimensions for the description of L2 learners' lexicon, i.e. global features that capture the overall state of learners' vocabulary rather than describe their different 'sub-knowledges' of words. The specific theoretical framework considered was Henriksen's three dimensional framework (1999), for it has the potential to reflect the differences in L2 learners' word knowledge as their L2 proficiency increases. These three dimensions are: breadth (partial and precise knowledge of vocabulary), depth (the dimension that describes learners' lexicon organization), and receptive-productive control (that captures receptive and productive skills regarding one and the same lexical item). Breadth of vocabulary relates to vocabulary size (How many words do you know), while depth of word knowledge has to do with how much do you know of a word (meaning, grammatical category, derivations, pragmatic and sociolinguistic value, collocations, etc.). Depth of lexical knowledge pertains to individual words in the first instance, and not to the lexicon as a whole.

According to Nassaji (2004), depth of lexical knowledge is a complex and multidimensional matter, and knowing a word well should imply not only recognizing its individual meanings, but also the several types of knowledge which are linked to a word. The different aspects of the knowledge of a word vary from its pronunciation, spelling, register, stylistic, and morphological features to knowledge of the words syntactic and semantic relationships with other words in the language, including collocational meanings and knowledge of antonymy, synonymy, and hyponymy (Chapelle 1994, Henriksen 1999, Read 2000).

In order to measure depth of vocabulary knowledge, various instruments have been developed, for instance, the Vocabulary Knowledge Scale (VKS, Paribakht & Wesche 1993) and Read's (1998) word association format. The VKS is designed to cover a wide range of lexical knowledge, from superficial recognition to productive knowledge. Read (1998) focused on receptive knowledge word associations as an operationalization of deep lexical knowledge, and developed a single-response test eliciting varied set of words and at the same time, probing depth of knowledge of words in some meaningful way.

In Zareva's research (2005), each dimension was measured as follows: breadth was studied by examining participants' vocabulary size and their knowledge of words from different frequency bands; depth was examined by looking at Word Association (WA) domain, and number of associations the participants generated to the Target Words (TWs) they knew; finally, the receptive-productive dimension was measured by participants' ability to recognize a word and explain its meaning by providing a brief explanation, suitable synonym or translation of the TW.

The analysis that was presented in Zareva's paper is predictive and it aims to serve as a practical instrument for identifying the smallest set of lexical knowledge predictors (ideally as good as the full model) at prefiguring the overall state of NSs' and L2 learners' lexicons. At the same time, it seeks to examine whether Henriksen's three dimensions fully capture the overall state of lexical knowledge of the participants involved in the study. The predictive variables used were: (1) self-reported vocabulary knowledge, (2) vocabulary size, (3) knowledge of words from various frequency bands, (4) native-like commonality of associations and (5) number of associations.

In Zareva's terms, Henriksen's three dimension framework fully captures the differences in the overall lexical competence of Native Speakers (NSs) and L2 learners of English at different levels of language proficiency. The results obtained in Zareva's research (2005) showed that L2 learners came up with more syntagmatic, personal or idiosyncratic meaning associations than native speakers of the language, who provided more paradigmatic and decontextualized meanings.

In general terms, according to Zareva (2005), the "best" set of predictive variables suggests that the receptive-productive dimension as well as breadth of vocabulary, in particular vocabulary size, seem to be the two dimensions that are more revealing of the overall state of learners' vocabularies than the dimension of quality.

In spite of the fact that word knowledge is of paramount importance when it comes to vocabulary assessment, there is another fundamental concept that needs to be dealt with: vocabulary ability. It is not only necessary to know a word, but also to have the ability to use that word in a certain communicative context.

In this respect, Chapelle (1994) proposes a definition of vocabulary ability based on Bachman's (1990) general construct of language ability. The definition includes "both

knowledge of language and the ability to put language to use in context" (Chapelle, 1994: 163). The three components of vocabulary assessment include: (1) contexts of vocabulary use, (2) vocabulary knowledge and fundamental processes, and (3) metacognitive strategies for vocabulary use.

According to Chapelle (1994), vocabulary knowledge is the component that has received more attention from the Applied Linguistics and Second Language Teaching experts. The author outlines four dimensions of this ability:

1. Vocabulary size: It refers to the number of words that a person knows. In the case of L2 students, it is tested by estimating how many common words they know based on tests. According to Chapelle (1994 in Read 2000: 32), "if we follow the logic of a communicative approach, we should not only measure vocabulary size in an absolute sense, but in relation to particular contexts of use."
2. Knowledge of word characteristics: The understanding of particular lexical items may range from vague to more precise and learnt words' meanings influence new ones. The role vocabulary tests play is more the role of research tools than assessment instruments, until the researchers have established a sounder basis for interpreting test-takers' performance in ways that are relevant to language teaching.
3. On the other hand, Meara (1997) argues that a person must dominate both receptive and productive knowledge of a word in order to have the command of it. If all these types of knowledge such as the one associated with the spoken form of a word, the grammatical behavior or how frequent a word is, etc. are mastered, it would be possible to recognize and produce a word in a native-like manner.
4. Lexicon organization: it is concerned with the way in which words and other lexical items are stored in the brain. Meara (1984, 1992) has worked in this area using word-association and lexical-network tasks.
5. Fundamental vocabulary processes: They refer to the processes that are crucial to knowledge of vocabulary, both for understanding oral and written

> language and speaking and writing. In native speakers these processes are considerably faster, since the L2 students have gaps in their knowledge. Even non-native speakers with large vocabularies perform these processes considerably slower than native speakers.
>
> (Chapelle 1994 in Read 2000: 31-33)

Chapelle (1994) proposes that one of the several purposes of measuring vocabulary is to extend the research on reading development and literacy programs, since vocabulary breadth is related to reading comprehension abilities. Furthermore, it can reveal the lexical gap second language learners face in undertaking different communicative tasks in the target language or in coping with authentic reading materials. For making such estimates, a large sample of words is needed, together with a simple response task to indicate if a word is known or not.

An example of an approach to describe vocabulary knowledge is the one proposed by Dale (1965:898), who defined four basic stages in knowing a word: stage 1: "I never saw it before"; stage 2: "I've heard of it, but I don't know what it means"; stage 3: "I recognize it in context – it has something to do with . . ."; stage 4: "I know it."

A more specific way of describing vocabulary knowledge is by measuring vocabulary depth. There are two main approaches to measure depth of lexical knowledge: first, the developmental approach, which describes the stages of acquisition, and second, the dimensional approach, which explains the level of acquisition of the various components of word knowledge. A good example of the use of the developmental approach is the Vocabulary Knowledge Scale, designed by Paribakht and Wesche (1993). They developed another scale that they called the Vocabulary Knowledge Scale, for a research study, that consisted in a series of statements: (1) I have never seen this word; (2) I have seen this word before, but I don't know what it means;(3) I have seen this word before and I think it means: _____ (synonym or translation); (4) I know this word. It means: _____ (synonym or translation); (5) I can use this word in a sentence. Paribakht and Wesche (1997) reformulated this scale by adding one statement, going from "I don't remember having seen this word" to "I know how to use this word in a sentence". This scale revealed some evidence of word knowledge in the form of synonym, L1 translation or sentence.

In the dimensional approach, we have the Word Associates Test by Read (1998). Some other tests in this area are The Euralex French Test and Interviews, the first with a "yes or no" format, and the second one with open-ended questions so that the learner can elicit diverse aspect of word knowledge.

Meara (1996a, 46) makes a quite useful distinction between testing single words' knowledge and overall assessment of the learner's vocabulary. This author favors the comprehensive measure of vocabulary, and proposes two key measures: an estimate of vocabulary size and a measure of how well organized the learner's vocabulary knowledge is.

In order to construct a well-formed test, researchers have been inclined to choose simple test formats, so that estimates would be reliable enough to validate vocabulary size. There are two types of tests which can reveal if a word is known or not:

- The Nation's Vocabulary Levels Test is the most widely used measure of English vocabulary size for second language learners. It requires the test-takers to match words with their synonyms or short definitions.
- "The Nation's new Vocabulary Size Test has a multiple-choice format, with each target word presented in a short non-defining sentence followed by four possible definitions." (Nation and Gu 2007 in Read 2007: 110)

Read (2007) has proposed a project to develop the Yes/ No tests in which spoken words are associated with two kinds of sentence context: one providing a lexically bare syntactic context and the other a semantically richer one. Contexts may add an accurate identification of the target word, and a link to a specific use of the word. Another application of the Yes/ No format is found in DIALANG, which is a web-based system through which learners of fourteen European languages can assess their proficiency in a target language. The purpose is to determine the general proficiency level of the learners so that when they take a specific skill test, the system will show them items and texts that suit their level.

In order to further illustrate some of the previously commented topics, we will present as an example a study made by Meara and Schmitt (1997). The researchers

examines two types of word knowledge: word associations, which link words in a certain manner in a person's mind and grammatical knowledge, which embraces word class, morphological characteristics, etc., and their change in time. In this particular study, the subjects did not show a high proficiency in verbal association although they were exposed to verbs such as 'known', reaching only 50% of the word associations possible under native speaker norms. According to this, it is possible to say that proficiency in language also implies vocabulary knowledge apart from grammatical competence.

After giving the tests to three different groups of Japanese students with different levels of proficiency, the subjects' responses were classified into a 4-point Lickert scale and compared to answers given by native speakers about how the test should have been answered. The results were divided into different levels according to subjects' vocabulary size, verbal suffix knowledge, word association and the relation between these levels and language proficiency. The results demonstrated that vocabulary size and proficiency are related as well as suffix and association knowledge, but they also showed that the subjects of this particular study did not have anything near native-like mastery of the two types of word knowledge mentioned above, i.e. word associations and grammatical knowledge. In conclusion, Meara and Schmitt (1997) believe that it is necessary to include several components in future research about depth of knowledge of words, such as variation of individual learning, the number of knowledge competences, etc.

3. The study

3.1 Objectives

3.1.1 General objectives

The main goal of this study is to compare word associations produced by learners of English as a foreign language at two levels of proficiency, intermediate and advanced, with word associations provided by native speakers of English.

3.1.2 Specific objectives

The study has three specific objectives:

1. To describe types of non-native speakers' associations produced by learners of English at two levels of communicative competence, intermediate and advanced levels.
2. To describe types of native speakers' associations.
3. To identify quantitative and qualitative differences and similarities between the non-native speakers' associations and those produced by native speakers of English.

3.2 Research questions

The following research question and sub-questions were posed for the present study on the basis of researchers' findings in the field:

1. What are the quantitative and qualitative differences and similarities between native and non-native speakers' word associations?

