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THE ROLE OF UNKNOWN VOCABULARY AND PRIOR KNOWLEDGE IN THE COMPREHENSION OF FAMILIAR AND UNFAMILIAR TEXT WHEN READING IN A FOREIGN LANGUAGE

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By

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ABSTRACT

THE ROLE OF UNKNOWN VOCABULARY AND PRIOR KNOWLEDGE IN THE COMPREHENSION OF FAMILIAR AND UNFAMILIAR TEXT WHEN READING IN A FOREIGN LANGUAGE

By

Susana B. Tuero

Evidence from studies in the process of reading in the first language reported strong correlations between word knowledge and comprehension (Anderson and Freebody, 1981; Nagy, William, Herman, and Anderson, 1985; Medo and Ryder, 1993). In addition, some L1 researchers (Rumelhart, 1977; Stanovich, 1980, 1984) hypothesized that the use of top-down processes (such as prior knowledge) may compensate for difficulties in bottom-up processes (such as vocabulary difficulties). Even though studies in L2 reading have been heavily dependent on L1 reading research, very few L2 studies have investigated this interactive-compensatory hypothesis, and how vocabulary knowledge relates to comprehension and information recall in the process of foreign language reading. The present study was designed to bridge this gap.

Participants in this study were high-school students who had been studying Spanish for at least four years at the time the data were collected. All students read two passages in Spanish, one about a familiar topic, 'La Noche de Brujas,' and the other about an unfamiliar topic, 'La Diablada.' Some of the students read an easy version, others read the hard version of each passage. The easy

version contained known words and the hard version contained words that are less frequently used. After reading the passages, the participants were asked to write a free recall, and then answer twelve multiple-choice questions to assess their comprehension. These data were analyzed statistically, and the students written protocols were individually examined.

Results of this study indicated that a) prior knowledge affected the students' recalls of supporting units, and their answers to scriptically implicit questions, b) vocabulary difficulty affected the students' recalls of central and supporting units, and their answers to textually explicit questions, c) topic familiarity and vocabulary difficulty did not interact in any of the recall or comprehension measures, d) difficult vocabulary appeared to affect the development of a coherent text in the students' written protocols.

This study concludes that background knowledge and vocabulary difficulty function independently and affect reading in different ways. Even though prior knowledge facilitates comprehension, vocabulary development is vital to foreign language reading.

DEDICATED TO THE MEMORY OF

MY GRANDMA, MARIA CASTAÑO DE VILAR,

who truly believed that education was

the open door to a better life

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CHAPTER ONE

INTRODUCTION

1. 1 OVERVIEW OF READING RESEARCH IN THE FIRST LANGUAGE

As a result of a renewed interest in cognition during the past three decades, considerable research has been conducted to examine and describe what happens in a reader's mind while reading. Some first-language reading researchers investigated the mechanical aspects of reading, such as the reader's eye movement (Carpenter & Just, 1983; Frazier & Rayner, 1982; Just & Carpenter, 1980). Results of these studies provided interesting information about the words that the readers fixated on and the length of time the reader fixated on each word in a text. It was found that more content words (adjectives, nouns, verbs, and adverbs) than function words (articles, preposition, and conjuctions) were fixated on. The proportion of content words that were fixated on was higher even for skillful readers.

Other researchers hypothesized that the reading process begins with the reader's recognition of letters, which are then combined to form words (Gough, 1972). LaBerge and Samuels (1974) moved a step further and suggested that certain letter combinations are processed in chunks. Skillful readers become familiar with syllables that occur frequently in the language and process those syllables as a single unit.

Carver (1977, 1978) claimed that the process of reading begins at word level. As words are processed, readers comprehend sentences. Sentence comprehension is an important mechanism in reading since the reader is expected to comprehend the writer's thoughts, and the writer's thoughts are expressed in sentences. Carver also hypothesized that there is an important link between reading and phonology. He used the term *rauding* to refer to this link which he considered of major importance in the process of reading.

These reading models that describe the reading process as a series of stages that occur in a linear fashion, and that start at text level are usually referred to as text-driven, or bottom-up models. An important counterweight to bottom-up models was provided by researchers who viewed the reader as the most important component of the reading process. Rumelhart and Ortony (1977) brought back the idea that the readers' past experience plays a major role in reading. It is the readers' knowledge of the world that helps them bring out the meaning of the text. The readers' prior knowledge is organized in chunks, usually called *schemata* , and stored in memory. It is during the process of reading that readers use their schemata to comprehend the text.

Introduced in the late 1960s and early 1979s, the ideas presented by Goodman and Smith had a tremendous impact on reading research. In their view, the reader is the most important component in the process of reading. The reader approaches the text with his/her prior knowledge and brings meaning to it. The negotiation process between the reader and the text results in comprehension.

Reading models that consider the reader as the major component in the reading process are usually referred to as reader-driven, top-down models. Top-down models have been widely accepted by teachers, reading specialists, and researchers. Results of a significant number of studies in first language reading demonstrated how the readers' prior knowledge may help or hinder comprehension processes (Anderson, Pichert, and Shirey, 1983; Anderson, Reynolds, Schallert, and Goetz, 1977; Carey, Harste, and Smith, 1981; Pichert and Anderson, 1977; Shimoda, 1993).

1. 2 OVERVIEW OF READING RESEARCH IN A FOREIGN LANGUAGE

Top-down cognitive models had a strong impact on research in the process of reading in a foreign language. For over a decade, much of the work done in L2 reading was carried out within the framework of schema theory (Aron, 1986; Barnitz, 1986; Carrell, 1983a, 1984b; Carrell and Eisterhold, 1983; Lee, 1986). Results of these studies demonstrated that not only topic familiarity but also the rhetorical organization of the text affects reading (Carrell, 1984a, b, 1987; Kintsch and Greene, 1978). Carrell (1987) claimed that even though unfamiliar content generally posed more difficulties for the participants in her study, the rhetorical form of the reading text was more important in the comprehension of temporal sequences among the events. Carrell concluded that both content and text form affect comprehension, but in different ways.

Although all reading researchers recognize the importance of the readers' prior knowledge in the reading process, the claim that the

reader's schemata is the major component of the process has received some criticism recently from researchers and reading specialists. The critique came from both first- and second-language reading researchers.

Some first-language reading researchers observed that the term *schema* is vague; it has no clear definition (Alba and Hasher, 1983; Brewer and Treyens, 1981; Paivio, 1986). Sadoski et. al (1991) wondered, for example, whether "we have an overall schema for color that is made up of particular colors (e.g. red, yellow) or schemata for particular colors that are made up of particular examples of these colors (e. g. fire engine red, lemon yellow). (p. 466)

Alba and Hasher (1983), in their review of frequently cited schema studies, observed that most of these studies used some obscure and bizarre passages. In addition, they commented about and Johnson's study (1972),

> **Their passages contained no explicit, concrete referents, and without a context to suggest exemplars for these referents, none is likely to be inferred.**

And they continue,

> **This should serve to reduce the possibility that one sentence could cue another at recall. It is not surprising then that recall of these materials is so poor; subjects had in effect been presented with a set of unrelated sentences. (p.220)**

Even though studies in the process of reading in a second/foreign language have concentrated almost exclusively on the study of top-down skills, some second-language reading researchers have began to speculate on the limitations of top-down models. Those studies have provided important information about the active and constructive processes involved in reading comprehension, but reading is a highly complex cognitive process. By concentrating heavily on the investigation of only one component, other important aspects of the process may be neglected.

Eskey (1988) suggested that top-down models accurately describe fluent readers for whom the use of higher-level skills is automatic. Good readers' decoding strategies are also automatic, and by using appropriate comprehension strategies, they are able to make predictions and skillfully interpret the text. Thus, top-down models partially describe the process of reading. Eskey (1988) clearly expressed his concerns:

> **... but for the less proficient, developing reader- like most second language readers- this model does not provide a picture of the problems such readers must surmount. (p. 93)**

Clarke (1988) recognized the important role that language proficiency plays in the process of reading. Good first-language readers may not transfer their adequate reading strategies when reading in a second language due to linguistic difficulties. It appears that difficulties at text level, such as vocabulary may "short circuit" readers' ability to interact with the text.

Some first-language reading researchers proposed an interactive view of the process of reading (Rumelhart, 1977; Stanovich, 1980, 1984). Under this hypothesis, readers confronted with difficulties at text level (e. g. because of complex vocabulary) can compensate for their deficiencies by using higher-level skills, such as their prior knowledge. Although this interactive-compensatory sounds appealing in both first- and second-language reading, researchers have failed to find such interaction in L1 reading (Freebody and Anderson, 1983; Stahl and Jacobson, 1986).

There is evidence that indicates that both high level skills and low level skills affect reading, but they do not interact. Both vocabulary and topic familiarity were found to affect L1 reading but in different ways.

In the following chapter, relevant literature will be reviewed. Models of first-language reading will be described in the first part of the chapter. Relevant experimental studies will be discussed. The second part of the chapter presents a review of research studies in the process of reading in a foreign language.

CHAPTER TWO

REVIEW OF THE LITERATURE

To the observer, reading looks like a simple, effortless skill, a skill that is expected to be acquired in our childhood and practiced for the rest of our lives. Like many other skills it is not completely lost under normal circumstances and results in comprehension. Contrary to the assumption that it is a simple mechanism, reading, however, is a very complex intellectual skill that consists of various cognitive processes. The use of these cognitive processes will result in comprehension.

2.1 MODELS OF READING IN THE FIRST LANGUAGE

Bottom-up Reading Models

Substantial research has been done in an attempt to understand what happens in a reader's mind while reading, what factors may help or hinder the comprehension process. Several cognitive models have been offered in an attempt to describe the process.

It was during the late 1800s and early 1900s that experimental psychologists got interested in the process of reading. In an attempt to understand reading, substantial research was conducted to study letters and word recognition, reaction time, and eye fixation. These were seen as reflections of mental processes and researchers used their results as a basis for speculation about mental processes.

Perception and imagery were also considered important factors in reading.

However, this interest in cognition subsided shortly after the turn of the century. As research focused more and more on observable behavior, studies on metalinguistic processes virtually ceased to exist. The widely accepted behaviorist theory drew any interest away from mental processes.

It was not until the 60s that renewed interest in cognition began to emerge. Once again reading comprehension, attention, information processing and memory became central in research.

Today research in reading has been enriched by the large number of professionals coming from different fields. Neurologists, anthropologists, linguists, and sociologists are trying to describe the psychological processes that occur in a person's mind while reading. However, this is not an easy task. Since those psychological processes are not open to direct observation, they can only be inferred by observing what readers do and by relying on what readers tell us they do while reading.

Several studies that focused on reading analyzed the reader's eye fixation on the words of the text (Carpenter & Just, 1983; Frazier & Rayner, 1982; Just & Carpenter, 1980). By studying the reader's eye movement, researchers recorded the words that were fixated on, the length of time that the reader fixated on each word and which words were refixated. There are two types of fixation: **forward fixations** and **regressive fixations**. Most of a reader's fixations are forward fixations, from earlier words to later words in the text.

It is suggested that if the reader does not encounter major difficulties, most of the fixations are forward fixations. When readers have difficulties in understanding the text, they make a larger number of regressive fixations, fixations to previous parts of the text.

Just and Carpenter Model. Just and Carpenter (1987) claimed that by observing the time that a reader spends on various parts of the text and which words he/she fixates or rereads we can 'have a view' of the ongoing cognitive processes. Based on their studies, these researchers stated that more content words than function words are fixated and that even skillful readers fixate a high proportion (up to 80 percent) of content words--adjectives, nouns, verbs, and adverbs. The proportion of function words that are fixated is much smaller. Readers fixate about 40 percent of the function words--articles, prepositions and conjunctions (Carpenter and Just, 1983; O'Regan, 1979). These percentages of fixations were made by proficient readers reading texts on a variety of topics which did not demand a strong knowledge of the subject.

Although most function words tend to be shorter than content words, word length does not seem to have been the reason why fewer function words are fixated. Three-letter content words such as *ant* and *run* were skipped less often than three-letter function words such as *the* and *and.* Just & Carpenter (1987) suggest that this may be the case because the first letter of the function word is encoded at the same time as the previous content word is processed. Because of the high frequency occurrence of function words, it is possible

the processing of the fixated content word occurs in parallel with recognition of the following function word. Psycholinguists such as Smith (1982), and Goodman (1989) would suggest that the explanation lies in the readers' use of linguistic knowledge. The reader's linguistic knowledge helps him make predictions about the immediately adjacent word, especially when it is a function word. Suppose that the reader reads a sentence such as '*It was necessary to call off the meeting.* ' It is quite likely that the function word *to* will not be fixated. The grammar knowledge that native speakers of English have about their language enables them to predict the occurrence of the word *to*, making the fixation of this function word unnecessary.

Although eye fixation research has produced interesting results, the process of reading cannot be explained only by the results of this kind of studies. Many models of reading proposed an explanation of the process beginning at text level. Then, a series of processes occur in chain, resulting in comprehension. This kind of model that describes the reading process as a series of stages that occur in a linear fashion starting at text level is usually referred to as a *bottom-up* reading model. In this view the construction of meaning begins at letter level; letters are processed and make words which at the time make phrases, and phrases make sentences. According to these text-driven models, language is processed in small chunks. New processed chunks of language are added to the previous ones until they can be processed at higher mental levels resulting in comprehension.

Gough Model. Some of the most widely known bottom-up models in reading were proposed in the 1970s. In 1972, Gough stated that the reading process starts the moment readers fixate their eyes on the text. The reader's eye fixation produces a mental representation. Gough claimed that readers read letter by letter; as words are formed, their meaning is processed in a 'mental lexicon' that is stored in the human brain. When a word makes sense, it is stored in short-term memory. When the content of short term memory is understood, comprehension results. Gough does not offer any explanation about how meaning is comprehended and stored, nor does he explain how inferences are made. This view of the comprehension process as a dictionary of words and meanings is too simplistic.

LaBerge and Samuels Model. Although LaBerge and Samuels' (1974) model has undergone revision (Samuels and LaBerge, 1983), the original model is often cited as another example of a bottom-up view of reading. LaBerge and Samuels emphasized the role of attention in the process of comprehension. They assumed that the reader performs two tasks while reading: decoding and comprehending. In the case of skilled readers, decoding is an automatic process. The theory of automaticity holds that as letters and words become familiar, the reader does not need to pay attention to decoding and can concentrate on comprehending. For LaBerge and Samuels, this is the main difference between skillful readers and poor readers. Skillful readers are able to decode the printed word automatically and can concentrate their attention on comprehension. Poor readers, on the other hands are unable to decode

automatically. They have to allocate more attention to decoding resulting in poor comprehension.

LaBerge and Samuels compare information processing with a factory. In a factory, raw material enters at one point and passes through different machines. Each machine has its own purpose, and the raw material undergoes various changes as it moves along from one machine to another. Some machines may work faster than others. When this is the case the raw material is delayed until the next machine is ready to process the material. At the end a final product leaves the factory at some other location. LaBerge and Samuels consider that the same four basic elements that are found in a factory-raw material, machinery, storage units, and a control manager-are also found in their information processing model.

The visual information provided by the text is the raw material that enters the factory. This visual information consists of letters, words, figures, pictures and any other kind of visual information that initiates the process. Once the visual information has entered the factory, it is processed by four different machines: visual memory, phonological memory, episodic memory and semantic memory.

Visual memory allows the reader to extract information from the printed marks on the page. Unlike Gough, LaBerge and Samuels claimed that print is not processed letter by letter. The reader's visual memory allows him to process not only letters but also combinations of letters that often form spelling patterns. Proficient readers, who are familiar with spelling patterns, process groups of

letters as a single visual unit. Certain letter combinations that occur frequently in English such as *'sch,'* and *'thr,'* as well as prefixes and suffixes, form spelling patterns that are processed as a chunk by skillful readers[1].

The second machine in the LaBerge and Samuels model that processes the incoming visual information is the reader's phonological memory. This mechanism transforms printed symbols into sound values. This translation of print into sounds may occur at different levels such as letter level or whole word level.

According to LaBerge and Samuels, it is in the reader's semantic memory that word meaning and grammar knowledge is stored. Semantic memory allows the reader to derive meaning from printed symbols. It is also his semantic memory that helps him to make sense out of a string of words that conform to the rules of grammar.

For LaBerge and Samuels these three machines (visual, phonological and semantic memory) are the most important in the reading process. These researchers hypothesize, however, that another mechanism, the reader's episodic memory, may affect the reading process. Episodic memory keeps a record of when, where, and how a particular piece of information was acquired. It is their episodic memory that hinders young children's comprehension of texts that are written in an unfamiliar typesetting. Samuels and

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[1] Harber and Harber (1981) moved a step further, and hypothesized that readers can recognize words in a holistic way, without identifying all the constituent letters. This holistic process occurs as the result of familiarity with spelling patterns, the shape of the word, and the context in which words occur.

LaBerge suggested that knowledge must not be limited to a particular time, place or setting in order to be maximally useful.

Attention is one of the most important factors in the LaBerge-Samuels model. It is called the 'strategic control manager.' Attention "usually refers to the amount of mental energy or effort required to perform tasks" (Samuels and LaBerge, 1983). These researchers observe that the amount of mental energy available at a certain time is limited. If the task requires less mental energy than the amount that is available, there is not a problem. However, if the task requires more attention than the amount that is available, the reader uses a particular reading strategy to overcome his limitations.

LaBerge and Samuels claim that in order to cope with our energy limitations, we divide the task into smaller units. Through this strategy, we are able to perform complex tasks. This process, however, is slow and difficult. Sub-units that do not exceed our attention capacity are processed one at a time. Through practice, the unskilled person will be able to process the sub-units at a much lower attention cost. Sub-units will then be processed in groups and the entire process is sped up.

In this bottom-up view of reading, this concept of speed through practice can help explain the basic difference between skilled readers and unskilled readers. In the case of unskilled readers the different activities that they carry out as they read require much more mental energy than the amount that is available. Decoding the words from the text, extracting the meaning of each word,

combining the meaning of the different words into phrases and phrases into sentences that make sense, and relating the meaning of the sentences to the rest of the text exceeds the unskilled reader's attention capacity.

In the case of skilled readers, on the other hand, very little attention is used for decoding. Practice helps lessen the amount of attention for decoding. With practice decoding becomes automatic. Automaticity is one of the most important characteristics of skilled readers. LaBerge and Samuels claim that skilled readers are able to decode and comprehend simultaneously. These researchers recognize that word recognition does not guarantee comprehension. Sometimes, however, the process of word recognition is successfully accomplished, but it may not result in comprehension. This may be because of another key component in the model, attention.

In the LaBerge and Samuels model attention also plays an important role in the processes of storing and retrieving information. In order for a reader to store the meaning of a particular word he has to pay attention. At this stage, however, the word is stored in what we ordinarily think of as short-term memory. During this acquisition phase, the reader has to pay attention to how the word is pronounced and it is during this phase that the reader associates the visual and the phonological representation of the word. At this early stage, the reader recognizes the word and retrieves its meaning but at a high energy cost. With practice, information about a word will be stored in our long-term memory,

and it is at this point that the reader is able to recognize a word and retrieve it from his/her memory with little attention.

When this model was first introduced in 1974, it suggested a linear flow of information from visual memory to semantic memory. Semantic memory did not have any effect on the other components. The model has undergone several revisions (Samuels, 1977; Samuels & LaBerge, 1983) and feedback loops were added to the original model. These feedback loops show that the components of a system can interact and affect each other. A well developed subskill can aid and compensate for other poorly developed subskills in the process.

Although the LaBerge and Samuels model is often cited as an example of the bottom-up view of the process of reading, the addition of feedback loops makes it fall into a category of *interactive* models, which will be discussed later. In this revised model the feedback loops indicate that all the components are interconnected. The important result of this interconnection is that each component can affect any and each of the other components of the reading process. If later processing stages (semantic memory) can affect early ones (visual memory), the process can not be considered truly bottom-up, but rather an interactive model (Barnett, 1989).

The LaBerge and Samuels model succeeds in representing, at least in part, some of the processes that occur while we read. It explains how important words are in reading. After all, without words, the process of reading would never occur. LaBerge and Samuels do acknowledge, however that reading is a complex process and that the

ability to decode words does not guarantee comprehension. This lack of comprehension may be explained through the automaticity theory. The theory suggests that, for unskilled readers, comprehension is hindered because decoding uses too much attention. A similar problem has been found with college students. Samuels and LaBerge (1983) point out that this occurs because the students use very little attention in decoding. Their attention is freed and directed elsewhere. The students perceive decoding as a non-demanding process and instead of focusing their attention on "understanding and recalling the author's viewpoints," they direct their attention elsewhere, sometimes to matters totally unrelated to the text they are reading.

The LaBerge-Samuels model does not elucidate what other skills are necessary to achieve comprehension. Attention is important in reading, but since it is not the only mechanism needed in reading, what other skills do efficient readers use? Perhaps, as Otto (1983) suggests, reading models offer a partial view of the reading process.

Carver Model. Carver (1977-78) hypothesized that the process of reading begins at word level. For Carver the sentence is the unitary expression of thought and, since the main purpose of reading is to comprehend the thoughts of a writer, sentence comprehension is an important mechanism in reading. Carver uses the term *rauding* to refer to what he considers a major process in reading. The term *rauding* refers to the link between reading and phonology. Carver considers this link of major importance. During the reading process, the reader says each word internally and this internal articulation

helps in the process of comprehension. Carver's model is often cited as a bottom-up view of reading because during rauding, each word that makes up a sentence is checked to determine whether it matches the complete thought that is being introduced.

Barnett (1989) pointed out that Carver's model of reading does not include some reading skills such as skimming and scanning. If during the process of reading, the reader checks each word for comprehension, the process must be different when the reader is going over the text only to get the gist of it or when he is looking for specific information and not checking every single word in the text.

However, Carver (1981) did consider skimming and scanning as he claimed that these are different types of reading processes. In fact he claimed that it is misleading to talk about "the reading process." As we read, we take different steps that lead to different results. Carver (1990) stated that there are five types of reading processes: (1) scanning; (2) skimming; (3) rauding; (4) studying/learning; and (5) memorizing. These types of processes are directly associated with reading rate -that is, how fast words are covered-and final results while reading. Carver proposed that these five basic processes be considered as different "gears" that operate at different rates and at different levels of power, from first gear to fifth gear. Scanning and skimming are the higher or fastest gears -fifth and fourth gears respectively. When scanning, readers are searching for a specific word or words. This process involves only lexical accessing in order to avoid missing the target word.

Skimming involves not only lexical access but also semantic encoding. In the skimming process the reader has to attach a semantic encoding component to each word that is accessed. Carver claimed that the skimming process is more powerful than the scanning process because it involves two components -lexical access and semantic encoding-instead of only one as in scanning (lexical accessing).

Rauding, the third gear, is considered the most important process. It is the type of reading process that most of us use in normal, natural reading situations. According to Carver, rauding is the type of process that results in comprehension. The reader recognizes each consecutive word and integrates the words into a complete thought. His position has not changed since his earliest research and he still believes that sentence comprehension is the most important step in reading.

The learning and memorizing processes, the second and first gears respectively, are slower and more powerful than scanning, skimming, and rauding. During the learning process, the reader's goal is to understand and remember the ideas presented in the text. During this process, the reader continuously checks his ideas to determine whether he will remember them later. As the idea-remembering component is added, the reading process becomes more powerful and takes additional time.

The memorizing process, the first gear, is the slowest and most powerful gear. In this process, the reader's goal is to recall specific facts later. This goal is achieved by adding another component to the

reading process, called fact rehearsing. This component involves a great deal of regressing and repeating information so as to make sure that thoughts and ideas will be successfully recalled later.

Carver's reading model is a current view of reading as a bottom-up process. Reading begins at word level. The meaning of each word is integrated into the meaning of the 'new' sentence that results in the thought represented by the sentence. This 'new' thought is not isolated but is related to the thoughts that resulted from the previous sentences.

Although Carver's view of reading as different types of processes rather than a single cognitive process seems sensible, this model provides a partial view of the reading process. Carver does not acknowledge the important role that the reader plays in the process. He does not discuss how inferences are made.

Top-down Models

The Psycholinguistic Models. The theories presented by Goodman and Smith have constituted an important counterweight to bottom-up or text-driven models of reading. Goodman (1967) refers to the process of reading as "a psycholinguistic game." According to the Goodman's model the reader approaches the text with his prior experience, with his knowledge of the world. It is the reader's knowledge that makes him less dependent on the text. The reader is central in this model. It is the reader who brings meaning to the text. Goodman views reading as a process of negotiation between the reader and the text. Comprehension occurs as the result of this

negotiation process. This model identifies four mechanisms that readers use while reading: predicting, sampling, confirming and correcting. The reader's knowledge of the language helps him make predictions about the grammatical structure of the text. At the same time the reader is also making semantic predictions. These syntactic and semantic predictions are going to be tested during the sampling process. It is during sampling that the reader confirms or corrects his predictions. Goodman claims that the reader does not need to process every letter or word in the text to confirm his prediction. It is during this stage that the reader has to make adjustments if the print does not match his semantic predictions or if the grammatical structure predicted is not there.

Goodman and his followers carried out several studies to demonstrate how readers use their knowledge to make semantic and grammatical predictions. They used a technique that they called *miscue analysis* . Subjects were asked to read aloud texts that they had not seen before. Every instance in which the reader departed from the text was considered a miscue. It was believed that readers use three language cue systems when reading: the syntactic cue system, the semantic cue system, and the grapho-phonemic cue system. Miscues were later analyzed on the assumption that the readers' departures' from the text reflected the ongoing cognitive process while constructing meaning through predicting, sampling, confirming and correcting (Goodman, 1981). The analysis of the reader's miscues indicates which cue system the reader used or did not use. Results from all these studies indicate that skillful readers

miscue within the same domain and do not correct themselves as long as there is no interference with meaning. Good readers' miscues are grammatically correct and semantically appropriate. Readers generally miscue using at least two cue systems; the following are examples of miscues provided by Weaver (1988) in her book Reading Process and Practice (p. 4):

truck
'The little monkey had it.' (syntactic miscue)

in the water
'... swimming and playing water games. (syntactic and semantic miscues)

imprentice
'... school was not as important for girls as...' (grapho-phonemic miscue)

Like Goodman, Smith considered the reader the most important component in the process of reading. Reading is an active process during which the reader brings meaning to the text. (Smith, 1971) Smith observed four basic characteristics in reading: it is purposeful, selective, anticipatory and it is based on prior knowledge. Reading is purposeful because readers have specific reasons or goals when they read; it is selective because readers consider what is relevant to their goals; it is based on comprehension because readers bring their knowledge to reading. Their prior knowledge, what Smith calls non-visual information, is what helps readers bring meaning to print. As they read, new information is added to the reader's prior knowledge. Reading is anticipatory because the reader's prior knowledge, his goals in

reading, and his expectation of comprehension help him/her anticipate the context of the text.

Models of reading that are reader-driven are usually referred as *top-down* models. Like *bottom-up* models, *top-down* models describe the reading process as a linear process. Unlike *bottom-up* models, the process of reading starts at high-level mental stages and moves *down* to the text.

Schema Theory. Schema theory is the cognitive model that has had the strongest impact on reading models. Its origin can be traced back to the beginning of this century. Schema theory was first introduced as a theory to explain how knowledge is stored in memory. Sir Francis Bartlett is usually cited as the first psychologist to use the term schema. However, Anderson and Pearson (1989) observe that the idea that knowledge may be represented schematically was introduced by the Gestalt psychologists, and Sadoski, Paivio, and Goetz (1991) claim that the idea can be traced to Kant's *Critique of Pure Reason.*

Rumelhart and Ortony (1977) are often cited as the first researchers in cognitive psychology to bring back the idea that abstract knowledge is stored in cognitive schemas. A schema is a 'chunk' of knowledge that is stored in memory. Our experience, our knowledge of the world is stored in cognitive schemas, and all new experience is perceived and analyzed in the light of our prior knowledge. In reading, it is the readers' schemas that play an important role in the process. Rumelhart and Ortony also recognize a place for the text in the reading process. The syntactic, semantic,

lexical, and orthographic information that a reader has available is going to influence his/her perception of print. The reader's prior knowledge interacts with his/her semantic and syntactic knowledge in the reading process.

Models that describe the reading process as an interactive process between the reader and the written text are usually referred as *interactive* reading models. As in *bottom-up* models, the print is important; but unlike *bottom-up* models the reader's mental activities are thought to have an impact on comprehension. Reading is not a linear process but rather a process in which all its components are interconnected and can affect each other.

During nearly two decades an impressive number of studies have been carried out within the framework of schema theory in reading research. Different terms have been used to refer to how abstract knowledge is stored in memory. Minsky (1975) talks about *frames* to refer to the representation of knowledge in memory. Kintsch & van Dijk (1978) use the term *macrostructures* while Schank (1982) talks of *plans* to refer to the cognitive structures stored in memory. However the terms *schema* and *schemata* or *schemas* have gained preference and most researchers use the term *schema theory* to refer to all models that consider prior knowledge to be a crucial point in comprehension.

According to Anderson and Pearson (1989) "a schema is an abstract knowledge structure" (p. 42). Our everyday experience results in knowledge that is abstracted and retained in memory. In the jargon of schema theory, the parts that constitute a schema are

sometimes called 'nodes,' 'slots,' or 'frameworks.' According to this theory an event or situation activates a particular schema that is used to interpret the situation. That means that the new situation is going to be interpreted in the light of the activated schema. Anderson and Pearson believe that once a schema is activated the nodes that are part of that particular schema are likely to be instantiated. On the other hand, an instantiated node is not likely to activate a particular schema. As an example, Anderson and Pearson refer to 'the Ship Christening' schema. A person's Ship Christening schema is likely to remind him of components of the schema such as 'new ship,' 'bottle broken on bow,' and 'celebrity.' But the mention of a celebrity is not likely to activate the Ship Christening schema. It is assumed that the same node is shared by different cognitive structures and that some of them are more salient than other in a particular schema.

Based on Anderson and Pearson's explanation, we can understand that there is a categorization of the components that make up a schema. However, how this categorization is achieved is not discussed. Why is it that some components are salient while others are not? It may be reasonable to claim that a person is more familiar with the concept of 'broken bottle' in situations other than the christening of a ship. It is quite likely that most of us have acquired the concept of 'broken bottle' in different situations, and only a few from christening a ship.

As can be seen in figure 1, in the schema diagram provided by Anderson and Pearson, the concept 'broken bottle' is diagrammed as a

node in the Ship Christening schema. However, the idea of what exactly constitutes a schema and what exactly a node is, does not seem to be well understood. Can a component of a schema act at a certain point as a schema itself? Can the concept of 'broken bottle' which is considered a node in the ship christening schema be considered a schema?

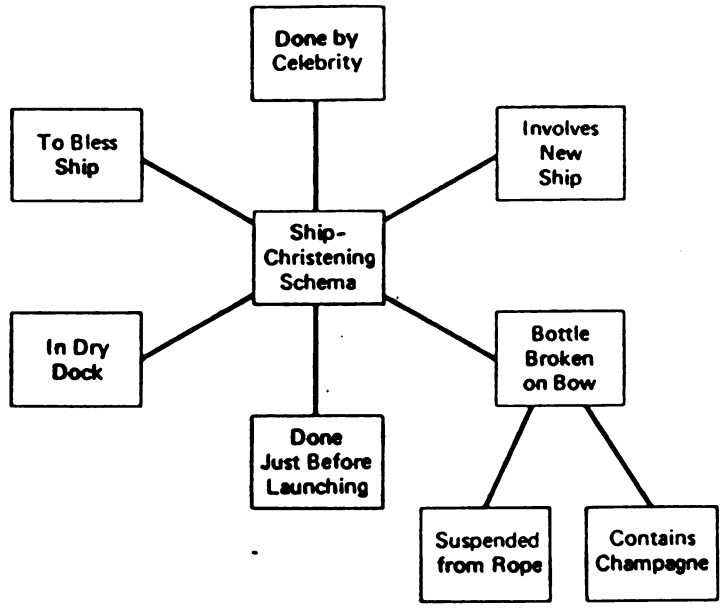

Figure 1. Representation of the 'ship-christening schema.' From *A schema-theoretic view of basic processes,* (p. 43) by R. C. Anderson and P. D. Pearson, 1988.

Although it is an accepted fact that readers use their background knowledge to construct meaning, some psychologists claim that the

term *schema* has left us with the false idea that we understand high-level stages in reading much better than we actually do. Sadoski et al. (1991) commented:

> ... the pervasive use of the term *schema* has at times created an illusion of consensus and has left the impression that we have a more profound understanding of cognition in reading than we do. (page 465)

The term *schema* has become synonymous with *prior knowledge* or *background information*. However, how knowledge is actually abstracted from each experience, how much knowledge is abstracted, and how abstraction occurs is still a puzzle in cognitive psychology (Sadoski et al., 1991).

Alba and Hasher (1983) identified five central processes in schema theory. Four of these processes are identified as encoding processes and one as a retrieval process. The four encoding processes are selection, abstraction, interpretation, and integration. Through selection, some information is selected for representation. Abstraction is the process that stores meaning but not the syntactical and lexical structure. Through the interpretation process, relevant background knowledge is instantiated to facilitate comprehension. As a result of the previous processes a representation is formed in memory. Through the retrieval process, called reconstruction, we rebuild an episode or event. Alba and Hasher concluded that memory for complex events is richer and more detailed that these processes would allow for. Besides, the process of integration does not appear to be essential. Research shows that

unintegrated information is sometimes available for recall (Alba and Hasher, 1983; Sadoski et al., 1991).

Despite the fact that several critiques of schema theory have been published (Iran-Nejad, 1987b; Paivio, 1986; Sadoski et al., 1991), its influence on reading in first and second language is still very strong.

During the past decade, several studies have been carried out to demonstrate how schematic knowledge help readers select, comprehend and retrieve information. Among the most influential schema studies often referred to are those carried out by Pichert and Anderson (1977); Anderson and Pichert (1978); Anderson, Pichert and Shirey (1983). In these studies, the researchers had their subjects read a passage involving two boys who visited a house and noticed the existence of different things in the house such as, bicycles, expensive china, and a rare coin collection. At the same time there is reference to some characteristics of the house itself such as the existence of a new fireplace, a leaky roof, etc. The researchers divided their subjects into three groups. Two groups were asked to assume the perspective of two different persona. The subjects in one group were prospective home buyers while the subjects in the other groups were told to read the passage from the perspective of a thief. The third group was a control group with no assigned perspective.

Results from these studies indicate that the subjects recalled more information that was relevant from the perspective of the persona they had been assigned. Home buyers remembered things that

might affect the house as real estate while burglars recalled valuable objects that could be removed. When the subjects were instructed to change perspectives for a second recall (without rereading the passage) they were able to remember facts that were important from the second perspective but that they had not previously recalled since those facts were unimportant from the first perspective. These results support Oakhill and Garnham's claims that in addition to what happens when the text is read, what happens at the time of the recall affects what is remembered (Oakhill and Garnham, 1988).

Shimoda (1993) had his subjects read two short excerpts from psychology textbooks and two from civil engineering textbooks. The participants in this study were senior-level college students whose majors were psychology and civil engineering. The results of this study support schema theory. Subjects reading familiar topics were able to read faster and attain better comprehension.

Several studies have looked at how prior knowledge and topic interest affect reading comprehension (Asher, Hymel, & Wigfield, 1978; Belloni & Jongsma, 1978; Stevens, 1980). Results from these studies indicate that reading comprehension is enhanced when subjects read material that was interesting to them. Baldwin, Peleg-Bruckner, and McClintock (1985) also studied the effect of higher knowledge and topic interest on reading comprehension and added a new variable, sex differences. Their 41 seventh- and eighth-grade students completed a 10-item interest inventory and took a 100-item prior knowledge test. The subjects were considered

fluent readers based on their scores on the California Achievement Test. Although results from these study suggest that both prior knowledge and topic interest affect reading comprehension, these two factors seem to be autonomous. Baldwin et al. concluded that the notion that prior knowledge and topic interest are highly correlated may be true for adult readers. As people get older they tend to specialize in areas that they find interesting. Therefore, knowledge and interest will correspond closely. The situation can be quite different for school children who are forced to study topics that may not be interesting for them. The result would be readers who have high knowledge of topics that are not appealing to them. Baldwin et al. observed that there was some interaction between topic interest and gender. These researchers found that topic interest had a greater effect on boys than on girls.

Although the effect of prior knowledge on reading has been extensively studied, how much it affects reading and how much it facilitates comprehension still remains unclear. Some researchers have found that prior knowledge may sometimes interfere with reading comprehension. Like Peeck, van den Bosch, and Kreupeling (1982), Alvermann, Smith, and Readance (1985) found that activation of prior knowledge did not facilitate comprehension. In fact, results indicate that readers whose prior knowledge conflicted with the information they read did not 'negotiate' the new information and 're-accommodate' their background knowledge. Instead they permitted their prior knowledge to override the new information. Although this did not seem to have much effect on the

multiple choice test measure, it did have a detrimental effect on the recall measures.

Alvermann et al. (1985) also raise the issue of the importance of the type of measure that is used to assess reading comprehension. Recall has become a common measure for comprehension assessment in L1 reading. Johnston (1983) pointed out that recall is the "most straightforward assessment" of the interaction between the reader and the text. More recently, Hayes (1989) claimed that recall analysis is the most powerful tool that cognitive psychology has to describe psychological processes. Although multiple-choice tests are also a common tool to collect data, results from studies that used only this type of comprehension measure should be evaluated cautiously. Benhardt (1991) indicates that a reader's understanding of the text may be influenced by questions or other type of information that he has to read as his reading comprehension is assessed.

Dual Coding Theory. Dual coding theory is a theory of cognition that has regained interest among psychologists and reading researchers. Although dual coding theory is contemporary to schema theory (it was introduced in the early 1970s) it has not attracted as much research as schema theory. Sadosky et al. (1991) claim that the main reason why dual coding theory remained almost ignored all these years is because of its imagery component. It was not until recently that imagery began to be considered important in the process of storing information in memory.

Like schema theory, dual coding theory is a theory of cognition. It attempts to explain how knowledge is abstracted and stored in memory, how linguistic and non-linguistic representations interact in cognition. Supporters of dual coding theory believe that cognition consists of two mental subsystems that specialize in the representation and processing of information. These two subsystems, verbal and non-verbal, have the capacity to operate in an integrated manner. This integration facilitates the processing of information in reading.

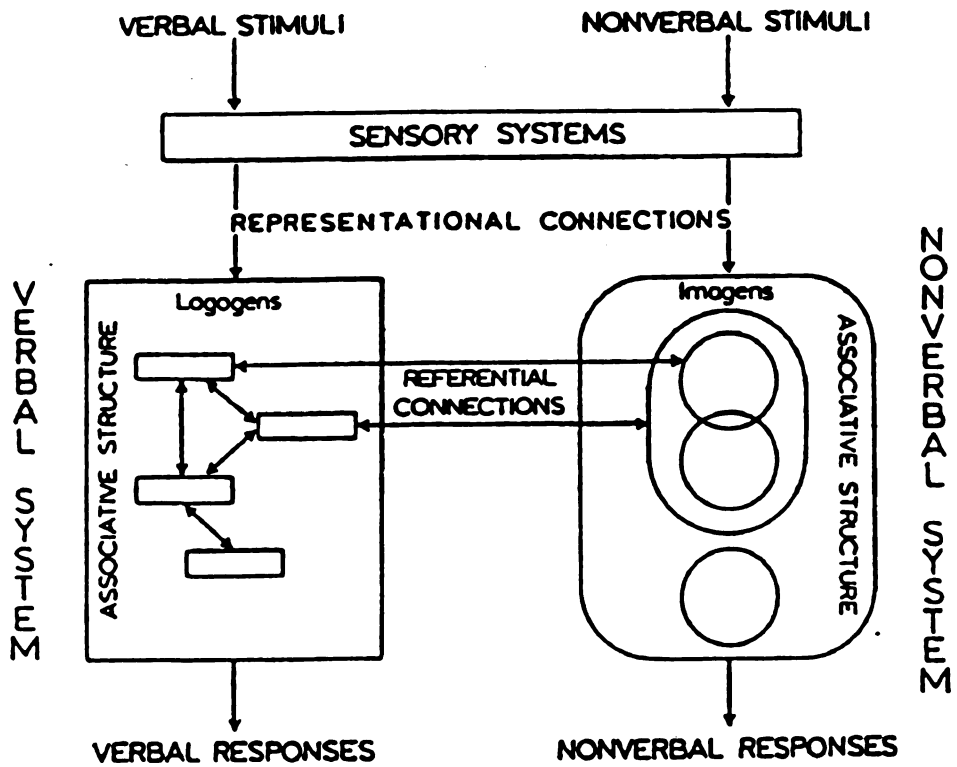

Figure 2. Dual coding model. From *Mental representations: A dual coding approach* (p. 67) by A. Paivio, 1986. New York: Oxford University Press.