This macro question can be subdivided as follows:

a. Which type of word association (i.e. paradigmatic, syntagmatic, phonological or other) shows the most significant difference between native and non-native speakers?
b. Which type of word association (i.e. paradigmatic, syntagmatic, phonological or other) shows the most significant similarity between native and non-native speakers?
c. Which type of native speakers' word association has the highest frequency of occurrence?
d. Which type of non-native speakers' word association has the highest frequency of occurrence?
e. Will advanced non-native speakers' associations be more native-like than those produced by intermediate non-native speaker because of their higher proficiency level in the target language? In other words, how do the intermediate and advanced learners compare?

3.3 Theoretical-descriptive framework

In the field of second language acquisition studies, applied linguists have shown an increasing interest in vocabulary acquisition research. Proposals and discussions about the nature of and interrelationships among aspects of lexical competence, vocabulary acquisition and learning processes have become more frequent among researchers. The main reason for the different frameworks, models, etc is the need of standardization in the description of vocabulary acquisition issues. For example, some researchers have established a dichotomy between receptive and productive vocabulary, i.e. completely distinct sets of vocabularies (e.g. Teichroew 1982) while others reject this view and suggest that there is rather a continuum between these two types of vocabulary (e.g. Færch, Haastrup, and Phillipson 1984, Hatch and Brown 1995). Other proposals are related to the constructs of breadth and

depth of vocabulary knowledge, which have been adopted by many vocabulary acquisition researchers in their studies (e.g. Henriksen 1999, Qian 1998, 1999).

The framework described in this section will include the aforementioned topics or dimensions along with the word association studies in vocabulary acquisition research. Furthermore, other relevant matters to be reviewed are the attempts to differentiate between the L1 and L2 mental lexicons, as well as the concept of a syntagmatic-paradigmatic shift in L1 and L2 speakers in relation to word knowledge development. Thus, the major considerations of researchers in the field of word association studies, their findings and the organization of the lexicon will constitute the basis of the present study.

3.3.1. Lexical competence

Concerning the construct of lexical competence, it is possible to choose between a global description including one or two dimensions, or a description of separate traits including all the possible aspects of word knowledge. Meara (1996) states that dealing with separate traits would be impracticable because they have continually being added to the description. Therefore, he proposes a model of lexical competence with only two dimensions, size and organization. However, a specification of the different dimensions of lexical competence is necessary in order to establish a more precise model of lexical development to do research. Thus, Henriksen (1999) proposes three dimensions of lexical competence to strike a balance between a global description and a separate traits one. These are: (1) a 'partial-precise knowledge' dimension, (2) a 'depth of knowledge' dimension, and (3) a 'receptive-productive' dimension. A description of these dimensions is provided below.

Dimension 1: The partial- precise knowledge dimension

This dimension, originally proposed by Meara (1996), refers to vocabulary size or breadth, i.e. the number of words a person knows. Many studies characterize vocabulary knowledge as precise comprehension. In tests, this knowledge is

operationalized as the ability to translate a target language word into the mother tongue or to paraphrase it in the target language. Different types of test formats have been used for measuring vocabulary size in order to compare L2 learners' different levels of knowledge along the partial to precise dimension.

Dimension 2: The depth of knowledge dimension

Read (1993) characterizes the concept of depth as the quality of the learner's vocabulary knowledge. In turn, Henriksen (1999) emphasizes the fact that this dimension is very complex since various types of knowledge that are essential components of the full understanding of a word (p. 305). Thus, a rich meaning representation of a word involves knowledge of both referential meaning, that is, the extensional relations between concept and referent and a word's intensional or sense relations to other words, such as paradigmatic (e.g. synonymy, antonymy, hyponymy) and syntagmatic relations, that is, collocational restrictions (p. 306). It is necessary to use several test formats to identify different aspects of knowledge to finally describe the quality or depth of vocabulary knowledge. Word associations, the topic of the present study, belong to this dimension of lexical competence.

Dimension 3: The receptive-productive dimension

Henriksen (1999) characterizes this dimension as the knowledge of a word a learner has which enables him to use it in comprehension and production speech and writing. Nevertheless, a clear definition of what reception and production mean is still necessary.

Mapping meaning onto form and network building

Acquiring word meaning is a process that involves both mapping onto form and network building, that is to say, the processes of developing semantic understanding of a word, that is, definitional, referential, or extensional links and working out the semantic relation of that word to other lexical items of the mental lexicon or network building, i.e. intensional links. (Henriksen 1999: 308

According to Aitchison (2003:199), the language learner faces three tasks when acquiring word meaning:

- Labeling: this term refers to the process of discovering which sequence of sounds is used as a name for a thing or entity. It creates a connection between concept, sign, and referent.
- Packaging: it refers to the process of discovering which things can be packaged together under one label and also to the process of discovering the range of meanings of a word.
- Network building: this third term refers to the process of discovering the sense relations or intensional links between words, i.e. fitting words together in the same semantic networks.

Researchers have focused on the initial process of mapping meaning onto form disregarding the process of network building, although in the last years attempts have been made to deal with this process (e.g. Wolter 2006, D. Helmut, J. Milton, and J. Treffers-Daller. (Eds.) 2007). There are a few explanations for this tendency:

- The first aspect, i.e. mapping meaning onto form, is the first and most central phase in vocabulary learning, whereas network building is a much later and slower process.
- Researchers' interest in the acquisition of nouns and verbs. For these word classes the development of the extensional links is an integral part of the learning process.
- The methodological problems involved in describing lexical progression of network building.

Johnson-Laird, Hermann, and Chaffin (1984) have stated that there is a need for a model or psychological theory of meaning that can incorporate different levels of representation, including both intensional and extensional links.

Vocabulary acquisition described as development along the three dimensions

In order to attempt developing a model of lexical development to guide L2 vocabulary acquisition research, Henriksen (1999) states that it is necessary to identify the relations between the three dimension of lexical competence and the processes of learning and use. Her proposals involve the following relationships.

- Development from partial to precise comprehension

  Lexical development can be characterized as the movement from vagueness about meaning to precision and mastery of finer shades of meaning. In acquiring word meaning, learner's knowledge of a lexical item goes through different stages. First, he recognizes that the word exists in the target language. The knowledge of this word changes and undergoes different degrees of partial knowledge towards precise comprehension. This knowledge gradually changes and increases as the experience of the word and of the target language expands.

- Development along the depth of knowledge dimension

  According to Henriksen (1999), the semantization process includes a progression along dimension 1, i.e. partial to precise knowledge, and dimension 2, i.e. depth of knowledge. She then adds that development along dimension 1 is related to the process of mapping, that is to say, creating extensional links via both labeling and packaging, whereas dimension 2 is primarily associated with network building, in the sense that it creates intensional links.

- The relationship between dimensions 1 and 2

  Henriksen asserts that development along dimension 2 (depth) is seen as an important issue for lexical development along dimension 1 (partial to precise knowledge). Thus, in the process of developing a general understanding of a word, the learner will firstly have to make a connection

between sign and referent. In addition, he will also have to organize the intensional relations between the items in the lexical set.

- Development from receptive to productive control

  Henriksen states that it is a well-accepted fact that only a limited number of words that we know receptively will ever become productive. According to this, it is assumed that most lexical items initially enter the learner's receptive vocabulary and may only subsequently become available for productive purposes. In this sense Henriksen is not applying a dichotomy between receptive and productive vocabularies, but she is operating on a continuum of receptive and productive vocabulary.

  Henriksen suggests that depth of knowledge of a lexical item is important for precise understanding. Besides, rich meaning representation is regarded as an essential factor for a word to become productive.

- Relations among the different dimensions

  Henriksen hypothesizes the importance of strong interrelationships among the three dimensions of lexical competence, with an emphasis on network building.

Henriksen finally highlights the complexity of the semantization process, "especially the crucial role of strengthening the organizational structure of the learner's lexicon 1999: 315). In addition she urges researchers to view vocabulary learning as both item learning and system changing processes. Thus, according to the author, vocabulary acquisition research should concentrate on the progression or development of the learner's interlanguage semantic networks, being also necessary to clarify the relationships between the dimensions of lexical competence considering them as continua and to operationalize lexical development along these dimensions or continua.

3.3.2. Word association studies

In linguistics, it is regular practice to classify words not only on the basis of their meanings, but also on the basis of their co-occurrence with other words. Thus, this co-occurrence encloses a complex relation between lexical items, which is a phenomenon perceived by language users. When facing a given word, speakers are able to retrieve from their lexical mind-storage a varied set of words that may relate with the former one that triggered this inner process. This mental relation has been labeled 'word association' and it has become an important subject matter in the field of lexical knowledge studies.

Word association studies focus on the processes involved in word association and were developed in the 1970s. Their aim is to elucidate the sequence of ideas in thought, thus they have contributed to the study of conceptual understanding. In addition, Vasiljevic (2008) asserts that their most significant implications are related to: (1) establishment of a socio-cultural perspective, (2) analysis of the mental lexicon and L2 proficiency, and (3) assessment of depth or quality of word knowledge.

Similarly, word association studies have developed means of measuring lexical knowledge through the creation of tests that provide an insight into what happens in a speaker's mental lexicon. Thus, these tests are relevant because they present a basis for studies of the word association of language learners. Word association tests have been used to examine how people acquire, organize and process lexical knowledge in L2. Moreover, the data obtained from word association studies can be used to enquire into the development of vocabulary depth, productive vocabulary skills and lexical organization, which is the case of the present study.

Word associations have had implications for different research areas, e.g. the study of memory, child language acquisition, and bilingualism (Meara 2009: xi). Regarding the second area of research, child language acquisition, it has been postulated that when children acquire their L1, firstly, they produce syntagmatic associations, and as they become older they are more likely to produce paradigmatic associations; this is what has been called 'syntagmatic-paradigmatic shift' (Entwisle

1966). Some other researchers (Politzer 1978, Söderman 1989) suggest that a similar phenomenon –a shift- happens in L2 learners.

Word association tests have been explored as elicitation tools in the belief that they reflect fundamental characteristics of the relations between words in the mental lexicon (Zareva 2007, Fitzpatrick 2007). The word association test was first developed by Sir Francis Galton and later modified by Wilhelm Wundt near the end of the nineteenth century (Stevens 1994). It was initially used as a psychological tool to study the subconscious mind and recently used by psycholinguists to explore the mental lexicon. Word association tests may have different formats, i.e. the aural-oral method, the aural-written method, the written-oral method and the written-written method, in which both the prompt words and the responses are provided in different modes. However, it is important to highlight the idea that the underlying principle is the same: stimulus words are presented to the subject, either verbally or in written form, and they are required to respond with the first word or words that come to their minds. The resulting word association is thought to mirror the words are stored and linked in people's mental lexicons; in addition, the association would assess some features of the depth of lexical knowledge dimension. According to Zorana Vasiljevic (2008: 1):

> "The relationship between the stimuli and the responses can be analyzed quantitatively or qualitatively. Quantitative measures such as the number of associative responses and their strength and consistency are concerned with the degree of organization of the associative response domain. Qualitative measures examine the nature of the relationship between stimulus words and responses."