Figure 2 presents a model of the two subsystems, and the three components assumed by dual coding theory. Information is

continually detected by our sensory systems. This information presented as verbal and non-verbal stimuli activates mental representations. These mental representations are called logogens in the verbal subsystem and imagens in the nonverbal subsystem. The verbal subsystem specializes in language. It involves the processing of linguistic stimuli. The non-verbal systems involves the generation of mental images while processing visual, auditory and affective information.

Sadoski et al. (1991) claim that a logogen is a representational unit that could correspond to a grapheme, a word, or to a larger familiar unit such as a phrase or a sentence. Representations in the nonverbal subsystem are "organized more in the form of holistic nested sets," e.g. eyes, noses, and mouths could be perceived separately, but are normally perceived as parts of a face. Representational units within a subsystem display associative characteristics labeled associative structure in Figure 2. This associative structure among units occurs as the result of experience or learning.

The model also contains three major components (Mayer and Anderson, 1991, 1992). Components 1 and 2 involve building representational connections between the presented information and the subsystems. Component 3 involves building referential connections between the two subsystems. These inter-system relations account for the great flexibility observed in human cognition. It is through these referential connections that language

can evoke some imagery or no imagery at all, and that mental images can boost language.

Dual coding theory is not inconsistent with schema theory, but it seems to provide a more complete and better articulated model of cognition. Some results in reading research can be better explained by dual coding theory than by schema theory. According to schema theory mental representations are stored in an abstract form, a schema. A schema selects the presented information, interprets it, and stores it in an integrated form. It is also a schema that governs the retrieval of information. If this is the case, readers' protocols should be quite consistent whether the task is to report on what they read or report on the images they had in their mind while they read. However, results from some recent studies (Long, Winograd, & Bridge, 1989; Sadoski, 1983, 1985; Sadoski, Goetz, Olivares, Lee, & Roberts, 1990) have shown that information in reports about imagery overlaps only partially with information in verbal reports. According to Sadoski, Paivio, & Goetz (1991) this apparent inconsistency can be easily interpreted through dual coding theory. If incoming information is stored under two mental representations in two separate subsystems, some variations can occur at the time of the retrieval. Supporters of dual coding theory claim that although these two subsystems have the capacity to operate in an integrated manner, they can also operate separately. Some questions still remain. Future studies will have to investigate, for instance, what causes the two subsystems to operate separately, and the circumstances under which this phenomenon occurs.

Support to dual coding theory has come from recent research that has focused on the study of the important role that imagery plays in information recall, and the process of reading (Danan, 1992; Intraub and Hoffman, 1992; Mayer & Anderson, 1991, 1992; Gambrell & Jawitz, 1993; Kulhavy, et al, 1993). Mental images can be built by the reader during verbal elaborations (Stein, Brock, Ballard, & Vye, 1987), and comprehension can be facilitated by presenting information visually, that is by presenting pictures which illustrate the text.

Mayer and Anderson's findings (1991, 1992) are consistent with a dual coding model. When reading scientific texts, subjects who used *explanative* pictures were able to understand better than those who did not have pictures. Because the material was encoded visually and verbally in an integrated manner, the subjects were able to remember and transfer information more easily than when the material was presented using one mode, verbally or visually.

Conclusions

For the past two decades, there has been a renewed interest in cognition. Much research has been devoted to identifying and explaining the cognitive mechanisms that are involved in the reading process. Despite the effort, full agreement on how comprehension is attained has not yet been reached.

When we think of the many variables that affect reading and reading comprehension -type of text, syntax, vocabulary, age of the reader, his motivation, interest, purpose- it becomes easier to

understand why it is hard to come to general agreement. In addition, the type of research that is done is usually affected by the scientific philosophy of the moment.

The many competing views of the reading process have led to the development of different theories. These competing views, however, always consider some basic components on which they choose to either agree or disagree. These areas of agreement or disagreement include the role of the text, the role of the reader and the reader's background knowledge, and the purpose of the reader.

The role of the text. Some researchers view reading as the act of extracting meaning encoded in the text by using different language systems such as orthographic structures, lexicon, and syntax. At the other end of the continuum are the researchers who believe that the text is just a blueprint that has no meaning in itself. Only the reader can bring meaning to a written text. Meaning is always relative. Since it only exists in the heads of the readers, a text has the potential of generating different meanings.

The role of the reader. Some theories perceive the reader as a passive recipient of information. Through the use of different language systems, the author 'pours' meaning on the text, and a skillful reader is the one who is able to successfully obtain the meaning that the author encoded on the paper. Other theories see the reader as the key component in the reading process. No text has meaning until the reader brings meaning to it.

The reader's background knowledge. This element is closely related to how the previous two components are perceived.

Researchers who claim that the process of reading starts at the text level, that the text is the key component, and that the reader's job is to attempt to retrieve the message encoded by the writer may totally ignore the reader's background knowledge when discussing the reading process. At the opposite end are the theorists who suggest that meaning is always constructed in the light of the reader's background knowledge. It is the reader's prior knowledge that helps him create meaning.

The purpose of the reader. Theories that hold that the text has a precise meaning do not recognize that the reader's purpose is of any importance in the reading process. When the written text is placed at the center of the process, the purpose of the reader is viewed as irrelevant in reading. Considering the purpose of the reader irrelevant seems to be one of the most difficult positions to sustain. Common knowledge and personal experience tell us that the way we read a book we chose to read is different from the way we read a scientific text on which we are going to be tested. Other theories view the reader's purpose as having a significant impact on how meaning is constructed. In fact, these theorists suggest that the reader starts with a purpose and predicts meaning before he looks at the text.

The perspective adopted here is what some theorists have called transactive theories (Cairney, 1990). Meaning is not in the text, nor is it in the reader. Both components are important in the process of reading. On one hand, the process of reading would not exist without text. The text is important as it has been shown by many research

studies; many of the text characteristics are of significant importance in the process of reading. Other research studies have investigated the relationship between the reader's linguistic knowledge and reading comprehension. Results indicate, for instance, that phonological information affects comprehension processes (McCutchen & Perfetti, 1982; McCutchen, Bell, France & Perfetti, 1991). Research has also demonstrated that the reader is a very important component of the process. It is the reader's prior experience, his knowledge of the world that will have a strong effect on comprehension. Comprehension results from the transaction between the reader and the text. As Rosenblatt suggests the reader creates a 'poem.' This poem is different from the text on the page and from the text in the reader's head.

2.2 MODELS OF READING IN SECOND/FOREIGN LANGUAGE

The Psycholinguistic Model

Goodman and Smith Model. Empirical studies in the process of reading in a second or foreign language have been heavily dependent on the first language reading research. An examination of the literature about the process of reading in a second/foreign language provides rather surprising findings. A close review of the literature reveals that recent research in the field has been dominated by two L1 theoretical frameworks: the Goodman's and Smith's psycholinguistic model, and by schema theory. Bernhardt (1991) examined 25 journals that "are of greatest interest to and accessed

by teachers and researchers in the area of second language learning in the United States, Canada, and English-speaking Europe and Asia." (p. 21) Her investigation revealed that from 1974 to 1988, 66.4 percent of the L1 citations in L2 reading studies referred either to Goodman or to Smith. There seems to be no clear reason to explain such a dominance of the psycholinguistic model. Bernhardt (1991) claims that it was due to a "lack of awareness and perception of the capabilities of models other than those of Goodman and Smith to explain the second language reading phenomena." (p. 22)

Schema Theory. For over a decade, the schema theory of cognition has also had a very strong impact on ESL reading. Much of the work in second language reading research has been carried out within the frame of schema theory (Alderson and Urquhart, 1988; Carrell, 1983a, b, 1984b; Carrell and Eisterhold, 1983; Lee, 1986). Extensive research was done on how prior knowledge affects L2 reading. This is hardly surprising, since a large number of L1 reading studies have revealed the importance of background knowledge in reading comprehension.

Basically, background knowledge studies can be divided into three broad categories. First, some studies examined how 'cultural schemata' affect reading. Second, other L2 reading researchers studied how 'topic familiarity' influences the process of reading. Third, there are studies that have looked into the readers' linguistic proficiency, and text features such as syntax and vocabulary as variables affecting the process of reading in a second language. In some cases two variables were taken into consideration, such as

topic familiarity and language proficiency (Mohammed and Swales, 1984; Alderson and Urquhart, 1988) and cultural origin and syntactic complexity of the text (Johnson, 1981).

Johnson (1982) observed that prior knowledge influenced her ESL readers' comprehension when they were presented with a passage that referred to Halloween. Johnson hypothesized that topic familiarity affected comprehension. More recently Pritchard (1990) determined that the reader's cultural schemata and the cultural perspectives of the text influenced not only reading comprehension but also reading strategies. In this study, 60 11th-grade students (30 American and 30 Palauan) read two letters. Each letter described the events surrounding a typical funeral in one of the two cultures. A taxonomy of processing strategies was developed based on the subjects' protocols. Five categories were identified: a) developing awareness, such as recognizing loss of concentration or failure to understand part of the text; b) accepting ambiguity: for example, formulating a question; c) establishing intrasentential ties: for instance, rereading and paraphrasing; d) establishing intersentential ties, relating a sentence to a previous portion of the text, and e) using background knowledge: for example, referring to a previous passage and speculating beyond the information presented in the text. Results from this study indicate that strategies used by the readers differed according to whether or not they were reading a culturally familiar or unfamiliar passage. When reading a culturally familiar passage, subjects used more strategies that were from categories 'd' and 'e'. Pritchard claims that by establishing

intersentential ties and using their prior knowledge, his subjects were able to 'develop a unified meaning of the text.'

Prior knowledge also plays a very important role in inferencing, a cognitive process used to construct meaning. Inferencing in reading refers to the mechanism through which the reader gets information beyond what is explicit in the text. Consider the following example provided by Rumelhart (1977b):

> **Mary heard the ice-cream man coming down the street. She remembered her birthday money and rushed into the house.**

This sentence can be easily understood by readers who know about ice-cream and ice-cream trucks. For some readers it is easy to 'infer' that Mary likes ice-cream and that she wants to get some with the money she received for her birthday. This sentence does not say that Mary likes ice-cream; nor does it say why she ran into the house. We are able to infer, however, that Mary ran into the house to get money to buy ice-cream. It is our prior knowledge that helps us get this information. In some cultures, on the other hand, ice-cream can only be purchased at special places, such as ice-cream parlors. Someone who comes from such a social group will have difficulty in understanding what an ice-cream truck is and how Alice could have 'identified it' by 'hearing' it. Why did she run into the house? Was she scared by the man? Did she run into the house looking for a shelter? Or did she think that her money might be stolen? Consequently, it

may be claimed that lack of relevant background information can hinder reading comprehension.

Other studies in L2 reading have examined the effect of topic familiarity and text structure on reading comprehension (Alderson and Urquhart, 1988; Carrell, 1984; Carrell, 1987; Nunan, 1985). Results from these studies have provided evidence that familiarity with text content and structure facilitate comprehension.

Carrell (1987) not only studied the effect of topic familiarity and text structure on reading comprehension but also examined their relation to each other. Fifty-two ESL students were divided into two groups based on their religious background. Group 1 consisted of 28 students of Muslim background, and group 2 consisted of 24 students of Roman Catholic background. Two reading passages were developed. Each passage was a biography of little-known Muslim and Catholic characters. Two versions of each passage were created; one version was a well-formed historical narrative, while the other presented a altered rhetorical organization. As predicted, the content familiarity and familiar rhetorical structure condition yielded good reading comprehension. On the other hand, unfamiliar content and unfamiliar rhetorical structure yielded poor reading comprehension. Carrell claims that when the subjects read a 'mixed' text (familiar content, unfamiliar rhetorical structure; unfamiliar content, familiar rhetorical structure) content familiarity affected comprehension to a greater extent than rhetorical structure. It is not explained, however, how the author defined topic familiarity. Religion is such an important part of life in some social groups that

it is hard to understand in this study why religious background was considered topic knowledge and not cultural background.

Although results from research indicate that background knowledge facilitates inferencing and text comprehension, it is not yet understood to what extent prior knowledge overrides language difficulties. Research has not provided conclusive results. Hammadou (1991) conducted two parallel studies, one in French, and one in Italian. Participants in the study were all native speakers of American English enrolled in French and Italian courses. Students were divided into two categories: beginners and advanced. All participants read authentic passages on familiar and unfamiliar topics. Familiar and unfamiliar topics were selected based on a previous survey of similar university students. The ranking for topic familiarity of French passages was: 1) AIDS; 2) Stealth bomber; 3) Sudan. The best recalled French passages were: 1) Stealth bomber; 2) Sudan; 3) AIDS. The ranking by topic familiarity of Italian passages was: 1) Sports; 2) Cinema; 3) Biography. However, the Italian passages in order of best recall were: 1) Biography; 2) Cinema; 3) Sports. Results indicate that the topics judged as most familiar (Sports and AIDS) were the least well recalled. Hammadou claims that a possible explanation for her results may lie in the fact that there is not a shortcut method for identifying prior knowledge. She calls into question a subject's self report on her/his prior knowledge. In her study, familiarity ranking was unable to predict better recalls of the passage. An important issue that is not considered in this study is the linguistic proficiency of the

participants. Although some of the students were considered advanced compared to the other participants, the language used in the unedited passages may have been beyond their linguistic abilities.

Language proficiency and text features have also been studied as major variables in the process of reading in a foreign language. Clarke (1988) examined the reading behaviors of Spanish speakers when reading in Spanish and in English. The participants were identified as good or poor L1 readers. Their answers on cloze tests in Spanish and in English were analyzed. Results indicated that good readers appeared to rely more on semantic cues than on syntactic cues compared to poor readers when reading in their native language. The gap between good and poor readers was reduced when the subjects were reading in English; the use of syntactic cues was equal by both good and poor readers when reading in the second language. Clarke claims that although good readers may transfer their L1 reading skills when reading in a foreign language, the linguistic proficiency of the readers has an important role in text comprehension. It seems that the reader's limited competence can "short-circuit" the good reader's system. This results in good readers using poor readers' strategies because of their inability to transfer successful L1 reading strategies.

Alderson and Urquhart's (1988) study supports the importance of linguistic competence in reading comprehension. They found that the background knowledge hypothesis was only partially confirmed, but there was strong evidence that suggested that readers with higher

language level outperformed those readers with weaker language knowledge.

Few second language reading studies have investigated how syntax at the sentence and text level affects reading comprehension. This is an important omission. Lack of data on this issue is rather surprising since a considerable amount of time is spent in second/foreign language classrooms explaining and practicing syntactic structures (Bernhardt, 1991). Guarino and Perkins (1986), Bhatia (1984), and Blau (1982) found that syntactic complexity does not affect reading comprehension significantly.

More recently, results from Yano, Long, and Ross's (1994) study indicate that linguistically simplified texts did not result in significantly increased comprehension. The participants in this study were 483 Japanese college students who read one of three versions of 13 reading passages. Research indicates that native speakers (NS) make various adjustments when conversing with nonnative speakers (NNS) in order to facilitate comprehension. (For a review, see Larsen-Freeman and Long, 1991; Long, 1983a.) Based on these findings, Yano et al. (1994) rewrote 13 passages from a wide range of areas: biology, computer science, ecology, geography, history, linguistics, and sociology. There were three versions of each passage: (a) native baseline, (b) simplified, and (c) elaborated. In the simplified form of the NS baseline version, sentences were shorter and the number of embedded clauses was kept to a minimum. In the elaborated form, paraphrasing was used to restate ideas and to provide definitions of low-frequency content words. Results

indicate that comprehension was higher for those participants who read the simplified version of the text, but not significantly higher than it was for those who read the elaborated version. Yano et al. claim that elaborated reading texts expose L2 reader to natural discourse. Elaborated texts are semantically rich and help readers make inferences and achieve better comprehension.

Strother and Ulijn (1987) provide consistent findings in this regard. They found that there were no significant differences between the subjects who read a syntactically simplified journal article and those who read an unsimplified version of the same article. Strother and Ulijn suggest that knowledge of vocabulary is more important than syntactic complexity. They conclude that "lexical rewriting" rather than "syntactic rewriting" of professional texts will result in better comprehension.

The importance of vocabulary knowledge in the process of reading has been well recognized in L1 reading. L1 reading research has reported strong correlations between word knowledge and comprehension (Wittrock, Marks, & Doctorow, 1975; Anderson & Freebody, 1981; Nagy, William, Herman, & Anderson, 1985; Medo & Ryder, 1993). Very few studies in L2 reading, however, have investigated how vocabulary knowledge relates to comprehension. This lack of data is rather surprising when we reflect that L2 reading research has been heavily dependent on L1 reading findings. In addition, because reading in a second or foreign language involves learning a new linguistic code, lower-level processing skills such as word knowledge can be assumed to be critical. One possible

explanation for this lack of data may the strong influence that schema theory and Goodman's psycholinguistic model have had on L2 reading research.

At the word recognition level, some L2 reading researchers have examined how orthography affects reading. Koda (1987, 1992), and Shimron and Sivan (1994) investigated the effect of the orthographic system on the process of reading and word recognition. Koda used Japanese students reading in English, and American college students reading in Japanese as a foreign language. In both studies, she found evidence supporting the claim that L2 readers focus strongly on visual information present in graphemic features when reading in a different orthographic system. This heavy involvement in lower-level processing strains the reader's short-term limited capacity, which frequently results in poor comprehension. In Shimron and Sivan's study, twenty four native speakers of Hebrew and twelve native speakers of English read two passages, one in Hebrew and the other in English. All the participants were highly advanced bilinguals who used their second language daily at work. Results of this study support the claim that orthography is an important variable in the process of reading. Shimron and Sivan's findings indicate that the text was read faster in English than in Hebrew; even by native speakers of Hebrew.

Kim (1995) examined the effect of vocabulary and prior knowledge on EFL students' recall protocols. The participants in this study were 108 Korean students who had been studying English as a foreign language for at least four and a half years. The students

were randomly assigned to one of the four treatments: (A) difficult vocabulary without prereading instruction; (B) easy vocabulary without prereading instruction; (C) difficult vocabulary with prereading instruction; and (D) easy vocabulary with prereading instruction. The prereading instruction was assumed to give the students information about what the text content was about, and knowledge in the content area of the text. Prereading instruction did not seem to have a strong effect on the amount of information recalled. The means were not noticeable different between the groups that read the difficult version, with or without prereading instruction, and between the groups that read the easy version, with or without prereading instruction. Results from this research indicated, however, that prereading instruction influenced the type of information that the participants included in their recalls. Participants who read the difficult vocabulary text and received prereading instruction reported more extratextual information, "which mostly reflected blind reliance on what the subjects remembered from the prereading instruction" (p. 53). The results of this study supported the claim that difficult vocabulary places a certain strain on the students' comprehension capacity, and that prereading instruction was not enough to help the students cope with difficult vocabulary.

Most L2 reading studies that have focused on vocabulary have been concerned with the pedagogical aspect of vocabulary knowledge and reading. Having recognized the important role of vocabulary in first language reading, L1 and L2 reading specialists have examined

techniques that teachers can effectively use to help their students retain words. Some of the techniques that are often suggested are: *possible sentences* (More and More, 1986), *list-group-label* (sometimes also called *semantic mapping* ; Johnson and Pearson, 1984), *contextual redefinition* (Cunningham, Cunningham, and Arthur, 1981), *feature analysis* (Johnson and Pearson, 1984, and *keyword method* (Pressley, Levin, and Delaney 1982). Further discussion of these techniques is beyond the scope of this review.

The technique that has received the most attention in the L2 reading field is the *keyword method*. Results from some early studies indicate that the keyword method facilitates the acquisition of new words in a foreign language (Atkinson and Raugh, 1975; Pressley, Levin and Delaney, 1982). There are two steps when students use the keyword method, the acoustic stage and the image stage. First, students find a known word that sounds like (and possible looks like) the target word. Tierney, Readence, and Dishner (1990) provide an example of this first stage when reading in English as their first language. Students encounter the word *potable* and think of the word *pot* that they already know. Both words are relatively similar in sound and spelling. When reading in a foreign language, students think of a word that may sound and look similar in their first language. Native speakers of Spanish trying to remember the meaning of the English word *glob* might think of the Spanish word *globo* , which means *balloon* and is similar in spelling and in sound. In stage two, the students create a visual image and associate it with the target. For instance, after the word potable is

related to the word pot, the students think of a pot filled with crystal clear, cool water (Tierney et. al, 1990). The Spanish speakers may create the image of something round similar to a drop that can be big or small. This technique is believed to help them store and retrieve words, so that next time native speakers of Spanish read a phrase such as 'a glob of paste,' or 'a glob of mashed potatoes,' they will easily access the meaning of the English word.

More recently, Hogben and Lawson (1994) examined whether experienced foreign language learners can also benefit from the use of the keyword method. In a brief report of their study Hogben and Lawson indicate that this method can also be successfully used with advanced foreign language learners.

One of the disadvantages that I can see when using this technique is that it is time consuming for the teacher if s/he generates the keywords, or for the class if the teacher intends to have the students come up with their own keywords. In the second stage, the creating of the visual image, the teacher can provide the image that links the key word and the target word; in this case there is no personal involvement by the students, resulting in a potentially extraneous image. On the other hand, if the students are asked to generate their own image, it is likely that a wide variety of visual images will be created. This will make virtually impossible for the teacher to help the students recall a word later on by referring to their mental image.

2.3 Vocabulary Knowledge and Reading Comprehension

Results from L1 reading research provided robust findings indicating that vocabulary knowledge affects reading comprehension. In fact, vocabulary knowledge have been found to correlate with text comprehension (Anderson and Freebody, 1981). Since research also indicated that prior knowledge facilitates comprehension, several L1 reading studies were carried out to investigate the compensatory hypothesis presented by interactive models of reading (Rumelhart, 1977; Stanovich, 1980, 1984). According to this hypothesis, deficiencies at any level during the reading process can be compensated for at another level. In other words, a reader that has difficulties at lower-level process, can compensate for this deficiency by using high-level processing. Results from these studies failed to provide evidence of such interaction between vocabulary knowledge and prior knowledge (Freebody and Anderson, 1983b; Kim and Goetz, 1994; Medo and Ryder, 1993; Stahl, Hare, Sinatra, and Gregory; Stahl and Jacobson, 1986; Stahl, Jacobson, Davis and Davis, 1989).

Stahl et al. (1989) studied how vocabulary difficulty and prior knowledge affect reading comprehension of an unfamiliar text. Their findings are consistent with results from earlier studies. Vocabulary and prior knowledge seem to affect recall, but these factors affect comprehension in different ways. Those students who read the difficult vocabulary version recalled more information out of order. It appears that unknown vocabulary hampers the development of a coherent text. The authors concluded that

vocabulary and background knowledge function independently and that readers do not use one higher-level process, such as prior knowledge, to compensate for problems in another higher-level knowledge source, such as difficult vocabulary.

Stahl (1991) suggests that the ongoing comprehension process has two components, microprocessing and macroprocessing. Microprocessing involves the development of a microstructure; this implies the combination of propositions into a coherent text. This process allows readers to recall coherent and ordered ideas from the text. Macroprocessing involves the development of the gist of the text. Readers can get a general idea of the text but have difficulty in understanding the relationship among the ideas presented.

As in first-language studies in reading, the importance of vocabulary has also been recognized in L2 reading research (Koda, 1989; Krashen, 1989; Laufer, 1990; Schulz, 1983). However, whereas current L1 reading researchers continue to examine the role of vocabulary in the process of reading, this interest in vocabulary is not so strong in L2 reading studies. Stoller and Grabe (1993) claim that "current L1 research suggests that vocabulary is much more central to understanding processes than L2 theorists and practitioners have generally recognized." (p. 25)

Eskey (1988) recognized the importance of background knowledge in reading comprehension, but also warned us of the potential hazards of de-emphasizing "the perceptual and decoding dimensions' of the process of reading. (p. 93)

Conclusions

Although most foreign language teachers have always perceived vocabulary knowledge as a predictor of success or failure in L2 reading, they have not received much evidence for this from empirical research. The strong influence of the psycholinguistic model and schema theory for over a decade have resulted in a large number of studies that focused on top-down processing.

Despite robust evidence provided by L1 reading research on the important role that vocabulary knowledge plays in the process of reading, very few studies have examined how vocabulary knowledge affects the process of reading in a foreign language.

There is some evidence that indicates that poor lower-level skills may 'short-circuit' the reading process in a foreign language, which will result in poor text comprehension. The orthographic system has proven to affect the process of reading. Although there is some research that focused on some bottom-up recognition skills, no studies have directly investigated *how* unknown words affect comprehension, and what aspects of the process are affected the most by unknown vocabulary. It is easy to understand the need of empirical research on the effect of vocabulary on the L2 reading process. Results from such studies will contribute to the development of second language reading models. Sound evidence from empirical research will also help reading teachers develop effective techniques to help language learners become efficient and effective readers.

CHAPTER THREE

METHODOLOGY

The purpose of this study is to investigate the effects of background knowledge and vocabulary on the process of reading in a foreign language, and the possible interaction between these two factors. Several studies carried out during the 1980s demonstrated the importance of background knowledge in the process of reading in a second language (Alderson and Urquhart, 1988; Carrell, 1983a, b, 1984b; Carrell and Eistehold, 1983; Johnson, 1982, Lee 1986). Since most foreign-language readers do not have an extensive knowledge of the foreign culture, peoples' customs and beliefs, the role that background information has in reading in foreign-language may be even more important than it is in first language reading.

The importance of vocabulary knowledge in the process of reading has been well recognized in first language (L1) reading. Studies in L1 reading have reported that there are strong correlations between word knowledge and reading comprehension (Wittrock, Marks and Doctorow, 1975; Anderson and Freebody, 1981; Nagy, William, Herman and Anderson, 1985; Medow and Ryder, 1993). Even though studies on the process of reading in L2 have closely followed L1 reading research in general, the interest in vocabulary is not parallel between the two fields. Whereas L1 reading researchers continue to investigate the role of vocabulary in reading comprehension, such research in L2 reading has been scarce. There

are a few early studies that emphasized the importance of vocabulary in ESL reading (Twaddell, 1973; Eskey, 1973) but most recent studies have focused on examining how prior knowledge affects reading. In some cases researchers examined the relationship between overall language proficiency and reading comprehension (Clarke, 1988; Alderson and Urquhart, 1988). But in such studies researchers concentrated more on the effect of syntax rather than the effect of vocabulary when analyzing their data.

During the 1980s, data from L1 reading research indicated that these two factors--background knowledge and prior knowledge--are closely related to each other. In fact, Stanovich (1980, 1984) claimed that there is an interactive-compensatory effect between prior knowledge and vocabulary during the process of reading. According to this hypothesis, L1 readers who have difficulties at one level may compensate for this deficiency by relying more on another level. In any particular reading situation, for instance, readers who find several unknown words can still understand the text if the topic is familiar to them. Research in L1 reading, however, has failed to provide strong evidence to support the interactive-compensatory hypothesis. On the contrary, results from some L1 reading studies indicate that the two factors--background knowledge and vocabulary--function independently. They may both affect comprehension but in different ways. Background knowledge seems to affect macroprocessing while vocabulary appears to affect microprocessing. Macroprocessing allows the reader to get the gist of the text. Microprocessing allows the reader to combine the words

into propositions and involves the combination of those propositions into coherent texts.

This study will investigate how prior knowledge and unknown vocabulary affect students' written recall of central and supporting ideas and the effect of these two variables on comprehension in a multiple-choice task. The possible interactive effects of background knowledge and vocabulary will also be examined. This research will attempt to answer the following questions:

a) How does prior knowledge affect information recall?

b) How does vocabulary difficulty affect information recall?

c) How does prior knowledge affect comprehension?

d) How does vocabulary difficulty affect comprehension?

e) Do prior knowledge and difficult vocabulary function interactively?

The following hypothesis regarding the role of vocabulary and background knowledge in L2 reading were formulated:

1. L2 readers who read about a *familiar topic* will perform better on the *recall of central units* than those who read about an unfamiliar topic.

2. L2 readers who read about a *familiar topic* will perform better on the *recall of supporting units* than those who read about an unfamiliar topic.

3. L2 readers who read an *easy vocabulary* text will perform better on the *recall of central units* than those who read a difficult vocabulary version.

4. L2 readers who read an *easy vocabulary* text will perform better on the *recall of supporting units* than those who read a difficult vocabulary version.

5. L2 readers who read a *difficult vocabulary* text about a familiar topic *will not compensate* for unknown vocabulary with topic familiarity in their *recall of central units*.

6. L2 readers who read a *difficult vocabulary* text about a familiar topic *will not compensate* for unknown vocabulary with topic familiarity in their *recall of supporting units*.

7. L2 readers who read about a *familiar topic* will not perform better on answering *textually explicit questions* than those who read about an unfamiliar topic.

8. L2 readers who read an *easy vocabulary* text will perform better on answering *textually explicit questions* than those who read a difficult vocabulary version.

9. L2 readers who read a *difficult vocabulary* text about a familiar topic *will not compensate* for unknown vocabulary with topic familiarity to answer *textually explicit questions*.

10. L2 readers who read about a *familiar topic* will not perform better on answering *textually implicit questions* than those who read about an unfamiliar topic.

11. L2 readers who read an *easy vocabulary* text will not perform better on answering *textually implicit questions* than those who read a difficult vocabulary version.

12. L2 readers who read a *difficult vocabulary* text about a familiar topic *will not compensate* for unknown vocabulary with topic familiarity to answer *textually implicit questions*.

13. L2 readers who read about a *familiar topic* will perform better on answering *scriptically implicit questions* than those who read about an unfamiliar topic.

14. L2 readers who read an *easy vocabulary* text will not perform better on answering *scriptically implicit questions* than those who read a difficult vocabulary version.

15. L2 readers who read a *difficult vocabulary* text about a familiar topic *will not compensate* for unknown vocabulary with topic familiarity to answer *scriptically implicit*

questions.

3.1 SUBJECTS

Participants in the study were 105 high-school students in five intact classes in a mid-size town in the midwestern United States. All the participants were juniors and seniors who consented to participate in the study. Their participation in the study was entirely voluntary and no student received any monetary compensation. It was clearly explained to them that the activities they were going to do during the study would not bring any changes into the classroom or in the way their classes were usually conducted. It was also explained to them that their performance on the activities was not going to affect their grades in any way. All the explanations were given in English to be sure that all the students understood them.

From the original 105 participants, the responses of 62 students were considered in this study. Responses from 43 students were not included because either (a) Spanish was the language used at home, or (b) they had been studying Spanish as a foreign language for less than four years, or (c) they did not attend all the classes, when the study was explained and the data collected. Table 1 presents the number of students in each class whose responses were not included in the study and the reasons for not including them.

TABLE 1
STUDENTS' RESPONSES NOT INCLUDED IN THE STUDY

Group	Number of students whose responses were not included	Reasons
A	2	Spanish used at home
A	3	missed some readings
B	6	missed some readings
B	7	Studied Spanish less than 4 yrs.
C	4	missed some readings
C	7	studied Spanish less than 4 yrs.
D	2	missed some readings
E	6	missed some readings
E	7	studied Spanish less than 4 yrs.

Except for one student who was 14 years old, all the participants in the study ranged in age from 15 to 18. The fourteen-year-old student's responses were included in the study because they were not significantly different from those provided by older students.

TABLE 2
AGE AND GENDER OF PARTICIPANTS

Age	18	17	16	15	14
Females	6	19	9	4	1
Males	3	9	10	1	0

Of the 62 students whose responses were included in the study, thirty nine were females and twenty three males. (Table 2)

Sixty students indicated that English was the language spoken at home. One student reported that he used Persian at home and another student reported that Bangladeshi was the language spoken at home. According to their classroom teacher neither of these students performed differently from the rest of the class in regular activities.

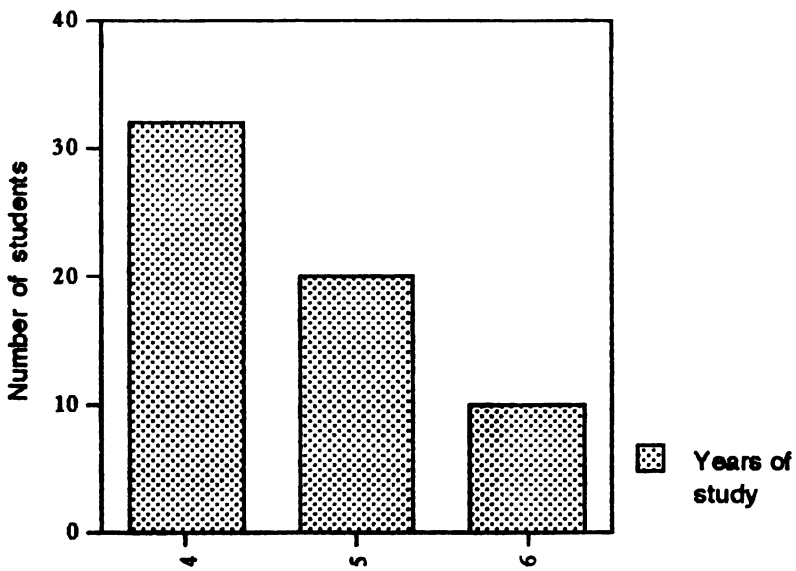

FIGURE 3
NUMBER OF YEARS THAT THE STUDENTS HAD STUDIED SPANISH

All the students whose responses were included in this study had been studying Spanish as a foreign language for a period of 4 to 6 years. Thirty-two students had been studying Spanish for 4 years; twenty students had studied the language for 5 years and ten students for a period of 6 years. Figure 3 shows the participants grouped according to the length of time they had been studying Spanish.

Twenty-four participants had visited a Spanish speaking country. Ten students had visited Mexico; seven had been to Spain; 6 had visited Costa Rica and one student had been to El Salvador. The length of time they stayed in the Spanish speaking countries varied from 2 days to 6 weeks. Figure 4 represents both groups of students, those who had never visited a Spanish speaking country and those who visited countries where Spanish was the native language. Figure 5 represents the Spanish speaking countries that the students visited.

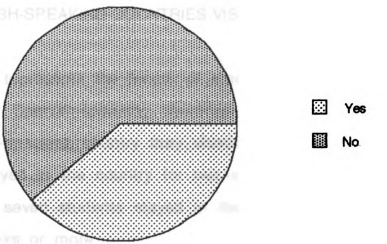

FIGURE 4
STUDENTS WHO VISITED SPANISH-SPEAKING COUNTRIES

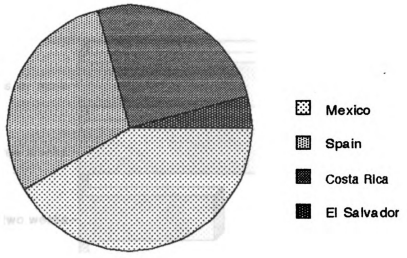

FIGURE 5
SPANISH-SPEAKING COUNTRIES VISITED BY THE STUDENTS

Figure 6 represents the length of time those students stayed in the different Spanish-speaking countries. Seven students stayed in the Spanish-speaking country they visited for a week or less; four students stayed in the country for two weeks; six students spent 3 weeks, and seven students stayed in the Spanish-speaking country for four weeks or more.

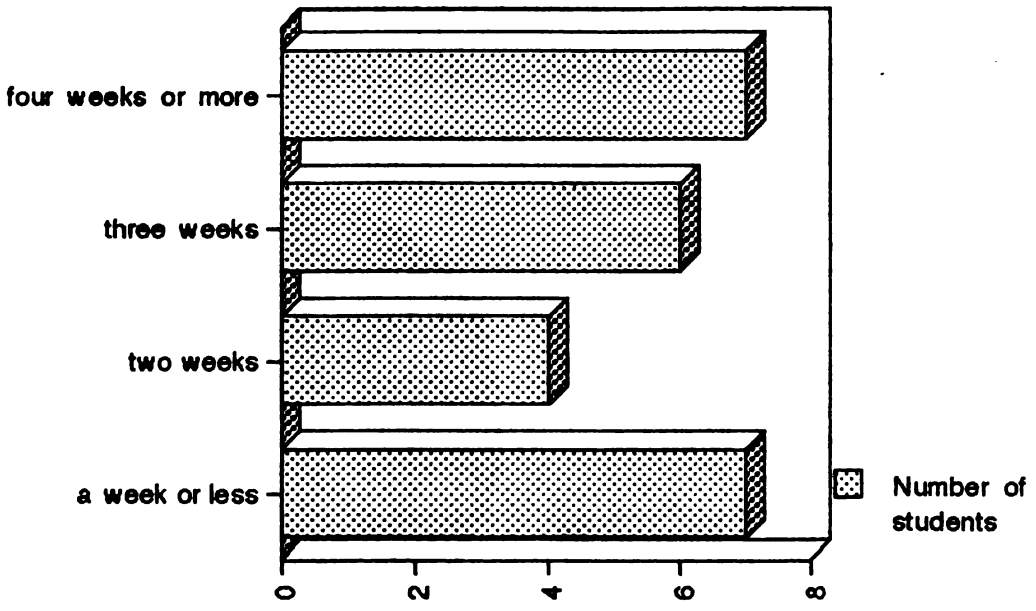

FIGURE 6
LENGTH OF STUDENTS' STAY IN A SPANISH-SPEAKING COUNTRY

Some of the students who participated in the study had Spanish speaking relatives or friends. Thirty-one participants indicated that they did not have any relatives or friends who spoke Spanish. Thirteen students indicated that their Spanish speaking friends used Spanish only when they talked to each other, but not when they talked to the participants of the study. Eighteen students said that their Spanish speaking friends used Spanish not only when they talked to each other but also when they talked to the students. Figure 7 represents the students who did not have Spanish speaking relatives or friends and those who had Spanish speaking friends. The section that represents the students who had Spanish speaking friends/relatives also indicates those participants whose friends/relatives spoke Spanish to them and those whose

friends/relatives used the language while the students were around but not when talking to the participants in the study.

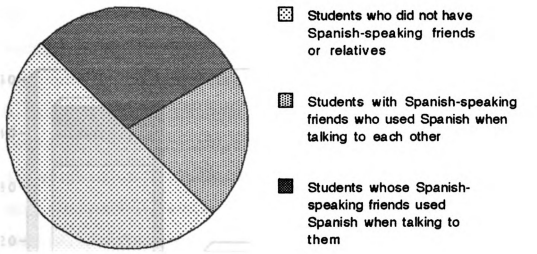

FIGURE 7
STUDENTS WHO HAD/DID NOT HAVE SPANISH-SPEAKING FRIENDS

Forty-five students reported that they were exposed to Spanish outside the classroom by watching television, and reading books and magazines in Spanish. The rest of the students said that their only contact with the foreign language was in the classroom.