As well, the author states that the development of word association tests is based on principles and laws underlying verbal association such as contiguity, contrast and similarity as well as frequency of words, being analyzed in a stimulus-response context. Furthermore, they are widely used to gather information

concerning the organization of the mental lexicon and the cognitive abilities of individual subjects.

3.3.3 Recent studies on word association

1) Comparing the L1 and L2 mental lexicon: a depth of individual word knowledge model. Wolter, B. (2001)

According to Wolter (2001), researchers have generally supported the notion that the L2 mental lexicon is in many ways different from the L1 mental lexicon. Channell (1990: 29) states that "evidence that the L2 user's mental lexicon of a given learner resembles the L1 user's mental lexicon is sparse". Similarly, Meara (1982, 1984) claims that "there are good reasons for believing that there might be significant differences between the lexicon of a learner and that of a native speaker" (1984: 231). In Meara's studies, he states that: (1) the connections between words in the second language learner's mental lexicon are less stable than the connections of native speakers, (2) phonology appears to play a much more prominent organizing role in the L2 mental lexicon than it does for native speakers, and (3) the semantic links between words tend to differ in a systematic way from those of native speakers.

The study carried out by Wolter (2001: 42) intends to confirm or refute two separate but closely related hypotheses:

1. The L2 mental lexicon of a non-native speaker is structurally similar to the L1 mental lexicon of a native speaker.
2. Depth of word knowledge (i.e. how well a word is known) is a key component for determining the degree of integration for the individual words that make up the structure of both the L1 and the L2 mental lexicon.

Traditionally, three types of responses have been considered in word association studies: paradigmatic, syntagmatic and phonological or "clang"

responses. Paradigmatic responses are words from the same word class as the prompt word. In turn, syntagmatic responses bear a sequential or collocational relationship to the prompt word. Clang responses are defined as responses that resemble the prompt word only phonologically, bearing no semantic connection.

In the studies done by Brown and Berkom (1960), Ervin (1961) and others, results show that the groups of older children produced a higher proportion of paradigmatic responses than the groups of younger children. Clang responses, on the other hand, were shown to diminish with age. The underlying assumption behind this phenomenon is that this shift in response type is related to some type of lexical or cognitive development. The phenomenon then came to be known as the syntagmatic-paradigmatic shift, or the developmental shift in response type. It is believed to occur for all words in a particular word class across the mental lexicon.

Support for a structurally similar L1 and L2 mental lexicon comes from research into response types for English as a second language (ESL) learners. Piper and Leicester (1980) found a significant difference in the mean proportion of paradigmatic responses when comparing a group of native English speakers, a group of advanced Japanese ESL learners, and a group of Japanese beginner English learners. The results suggested that native speakers produced more paradigmatic responses to prompt words of the verb and adjective types than the advanced learners, who had more paradigmatic responses than the beginner group. There was little difference between the three groups with respect to nouns, a finding that indicates that ESL learners, like native speaker children, demonstrate a shift in response type in an early stage than other word classes.

Söderman (1993) found that the mean number of paradigmatic responses was positively related to proficiency. In addition, the mean number of clang responses tended to decrease with proficiency. In a second study, Söderman (1993) compared highly proficient non-native speakers to a group of native speakers using low and high frequency adjectives as prompt words. The results showed that although native speakers did produce a higher number of paradigmatic responses in both groups of prompt words, in neither case were the differences significant, and both groups produced an equal number of “unusual” responses (clang, and others).

It has been a long-standing practice for researchers using word association tests for purposes of investigating the mental lexicon to use words that are rather common. This represents a drawback when trying to make an accurate assessment, because the words are presumably well-known. The mental lexicon model that can be derived from such a test is, therefore, limited. Extrapolating such results to include the thousands and thousands of words that make up the mental lexicon of a normal native speaker is tenuous at best. It is here that the inclusion of lower-frequency words can offer greater insight into the functioning of the L2 mental lexicon. Stolz and Tiffany (1972) investigated how a group of native speakers would respond to low-frequency words. The results showed a number of non-nativelike responses to the prompt words on the low-frequency list, including clang responses, responses that seemed to have originated from a word resembling the prompt word only phonologically, and a much higher proportion of words that were simply unclassifiable.

To summarize the evidence for a structurally similar L1 and L2 lexicon, there are three patterns that must be considered:

1. Both native speakers of English and L2 learners demonstrate syntagmatic-paradigmatic shifts in responses.
2. Both native speakers of English (when presented with low-frequency prompt words) and learners of various levels of proficiency produce clang responses, mediated responses, and responses that seem completely unrelated to the prompt word.
3. A large diversity of responses can be found in the data of word association tests collected for L2 learners. NS adults (again when presented with low-frequency prompt words), and NS children.

(Wolter 2001: 45)

One of the factors that have been thought to account for how words are organized in both the L1 and L2 mental lexicon is word frequency. However, it seems that word frequency alone is not the most plausible explanation, given that the ratings are quite arbitrary; they have limited value in helping us to predict which

words are known by a particular individual. Thus, the ability of word-frequency rating to describe a psycholinguistic phenomenon like the structure of mental lexicon is limited.

Another possible explanation is language proficiency; it would actually be surprising if proficiency were unrelated to response patterns. However, it cannot account for the fact that NS adults tend to produce non-nativelike responses to low frequency prompt words. Correlation between a measure on proficiency and stereotypy of responses has failed to show any significant relationship. There seems to be an underlying factor that is more capable of accounting for patterns of response types. This underlying factor seems to be the depth of individual word knowledge (DIWK). A DIWK model deals with the connections in both the L1 and the L2 mental lexicon as conditioned not by language proficiency or word frequency per se, but by how well particular words are known to a given speaker. There are three aspects of DIWK that need further clarification:

- First, at any given time, a learner's mental lexicon will probably look different than that of most native speakers, as even advanced learners have a smaller stock of words in their L2 mental lexicon than most native speakers. Besides, the mental lexicon of all speakers is unstable, many words are known to varying degrees.
- Second, the mental lexicon has traditionally been viewed from a holistic perspective by looking at patterns of response across different sections of the population. By doing this, the mental lexicon can be seen as a fixed structure into which forms are fitted, and therefore, one is dealing with the connections between the words rather than preexisting and overarching structures containing those words.
- Third, every word in the mind does not bear the same status. This concept is part of the notion that the receptive vocabulary of a speaker of any language is larger than his productive vocabulary, and it is also central to the model of the mental lexicon being proposed here.

(Wolter 2001: 46-47)

Considering all these conditions, it seems quite possible that every word in the mental lexicon is acquired individually, and undergoes developmental shifts separately from other words in the mental lexicon. It follows that the mental lexicon can be viewed as having a core vocabulary that contains the well-known words, and various peripheral layers of vocabulary containing words that are known to different degrees. In this model, the strength of connections is defined by how well a word is known, its proximity to the core vocabulary. Therefore, paradigmatic responses would be formed between words within the inner circles, syntagmatic connections are slightly further out, and phonological connections are located at the periphery. The closer to the center, the stronger the connections are.

A model like this could account for the syntagmatic-paradigmatic shift for all ages of native speakers and FL learners, the presence of phonological responses as well as the differences in the responses found in different samples of data. The advantage of the DIWK model lies in the ability to deal with incongruous data between native speakers and non-native speakers, responses to high and low frequency prompt words, and even the differences between NS children and adults.

The real interest in DIWK lies in the subconscious connections revealed between the words forming the whole mental lexicon, and the implications these connections would have in helping to determine a developmental model capable of accounting for the process by which words are integrated into the mental lexicon.

In order to classify the responses obtained in his research, Wolter (2001) used a well-known type of categorization which involves the following categories: (1) paradigmatic category, used for a word which belongs to the same word class as the prompt word; (2) syntagmatic category. This includes (a) words belonging to different word classes from the prompt word which show some kind of semantic or syntactic relevance to the prompt word, and (b) words from the same word class that show a sequential or an affective relation to the prompt word, provided the relation is overtly clear; (3) clang-other category refers to responses that resemble the prompt word only phonologically and resemble those that are simply a different

form of the prompt word; (4) no response category. This is used in the case of participants who could not provide a reply to the prompt word.

As regards Depth of Individual Word Knowledge, this study used a Depth of Individual Word Knowledge Test (DWIK test) to determine how well each of the prompt words was known to each of the subjects. Therefore, DWIK was assessed using the Vocabulary Knowledge Scale (VKS) as developed by Wesche and Paribakht (1996) a combination of self-reported and demonstrated knowledge (Wesche and Paribakht 1996: 30) and which can provide DWIK scores on a scale of 1-5 which is, again, another type of nominal classification that is not representative of any particular interval value.

In order to test the two hypotheses, the data were analyzed in two ways. The first hypothesis was tested by comparing patterns of responses between groups for each VKS category. To test the second one, that depth of word knowledge is a key factor in determining the structure of both the L1 and L2 mental lexicons, the mean proportion of response types was assessed in relation to the five categories derived from the five possible scores on the VKS test. With respect to the results of the study, Wolter (2001) points out that overall pattern of responses were not of direct relevance to the hypotheses. As would be expected, based on the results of past research, the NS group showed a tendency to produce a greater proportion of paradigmatic responses and a comparatively smaller proportion of clang-other responses. However, the NS group also produced a higher proportion of syntagmatic responses than did the group of NNS.

In terms of how similar the L1 and the L2 mental lexicons are structured, the results are somewhat mixed. According to the author, statistical analyzes revealed that both groups did demonstrate a highly significant tendency to respond in accordance with patterns determined by the VKS scores. However, there seemed to be some deviation between the two groups, particularly when the prompt words were well known. Therefore, the two groups did not produce data to support the notion that the L1 and the L2 mental lexicon are structurally similar in this case.

Regarding the patterns of responses for the VKS 1 and VKS 2 categories, there is a good deal of similarity between both groups, in that no statistically

significant difference was detected between the groups for either of these categories. In this light, it would seem that words that are not well known by non-native and native speakers tend to generate a lot of childlike or, as has been suggested in this study, non-nativelike responses. Although this is not surprising, it does give insights into the seemingly loosely structured model of the L2 mental lexicon described in previous research.