The majority of the students reported that they were planning to continue studying Spanish after they finish high school. Forty-five participants indicated their interest in continuing with the study of the language beyond high-school; seven students said that they were not sure at that time, and ten participants indicated that they had decided not to continue learning Spanish after they graduated. Figure 8 represents the students who were in contact with Spanish outside

the classroom and those who were not. The same figure indicates the number of students in each group (exposed and not exposed outside the classroom) that planned/did not plan to continue studying Spanish after they finished high school.

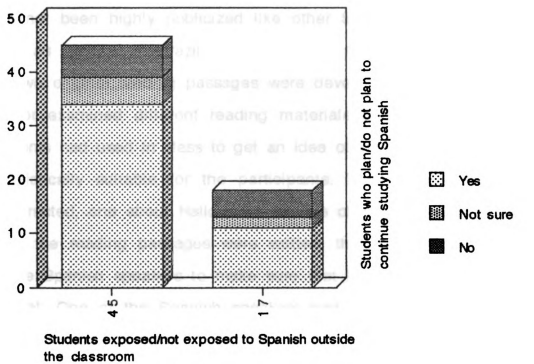

FIGURE 8
STUDENTS' LANGUAGE EXPOSURE AND PLANS TO CONTINUE STUDYING

3.2 MATERIALS

The nature of the study required that special attention be paid to the topics selected for the reading texts. Two passages were used: one reading passage was on a familiar theme, the other presented an unfamiliar topic. Since all the participants in the study were

assumed to be American high-school students[2], *Halloween* was selected as the topic for the familiar passage. The reading passage on an unfamiliar topic was about *La Diablada*, a festival held in Bolivia every year. La Diablada was considered an appropriate topic because: a) Bolivia is a Latin American country with which not many high-school students are familiar; b) La Diablada is a festival that has not been highly publicized like other South American festivals, such as Carnival in Brazil.

Two original reading passages were developed for the study. The author examined different reading materials and tests that the students had used in class to get an idea of what would be linguistically suitable for the participants. Then, two passages were constructed, one about Halloween and the other about La Diablada. After the reading passages were written, they were read by two native Spanish speakers to make sure that the reading sounded natural. One of the Spanish speakers had formal linguistic training and experience in teaching Spanish as a foreign language in the United States. The other Spanish speaker had no linguistic training and had no experience in teaching any languages. His area of study is Biochemistry, and he had been living in the States for just a year at the time he read the passages. The changes suggested by both Spanish speakers were discussed and incorporated. There was total agreement between the Spanish speakers themselves and the author on what became the final version of the reading passages. The passage about Halloween consisted of three paragraphs; the easy

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[2] Two students who participated in the study were not Americans; one came from Iran and the other from Bangladesh. Both of them, however, had lived in the United States for over five years, long enough to be familiar with Halloween.

version contained 269 words and the hard version had 267 words. The passage about La Diablada consisted of three paragraphs; the hard version contained 290 words and the easy version contained 289 words.

Based on the two original passages, two versions of each passage were developed, a difficult version and an easy version. The level of difficulty was determined by the vocabulary used in the texts. The easy version contained words frequently used in intermediate/high intermediate reading materials. The difficult version contained words that are generally used less frequently. The reading passage that contained these words was considered the hard version of the reading passage. The procedure used to create the easy and the difficult versions of each reading passage was modeled on the procedure used by Stahl, Jacobson, Davis and Davis (1989) in their study on the effect of prior knowledge and difficult vocabulary when reading in the first language. The easy version included words that were thought to be known to the students. As will be discussed later in this chapter, there were three words in both versions (easy and hard) of the passage about La Diablada that were considered easy. As a result of the post-data collection activity, it was found that three participants did not know these words. For the hard version, approximately every sixth content word was replaced by a difficult (unknown) synonym. Special attention was paid to make both versions sound natural, avoiding the use of stilted language. In some cases, a function word was changed, added or deleted in an effort to make the modified text sound natural. After the two versions of each reading passage were developed, they were read by

the two native Spanish speakers who read the original passages to make sure that the four final versions did not sound affected or artificial. Excerpts from the two versions of each passage are shown in Table 3.

TABLE 3
SAMPLE PARAGRAPHS FROM EASY AND HARD TEXT VERSIONS

Familiar topic - easy version

Una de las fiestas más esperadas por los niños de Norteamérica es la famosa "Noche de Brujas". Ese día por la tardecita, los niños van de puerta en puerta visitando amigos y vecinos. Los niños y a veces también los adultos llevan máscaras, algunas muy feas, que representan personajes de ciencia ficción, figuras del gobierno y muy especialmente brujas, fantasmas y esqueletos.

Familiar topic - hard version

Una de las fiestas más esperadas por los niños de Norteamérica es la famosa "Noche de Brujas". Ese día por la tardecita, los niños van de puerta en puerta visitando amigos y vecinos. Los niños y a veces también los adultos llevan máscaras, algunas horripilantes, que representan personajes de ciencia ficción, figuras gubernamentales, y muy especialmente brujas, fantasmas y esqueletos.

Unfamiliar topic - easy version

Cada año se celebra en Oruro, Bolivia, la famosa "Diablada". Esta es una de las fiestas más originales e interesantes de Sudamérica. La población de Oruro está compuesta, en su mayor parte, por indios. Todos los años en tiempo de Carnaval, en febrero o marzo, estos indios abandonan sus peligrosos trabajos en las minas y se ponen a bailar al ritmo de las guitarras y otros instrumentos típicos. Los bailarines llevan máscaras que representan diferentes figuras de la

TABLE 3 (cont'd)

historia y de la mitología, así como también sapos, serpientes y especialmente diablos, centenares de diablos. Muchos de los turistas que llegan a ver la diablada no entienden el doble significado de la fiesta.

Unfamiliar topic - hard version

Cada año se celebra en Oruro, Bolivia, la famosa "Diablada". Esta es una de las fiestas más interesantes de Sudamérica. La población de Oruro está compuesta, en su mayor parte, por quechuas. Todos los años en tiempo de Carnaval, en febrero o marzo, estos indios dejan sus peligrosos trabajos en las minas y se ponen a bailar al ritmo de los charangos y otros instrumentos típicos. Los bailarines llevan caretas que representan figuras de la historia y de la mitología, así como también batracios, serpientes y especialmente diablos, centenares de diablos. Muchos de los turistas que llegan a presenciar la diablada no entienden el doble significado de la fiesta.

The first two sentences and the last sentence were the same in both versions--easy and hard--of the two reading passages on the same topic. A copy of both reading passages--familiar and unfamiliar--hard and easy versions, along with the translations into English are included in Appendix A.

3.3 INSTRUMENTS

The written-recall measure. The first measure used after the participants read the passages was a free written recall. After reading the passage, each student received a blank page with instructions printed at the top. The instructions, written in English,

asked the participants to write as much information as they recalled from the passage they had just read.

In order to quantitatively assess the readers' protocols, each reading passage had been divided into linguistic units. In addition to the two native speakers of Spanish who had read the first versions of the reading passages, two other near native speakers of English worked independently to divide the passages into clauses following Lee's (1987) procedures adapted from Johnson (1970). Johnson was the first to devise an objective method for dividing prose. Lee (1987) adopted Johnson's methodology and suggested dividing the text into clauses. Table 4 shows how the first paragraphs of the easy version of the reading texts were divided.

All disagreements were discussed and resolved before the data were collected. The passage about Halloween was divided into twenty-four linguistic units, and the passage about La Diablada was divided into twenty-seven.

TABLE 4
SAMPLE PARAGRAPHS FROM FAMILIAR AND UNFAMILIAR TEXTS

La Noche de Brujas

/Una de las fiestas más esperadas por los niños de Norteamérica es la famosa "Noche de Brujas". / Ese día por la tardecita, los niños van de puerta en puerta visitando amigos y vecinos. / Los niños y a veces también los adultos llevan máscaras, / algunas muy feas, / que representan personajes de ciencia ficción, figuras del gobierno y muy especialmente brujas, fantasmas y esqueletos. /

La Diablada

/Cada año se celebra en Oruro, Bolivia, la famosa "Diablada". /

TABLE 4 (con't)

Esta es una de las fiestas más originales e interesantes de Sudamérica. / La población de Oruro está compuesta, en su mayor parte, por indios. / Todos los años en tiempo de Carnaval, en febrero o marzo, estos indios abandonan sus peligrosos trabajos en las minas / y se ponen a bailar al ritmo de las guitarras y otros instrumentos típicos. / Los bailarines llevan máscaras / que representan diferentes figuras de la historia y de la mitología, / así como también sapos, serpientes y especialmente diablos, centenares de diablos. / Muchos de los turistas que llegan a ver la diablada / no entienden el doble significado de la fiesta.

Modeled on the procedure suggested by Johnson (1970), the clauses were then classified according to their importance to the whole text. When the importance of the clauses is taken into consideration, they can be classified as *central, supportive,* and *distracting.* Using this classification, the same readers who divided the text into clauses were then asked to rank the clauses according to their importance to the passage. This was done in two steps. First the readers were asked to cross out clauses until only half of the original number of clauses was left. They were instructed to cross out those clauses which "could be eliminated without destroying the essence of the story" (Johnson, 1970 p.13). At a second stage, the readers were presented with the clauses they had left and asked to cross out half of them so that only those clauses that constituted the core of the reading remained. The units left were classified as central clauses and the units that were crossed out during this second stage were considered supportive clauses. All the clauses

that were crossed out the first time were classified as distracting clauses.

As a result of this classification, six linguistic units from the passage about Halloween were classified as central units and six as supporting units. From the passage about La Diablada, seven linguistic units were classified as central units, and six as supporting units. Table 5 and 6 present the central, and supporting units from the reading passages.

TABLE 5
CENTRAL AND SUPPORTING UNITS FROM HALLOWEEN

Central units:
- La Noche de Brujas se inició como un festival Celta
-(Los Celtas) dedicaba el último día de octubre al Señor de la Muerte
-(Para los Celtas) en noviembre empezaba el invierno, la estación del frío, la tristeza y la oscuridad
-Los Celtas asociaban el primer día de noviembre con los muertos
-(Fue) durante la dominación romana
-(que) la celebración celta se mezcló con la cristiana
Supporting units:
-(La Noche de Brujas) es una de las fiestas más esperadas
-Los niños y los adultos llevan máscaras
-(Las máscaras) representan figuras del gobierno y fantasmas, brujas y esqueletos
-La gente encendía fuego por la noche
-para asustar a las malas influencias
-El Papa declaró el primero de noviembre el Día de Todos los Santos

TABLE 6
CENTRAL AND SUPPORTING UNITS FROM LA DIABLADA

Central units:

-Cada año se celebra en Oruro, Bolivia, la famosa Diablada
-Cuenta la leyenda de los Andes que hace mucho tiempo, el antiguo pueblo andino de los Urus llevó una vida de mucha libertad
-(luego) abandonó las malas costumbres
-Un espíritu malo resolvió vengarse
-Entonces apareció Ñusca, una princesa Inca, que transformó
a los animales en piedra.
-Para muchos habitantes de la zona y para la mayor parte de los indios, la Ñusca es la Virgen de Socabón.
-(La Ñusca) es la figura central de La Diablada

Supporting units:

-Todos los años en tiempo de Carnaval, en febrero o marzo, los indios abandonan sus peligrosso trabajos en las minas
-Los bailarines (los indios) llevan máscaras
-que presentan diferentes figuras de la historia y la mitología
-Un día (el pueblo de los Urus) cambio su manera de vivir
-(Un espíritu malo) trató de vencer a los Urus
-enviándoles muchos y diferentes animales

The comprehension measure. The measure used to assess students' comprehension of the texts was a multiple-choice test. Twelve multiple choice questions were developed for the familiar text and twelve for the unfamiliar text. All the questions and the

options were in English. The procedure used to write the questions was modeled on the procedure used by Stahl, Jacobson, Davis and Davis (1989) in their study on the process of reading in the first language. According to their coding scheme, four of the questions were textually explicit; four were textually implicit; and four were scriptically implicit.

A question whose answer was explicitly stated in the text was defined as a *textually explicit* question. A *textually implicit* question was defined as one whose answer had to be inferred from the text. A *scriptically implicit* question was defined as one whose answer had to be inferred by the reader on the basis of his/ her prior knowledge; this definition was also used in Pearson and Johnson (1978), Stahl and Jacobson (1986), and Stahl, Jacobson, Davis, and Davis (1989). All the questions and possible answers were presented in English in order to avoid comprehension problems.

3.4 PROCEDURES

The students who participated in this study had a fifty-minute class in Spanish every day. The data for this study were collected during three class periods. Although the classroom instructor stayed in the classroom during the time the study was carried out, all the data were collected by the researcher.

On the first day, all the students were asked to fill out a questionnaire that provided information about their age, gender, language used at home, and length of time they had been studying Spanish. In order to get more information about their exposure to the language outside the classroom, they had to indicate whether they

had lived in and/or visited a Spanish-speaking country; those who answered any of these two question affirmatively were asked to indicate the length of their stay in that country. The students were also asked to indicate whether they had Spanish-speaking friends or relatives who used Spanish when talking to them. The last two questions were about whether they read or watched television in Spanish and whether or not they were planning to continue studying the language after they finished high school. After the students completed the questionnaire and handed it in to the researcher, they were asked to complete a consent form which asked for permission to use the data collected for a study on the process of reading in a foreign language. Copies of the questionnaire and the consent form are included in Appendix A.

The students were told that during the following two days they were going to read two texts. They were also told that they could read the texts at their own pace and as many times as they needed. The participants were informed that there was no time limit for reading each passage. They were encouraged to make an effort to understand as much as they could because they were going to perform some activities after each reading. In order to ensure that all the students understood what they were going to do, all the explanations and directions were given in English.

On the following two days, each group was randomly assigned to read one of the two topics--familiar or unfamiliar. On day one of the data collection, groups B, D and E read the text that presented a familiar topic, Halloween; groups A, and C read the unfamiliar topic, La Diablada. On the second day that the data were collected, groups

B, D, and E read the unfamiliar topic and groups A and C read the familiar topic.

This resulted in all groups reading both reading texts--familiar and unfamiliar. Participants stayed in their classes and were randomly assigned to one of the two versions of the reading text--hard or easy. A total of thirty-two participants read the hard version of the unfamiliar topic, and thirty students read the easy version. Thirty-one students read the hard version and the same number of students read the hard version of the familiar topic. Table 7 represents the reading conditions for each group; figures in parenthesis indicate the number of students that read the easy and hard versions in each group.

TABLE 7
SCHEDULE OF READING CONDITIONS

	Day One	Day Two
Group A	La Diablada (hard= 10; easy=7)	Halloween (hard= 9; easy= 8)
Group B	Halloween (hard= 7; easy= 6)	La Diablada (hard= 6; easy= 7)
Group C	La Diablada (hard= 4; easy= 4)	Halloween (hard= 4; easy= 4)
Group D	Halloween (hard= 7; easy= 6)	La Diablada (hard= 6; easy= 7)
Group E	Halloween (hard= 4; easy= 7)	La Diablada (hard= 6; easy= 5)

The same data collection procedure used on day one was used on day two. Students received their reading texts and took as much time as they needed to read the passages. They were instructed not to use dictionaries, books, or consult with their classmates while reading. When they finished, they returned the reading passage to the researcher and received a blank sheet. The instructions on the sheet asked them to write in English as much information as they recalled from the text they had just read. A copy of the sheets where the students wrote their free recalls for each reading text--familiar and unfamiliar--is included in Appendix A.

When the students finished writing, they gave their written recalls to the researcher. Following the free recall, participants received twelve multiple-choice questions to assess their comprehension. Each question had four options. No answer sheets were used; participants marked their answers in the booklet. Four of the questions were textually explicit; four were textually implicit; and four were scriptically implicit. A copy of the multiple-choice task for each reading passage is included in Appendix A.

Upon completion of the multiple-choice task, participants turned it in to the researcher. Those students who finished first were allowed to study or prepare homework for other classes. On the first day of data collection, the classroom instructor let a few students go to the school library.

On the second day, those students who finished first were also allowed to do work for other classes but were asked not to leave the classroom. It is important to stress here that this study was designed to investigate the effect of prior knowledge and unknown

vocabulary on the process of reading. In order to evaluate the participants' prior knowledge about La Diablada and Halloween, and verify assumptions about topic familiarity and easy and hard vocabulary, two activities were done on the second day of the data collection. After all participants had finished the multiple-choice task and returned it to the researcher, they were asked to rate orally how familiar they were with the topics they had read. Three options were written on the board and participants were asked to raise their hands when they agreed with the option that was read. The options on the board were presented in different order to different groups. Table 8 presents how the options were presented to the five groups. All participants in all groups indicated that they were 'very familiar' with the topic Halloween.

The same procedure was used to evaluate students' prior knowledge about La Diablada. Results indicated that none of the participants was familiar with La Diablada. All the students claimed that they had never heard of or read about La Diablada.

TABLE 8
OPTIONS PRESENTED TO STUDENTS TO RATE TOPIC FAMILIARITY

Group A The topic	HALLOWEEN is	-very familiar to me -a little familiar to me -not familiar to me
Group B The topic	HALLOWEEN is	-not familiar to me -a little familiar to me -very familiar to me

TABLE 8 (con't)

Groups C & E The topic	HALLOWEEN is	-very familiar to me -not familiar to me -a little familiar to me
Group D The topic	HALLOWEEN is	-not familiar to me -very familiar to me -a little familiar to me

Following this activity, each student received a copy of one of the reading texts. Copies of both reading texts (familiar and unfamiliar) and copies of both versions (hard and easy) were randomly distributed among the students in every group. They were asked to reread the passage and underline all the words they did not know. As was predicted, all the hard words in both passages--Halloween and La Diablada--were unknown to the students. In addition to the predicted hard words, three more words were underlined by three students in the passage about La Diablada ('indios,' 'lugareños,' and 'ritmo'). It is interesting to notice that two of these words are very similar in English, 'indios' (Indians), and 'ritmo' (rhythm--more obvious in pronunciation than in spelling). Even though these words seem to be transparent in meaning, three participants failed to detect the connection between the Spanish and the English versions. 'Lugareños' refers to the people who live in a particular area 'lugar.' Although 'lugar' could be considered a high frequency word, three participants were not able to perceive the link between 'lugar' and 'lugareño.' The fact that all these words were included in the

unfamiliar text may have influenced the way participants viewed the words.

CHAPTER FOUR

ANALYSIS AND RESULTS

The first part of this chapter presents the quantitative analysis of the data collected for this study. First, the effect of topic familiarity and vocabulary on recall measure and comprehension measure is analyzed using descriptive statistics. Then a multivariate analysis of covariance (MANCOVA), a multivariate analysis of variance (MANOVA), and several univariate analyses of variance (ANOVA) were applied to the participants' recall of information, and to their comprehension scores.

In order to analyze the recall measure further, the participants' written protocols were individually examined. The second part of this chapter contains the results of the qualitative analysis .

4.1 QUANTITATIVE ANALYSIS

Statistical Analysis

Descriptive statistics. First, descriptive statistics were used to analyze the two dependent variables--recall and comprehension. As was expected, the mean scores were higher for recall when the participants read a familiar text (familiar: $\bar{X}$= 4.339, SD= 2.172; unfamiliar: $\bar{X}$= 3.323, SD= 2.141). Vocabulary difficulty also affected recall scores. The mean for participants who read the easy version (known vocabulary) was higher than for the students who read the version that contained unknown vocabulary (easy: $\bar{X}$= 4.393,

SD= 2.216; hard: $\bar{X}$= 3.286, SD= 2.075). A summary of descriptive statistics for recall scores is presented in Table 9.