In reference to a syntagmatic-paradigmatic shift in relation to word knowledge, Söderman (1993 in Wolter 2001: 62) suggests that "a syntagmatic response is indicative of a good deal of lexical knowledge, which goes beyond simply knowing the meaning of a word, and should be regarded as indicative of a lower degree of lexical knowledge regarding a particular word."

In general terms, lexical knowledge studies tend to concentrate on the increase of paradigmatic responses rather than in the change of the number of syntagmatic ones, thus paradigmatic responses have been related to better more native-like proficiency. Ervin (1961) presents a different perspective in the assessment of word association tests, highlighting the fact that the increase of paradigmatic responses is not inversely proportional to the lowering in the syntagmatic responses, but to the disappearance of clang or nonsensical responses.

The syntagmatic-paradigmatic shift continues to be quite vague and imprecise; therefore, researchers have a preference for a shift from semantically meaningless responses to meaningful ones, implying an increase in both paradigmatic and syntagmatic responses. This new perspective derives from the results of certain native speakers who had a greater tendency to produce syntagmatic responses than paradigmatic ones. Either a syntagmatic or a paradigmatic dominant mental lexicon is proof of depth of word knowledge, and neither native speakers nor non-native speakers should be judged as more or less proficient according to the type of responses.

Furthermore, the difference in responses can be attributed to a mixture of depth and breadth of word knowledge, since there are studies which affirm that the tendency of the L1 mental lexicon to structure the L2 mental lexicon diminishes in relation to the improvement of proficiency. However, there is also the case of highly

competent L2 learners whose mental lexicon is still decidedly influenced by L1 structure; a fact that should not be ignored or underestimated. This idea is based on the fact that the studies in relation to it were found in depth *and* breadth of word knowledge, so that, when presented with a prompt word a native speaker has a propensity to produce paradigmatic responses, for example, synonyms, for the reason that the range and availability of possible answers is wider than in the case of a non-native speaker. This explains the variety of responses to the same prompt word by a group of native speakers.

In the context of a single-response test, there will be a number of possible responses competing, either paradigmatic or syntagmatic, even clang responses; in native speakers this process takes place subconsciously in a short period of time, and there will be an inclination to paradigmatic responses. Thus, a native speaker manages a broader variety of these types of responses. This tendency is not a proof of higher proficiency, but of a more extensive store of words. So, when a non-native speaker of high proficiency, or a native speaker, has more paradigmatic responses, it cannot be concluded that this is due to a higher lexical level of development, but to the simple fact of a larger mental lexicon.

The second hypothesis formulated by Wolter (2001: 42), "depth of word knowledge is related to patterns of response type for both native and non-native", was supported by the results of the study. This allowed Wolter to cautiously propose a developmental model for the mental lexicon; "it would seem that the words in the mental lexicon form connections in a somewhat systematic fashion as they come to be better understood." (p 65)

The process of word knowledge should be considered from now on as a type of "movement" from a state in which phonological and other non-semantic links predominate to a state in which paradigmatic and/or syntagmatic connections become predominant. This movement will not neglect the two first mentioned states, but it will refer to the change of the dominant state.

The importance of this study remains in the clarification of the L2 mental lexicon, which is not as randomly and loosely structured as it was considered to be in the past. Additionally, in testing non-native speakers, it should be noted that the

L2 mental lexicon is smaller than or not as productive as the native lexicon. Taking this into account, research on word association cannot be extrapolated on in order to develop a comprehensive model of L2 mental lexicon. In future studies, word association tests should aim at examining the depth of individual word knowledge.

2) Word class influence on word association test results. Nissen and Henriksen 2006

In the area of word class influence on word association test results, Nissen and Henriksen's (2006) findings and proposals concerning this issue are described below. The first assumption made by the authors is that "word associations reflect fundamental characteristics of the relations between words in the mental lexicon" (p. 389). L1 and L2 word association tests have described and explored lexical and cognitive development of both native and non-native speakers. In her studies on large-scale L1 associations, Entwisle (1966) noted that there was a syntagmatic-paradigmatic shift in L1, believed to occur between the ages of 6 to 8. This phenomenon was defined as a function of language exposure and knowledge of the individual word, since acquisition and consolidation of words in the mental lexicon are manifested through the change of associative behavior from clang responses → syntagmatic responses → paradigmatic responses → late syntagmatic responses (1966: 74).

In addition, recent studies (Söderman 1993, Namei 2004) show that this shift can also be identified in the associations of non-native speakers. This finding refutes Meara's proposal (1984) that L1 and L2 mental lexicons are different from each other. According to Namei (2004: 382), the shift in L1 and L2 is not an organizational characteristic of the whole mental lexicon but a developmental feature of every individual word, indicating increased lexical knowledge.

Nissen and Henriksen (2006) state that the influence of word class of the prompt words in word associations tests as well as the degree of knowledge of the individual word are of major importance in terms of associative behavior. Although the issue of word class influence on test results has not been thoroughly explored in

the discussion of L2 associative behavior, Clark (1993) and Källkvist (1999) note that response types and associative behavior seem to be affected by word class, which points to the fact that word class is an influential factor in language acquisition and in the integration of words in the mental lexicon.

The hypotheses formulated by Nissen and Henriksen (2006) are: "(1) In the L1 word association test, the proportion of *paradigmatic* responses will be larger than the proportion of syntagmatic responses. (2) In the L2 test, the proportion of *syntagmatic* responses will be larger than the proportion of paradigmatic responses. (3) *Nouns* will elicit more paradigmatic responses than verbs and adjectives in both tests, i.e. the distribution of responses types will *differ according to the word class* of the prompt word in the L1 test as well as in the L2 test." (p. 391-392).

Other factors that may affect the integration of words in the mental lexicon and thus influence response patterns in word association tests are:

- knowledge of the individual word (Söderman 1993, Wolter 2001)
- word frequency (Söderman 1993, Wolter 2001)
- whether or not the word denotes concrete or abstract matter (Kolers 1963, Jin 1990, Nelson and Schreiber 1992, de Groot 1989, 1993)
- whether or not the word generates a mental image, i.e. its imageability (de Groot 1989)
- whether or not the L2 word in question is a close cognate of an L1 word (de Groot 1993). (p.392).

The dependent variable controlled by Nissen and Henriksen (2006) was response types, while the independent ones were word class of the prompt word, and language, i.e. Danish (L1) and English (L2).

The authors point out that little is known about the influence of test mode on test results. Nevertheless, they explain why they used a certain method and why others were left aside. Cramer (1968) claims that orally presented prompt words will lead to a higher proportion of paradigmatic responses than prompt words

presented in visual form. In turn, Clark (in Greidanus and Nienhus 2001: 570) notes that syntagmatic responses are influenced by the direction of writing (from left to right). Thus, written responses will favor syntagmatic answers. Besides, Nissen and Henriksen refer to the need of preventing chaining of responses, i.e. triggering associations from previous prompt words so they suggest that answers should be written in columns and not in contiguous lines. Yet chaining may still occur.

When referring to the list of prompt words, the authors report that they applied the following criteria: firstly, they used Nation's *Vocabulary Levels Test* because it allowed them to select a fair number of words from each word class. Secondly, frequency of prompt words was controllable thus minimizing influences on test results. Thirdly, high frequency prompt words were commonly used words, which were likely to be known by L2 participants.

Regarding the three hypotheses of the study, the researchers obtained the following results: the L1 results indicated a predominance of syntagmatic responses over paradigmatic ones, contrary to what was predicted. The second hypothesis was confirmed, since the L2 responses showed a predominance of syntagmatic relationships. In a follow-up study Nissen and Henriksen (2006) asked informants to respond with two words and the findings are reported as follows: "In both the L1 and L2 test we find a relatively constant predominance of syntagmatic responses, a decrease in paradigmatic responses in the case of second response associations, and consequently an increase in other and no responses" (Henriksen and Nissen 2006: 396). Therefore, no major differences occurred between first and second response associations. Concerning the third hypothesis, results demonstrated that word class influenced the informants' word association behavior both in their L1 and L2.

When discussing word class influence on response patterns, Nissen and Henriksen refer to research done in L1 lexical acquisition (Clark1993, Källvist 1999). This influence may make syntagmatic responses in the L1 test predominant. This phenomenon may be explained by the process of acquisition and semantic organization of nouns, verbs and adjectives. At the moment of acquiring the mother tongue, the child learns to denote concrete objects, i.e. nouns, earlier than abstract

words, and these take longer to process. This is also applicable to L2 acquisition. Nouns are supposedly more highly integrated into the mental lexicon than verbs and adjectives because "(a) their meaning is often more clearly defined and less abstract the meaning of verbs and adjectives and therefore easier to process cognitively, (b) nouns have been known to the language user for a longer time than verbs and adjectives and (c) therefore are possibly also integrated into and consolidated in the word web to a higher degree than verbs and adjectives" (Nissen and Henriksen 2006: 402). In addition, knowledge of nouns appears to be crucial in verb and adjective acquisition since verbs and adjectives are related to nouns by involving them in action or providing them with characteristics or properties.

Verbs are more cognitively complex for the child, because (1) their lack of shape, (2) sometimes their meanings overlap, and (3) they are often polysemantic and add meaning from particles attached to them (collocations). In turn, "adjectives are difficult to decode and acquire because they are conceptually abstract, and less well-defined and delimited than nouns" (Nissen and Henriksen 2006: 402).

3) Structure of the second language mental lexicon: how does it compare to native speakers' lexical organization? Zareva 2007

One recent study on word association is the one from Zareva (2007), who presents one of the questions commonly asked in second language (L2) lexical research: "how L2 learners' patterns of lexical organization compare to those of native speakers (NSs)." (Zareva 2007: 123). A big amount of research approaches this question by using word association tests. However, the role of language proficiency of L2 learners' lexical knowledge has not been taken into account, particularly the quantitative and the qualitative patterns of meaning connections. As well, the strength of the relationship between these patterns has not been deeply studied, even though the general idea seems to be that they are interrelated. In order to address these concerns, Zareva (2007) presents some traditional distinctions between qualitative and quantitative patterns of meaning connections in first language word association research; then, the author refers to the application of

word association tests in L2 studies and to some findings concerning L2 learners' vocabulary structure. Finally, she reports her study including native speakers and L2 learners of English, whose results show that the difference between L2 speakers' and native speakers' lexical knowledge organization is quantitative rather than qualitative.

In relation to word association research in L1, Zareva (2007) mentions that there is a big quantity of assumptions which come from the idea that language associative behavior might be revealing of the cognitive processes of human thought. The organization of the word associations has been typically described quantitatively and qualitatively in L1 research. Quantitative measures are used to indicate the characteristics of the organization of the associative domain, taking into account the number of associations. Qualitative measures have been applied to describe the characteristics of the word association domain of language users.

Concerning word association tests in L2 research, Zareva (2007) states that it is possible to distinguish several lines in this field, all of them differing in the way in which L2 association patterns are approached. Moreover, she mentions the fact that word association tests have been interpreted from different perspectives: socio-cultural; from the point of view of language proficiency and associative behavior; in terms of depth of vocabulary knowledge; and the organization of the L2 mental lexicon. In addition, the author points out that these lines constitute a valuable contribution to the understanding of the relation between associative behavior and the factors that influence the organization of L2 users' meaning connections.

With respect to Zareva's (2007) study, one point she discusses is the use of word association tests. She asserts that it ultimately depends on the theoretical perspective from which the data is interpreted. Furthermore, the author postulates that word associations represent the way in which semantic information is structured in memory. Accordingly, as pointed out by Nelson (1977 in Zareva 2007: 142), "the study of word association structure is another approach to the organization of semantic memory, a subject worthy of study on its own terms, without regard to its connection to linguistic or cognitive function". In consequence,

in L2 research, word association tests have often been used to study how L2 learners organize their lexical knowledge and how the structure of their mental lexicons compares to the features of native speakers' lexicons. As another important consideration, Zareva (2007) mentions that her study was designed to probe the qualitative and quantitative features of L2 learners' lexical knowledge as their proficiency increases.

Finally, Zareva (2007) concludes that there are quantitative but not qualitative differences in the structure patterns of lexical knowledge between native and L2 learners of English. The quantitative differences were noticed in the intermediate learners' group of subjects, while qualitatively there was a greater proportion of paradigmatic than syntagmatic associations for familiar words. The author postulates that this phenomenon can be explained on the basis of the subjects' well-developed cognitive skills as well as their familiarity with the words they were exposed to in the test. For future research, Zareva (2007) suggests a more comprehensive examination of word familiarity and the way it influences the development of meaning connections, as well as she points to the impact word features may have in the qualitative and quantitative characteristics of L2 learners' associations.

In sum, the analysis of the word association data generated by advanced and intermediate learners of English revealed quantitative but not qualitative differences in the patterns they develop to structure their lexical knowledge. The quantitative differences were most noticeable in the intermediate learner group, who differed from the other groups in the overall number, stability and diversity of meaning connections among words they were already familiar with. Qualitatively, adult L2 learners, like NS, show a preference for a greater proportion of paradigmatic than syntagmatic connections for familiar words, which is most probably an artifact of their well-developed cognitive skills as well as their word familiarity. In any event, it will be valuable to find out more about the way familiarity influences the development of meaning connections, as well as the way word features, such as lexical class and frequency of occurrence affect the qualitative and the quantitative characteristics of L2 learners' associative domains.

With respect to the proposal concerning the syntagmatic-paradigmatic shift in word knowledge, it has been claimed that when children acquire vocabulary in their L1, at an initial state they produce syntagmatic associations, and when they become older this associations tend to be more paradigmatic. According to some researchers (e.g. Politzer 1978, Söderman 1989), this syntagmatic-paradigmatic shift may also be experienced by L2 learners.

3.3.4. Taxonomy of word association responses applied in the present study

In the present study, responses elicited by means of a word association test will be classified into five categories: paradigmatic, syntagmatic, phonological, other, and no response.

(1) Paradigmatic category. This refers to words which show a clear semantic relation to the prompt word and are substitutable for one another in a well-formed syntactic string regardless their grammatical categories. This connection may be one of the following semantic relations: synonymy (e.g. *small/little*), antonymy (e.g. *buy/sell*), hyponymy, including co-hyponymy (e.g *bitter/sweet/sour*) and hyperonymy (*animal/rabbit*), and meronymy (e.g. *petal/rose*).

(2) Syntagmatic category. This refers to word responses related syntactically and/or sequentially to the prompt word. Thus they can co-occur in grammatically well-formed expressions. They can also be compounds including the prompt word or its derivatives (e.g. *dinner/table, devil/hell*)

(3) Phonological category. This refers to word responses that are not semantically related to the prompt word but only resemble it phonologically (e.g. *mock/cock, limp/pimp*)

(4) Other. This category includes the following type of responses: (a) words without semantic connections to the prompt word; (b) answers in which the subjects express personal attitudes; (c) indefinite pronouns (such as *anything, somebody, something, everybody, etc*.); (d) reflexive pronouns (like *oneself, yourself, himself, etc.*); (e) general pronouns (for instance *people, thing, person, etc.*); (f) exclamations; and (g) responses clearly chained to the previous ones.

(5) No response. This refers to the absence of a reply.

3.4 Methodology

3.4.1 Participants

The subjects were 45 randomly selected university students. Their ages ranged from twenty to twenty-seven. These participants belonged to two different groups: (1) 30 Chilean learners of English as a foreign language and (2) 15 native speakers of English. The non-native speaker group was constituted by learners at two levels of communicative competence, intermediate and advanced. The non-native participants were second and fourth year students from the academic program Licenciatura en Lengua y Literatura Inglesas, offered at the Departamento de Lingüística, Facultad de Filosofia y Humanidades, Universidad de Chile. For the purposes of this study, second-year students were considered 'intermediate' while fourth-year students, 'advanced' learners. The native speaker group was composed by American students: 10 of them were taking different courses at two universities in Santiago, 4 were former exchange students at Universidad de Chile, and now they are continuing their studies in the U.S.A. The other native speaker is also a former exchange student but he returned to the U.S.A. to graduate, and now, he has settled down in Chile and works for a news agency.

3.4.2 Data

3.4.2.1 Data elicitation

The data for the study were elicited by means of the application of the same word association test to both non-native speakers and native speakers of English. The test for the non-native speakers was given in two different sessions, for the intermediate and advanced students, separately. As for the native speakers, half of the tests was given in the same way non-

native speakers took them; the other half received the test via e-mail, answered it, and sent the answer sheet back.

3.4.2.2 Instrument

In the study, the written-written method for the word association test was chosen in that it is assumed to be a better means of accessing the subconscious connections existing in the mind than other competing methods. In addition, another advantage of using this method is that it allows the gathering of a major amount of data in a relatively short period of time.

The word association test applied consists of 40 prompt words chosen from the test designed by Nissen and Henriksen (2006). These applied linguists chose the 90 words used in their test from Nation's Vocabulary Levels Test, Test A (in Schmitt 2000) and Test B (in Nation 2001). These 90 words belong to the 2000 and 3000 word frequency levels. These levels, according to Read (2000: 119), represent "the high-frequency words that all learners need to know in order to function effectively in English". The 40 stimulus words chosen by the research group were those that were thought to occur more frequently. Consequently, it was assumed that these words would probably belong to the 2000 word level. This criterion was adopted in order to reduce the number of clang or no responses by the intermediate learners of English.

Furthermore, in order to avoid any influence from word class on the participants' response patterns, words were chosen taking into account Nissen and Henriksen's (2006) suggestions. Thus, the test consisted of 20 nouns, 10 adjectives and 10 verbs. In addition, words belonging to the same word class were presented in a random order. The participants were asked to produce one response for each prompt word.

The test was preceded by the following written instructions:

"The following test is a word association test.

1. You will see a set of slides with one word each. Each word will be numbered and shown only once.

2. Read the word, and then in the answer sheet write the first word that comes to your mind. Please fill each blank with a SINGLE word.

3. Try to avoid the use of indefinite pronouns like 'anything', 'somebody', 'something' or 'everybody'; reflexive pronouns such as 'oneself', 'yourself', 'himself'; general nouns such as 'people', 'thing', 'person'; proper nouns and compounds.

4. Write the answer in the corresponding blank according to the number given in each slide. The change of each slide will be indicated by a sound.

The following examples followed the instructions:

1) Prompt word: star
   Response: sky
2) Prompt word: walk
   Response: street"

(See word association test in Appendix 7.1)

3.4.2.3 Piloting the word association test

In order to confirm that the design and format of the word association test were adequate for the purposes of the study, 10 prompt words, out of the 40 that were to be included in the test, were chosen for piloting the test with the seminar group members and the research seminar supervisor. The prompt words were displayed in a PowerPoint presentation. Each slide contained one word that was shown for ten seconds. As the format was a written-written one, the responses were produced in writing. The PowerPoint presentation intended to allow the same amount of time to participants to respond to the prompt word.

After administering the pilot test, some modifications were necessary in order to improve the design of the test and the upcoming application. The time assigned to show each slide with a prompt word was lengthened from 10 to 15 seconds. Another adjustment was to add a sound between slides to make the participants aware that the word was about to change. Finally, one last modification concerned the instructions of the test. It was considered advisable to attempt to avoid certain kind of responses such as “person”, “people”, and “somebody”; so these specific instructions were included in the introduction to the test. After the modifications were made, the test was ready to be applied.

3.4.2.4 Test administration

The advanced L2 learner group (fourth year students) was asked to come to a special session in order to give them the test at the faculty. Some of the seminar group members administered the test, using the necessary equipment to project the slides. Instructions to the students were given orally in English. They received an answer sheet with the same instructions, which were included at the beginning of the PowerPoint presentation. After the explanation of the test procedure in English, the presentation began. At the end, the 15 participants present handed in the answers sheets. There were 4 remaining students who gave the test after this session, in the exactly same conditions.

Intermediate L2 learners (second year) took the test after a class. We asked permission to the professor. In the class there were 15 students. The test was taken following the same procedure as for advanced students.

In the case of native speakers, the test was administered differently. The test was sent by e-mail to most of them. On the one hand, the exchange students who were in Chile at the time we began this research were given the test as a home assignment by their Spanish teachers, who kindly cooperated

with the study. Later, the teachers handed in the responses to the research group. In the case of the exchange students who were not in Chile, the test was sent to them by e-mail, attaching the PowerPoint presentation, the answer sheet, and clear instructions. The same procedure was followed in the case of the native speaker who is living in Chile. Their responses were sent a week after the test had been mailed to them.

In cases in which participants were unfamiliar with word association tests or when they still did not understand what they were supposed to do, instructions were given again. Finally, participants were encouraged to respond to as many prompt words as possible.

3.4.3 Data analysis

3.4.3.1 Criteria for data analysis

The following criteria were adopted for the data analysis:

1. Spelling mistakes were not taken into account when analyzing the responses; thus, every response counted as valid regardless their spelling, as long as they resembled closely the target word (e.g. maravillous – marvelous).
2. Some prompt words could belong to two word classes, nouns and verbs. In spite of the fact that in these cases the word class was added to the word in the slides, some participants responded to them either as nouns or as verbs. For the purposes of the analysis, these replies were considered as responses to the word class the participants had chosen.