TABLE 9
DESCRIPTIVE STATISTICS FOR RECALL SCORES

Variable	bckgrnd	N	Mean	Median	StDev	SEMean
Recall	0	62	3.323	3.000	2.141	0.272
	1	62	4.339	4.000	2.172	0.276
	vcbdiff					
	0	63	3.286	3.000	2.075	0.261
	1	61	4.393	4.000	2.216	0.284

Code: Bckgrnd= prior knowledge; 0= unfamiliar topic; 1= familiar topic.
Vcbdiff= vocabulary difficulty; 0= hard version/unknown vocabulary; 1= easy version/known vocabulary.

Histograms are graphic representations used to show the frequency distributions of the data. Histograms were also used in this study to display graphically the frequency distribution of recall scores. Figures 9 and 10 show the frequency distribution of recall scores for familiar and unfamiliar texts. Figures 11 and 12 display the frequency distribution of recall scores for hard and easy versions.

N= 62 bckgrnd= 0		
Midpoint	Count	
0	3	* * *
1	7	* * * * * * *
2	14	* * * * * * * * * * * * * *
3	15	* * * * * * * * * * * * * * *
4	9	* * * * * * * * *
5	7	* * * * * * *
6	1	*
7	3	* * *
8	1	*
9	0	
10	2	* *

FIGURE 9
RECALL SCORES FOR UNFAMILIAR TEXT

N= 62 bckgrnd= 1		
Midpoint	Count	
0	1	*
1	5	* * * * *
2	8	* * * * * * * *
3	9	* * * * * * * * *
4	13	* * * * * * * * * * * * *
5	5	* * * * *
6	10	* * * * * * * * * *
7	4	* * * *
8	7	* * * * * * *
9	0	
10	0	

FIGURE 10
RECALL SCORES FOR FAMILIAR TEXT

N= 63 vcbdiff= 0

Midpoint	Count	
0	4	* * * *
1	9	* * * * * * * * *
2	12	* * * * * * * * * * * *
3	12	* * * * * * * * * * * *
4	10	* * * * * * * * * *
5	7	* * * * * * *
6	3	* * *
7	3	* * *
8	3	* * *
9	0	
10	0	

FIGURE 11
RECALL SCORES FOR HARD VERSION

N= 62 vcbdiff= 1

Midpoint	Count	
0	0	
1	3	* * *
2	10	* * * * * * * * * *
3	12	* * * * * * * * * * * *
4	12	* * * * * * * * * * * *
5	5	* * * * *
6	8	* * * * * * * *
7	4	* * * *
8	5	* * * * *
9	0	
10	2	* *

FIGURE 12
RECALL SCORES FOR EASY VERSION

The same procedure was used for students' comprehension scores, and the results obtained were similar. The mean for comprehension scores was higher for those participants who read the familiar topic (familiar: $\bar{X}$= 8.742, SD= 1.890; unfamiliar: $\bar{X}$= 7.694, SD= 2.053). Students' comprehension scores also showed differences. The mean for comprehension scores was higher for participants who read the passages that contained known vocabulary (easy= $\bar{X}$ 8.377, SD= 2.001; hard= $\bar{X}$ 8.063, SD= 2.070). Table 10 presents a summary of descriptive statistics for comprehension scores of unfamiliar and familiar topic, and for easy and hard versions.

TABLE 10
DESCRIPTIVE STATISTICS FOR COMPREHENSION SCORES

Variable	bckgrnd	N	Mean	Median	StDev	SEMean
Cmprehnsn	0	62	7.649	7.000	2.053	0.261
	1	62	8.742	9.000	1.890	0.240
	vcbdiff					
	0	63	8.063	8.000	2.070	0.261
	1	61	8.377	9.000	2.001	0.256

Code: Cmprehnsn= comprehension
Bckgrnd= prior knowledge; 0= unfamiliar topic; 1= familiar topic.
Vcbdiff= vocabulary difficulty; 0= hard version/unknown vocabulary; 1= easy version/known vocabulary.

The frequency distribution of comprehension scores for familiar and unfamiliar texts and for hard and easy versions is displayed graphically in Figures 13, 14, 15, and 16 in Appendix B.

Descriptive statistics were also used to look at the central tendency and dispersion of the scores within each measure used, recall (main clauses and supporting clauses) and comprehension (explicit, implicit and scriptically implicit questions). Means and standard deviations for central clauses and supporting clauses are shown in Table 11.

TABLE 11
EFFECT OF BACKGROUND ON CENTRAL AND SUPPORTING CLAUSES

Variable	bckgrnd	N	Mean	Median	StDev	SEMean
Ctrl-Cl	0	62	1.645	1.000	1.392	0.177
	1	62	1.613	2.000	1.285	0.163
Sprtng-Cl	bckgrnd					
	0	62	1.677	2.000	1.142	0.145
	1	62	2.726	3.000	1.357	0.172

Code: Ctrl-Cl= central clauses; Sprtng-Cl= supporting clauses. Bckgrnd= prior knowledge; 0= unfamiliar topic; 1= familiar topic.

At this early stage of the analysis, there were already indications that prior knowledge affects different aspects of the

recall measures. The means were not noticeably different for the recall of central clauses for the students who read the unfamiliar text and those who read the familiar topic (Central clauses, unfamiliar topic: $\bar{X}$= 1.645, SD= 1.392; familiar topic: $\bar{X}$=1.613, SD= 1.285). Background, however, seemed to have certain effects on the recall of supporting clauses (Supporting clauses, unfamiliar topic: $\bar{X}$= 1.677, SD= 1.142; familiar topic: $\bar{X}$= 2.726, SD= 1.357). Figures 17, 18, 19, and 20 in Appendix B present the histograms for the recall of central and supporting ideas of unfamiliar and unfamiliar topics.

Vocabulary difficulty also seemed to affect different aspects of the recall measure. This first analysis of the effect of vocabulary on the recall of central and supporting clauses seemed to indicate that vocabulary difficulty affects the recall of both types of clauses. The level of vocabulary difficulty had some effect on the recall of central clauses. The mean of the recall of central clauses was .50 higher for those participants that read the easy versions of each passage (Central clauses, hard vocabulary: $\bar{X}$= 1.381, SD= 1.038; easy vocabulary: $\bar{X}$= 1.885, SD= 1.55). The effect of the level of vocabulary difficulty had an even stronger effect on the number of supporting ideas recalled than on the number of central clauses (Supporting clauses, hard vocabulary: $\bar{X}$= 1.905, SD= 1.422; easy vocabulary: $\bar{X}$= 2.508, SD= 1.22). Table 12 shows the descriptive statistics for the effect of vocabulary on the recall of central and supporting clauses.

TABLE 12
EFFECT OF VOCABULARY ON CENTRAL AND SUPPORTING CLAUSES

Variable	vcbdiff	N	Mean	Median	StDev	SEMean
Ctrl-Cl	0	63	1.381	1.000	1.038	0.131
	1	61	1.885	2.000	1.550	0.198
Sprtng-Cl	vcbdiff					
	0	63	1.905	2.000	1.422	0.179
	1	61	2.508	3.000	1.220	0.156

Code: Ctrl-Cl= central clauses; Sprtng-Cl= supporting clauses.
Vcbdiff= vocabulary difficulty; 0= hard version/unknown vocabulary; 1= easy version/known vocabulary.

Histograms were used to display graphically the frequency distribution for recall of central and supporting ideas of easy and hard versions. Figures 21, 22, 23 and 24 in Appendix B show the frequency distribution of recall scores for hard and easy versions.

Descriptive statistics were also used to look within the comprehension measure--explicit, implicit, and scriptically implicit questions. The results of descriptive statistics for the comprehension measure are summarized in Tables 13 and 14.

TABLE 13
EFFECT OF BACKGROUND ON COMPREHENSION MEASURE

Variable	Bckgrnd	N	Mean	Median	StDev	SEMean
Expl-Q	0	62	3.00	3.000	0.887	0.113
	1	62	2.935	3.000	1.143	0.145

TABLE 13 (cont'd)

Impl-Q	0	62	2.355	2.000	0.057	0.134
	1	62	2.081	2.000	0.929	0.118
Scrptl-Q	0	62	2.339	2.000	0.974	0.124
	1	62	3.725	4.000	0.484	0.061

Code: Bckgrnd= background; 0= unfamiliar; 1= familiar
Expl-Q= explicit questions
Impl-Q= implicit questions
Scrptl-Q= scriptically implicit questions

TABLE 14
EFFECT OF VOCABULARY ON COMPREHENSION MEASURE

Variable	Vcbdiff	N	Mean	Median	StDev	SEMean
Expl-Q	0	63	2.810	3.000	1.105	0.139
	1	61	3.131	3.000	0.903	0.116
Impl-Q	0	63	2.190	2.000	0.965	0.122
	1	61	2.246	2.000	1.043	0.134
Scrptl-Q	0	63	3.063	3.000	1.076	0.136
	1	61	3.000	4.000	1.000	0.128

Code: Vcbdiff= vocabulary difficulty; 0= hard; 1= easy
Expl-Q= explicit questions
Impl-Q= implicit questions
Scrptl-Q= scriptically implicit questions

Two aspects of these tables are noteworthy. First, background did not have a strong effect on answering explicit questions. In fact the mean score was slightly higher for the students who read the unfamiliar topic compared to the mean score for those participants who read the familiar topic (unfamiliar: $\bar{X}$=3.0, SD= 0.887; familiar: $\bar{X}$= 2.93, SD= 1.143). Students' answers to textually implicit questions present a similar pattern. The mean score was slightly higher for the students who read the unfamiliar topic (unfamiliar: $\bar{X}$=2.355, SD= 0.057; familiar: $\bar{X}$= 2.081, SD= 0.929). As was expected, topic familiarity was significant when the participants answered questions that were scriptically implicit (unfamiliar, $\bar{X}$= 2.33, SD= 0.974; familiar: $\bar{X}$= 3.72, SD= 0.484). Second, vocabulary difficulty affected students' answers to explicit questions. The mean score was slightly higher for those students who read the easy version ($\bar{X}$= 3.131, SD= 0.90) than the mean for the participants who read the hard version ($\bar{X}$= 2.81, SD= 1.105). When answering textually implicit questions, the mean score was slightly higher for those participants who read the easy version (easy: $\bar{X}$=2.246, SD= 1.043; hard: $\bar{X}$= 2.19, SD= 0.965).

Figures 25 to 36, in Appendix B display graphically the frequency distribution of comprehension scores (explicit, implicit, and scriptically implicit questions) for familiar and unfamiliar topics, and for hard and easy versions. The observations of the descriptive statistics indicated that a multivariate analysis of variance might be appropriate to use for this study.

Multivariate Analysis of Covariance. The data were then subjected to a multivariate analysis of covariance (MANCOVA, using MINITAB 10.0), using the number of units recalled (main clauses and supporting clauses) and the multiple-choice scores (explicit, implicit, scriptically implicit questions) as dependent variables. Topic familiarity, vocabulary difficulty, gender, and whether participants had visited a Spanish-speaking country were used as nominal independent variables. Participants' age, years that they had been studying Spanish, length of stay in the Spanish-speaking country (for those students who had spent sometime overseas), whether they had contact with the language outside the classroom, and whether they had Spanish-speaking friends were used as covariates.

Results indicated that age, gender, years of language study, interaction with Spanish-speaking friends/relatives, visit to a Spanish-speaking country, length of the stay in that country, and contact with the language outside the classroom did not have statistically significant overall effect on the dependent variables. The overall effect of topic familiarity was statistically significant $F = 32.186$ (5, 109), $p = 0.000$. The overall effect of vocabulary difficulty approached statistical significance $F = 1.997$ (5, 109), $p = .085$. At this early stage of data analysis, there were already indications that the interaction between background knowledge and vocabulary was not statistically significant $F = .804$ (5, 109), $p = .549$. Tables 15, 16 and 17 present the results of the analysis for background knowledge, vocabulary difficulty, and interaction

between background knowledge and vocabulary; the complete analysis is included in Appendix C.

TABLE 15
MULTIVARIATE ANALYSIS OF COVARIANCE FOR BACKGROUND KNOWLEDGE

MANCOVA for topic familiarity		s= 1	m= 1.5	n= 53.5
CRITERION	TEST STATISTIC	F	DF	P
Wilk's	0.40381	32.186	(5, 109)	0.000
Lawley-Hotelling	0.47640	32.186	(5. 109)	0.000
Pillai's	0.59619	32.186	(5, 109)	0.000
Roy's	1.47640			

TABLE 16
MULTIVARIATE ANALYSIS OF COVARIANCE FOR VOCABULARY

MANCOVA for vocabulary		s= 1	m= 1.5	n= 53.5
CRITERION	TEST STATISTIC	F	DF	P
Wilk's	0.91606	1.997	(5, 109)	0.085
Lawley-Hotelling	0.09163	1.997	(5. 109)	0.085
Pillai's	0.08394	1.997	(5, 116)	0.085
Roy's	0.09163			

TABLE 17
MULTIVARIATE ANALYSIS OF COVARIANCE FOR INTERACTION BETWEEN BACKGROUND AND VOCABULARY

MANCOVA for topic familiarity and vocabulary interaction s= 1 m= 1.5 n= 53.5

CRITERION	TEST STATISTIC	F	DF	P
Wilk's	0.96444	0.804	(5, 116)	0.549
Lawley-Hotelling	0.03687	0.804	(5. 116)	0.549
Pillai's	0.03556	0.804	(5, 116)	0.549
Roy's	0.03687			

The first statistical model was trimmed and a separate multivariate analysis of variance (MANOVA) was performed using the recall measure and the multiple-choice scores as dependent variables, and background knowledge, vocabulary, and the interaction between background knowledge and vocabulary as independent variables. Even though the first results already indicated that the compensatory interaction between prior knowledge and vocabulary was not statistically significant, this variable was included in this second analysis because of its relevance to the present study.

With the alpha level set at .05, the results of this second analysis indicated that prior knowledge was significant $F = .418$ (5, 116), $p = .000$. The effect of vocabulary approached significance $F = .913$ (5, 116), $p = .059$. Because of the importance of vocabulary to the present study, and despite the fact that the effect of vocabulary has

a p-value slightly higher that .05, this variable will be examined in the remainder of this dissertation. This position is supported by some statisticians who warn us against adopting in advance any rigid standard. Guilford and Fruchter (1978) commented: "Instead of confining ourselves to a two-choice decision--rejection or acceptance--we might allow a third possibility, that of suspended judgment..."

Tables 18, 19, and 20 present the results of the analysis of background knowledge, vocabulary difficulty, and interaction between background knowledge and vocabulary after the first model was trimmed.

TABLE 18
MULTIVARIATE ANALYSIS OF COVARIANCE FOR BACKGROUND KNOWLEDGE

MANCOVA for topic familiarity	s= 1	m= 1.5	n= 57.0
CRITERION	TEST STATISTIC	F	DF	P
Wilk's	0.41814	32.284	(5, 116)	0.000
Lawley-Hotelling	1.39154	32.284	(5. 116)	0.000
Pillai's	0.58186	32.284	(5, 116)	0.000
Roy's	1.39154			

TABLE 19
MULTIVARIATE ANALYSIS OF COVARIANCE FOR VOCABULARY

MANCOVA for vocabulary		s= 1	m= 1.5	n= 57.0
CRITERION	TEST STATISTIC	F	DF	P
Wilk's	0.91352	2.196	(5, 116)	0.059
Lawley-Hotelling	0.09466	2.196	(5. 116)	0.059
Pillai's	0.08648	2.196	(5, 116)	0.059
Roy's	0.09466			

TABLE 20
MULTIVARIATE ANALYSIS OF COVARIANCE FOR INTERACTION BETWEEN BACKGROUND AND VOCABULARY

MANCOVA for topic familiarity and vocabulary interaction		s= 1	m= 1.5	n= 57.0
CRITERION	TEST STATISTIC	F	DF	P
Wilk's	0.96253	0.903	(5, 116)	0.482
Lawley-Hotelling	0.03893	0.903	(5. 116)	0.482
Pillai's	0.03747	0.903	(5, 116)	0.482
Roy's	0.03893			

In order to analyze both the recall measure and the comprehension measure further, an analysis of variance (ANOVA) was used to look

at the type of information recalled (central clauses and supporting clauses) and the different question types (textually explicit, textually implicit, and scriptically implicit).

The univariate test found that vocabulary was statistically significant on the recall of central clauses ($F = 4.59$, $p < .05$). There was not significant main effect for either background knowledge or interaction between prior knowledge and vocabulary on the recall of central clauses. Table 21 presents the results of the analysis of the recall of central clauses.

TABLE 21
ANALYSIS OF VARIANCE FOR RECALL OF CENTRAL CLAUSES

	DF	Seq SS	F	P
topic familiarity	1	0.032	0.04	0.844
vocabulary difficulty	1	7.900	4.59	0.034
interaction between vocabulary difficulty and topic familiarity	1	4.383	2.55	0.113

For recall of supporting clauses, both prior knowledge ($F = 22.40$, $p < .05$), and vocabulary ($F = 7.23$, $p < .05$) showed significant main effects. The interaction between these two variables was not statistically significant. Table 22 shows the results of the analysis of the recall of supporting clauses.

TABLE 22
ANALYSIS OF VARIANCE FOR RECALL OF SUPPORTING CLAUSES

	DF	Seq SS	F	P
topic familiarity	1	34.073	22.40	0.000
vocabulary difficulty	1	10.664	7.23	0.008
interaction between vocabulary difficulty and topic familiarity	1	4.039	2.74	0.101

Results of the statistical analysis support the claim that background knowledge and vocabulary difficulty have statistically significant effects on the students' recalls. These results confirm claims from L1 reading research regarding the fact that prior knowledge and vocabulary affect different aspects of the reading process. Prior knowledge and vocabulary had affected the recall of supporting ideas. Vocabulary, however, was the only variable that affected the recall of central ideas. The failure to find a compensatory interaction between background knowledge and vocabulary confirmed findings from research studies in L1 reading.

For the analysis of comprehension scores, the multiple-choice scores for answers to textually explicit questions, textually implicit questions and scriptically implicit questions were used as dependent variables. Topic familiarity and vocabulary were used as independent variables. Because it was hypothesized that background knowledge and vocabulary function independently, not interactively, compensatory interaction was examined again.

Results of the ANOVA on the reading comprehension scores indicate that vocabulary and prior knowledge affect comprehension in different ways. For the students' answers to textually explicit questions, vocabulary, ($F = 3.12$, $p = .080$) had a stronger effect than background knowledge ($F = .15$, $p = .69$). As in the other analysis, the interaction between the two variables (vocabulary difficulty and background knowledge) was not statistically significant. These results agree somewhat with the findings from L1 reading research. Using a similar reading comprehension measure, Stahl, Jacobsons, Davis and Davis (1989) found some effect for vocabulary on their participants' answers to textually explicit questions. The authors, however, suggest interpreting these results with caution since they were not "protected by a significant overall effect" (p. 35). Results of the statistical analysis of students' answers to textually explicit questions are presented in Table 23.

TABLE 23
ANALYSIS OF VARIANCE FOR TEXTUALLY EXPLICIT QUESTIONS

	DF	Seq SS	F	P
topic familiarity	1	0.129	0.15	0.695
vocabulary difficulty	1	3.227	3.12	0.080
interaction between vocabulary difficulty and topic familiarity	1	0.518	0.50	0.480

For the participants' answers to textually implicit questions, neither topic familiarity, ($F = 2.42$, $p = .122$), nor vocabulary,

($F = .11$, $p = .738$), nor the interaction between these two variables, ($F = 1.53$, $p = .219$), had statistically significant effects. As was predicted, the analysis showed a significant effect of topic familiarity, ($F = 99.81$, $p = .000$), on answers to scriptically implicit questions. Vocabulary effect, ($F = .38$, $p = .538$), and interaction effect, ($F = .15$, $p = .700$), were not significant. Results of the statistical analysis of students' answers to textually implicit and scriptically implicit questions are presented in Tables 24 and 25.