3.4.3.2 Procedure for data analysis

The following procedure was followed in the data analysis:

1. Digitalization of the responses for better managing. (in one sheet each prompt word with its responses).
2. Digital listing of every response according to the participants' groups: intermediate L2 learners (second year students), advanced L2 learners (fourth year students) and native speakers.
3. Classification of responses into the five categories of the taxonomy, according to their relation to the prompt word: syntagmatic, paradigmatic, phonological, other, and no response.
4. Each response was assigned a letter that identified it as being a paradigmatic response (P), syntagmatic (S), other (O), phonological (Ph) and no response (NR).
5. Classification of paradigmatic responses, according to their semantic relation to the prompt word: synonymy, antonymy, hyponymy (co-hyponymy), meronymy, and hyperonymy. This sub-classification was used to make the data analysis more rigorous.
6. Counting the number of responses belonging to each category produced by each participant group separately.
7. Counting the number of responses belonging to each category produced by the non-native speaker groups and the native speaker group.
8. Calculation of percentages of every response in each group.
9. Drawing graphs to report the results obtained in the data analysis.

The research group members organized the analysis as follows:

At the beginning of the data analysis, all the research group and the research seminar supervisor analyzed responses together in order to adopt certain analysis criteria, detect possible problems in the classification

scheme, and to make decisions on the basis of a consensus between the members of the group. It was decided that the participant group that should be analyzed first was the one composed by native speakers. This procedure was adopted to facilitate the subsequent analysis of the non-native speakers' responses. Then, the non-native responses from the advanced learners followed, to later finish with the non-native responses from the intermediate learners.

Later on, the research group was subdivided into three groups that were assigned a certain number of tests to analyze. Then the tests were exchanged among the groups in order to promote homogeneity of criteria and consistency of the procedure. Thus, each test was analyzed twice with the purpose of reaching the aimed consensus. In addition, the analyzes were checked by all the members of the research group and the research supervisor.

4. Discussion of results

In this section, the results obtained in the study will be described and discussed. The discussion below follows the order of the research sub-questions, which were embedded within the macro-question, "What are the quantitative and qualitative differences and similarities between native and non-native speakers' word associations?" (Section 3.2)

a. Which type of word association (i.e. paradigmatic, syntagmatic, phonological or other) shows the most significant difference between native and non-native speakers?
b. Which type of word association (i.e. paradigmatic, syntagmatic, phonological or other) shows the most significant similarity between native and non-native speakers?

As these research sub-questions aim at the type of word association responses, both will be answered together.

In relation to question (a), Figure 1 shows the most significant difference between native and non-native participants' (intermediate and advanced) responses which lies in the category of paradigmatic associations. As expected on the basis of the results of previous studies, the proportion of paradigmatic native speakers' responses was higher than the one of the non-native group (native speakers 36% vs. non-native speakers 25.83%). This result may be linked to the proposal of a syntagmatic- paradigmatic shift which would occur as proficiency in the L1 and L2 increases.

With respect to question (b), there was a similarity in the frequency of occurrence of the category of syntagmatic responses in native and non-native speakers, i.e. more than half of the answers showed a syntagmatic relation to the prompt word (native speakers 58.50%, non-native speakers 58.25%). Thus, the proportion is almost alike. It should be stated that this finding is unexpected when compared to results in similar studies. This similarity could be explained on the basis of the lack of stability in terms of the results of WA tests reported in several previous studies. Another possible explanation is Entwisle's (1966 in Nissen and

Henriksen 2006) late syntagmatic notion, which is characteristic of adults' associations and may be an indicator of lexical knowledge development. Thus, the amount of syntagmatic responses might reflect the enrichment of word associations in advanced L2 learners.

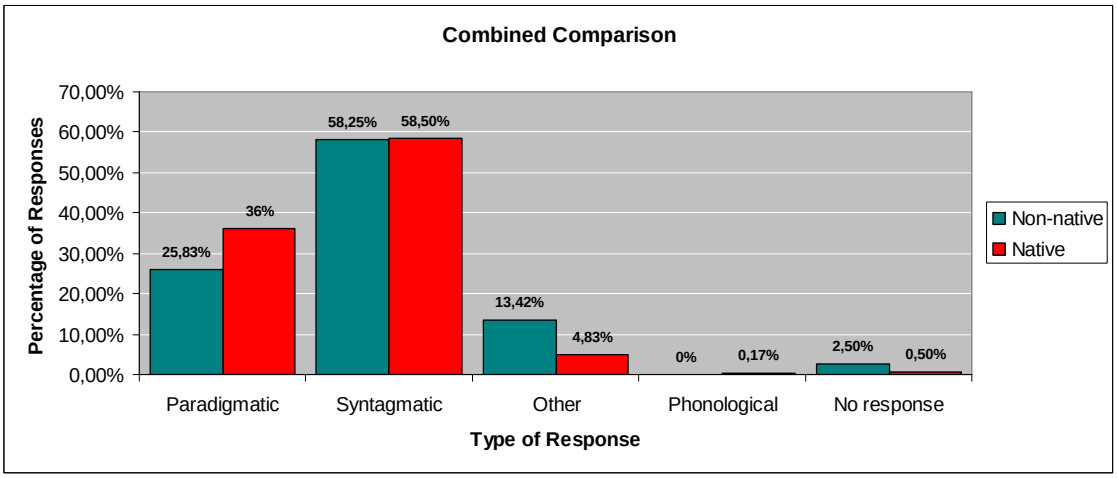

Figure1. Mean proportion of native and non-native associations

c. Which type of native speakers' word association has the highest frequency of occurrence?
d. Which type of non-native speakers' word association has the highest frequency of occurrence?

As these research sub-questions aim at the highest frequency of occurrence of word association responses, both will be answered together.

Native speakers, as shown in Figure 2, had a higher percentage of syntagmatic responses than paradigmatic ones. However, the proportion of paradigmatic responses was higher compared to the frequency of occurrence of the non-native speakers groups (syntagmatic 58.5% vs. paradigmatic 36%).

The non-native speakers' answers in Figure 3, presented a noticeable difference between the two types of responses (paradigmatic 25.83% vs. syntagmatic 58.25%), this can be accounted for by the syntagmatic-paradigmatic shift occurring in L2 learners.

The fact that there was a larger amount of syntagmatic responses in the non-native speakers group could perhaps be explained by the possible organization of the mental lexicon. It may be suggested that the mental lexicon is organized in a 'horizontal-sequential' (e.g. syntactic and grammatical relations) rather than 'vertical-selective structure' (e.g. lexical sense relations), and this would affect the way in which mental relations between words are constructed. It may be said, then that at an initial stage the mental lexicon is organized horizontally, and as the proficiency of the learners and speakers improves, the vertical-selective structure may be developed without modifying or suppressing the horizontal one, already acquired or learnt. With this development, the mental lexicon evolves to a higher level, i.e. a network of words. In turn, the paradigmatic association is more complex, hence the scope of possible word associations is limited when compared to the syntagmatic relations, which seem to be easier for the subjects.

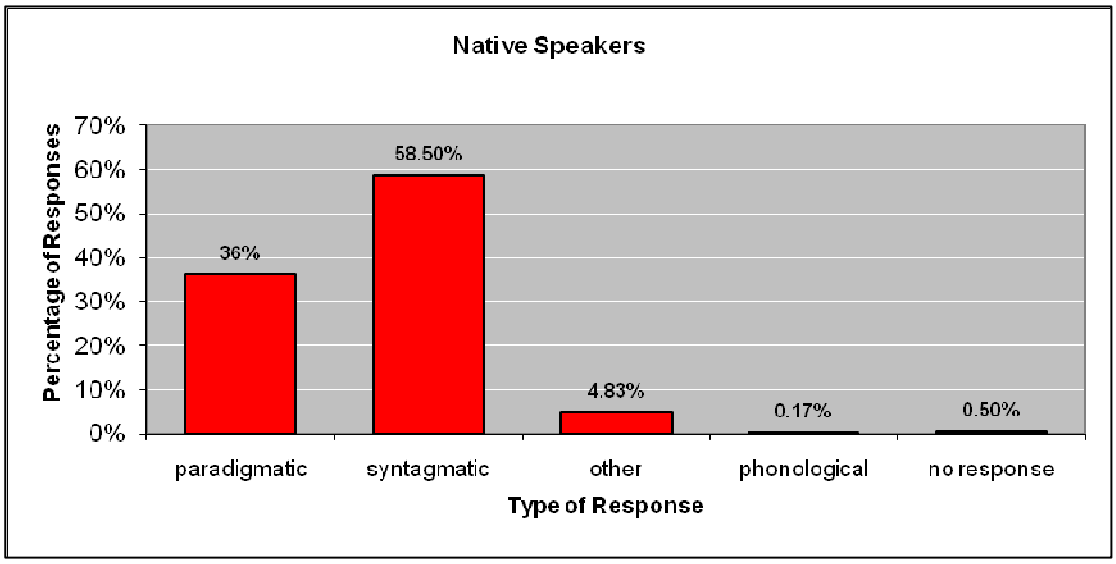

Figure2. Native speakers' responses

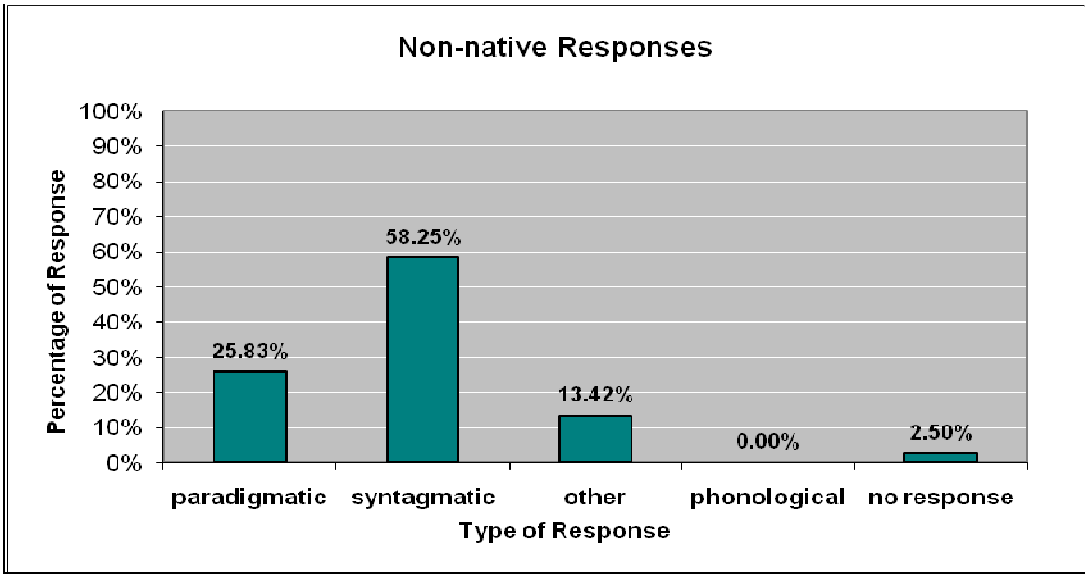

Figure 3. Non-native speakers' responses

In addition to what has been discussed above, the higher proportion of syntagmatic responses when compared to paradigmatic ones in the case of L2 learners could have occurred because of the teaching strategies used in English Language classes. When new lexical items are taught, they are generally presented in chunks, including collocational patterns.