TABLE 24
ANALYSIS OF VARIANCE FOR TEXTUALLY IMPLICIT QUESTIONS

	DF	Seq SS	F	P
topic familiarity	1	2.230	2.42	0.122
vocabulary difficulty	1	0.111	0.11	0.738
interaction between vocabulary difficulty and topic familiarity	1	1.517	1.53	0.219

TABLE 25
ANALYSIS OF VARIANCE FOR RECALL OF SCRIPTICALLY IMPLICIT QUESTIONS

	DF	Seq SS	F	P
topic familiarity	1	59.645	99.81	0.000
vocabulary difficulty	1	0.229	0.38	0.538
interaction between vocabulary difficulty and topic familiarity	1	0.089	0.15	0.700

4.2 QUALITATIVE ANALYSIS

Students' written protocols

"La Noche de Brujas." In examining the written protocols of the familiar topic, I found that many of the students who read the easy version (known vocabulary) of the reading text mentioned the day when Halloween is celebrated. Although it would be plausible to suggest that students did that because the topic was extremely familiar to them, it should also be noted that there was enough information present in the text to infer the date. Even readers who were not familiar with the celebration could have inferred the day when Halloween is celebrated. Eleven students out of the thirty-one who read the easy version mentioned the day. It seems reasonable to claim that this was the result of the students' prior knowledge since this reading was on a familiar topic. However, only two participants who read the difficult vocabulary text mentioned the date. Unknown vocabulary appeared to block ready access to prior knowledge. Excerpts of recalls from students who read the easy version are shown in Table 26. In order to protect the participants' anonymity, each written protocol was given a number.

TABLE 26
SAMPLE SENTENCES FROM THE STUDENTS' WRITTEN RECALL
HALLOWEEN/EASY VERSION

Student #12: (Halloween) is held on the last day of October.
Student #13: People celebrate Halloween on the night of October 31 st.

TABLE 26 (cont'd)

Student #36: This celebration takes place on the last day of October.

Some students who read the difficult vocabulary text also included information that was not in the reading text. The information that these students included in their protocols, however, was of a different type. They mentioned 'children receiving candy,' 'adults wearing masks to spook the kids,' and 'children going with their parents from door to door.' It is interesting to mention that none of this information was implied in the text. This suggests that these students relied more on their prior knowledge of the topic than did those who read the easy vocabulary text. Table 27 presents excerpts of recalls from students who read the hard version.

TABLE 27
SAMPLE SENTENCES FROM THE STUDENTS' WRITTEN RECALL
HALLOWEEN/HARD VERSION

Student # 9: ... children and their parents go door to door...

Student #32: On this night adults wear masks to spook the kids.

Student #33: (Children) go from to house to house collecting candy.

The qualitative analysis of the students' protocols also indicates that those students who read the hard vocabulary text made 'extra-textual' inferences. An extra-textual inference is defined here as a judgment made or an idea that is arrived at for which no information is presented, implied, or suggested by the facts that are given in the text. Seven students who read the difficult vocabulary version about Halloween produced extra-textual inferences. None of the students who read the easy version of the text produced this type of inferences. Samples of the students' extra-textual inferences are presented in Table 28.

TABLE 28
SAMPLE SENTENCES FROM STUDENTS' EXTRA-TEXTUAL INFERENCES

Student # 1:	One ruler made the next day, November 1, All Saint's Day, and the two days became more religious.
Student #23:	November 1 was named the day of the Saints. The reason for this is because the people were Christian and superstitious.
Student #32:	It (Halloween) is a Christian tale.

In examining the protocols, I also noticed that parts of some written recalls written by participants who read the hard version of the text made little sense. Although some of the paragraphs contained a central clause and/or a supporting clause, which was/were counted as such for the quantitative analysis of the data, the paragraph as a whole lacked coherence and was unclear and

confusing. Student #24 wrote: "Apparently it (Halloween) was a holiday started to keep evil witches away from villages and signifying the last day of fall. The past to begin winter some villages thought it helped others thought it didn't." Student #52 wrote: "The adults were dressed in masquerade, as witches, ghosts and bad spirits. Because the 1st of November marks the beginning of winter and bad spirits. They celebrate while the Celts celebrate their holiday." Protocols from Student #3 and Student #32 presented similar problems. Even though the number of protocols that presented such characteristics was small, it is particularly important to note that all of these protocols were written by students who read the hard version of the Halloween text. Because of the unusual characteristics of these recalls, special attention was given to the protocols that the same students produced after reading La Diablada, the unfamiliar text. Students #3, 24, and 32 read the difficult vocabulary text while Student #52 read the easy vocabulary text. Aside from the amount of information that these students remembered or did not remember, their protocols were clear and organized. None of the recalls written by students who read the easy vocabulary version of Halloween presented this lack of coherence and organization.

The qualitative analysis of the data indicated that prior knowledge did not compensate for vocabulary difficulty, and that it hindered integration of new information. In addition, unknown words seemed to affect the type of information that was recalled when reading a familiar topic.

"La Diablada." The qualitative analysis of the written recalls of the unfamiliar topic indicated that unknown vocabulary affected not only the amount of information recalled but also the kind of information that was recalled. The first most noticeable difference between the protocols written by students who read the easy version and those written by students who read the hard version was the number of clauses remembered. Those participants who read the easy vocabulary version recalled over thirty percent more units than those who read the hard version. Within the group that read the same version, there were no major differences in the number of central clauses and supporting ideas that the students recalled. The participants who read the easy vocabulary text recalled sixty-three central ideas and sixty-five supporting ideas. Those participants who read the hard version recalled thirty-nine central ideas and thirty nine supporting ideas.

The analysis also indicated that the main effect of vocabulary difficulty was on the type of information that the students recalled. Students who read the easy version reported information directly as it was in the text or very similar to what was in the passage. No students reported any inferences, nor did they add any information that was not in the reading text. On the other hand, the students who read the difficult vocabulary text reported information that was erroneous. Two students, for example, wrote that La Diablada was a festival celebrated in Peru; one student wrote that it was held in Brazil and another said that it was a festival in Argentina.

Another interesting pattern found in recalls from students who read the hard version was the number of participants who wrote how

difficult that passage was for them. The fact that they had to read the difficult version and that they could not rely on their prior knowledge must have made the task hard for them. Samples of the students' protocols of the unfamiliar topic are presented in Table 29.

TABLE 29
SAMPLE SENTENCES FROM STUDENTS' PROTOCOLS OF THE UNFAMILIAR TOPIC

Student # 17:	"I didn't really understand this passage. It was something about South American festivals."
Student #18:	"I don't know. I don't recall how the party originated."
Student #38:	"I think that the story talked a little bit about the people who involved, but I don't really remember. I forgot a lot of the story."

4.3 CHAPTER SUMMARY

The results of this study confirm findings of past research indicating that prior knowledge and vocabulary difficulty affect the process of reading. These two aspects, however, do not appear to interact, and they appear to affect the process of reading differently. These findings are consistent with earlier L1 reading research (Freebody and Anderson, 1983b; Stahl and Jacobson, 1986; Stahl, Jacobson, Davis and Davis, 1989) but in conflict with Stanovich's interactive hypothesis. The interaction between prior knowledge and vocabulary was not found to have a primary effect on

the recall or comprehension measures used in this study. Vocabulary was a high predictor for the recall of central ideas and supporting ideas. Prior knowledge was statistically significant on the recall of supporting ideas.

On the comprehension measure, vocabulary was the strongest predictor for the students' answers to textually explicit questions. Neither prior knowledge nor the interaction between background and vocabulary were found to have main effects. These findings are also consistent with the results of Stahl et al.'s research (1986,1989), which showed that vocabulary had some effect on answers to textually explicit question in L1 reading.

None of the independent variables had any effect on the participants' answers to textually implicit questions. These results also confirmed L1 reading research. On the other hand, the effect of prior knowledge on the students' answers to scriptically implicit questions was very significant, as was predicted. The interaction between background and vocabulary did not have main effects on the students' answers to textually implicit questions or to scriptically implicit questions.

The qualitative analysis of the recall protocols suggests that prior knowledge and vocabulary affect reading comprehension, but in different ways. While topic familiarity affected the amount of information recalled, vocabulary affected the type of information the participants wrote in their protocols.

In chapter five, the results of the qualitative and quantitative analyses of the data will be discussed in more depth. I will also

refer to the implications of these results for further research and for the teaching of foreign languages.

CHAPTER FIVE

SUMMARY AND CONCLUSIONS

The main focus of this study was to investigate the effect of prior knowledge and vocabulary difficulty on the process of reading in a foreign language. In addition, the possible interaction between background knowledge and vocabulary was examined. This final chapter will provide a summary of the research, and discuss the results and their implications for research in L2 reading and for foreign language teaching.

The following research hypotheses were formulated regarding the effect of prior knowledge, vocabulary difficulty, and the interaction between prior knowledge and vocabulary on recall and comprehension in L2 reading:

1. L2 readers who read about a *familiar topic* will perform better on the *recall of central units* than those who read about an unfamiliar topic.

2. L2 readers who read about a *familiar topic* will perform better on the *recall of supporting units* than those who read about an unfamiliar topic.

3. L2 readers who read an *easy vocabulary* text will perform better on the *recall of central units* than those who read a difficult vocabulary version.

4. L2 readers who read an *easy vocabulary* text will perform better on the *recall of supporting units* than those who read a difficult vocabulary version.

5. L2 readers who read a *difficult vocabulary* text about a familiar topic *will not compensate* for unknown vocabulary with topic familiarity in their *recall of central units*.

6. L2 readers who read a *difficult vocabulary* text about a familiar topic *will not compensate* for unknown vocabulary with topic familiarity in their *recall of supporting units*.

7. L2 readers who read about a *familiar topic* will not perform better on answering *textually explicit questions* than those who read about an unfamiliar topic.

8. L2 readers who read an *easy vocabulary* text will perform better on answering *textually explicit questions* than those who read a difficult vocabulary version.

9. L2 readers who read a *difficult vocabulary* text about a familiar topic *will not compensate* for unknown vocabulary with topic familiarity to answer *textually explicit questions*.

10. L2 readers who read about a *familiar topic* will not perform better on answering *textually implicit questions* than those who read about an unfamiliar topic.

11. L2 readers who read an *easy vocabulary* text will not perform better on answering *textually implicit questions* than those who read a difficult vocabulary version.

12. L2 readers who read a *difficult vocabulary* text about a familiar topic *will not compensate* for unknown vocabulary with topic familiarity to answer *textually implicit questions*.

13. L2 readers who read about a *familiar topic* will perform better on answering *scriptically implicit questions* than those who read about an unfamiliar topic.

14. L2 readers who read an *easy vocabulary* text will not perform better on answering *scriptically implicit questions* than those who read a difficult vocabulary version.

15. L2 readers who read a *difficult vocabulary* text about a familiar topic *will not compensate* for unknown vocabulary

with topic familiarity to answer *scriptically implicit questions.*

5.1 SUMMARY OF RESEARCH

One hundred and five students participated in the study. From the original number of participants, the responses of forty-three students were not considered in this study because of at least one of the following reasons: 1) Spanish was the language used at home, 2) they had been studying Spanish as a foreign language for less than four years, 3) they were not present in all of the classes when the study was explained and the data collected. Data were collected on three consecutive days during the students' Spanish class.

Each student read two passages. One of the passages was about a familiar topic (Halloween) and the other about an unfamiliar topic (La Diablada). The participants were randomly given a difficult (unknown) vocabulary version of the passage or an easy (known) vocabulary version to read. After the participants finished reading, they gave the reading texts to the researcher and received a blank page. They were then instructed to write as much information as they recalled from the text. Following the free recall, the students answered twelve multiple-choice questions to assess their comprehension. The procedure used to write the questions was modeled on the procedure used by Stahl, Jacobson, Davis and Davis (1989) in their study on the process of reading in the first language. According to their coding scheme, four of the questions were textually explicit; four were textually implicit; and four were scriptically implicit.

A question whose answer was explicitly stated in the text was defined as a *textually explicit* question. A *textually implicit* question was defined as one whose answer had to be inferred from the text. A *scriptically implicit* question was defined as one whose answer had to be inferred by the reader on the basis of his/her prior knowledge; this definition was also used in Pearson and Johnson (1978), Stahl and Jacobson (1986), and Stahl, Jacobson, Davis, and Davis (1989). All the questions and possible answers were presented in English in order to avoid comprehension problems.

The data in this study were subjected to three different types of statistical analysis. First, a multivariate analysis of covariance was performed on the students' free recalls and their answers to the multiple-choice comprehension questions. Second, the model was trimmed and a multivariate analysis of variance was performed on the recall and the comprehension measures. In order to test all the hypotheses of the study, the recall measure (recall of central and supporting units) and the comprehension scores (answers to textually explicit questions, textually implicit questions and scriptically implicit questions) were subjected to various analysis of variances.

To analyze the students' free recalls further, their written protocols were individually examined. This qualitative analysis focused on the type of information included in the students' written protocols.

5.2 CONCLUSIONS

The findings of this study confirmed results from L1 and L2 research indicating that prior knowledge and vocabulary difficulty affect comprehension processes and recall from text. However, these two factors appeared to affect different aspects of the process of reading.

Prior research and common sense suggest that background knowledge facilitates recall. However, in analyzing how prior knowledge affected recall of central ideas, this research does not support hypotheses 1. The findings here suggest that, in fact, topic familiarity did not facilitate the recall of central units. The means for the recall of central units were not significantly higher for those students who read the topic about Halloween. Background knowledge did, however, have a stronger effect on the recall of supporting ideas. These results supported hypotheses 2. One of the reasons for this may be that the topic was so familiar to the students that they relied too much on their prior knowledge. Their schemata not only did not help them, but actually interfered with the integration of the new information. Most of the ideas that were considered central in the reading text explained the origin of Halloween. Some of the clauses that were classified as central units read: 'This popular celebration actually started as a Celtic festival,' and 'The last day in October was dedicated to The Lord of the Dead.' It is quite likely that these ideas were totally new to the students. On the other hand, most supporting ideas presented information that was known by the students, such as 'La Noche de Brujas' is the favorite holiday of many children in North America,' and 'The

children and sometimes adults too, wear masks...' This may explain, in part, the different effect that background knowledge had on the recall of central and supporting units. In this study, prior knowledge did not seem to help the participants encode new information from the text.

Schema theory claims that our experience results in knowledge that is stored in memory, in slots or frameworks usually called schemata. A schema will help the reader interpret a new situation and integrate new information. Alba and Hasher (1983) identified five central cognitive processes in schema theory. Four of these processes were identified as encoding processes (selection, abstraction, interpretation, and integration) and one as a retrieval process. In this study, prior knowledge did not help the students recall new information that had been categorized as central units. The students' inability to recall central units suggests that the interconnection of the processes within the encoding system, and between the encoding system and the retrieval system may not be as automatic as is often assumed.

These findings appear to be easier to explain under dual coding theory. As it was discussed in Chapter 1 (p. 31), this theory suggests that cognition consists of two mental subsystems that specialize in the representation and processing of information. These two subsystems, verbal and nonverbal, have the capacity to operate in an integrated manner. This integration facilitates the processing of information in reading. The verbal subsystem specializes in language. It involves the processing of linguistic stimuli. The nonverbal systems involves the generation of mental images while

processing visual, auditory and affective information. The information within each subsystem is interconnected, and there are referential interconnections between the two subsystems. Incoming information is assumed to be stored under two mental representations in two separate subsystems. Because different variables may affect the information within one subsystem and the referential interconnection between the two subsystems, supporters of dual coding theory explain that some variations can occur at the time of the retrieval. Results of this study indicate that unknown vocabulary could be one of the variables that affects the representational connections within each system. This results in the readers' difficulty to use their background knowledge to integrate new information. Difficult vocabulary may also affect the referential connections between the two subsystems limiting the readers' ability to construct a coherent recall at the time of information retrieval.

According to the results of this study, difficult vocabulary affected the recall of both central units and supporting units. These findings show hypotheses 3 and 4 to be true for the current study. Students who read the easy vocabulary text performed better in the recall of central and supporting clauses than those students who read the difficult vocabulary text.

Prior research has provided robust evidence that both background knowledge and vocabulary affect the process of reading. Since a person who is very familiar with a particular topic generally knows words related to that topic, it is believed that these two factors are related to each other. Research in L1 reading investigated the

interactive-compensatory hypotheses presented by some researchers such as Rumelhart (1977) and Stanovich (1980, 1984). These research studies, however, failed to demonstrate an overall significant interaction between these two factors (Freebody and Anderson, 1983b; Stahl and Jacobson, 1986; Stahl, Jacobson, Davis and Davis, 1989). A text that contains difficult (unknown) words will hamper recall even if the reading is about a familiar topic. The results from this study were consistent with findings in L1 research. The participants could not use their high-level knowledge (background knowledge) source to compensate for vocabulary difficulty in the recall of central and supporting units. These findings support hypotheses 5 and 6 of this study.

The qualitative analysis of the students' protocols also suggested that background knowledge and vocabulary affected reading differently. Some students included in their recall protocols information that was not in the text they read about the familiar topic. The students' familiarity with the topic was the grounds for all that 'extra' information reported. However, two trends were found upon examination of the information that these students included in their reports. Vocabulary appeared to affect the type of information they recalled. On the one hand, students who read the easy vocabulary version mentioned when Halloween is celebrated. It can be argued that this occurred because of the students' familiarity with the topic. But it could have also been inferred from the text. Good readers could have inferred when Halloween is celebrated even if they were not so familiar with the celebration. On the other hand, it is important to note that the students who read the difficult

vocabulary text added information that could have never been inferred from the reading.

Such a pattern suggests that vocabulary interfered with recall of information. It is possible that the students' effort to extract meaning demanded too much mental energy because of vocabulary difficulty. This strain on the participants' attention capacity did not leave enough mental energy for the students to process the rest of the information. Then, when the students were asked to write down as much information as they recalled, prior knowledge was the only cognitive resource they could rely on. This resulted in students reporting information that was neither in the text nor could have been inferred.

Difficult vocabulary also appeared to affect the clarity and cohesion of the students' recall protocols. Parts of some protocols were disorganized and incoherent. This indicated that participants recalled parts of the text, but difficult words hindered their ability to process the information and recall it in a logical and coherent way. Stahl et al. (1989) also found that when their students read a difficult vocabulary text, the ideas in their protocols were disorganized and lacked coherence.

As was hypothesized, only vocabulary showed significant effect on answers to textually explicit questions. Although it would be reasonable to think that prior knowledge facilitates answers to textually explicit questions, findings of this study did not come as a surprise since earlier L1 research found similar results (Stahl et al, 1989). No main effect for prior knowledge and vocabulary interaction was found. This failure to find a compensatory

interaction effect on answers to textually explicit questions strengthens the claim that prior knowledge and difficulty of vocabulary function independently. These results support hypotheses 7, 8, and 9.

According to results of this research, neither background knowledge nor vocabulary appeared to have any effect on answers to textually implicit questions. Anderson and Pearson (1984) suggested that one of the ways in which prior knowledge facilitates comprehension is by enabling the reader to make inferences about their reading. Results from this study did not support this claim. Participants were expected to pull together information from different sentences in order to answer textually implicit questions. The following is an example of a textually implicit question.

The students read:

(Los Celtas) Creían que en esta época del año las brujas, los malos espíritus y hasta el mismo diablo visitaba los pueblos y villas. La gente entonces encendía grandes fuegos que mantenían encendidos durante toda la noche, pues se creía que de este modo se asustaban esas malas influencias. Otros pueblos en Europa también pensaban que durante el último día de octubre los malos espíritus andaban por el mundo.

The Celts believed that it was at this time of the year when witches, evil spirits, and the Devil, himself, visited towns and villages. People lit fires that kept burning all night to ward off evil spirits.
People in other parts of Europe also believed that evil spirits roamed the world during the last day in October.

The textually implicit question that the students had to answer read:

Why might other groups in Europe have lit fires on October 31?

(a) Because the season of darkness started.
(b) To ward off evil spirits.
(c) To warship the Sun God.
(d) Because they believes in Samhain.

Item 'b' was the correct answer. Readers failed to infer that because other people in Europe also believed that evil spirits visited the world on October 31, they might have lit fires to ward off those bad spirits. It is not clearly known why the students' prior knowledge did not facilitate the answer to textually implicit questions. The reason may lie in the fact that the information was so new to them that their schema did not encode and store such information.