Besides, it is important to point out the fact that the test design may have led to the elicitation of more syntagmatic responses rather than paradigmatic ones. Since it was a test consisting of only one prompt word and one association, more syntagmatic/sequential responses may have been triggered. Had the test been different, consisting, for example, of more than one association per prompt word, results would have been different.

e. Will advanced non-native speakers' associations be more native-like than those produced by intermediate non-native speakers because of their higher proficiency level in the target language? In other words, how do the intermediate and advanced learners compare?

As can be seen in figures 4, 5 and 6, the proportion of syntagmatic responses of both non-native speakers groups is the largest compared to the other types of responses obtained. In the intermediate learners group, the proportion of syntagmatic responses is 57.33% while the paradigmatic one is 20.83%. In turn, the advanced non-native learners' proportion of syntagmatic associations is 59.17% while the paradigmatic association proportion corresponds to 30.83% of the total. Therefore, as expected, the learners that resembled native speakers the most was the advanced group.

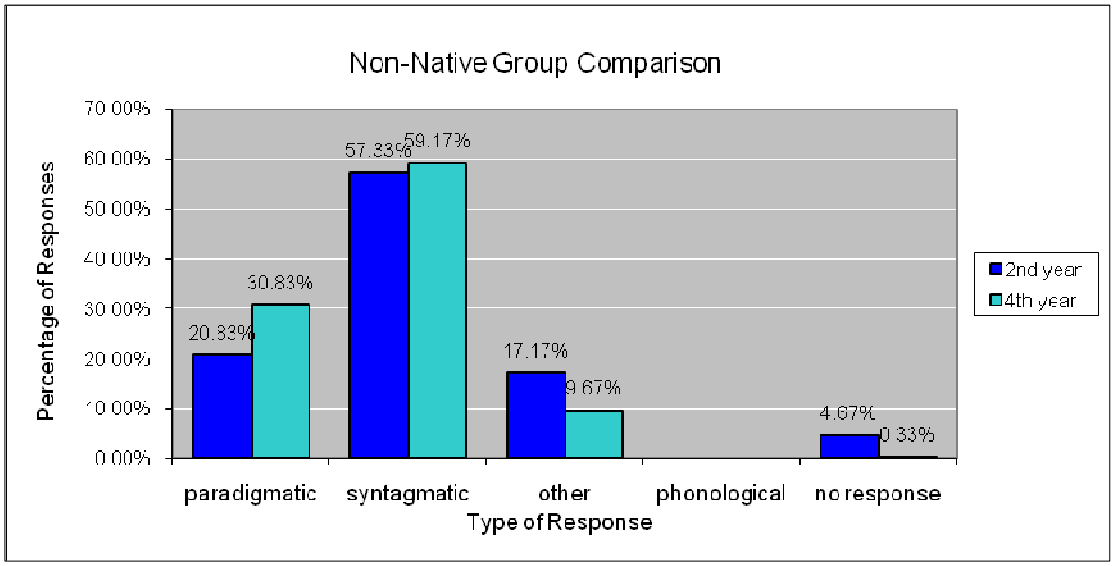

Figure 4. Non-native speakers' responses comparison.

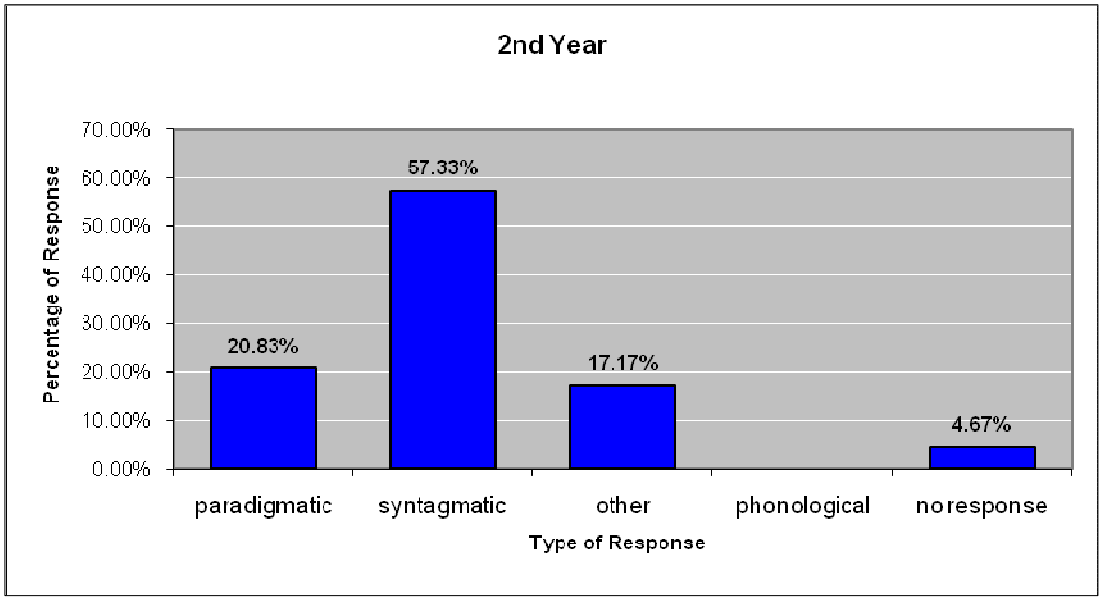

Figure 5. Intermediate non-native speakers' responses

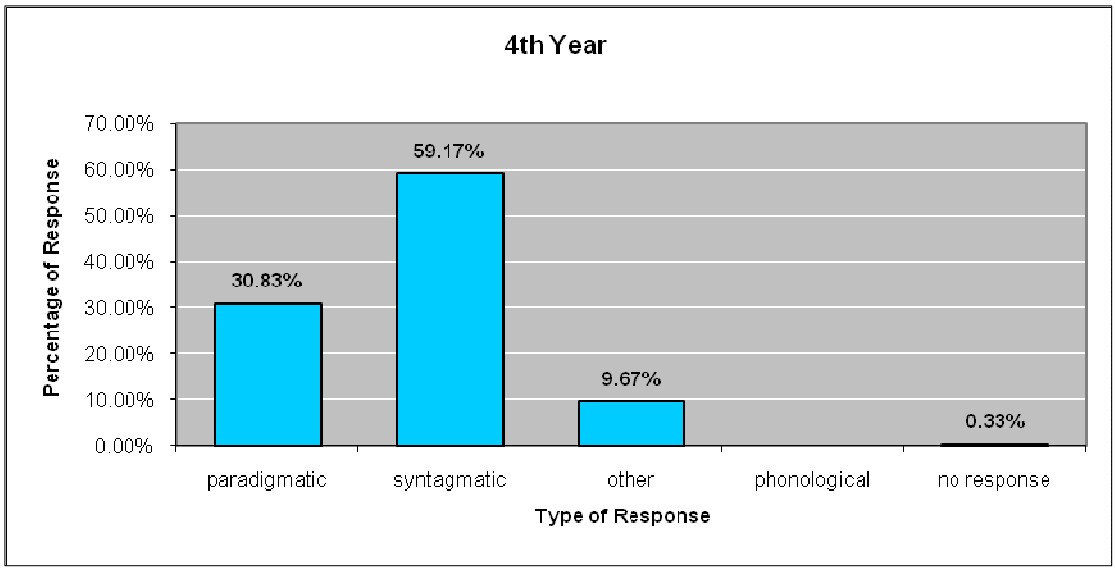

Figure 6. Advanced non-native speakers' responses

As stated above, the advanced non-native speakers showed a salient tendency to produce responses that can be regarded as 'native-like'. This finding can be attributed to the proficiency level variable in language learning. This fact suggests the strong influence of the level of competence reached through the years

studying the foreign language at university. If we compare advanced non-native speakers' responses to the ones given by intermediate non-native speakers, the advanced group responses were closer to native responses than the intermediate ones. The reason why there is such a difference between them is the larger quantity of input exposure experienced during the third year of the academic program the participants were taking. The third year curriculum includes a larger number of courses whose contents are more linguistically demanding compared to those in previous years. Taking these variables into consideration, it is reasonable to assume that the third year of the academic program constitutes a crucial period in terms of foreign or second language acquisition.

5. Conclusions

The framework used in this study was specific and, at the same time, comprehensive, covering research work from applied linguists with a long-standing tradition in word knowledge studies. In addition, the study reviewed current research on word associations in order to become acquainted with the latest findings and proposals about this area of enquiry.

From this study on one aspect of depth of lexical knowledge, word associations, the following conclusions can be drawn in relation to L2 learners'. First of all, the theoretical framework was useful for the purpose of analyzing L2 word associations produced by learners at two proficiency levels. It can be claimed that through the word association analysis it is possible to gain an insight into the processes that might occur in the L2 mental lexicon concerning the development of vocabulary knowledge. Thus, it is possible to assume that the semantic network is enhanced as learning evolves to more complex stages, thus configuring a more intricate net of word associations at both paradigmatic and syntagmatic levels.

Second, although not expected, the L1 and L2 participants in the study presented a tendency to produce a larger quantity of syntagmatic responses over paradigmatic ones. This behavior could be explained in terms of the late syntagmatic theory regarding lexical knowledge development. According to Entiwstle (1966 in Nissen and Henriksen 2006), late syntagmatic responses are characteristic of adult associations. They involve an enlargement in meaning due to a richer and more flexible interpretation of a concept; thus, syntagmatic responses indicate lexical knowledge development. Other researchers have claimed that such a process occurs in child language acquisition. Nevertheless, this process was also observable in the native and non- native speakers in the study.

With regard to the differences between native speakers and non-native speakers in terms of word associations, the study led to the conclusion that the higher the level of proficiency, the more native-like the responses on the part of the L2 learners. In fact, when comparing L2 intermediate learners' and advanced learners' word associations, their responses were considerably different with respect to the elicitation of syntagmatic and paradigmatic responses. It was observed that advanced L2 learners' word associations are

the ones that more closely resemble those produced by native speakers. A plausible explanation of this difference is the big amount of input that subjects are exposed to in the third year of the Licenciatura en Lengua y Literatura Inglesa academic program offered at Universidad de Chile. This exposure leads to the assumption that this period is critical in terms of L2 acquisition and deepening of lexical knowledge.

Another important finding was the observation of the occurrence of a syntagmatic-paradigmatic shift in intermediate and advanced L2 learners, since the number of both syntagmatic and paradigmatic responses increased from the intermediate to the advanced levels.

Moreover, the study drew attention to the importance of both paradigmatic and syntagmatic associations, as it can be claimed that both reflect the organization of the mental lexicon. Therefore, the appropriate performance in a foreign language is not only given by the fact of knowing a certain amount of words but also by having access to them in order to use them properly in order to communicate efficiently in that language. In addition, paradigmatic associations reflect the availability of words for speakers to select them from their mental repertoire, while syntagmatic associations reflect the appropriate selection and sequential word ordering in a certain context to bring successful communication about.

From an evaluative perspective, it is relevant to address the characteristics of the test applied in the study, which will be discussed in terms of its limitations and potentialities, along with some suggestions for future research in the field. Firstly, concerning the limitations of the study, some problems were faced regarding the test format, administration, and data analysis. Regarding the test format, it might have influenced, to a certain extent, the occurrence of syntagmatic responses, since it might have facilitated the sequential association of words as commented in the previous section of this report. Concerning the test, an interview with the subjects after the administration of the test would have been necessary in order to establish the reasons why the subjects came to their responses. This interview might have provided a better understanding of the subjects' word associations. With respect to this drawback, due to time restrictions, the group could not hold an interview with the participants. It is suggested that this should be done in further research to enable researchers to make a more accurate data analysis.

Regarding the limitations brought about by the instrument, during the data analysis it became evident that there were difficulties with the choice of some prompt words (e.g. marble, either a noun or an adjective). Some strategy should be used to make subjects avoid word class ambiguity. Due to this ambiguity, some difficulties were faced during the analysis of the data, such as the classification of responses into paradigmatic or syntagmatic ones.

In relation to the potentialities of this study, the test design allowed the group to easily analyze the subjects' responses, due to its written-written format. Also, the test was given in a relatively short period of time, no more than 15 minutes. Furthermore, it was possible to send the test via e-mail, which facilitated its administration. Besides, subjects were in a comfortable environment, under no pressure or stress.

Concerning the data analysis, participants' responses to each prompt word were grouped in a new sheet (one page for each prompt word and its responses), and they were subsequently analyzed. Therefore, it was possible to have a wide view of the responses, not being influenced by the answers of other prompt words. The prompt words were specifically selected after an exhaustive search and analysis of different authors' word lists. The word choice criteria were their frequency of occurrence and their meanings. In this way, the occurrence of the 'no response' category was reduced, especially in the case of intermediate L2 learners. The low frequency of occurrence of 'phonological associations' and 'no responses' validates the adequacy of the test design. This may constitute one of the main achievements of the present study.

Finally, the following considerations could lead to improvements in future research studies in the field. The number of participants should be larger in order to be able to generalize results about the different groups of subjects and their responses to word associations. In addition, regarding the choice of prompt words for the word association test, care should be taken to omit words belonging to different word classes, and thus, lead to a more rigorous data analysis. Finally, there is a need for a comprehensive word association taxonomy whose categories should be defined as carefully and as detailed as possible in order to avoid ambiguity when applying it to the analysis of responses produced by participants in word association studies.

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7. Appendices

7.1 Appendix A. Word Association Test

This is a word association test

1.- You will see a set of slides with one word each.

Each word will be numbered and shown only once.

2.- Read the word, and then in the answer sheet write the first word that comes to your mind. Please fill each blank with a <u>SINGLE</u> word.

3. Please avoid the use of <u>indefinite pronouns</u> like *anything, somebody, something* **or** *everybody;* **<u>reflexive pronouns</u> such as** *oneself, yourself, himself;* **<u>general nouns</u> such as** *people, thing, person;* **and <u>proper nouns.</u>**

4.- Write the answer in the corresponding blank according to the number of the word in each slide. The change of each slide will be indicated by a sound.

Example:

1) **Star**

1) *sky*

2) Walk

2) *street*

Ready?

Let’s begin

1) Alone

2)Condemn

3) Marble

4) Dust

5) Climb

(noun)

6) Temperature

7)Brave

8) Injure

9) Naked

10) Wine

11) Mirror

12) Solution

13) Happy

14) Slow

15) Assist

16) Bull

17) Empty

18) Improve

19) Noise

20) Candle

21) Betray

22) Muscle

23) Climate

24) Bitter

25) Factory

26) Melt

27) Blanket

28)Magnificent

29) Charity

30) Motor

31) Dignity

32) Illustrate

33) Birth

34) Endure

35) Jump

(noun)

36) Small

37) Pride

38) Bake

39) Boot

40) Striking

7.2 Answer Sheet

ANSWER SHEET

Name:

1._____	11._____	21._____	31._____
2._____	12._____	22._____	32._____
3._____	13._____	23._____	33._____
4._____	14._____	24._____	34._____
5._____	15._____	25._____	35._____
6._____	16._____	26._____	36._____
7._____	17._____	27._____	37._____
8._____	18._____	28._____	38._____
9._____	19._____	29._____	39._____
10._____	20._____	30._____	40._____

Appendix 7.3 Test samples
7.3.1 Intermediate learner test sample

ANSWER SHEET

Name:

1. person	11. wood	21. friend	31. woman
2. jail	12. right	22. sweat	32. sheets
3. hard	13. smile	23. warm	33. baby
4. dirty	14. turtle	24. chocolate	34. strenght
5. mountain	15. help	25. industry	35. high
6. cold	16. Spain	26. chocolate	36. piece
7. man	17. hole	27. white	37. humans
8. hurt	18. better	28. bright	38. cookies
9. people	19. shout	29. coins	39. music
10. tasty	20. wind	30. sound	40. play

7.3.2 Advanced learner sample test

ANSWER SHEET

Name:

1. Room	11. Wall	21. Liar	31. condition
2. Jail	12. Tribulation	22. Strength	32. example.
3.	13. Joy	23. Hurrican.	33. baby
4. Ground	14. Fast	24. Sweet	34. to hold on.
5. Mountain	15. Help	25. Production	35. high
6. Fine	16. Chicago	26. Ice	36. mouse
7. Heart	17. Chest	27. Bed	37. heart.
8. Wound	18. Skills	28. awesome	38. Cake
9. Cloth	19. Loud	29. Kindness	39. shoe.
10. Glass	20. Light	30. engine.	40. incredible.

40

7.3.3 Native speaker test sample

ANSWER SHEET

Name:

1. isolated	11. reflect	21. ——	31. pride
2. reject	12. concord	22. strength	32. outline
3. white	13. content.	23. change	33. beginning
4. desert	14. ——	24. taste	34. survive
5. incline	15. aid	25. multi leveled	35. up.
6. measure	16. stubborn	26. [illegible] heat	36. diminutive
7. valiant	17. pore	27. warmth	37. patriotism
8. hurt	18. gradual	28. great	38. warmth.
9. virgin	19. ambient	29. support	39. shoe
10. red	20. light	30. power.	40. surprising

7.4 Sample of digitalization of analyzed responses

2) **CONDEMN**

2ND YEAR

1. JAIL **S**
2. PRISON **S**
3. GUILTY **S**
4. HELL **S**
5. JAIL **S**
6. GAOL **S**
7. GUILTY **S**
8. DEATH **S**
9. IMPRISON **P_HY**
10. PRISON S
11. JAIL S
12. JAIL S
13. PRISON S
14. FOREVER O
15. PRISON S

4TH YEAR

1. SCAFFOLD S
2. JAIL S
3. GUILT S
4. BLOOD O
5. JAIL S
6. JUDGE P_HY
7. JAIL S
8. PRISION S
9. TRIAL S
10. GUILTY S
11. JAIL S
12. PUNISH P_HY
13. CRIMINAL S
14. JAIL S
15. ALL S

NATIVE

1. HATE P_COHY
2. SAD S
3. CONDOM PH
4. OUTLAW S
5. PRISON S
6. CRIME (n) S
7. PUNISH P_HY
8. JUDGE P_HY
9. REJECT P_COHY
10. PRISIONER S
11. ANGER S
12. PUNISHMENT P_HY
13. PUNISH P_HY
14. BAD S
15. JUDGE P_HY

3) **MARBLE**

2ND YEAR

1. - NR
2. - NR
3. MAGIC O
4. WONDERFUL O
5. WOOD P_COHY
6. GAMES S
7. UNKNOWN O
8. CANDY O
9. PLASTIC P_COHY
10. STAIRS S
11. GAME S
12. HARD S
13. STATUE S
14. MOON O
15. CORAL O

4TH YEAR

1. TABLE S
2. NR
3. WHITE S
4. TREE O
5. GAME S
6. TREE O
7. BALL P
8. VALUABLE S
9. FURNITURE S
10. CIRCLE S
11. TABLE S
12. PLAY S
13. NICE O
14. WONDERFUL O
15. GUM O

NATIVE

1. BALL P_S
2. TOP S
3. ROCK P_HY
4. STONE P_HY
5. TOY P_HY
6. FLOOR (n) S
7. STONE P_HY
8. STATUE S
9. WHITE S
10. STONE P_HY
11. SPHERE P_S
12. FLOOR S
13. GLASS P_COHY
14. STONE P_HY
15. STONE P_HY

4) **DUST**

2ND YEAR

1. DIRTY S
2. DUSTPAN S
3. OBLIGATION O
4. NR
5. SWEEP S
6. WIND S
7. ALERGY S
8. NASTY O
9. DIRTY S
10. PATH S
11. FLOOR S
12. DIRTY S
13. OLD O
14. WIND S
15. CLEAN S

4TH YEAR

1. WIND S
2. GROUND S
3. DIRTY S
4. BROOM S
5. ASHES S
6. DIRT P_S
7. POWDER P_COHY
8. WIND S
9. DIRTY S
10. DIRTY S
11. BROOM S
12. UNTIDY S
13. OBLIVION O
14. SAND P_COHY
15. MAGIC S

NATIVE

1. AIR S
2. SAND P_COHY
3. CRACK S
4. ALERGY S
5. DUSTER S
6. GOLD (n) S
7. DIRT P_S
8. CLEANING S
9. DESERT S
10. DIRT P_S
11. GRAY S
12. ASHES S
13. SNEEZE S
14. POWDER P_COHY
15. GRAY