The effect of the interaction between prior knowledge and vocabulary was not significant on answers to textually implicit questions. These results support hypotheses 10, 11, and 12 of this research.

As was hypothesized, only background knowledge showed significant effects on answers to scriptically implicit questions. Students performed better in answering scriptically implicit questions when they read about the familiar topic than when they read the unfamiliar topic. The only cognitive source students could use to answer this type of questions was their prior knowledge. Therefore, when the participants had to answer questions about La Diablada, they lacked the schemata necessary to answer those questions correctly. Following are examples of scriptically implicit questions that the students had to answer about 'La Noche de Brujas' and 'La Diablada':

What colors are usually associated with 'La Noche de Brujas?
(a) Red and black.
(b) Black and orange.
(c) Orange and green.
(d) Green and red.

What metal was extracted in large quantities from an area near Oruro?
(a) Gold
(b) Silver
(c) Copper
(d) Zinc

Vocabulary did not affect the students' answers to scriptically implicit questions. Most of the students answered these questions correctly when they read the passage about Halloween. Only two students out of sixty-two answered the example above incorrectly. One of those students had read the easy version and the other the hard version, and they both chose item 'a' as the correct answer. The fact that the color red is often used for items associated with Halloween might have affected the way these two students answered this particular question. Also, option 'a' was the one next to the correct answers, so the possibility that the students marked 'a' by mistake can not be disregarded. On the other hand, when the students read about the unfamiliar topic, La Diablada, they did not have the schemata to help them answer scriptically implicit questions. For example, only twelve students correctly answered the question presented above about 'La Diablada.' Most students chose item 'a. gold' as the correct answer, probably because of the high value that is usually attached to gold. Thirteen participants chose 'copper,' and two students chose 'zinc.'

As in the other analysis, no significant interaction was found between prior knowledge and vocabulary. These results confirm hypotheses 13, 14, and 15 of this study.

Before closing this section on conclusions, it is important to briefly discuss the students' reactions in the classroom after they read the different passages and versions. When the students read the passage about Halloween, the comments that were heard in the classroom were not directly related to any aspects of the text. The comments were mostly humorous because they read about Halloween in May. Some of the students' comments were: "Are we celebrating Halloween earlier this year, or what?" "Somebody should have told us that Halloween has been changed..."

The students' comments after they read La Diablada were about the reading text. They complained that they had been asked to read about La Diablada, something they did not even know existed. They said that there were "too many" things that they "did not understand" and, of course, "could not include" in the recalls because "they did not remember much." To these comments, students who had read the hard version added that there were "too many words" that they did not know. One student who had read the easy version said "it was not the words. I knew all the words... I think, it was the passage... the whole passage was hard."

It is interesting to note that the students mentioned the inclusion of unknown words when they read La Diablada. They did not make any reference to the difficult vocabulary when they read La Noche de Brujas. The cognitive cost of having to read about a completely

unfamiliar topic made them become aware of all the unknown words that were in the passage.

5.3 IMPLICATIONS FOR L2 READING RESEARCH

Before discussing the implications of the present study for further research in the area of reading in a foreign language, it would be reasonable to examine the limitations of the study. Three words in the unfamiliar topic text which had been classified as 'easy words' (known) were actually identified as unknown by the students. Although the number is really small, it is unknown whether those words could have affected the analysis of the effect of vocabulary difficulty.

The results of the present study pose questions, which should be addressed in future investigations. Further research is needed to know whether results from this study can be generalized to other age groups. The students who participated in this study were all teenagers. Although the analysis of the data indicated that age did not have any effect on the results, it would be interesting to find out if the same results would be obtained with children or with adults.

Research in L2 reading has provided evidence suggesting that orthographic systems affect word recognition and reading. In a very widely cited study, Scriber and Cole (1981) conducted a series of cognitive tasks with four groups of Vai adults, an African tribe. One group included Arabic literates; another group included English literates; another group included Vai literates, and the fourth group included illiterate adults. Scribe and Cole claimed that their

subjects performed better on cognitive tasks that required cognitive operations that were similar to the orthographic system that they usually read. In more recent studies Koda (1987, 1992) and Shimron and Sivan (1994) investigated the effect of orthography on the process of reading. Important results would come from research with a design similar to the present study but with participants who use different orthographic systems.

Replacing approximately every sixth content word by a difficult synonym appeared to affect the recall of central and supporting ideas. It is generally assumed that readers can skip words and still continue to comprehend. Further research is needed to investigate what ratio of difficult words affects recall of central and supporting ideas.

Results from this study suggest that prior knowledge and vocabulary affect different aspects of reading. More research using different text structures and vocabulary is needed to better understand how prior knowledge and vocabulary affect comprehension, and to clearly identify which aspects these two variables affect.

5.4 IMPLICATIONS FOR L2 TEACHING

For many years reading teachers have been using prereading activities to either activate the students' background knowledge or to provide relevant information to facilitate reading comprehension. The results of the present study support the claim that prior knowledge affects information recall and comprehension. However, it may be imprudent to believe that topic familiarity will help

readers cope with vocabulary difficulty. Foreign language teachers should be aware that unknown words may be far more troublesome than has been usually thought.

One of the main reasons why people read in a foreign language is to learn, to acquire knowledge. Most second/foreign language learners see the language as a tool. There may be L2 readers who read for pleasure, but the vast majority do it to get information that will help them improve their work quality, their efficiency at work, or simply help them pass a test. Results of this study indicate that vocabulary plays a very important role in the recall of main and supporting ideas. By developing activities that help L2 language learners enlarge their vocabulary, language teachers will help them become more efficient and effective readers and more successful language users.

An excellent way to help second language readers enlarge their vocabulary is to use contextually rich materials. The regular use of semantically rich texts allows language learners to use context to derive meaning of unknown words. Klein (1988) refers to a personal experience related to this point. His stepdaughter insisted on reading to him some news from the newspaper. The article was about an interview to a police officer. The article read: '... "I was speeding because I thought my plant was moribund." She told the officer that the plant did not look well, was very dry, the leaves were wilted, and it was very expensive.' When the author asked the girl whether she knew what the word *moribund* meant, the girl responded that "it was something that was either very sick or dead!" Klein states that this is not the normal use of the term *moribund*,

the girl, however, was able to derive the accurate meaning using the semantically rich context in which the word was embedded. Readers should became aware that they can depend on contextual information in the text to generate meaning for new word when reading in a foreign language.

Since students cannot be taught every word they will encounter as they read, some specialists suggest the use of various reading texts on the same topic. This helps language learners not only to enlarge their vocabulary but also to develop the ability to make inferences as they become more familiar with the topic and the vocabulary.

Students should understand the advantages of using their prior knowledge to obtain a better comprehension of the text. Language learners are not always aware that personal experience is very important in reading comprehension. Students should be encouraged to think about how their reading relates to what they already know, and to think about what else they know about the topic. Language teachers should provide their students with reading activities and work with the learners to help them develop the ability to use their background knowledge when they read in a foreign language.

Unknown vocabulary presents a difficult problem to L2 reading comprehension. Not only do difficult lexical items hinder the recall of important information, but also appear to affect the coherence and organization of their recalls. Foreign language teachers should continue developing prereading activities to help their students activate their background knowledge. Some activities should also focus on word meaning since there seems to be strong evidence that

indicates that vocabulary knowledge is central to succeed in certain reading comprehension tasks.

APPENDIX A

STUDENT MATERIALS

APPENDIX A
STUDENT MATERIALS

CONSENT FORM

The research study being done by Ms. Susana B. Tuero is part of a project for a doctoral dissertation on the process of reading in a foreign language.

The activities that will be done during the time the data are collected will not bring any changes into the classroom or in the way classes are usually conducted. It must also be noted that your performance on the activities will not affect your grades in any way. After the data are analyzed, the general results will be available to the language teachers and the students that participated in the study.

The research has been explained to me and I understand the basic purposes and procedures. I freely consent to participate in the study and understand that at any time I may withdraw without penalty.

I understand that all the results will be treated with strict confidence and that all subjects will remain anonymous; upon request, results will be made available to me as long as the anonymity of other subjects can be maintained.

_____
Name

_____
Date

STUDENT QUESTIONNAIRE

1. Name: _____

2. Age: _____

3. Gender: F___ M___

4. Language spoken at home: _____

5. How long have you been studying Spanish at school? _____

6. Have you ever visited any Spanish speaking countries?
   Yes___ No___
   If your answer is 'yes,' when, where, and how long?_____
   _____

7. Have you ever lived in a Spanish speaking country?
   Yes___ No___
   If your answer is 'yes,' where and how long? _____
   _____

8. Do you have Spanish speaking friends/relatives?
   Yes___ No___
   If your answer is 'yes,'
   do they speak Spanish to you? Yes___ No___
   do they speak in Spanish to each other while you are around? Yes___ No___

9. Do you have any contact with the Spanish language outside the classroom (reading books, watching TV, and/or listening to the radio in Spanish)? Yes___ No___

10. Are you planning to continue studying Spanish after you graduate from high school? Yes___ No___

READING PASSAGE-FAMILIAR TOPIC/EASY VERSION

La Noche de Brujas

Una de las fiestas más esperadas por los niños en Norteamérica es la famosa "Noche de Brujas." Ese día por la tardecita, los niños van de puerta en puerta visitando amigos y vecinos. Los niños y a veces también los adultos llevan máscaras, algunas muy feas, que representan personajes de ciencia ficción, figuras del gobierno y muy especialmente brujas, fantasmas y esqueletos.

Esta popular celebración se inició en realidad como un festival Celta. Los Druidas eran los maestros y sacerdotes de los Celtas, adoraban el sol y consideraban al fuego un elemento sagrado. El último día de octubre lo dedicaban a Samhain, el Señor de la Muerte. Este era también el último día en el calendario celta. En noviembre empezaba el invierno, la estación del frío, la tristeza y la oscuridad. Por esto es que los Celtas asociaban el primer día de noviembre con los muertos. Creían que en esta época del año las brujas, los malos espíritus y hasta el mismo diablo visitaba los pueblos y villas. La gente entonces encendía grandes fuegos que mantenían encendidos durante toda la noche, pues se creía que de este modo se asustaban esas malas influencias. Otros pueblos en Europa también pensaban que durante el último día de octubre los malos espíritus andaban por el mundo.

En el año 834, el Papa Gregorio IV declaró el 1 de noviembre como el día de todos los santos. Y fue durante la dominación romana que la celebración celta se mezcló con la celebración cristiana. Hoy pocos son los que conocen el origen de la "Noche de Brujas," y como dicha celebración llegó hasta nosotros.

READING PASSAGE-FAMILIAR TOPIC/HARD VERSION

La Noche de Brujas

Una de las fiestas más esperadas por los niños en Norteamérica es la famosa "Noche de Brujas." Ese día por la tardecita, los niños van de puerta en puerta visitando amigos y vecinos. Los niños y a veces también los adultos llevan máscaras, algunas horripilantes, que representan personajes de ciencia ficción, figuras gubernamentales y muy especialmente brujas, fantasmas y esqueletos.

Esta popular celebración se comenzó en realidad como un festival Celta. Los Druidas eran los guías y sacerdotes de los Celtas, adoraban el sol y consideraban al fuego un elemento místico. El último día de octubre lo dedicaban a Samhain, el Señor de la Parca Este era también el último día en el calendario celta. En noviembre comenzaba el invierno, la estación del frío, la tristeza y la negrura. Por esto es que los Celtas asociaban el primer día de noviembre con los difuntos. Creían que en esta época del año las brujas, los malos espíritus y hasta el mismo mandinga visitaba los pueblos y villas. La gente entonces encendía grandes hogueras que mantenían encendidas durante toda la noche, pues se creía que de este modo se auyentaban esas malas influencias. Otros pueblos en Europa también pensaban que durante el último día de octubre los malos espíritus andaban por el mundo.

En el año 834, el Papa Gregorio IV instituyó el 1 de noviembre como el día de todos los santos. Y fue durante la dominación romana que la celebración celta se entretejió con la celebración cristiana. Hoy pocos son los que conocen el origen de la "Noche de Brujas," y como dicha celebración llegó hasta nosotros.

READING PASSAGE-FAMILIAR TOPIC (TRANSLATION)

La Noche de Brujas

"La Noche de Brujas" is the favorite holiday of many children in North America. On this day, in the evening, children go from door to door, visiting friends and neighbors. The children and sometimes adults too, wear masks, some of them really ugly, that represent science fiction characters, figures from the government and specially witches, ghosts, and skeletons.

This popular celebration actually started as a Celtic festival. The Druids were the guides and priests of the Celts; they worshipped the sun and considered fire a sacred element. The last day in October was dedicated to Samhain, The Lord of the Dead. This day was also the last day on the Celtic calendar. November indicated the beginning of winter, the season of cold, sadness, and darkness. This was the reason why the Celts associated November 1 with the dead. The Celts believed that it was at this time of the year when witches, evil spirits, and the Devil, himself, visited towns and villages. People lit large fires that kept burning all night to ward off evil spirits. People in other parts in Europe also believed that evil spirits roamed the world during the last day in October.

In the year 834, Pope Gregory IV established November 1 as All Saint's Day. It was during the Roman domination that the Celtic festival and the Christian faith amalgamated. Today few people know the origin of "La Noche de Brujas," and how this celebration came to us.

WRITTEN RECALL-FAMILIAR TOPIC

.....

(Name)

You have just read a short passage about **La Noche de Brujas**. In the space provided below, write in English as much information from the passage as you recall. Please, write down your ideas in the same order you think they were presented in the text. Use the back of this paper if necessary.

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COMPREHENSION ASSESSMENT-FAMILIAR TOPIC

(A) .....
(Name)

The questions below are about **La Noche de Brujas**. Read them carefully and choose one item 'a,' 'b,' 'c,' or 'd' that answers each question correctly.

1. What colors are usually associated with La Noche de Brujas?
   (a) Red and black.
   (b) Black and orange.
   (c) Orange and green.
   (d) Green and red.

2. What can be see in most houses on La Noche de Brujas?
   (a) Pumpkins and gourds.
   (b) Poincettias and mistletoe.
   (c) Watermelons and plums.
   (d) Pine wreaths.

3. Why did the Celts associate November 1 with darkness?
   (a) Because all the fires in their homes were put out that day.
   (b) Because they believed that the Lord of Death visited all towns that day.
   (c) Because they believes that evil powers could enter their homes that day.
   (d) Because it was the beginning of winter for them.

4. Who were the Druids?
   (a) Soldiers that defended the Celts.
   (b) Kings of different Celtic tribes.
   (c) Priests and guides for the Celts.
   (d) Gods worshipped by the Celts.

5. Why do children go from house to house on La Noche de Brujas?
   (a) To sing to their friends and neighbors.
   (b) Because friends and neighbours give them candy.
   (c) Because they have candy for their friends and neighbors.
   (d) Because they sell candy to their friends and neighbors.

6. What was the last day in October according to the Celtic calendar?
   (a) It was the day when the Celts started harvesting their crops.
   (b) It was the day when the Celts began preparing for war.
   (c) It was the last day of the year on the Celtic calendar.
   (d) It was when the Celts started their sacred fire each year.

7. Why might other groups in Europe have lit fires on October 31?
   (a) Because the season of darkness started.
   (b) To ward off evil spirits.
   (c) To worship the Sun God.
   (d) Because they believed in Samhain.

8. Why was the fire so important for the Celts?
   (a) Because they related it to God.
   (b) Because they used it to honor the dead.
   (c) Because it brought strength to the feeble folk.
   (d) Because it symbolized eternal life.

9. How did this Celtic celebration come to us?
   (a) Because many people believed in witches.
   (b) Because the Celtics spreaded their beliefs all over Europe.
   (c) Because it mixed with the Christian faith.
   (d) Because the Romans adopted the Celtic calendar.

10. What happened in the year 834?
    (a) The Romans conquered the Celtic tribes.
    (b) Good people lit their fires in Europe.
    (c) The Celts stopped worshipping Samhain.
    (d) The Pope established the All Saints' Day.

11. On whom do children play tricks on La Noche de Brujas?
    (a) On the people who dress up as witches and ghosts.
    (b) On people who lit fires that night.
    (c) On people who don't have candles by their windows.
    (d) On people who don't give them anything.

12. What was the relation between October 31 and death for the Celts?
    (a) October 31 and death represented the end of something.
    (b) On October 31, the Celts lit fires to honor the dead .
    (c) Gods that protected the dead were worshipped on October 31.
    (d) Celtic Kings were placed in their burial sites on October 31

COMPREHENSION ASSESSMENT-FAMILIAR TOPIC

(B) .....

(Name) --

The questions below are about **La Noche de Brujas**. Read them carefully and choose one item 'a,' 'b,' 'c,' or 'd' that answers each question correctly.

1. Why do children go from house to house on La Noche de Brujas?
   (a) To sing to their friends and neighbors.
   (b) Because friends and neighbours give them candy.
   (c) Because they have candy for their friends and neighbors.
   (d) Because they sell candy to their friends and neighbors.

2. What can be see in most houses on La Noche de Brujas?
   (a) Pumpkins and gourds.
   (b) Poincettias and mistletoe.
   (c) Watermelons and plums.
   (d) Pine wreaths.

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   (c) Because they believes that evil powers could enter their homes that day.
   (d) Because it was the beginning of winter for them.

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    (c) The Celts stopped worshipping Samhain.
    (d) The Pope established the All Saints' Day.

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    (a) On the people who dress up as witches and ghosts.
    (b) On people who lit fires that night.
    (c) On people who don't have candles by their windows.
    (d) On people who don't give them anything.

READING PASSAGE-UNFAMILIAR TOPIC/EASY VERSION

La Diablada

Cada año se celebra en Oruro, Bolivia, la famosa "Diablada", una de las fiestas más interesantes de Sudamérica. La población de Oruro está compuesta, en su mayor parte por indios. Todos los años en tiempo de Carnaval, en febrero o marzo, estos indios abandonan sus peligrosos trabajos en las minas y se ponen a bailar al ritmo de las guitarras y otros instrumentos típicos. Los bailarines llevan máscaras que representan diferentes figuras de la historia y de la mitología, así como también sapos serpientes y especialmente diablos, centenares de diablos. Muchos de los turistas que llegan a ver La Diablada no saben del doble significado de la fiesta.

Cuenta la leyenda de los Andes que hace mucho tiempo, el antiguo pueblo andino de los Urus llevó una vida de mucha libertad, pero que finalmente, conoció el arrepentimiento. Un día cambió su manera de vivir y abandonó las malas costumbres. Sin embargo, al antiguo señor de los Urus, un espíritu malo llamado Huari, no le gustó este cambio y resolvió vengarse. Trató de vencer a los Urus enviándoles muchos y diferentes animales para que los eliminaran. Entonces apareció Ñusta, una princesa Inca, que transformó a algunos animales en figuras de piedra dura y al resto de los animales que venían a atacarlos en pequeños granos de arena.

Para muchos de los habitantes de la zona y para la mayor parte de los indios, la Ñusca es la Virgen del Socavón, patrona de los mineros y figura central de La Diablada. El desfile de músicos y bailarines es seguida con interés por lugareños y visitantes. El origen de la fiesta, los bailes característicos y los brillantes colores de la vestimenta de los participantes le dan a esta fiesta su espíritu único.

READING PASSAGE-UNFAMILIAR TOPIC/HARD VERSION

La Diablada

Cada año se celebra en Oruro, Bolivia, la famosa "Diablada", una de las fiestas más interesantes de Sudamérica. La población de Oruro está compuesta, en su mayor parte por quechuas. Todos los años en tiempo de Carnaval, en febrero o marzo, estos indios dejan sus peligrosos trabajos en las minas y se ponen a bailar al ritmo de los charangos y otros instrumentos típicos. Los bailarines llevan caretas que representan diferentes figuras de la historia y de la mitología, así como también batracios, serpientes y especialmente diablos, centenares de diablos. Muchos de los turistas que llegan a presenciar La Diablada no entienden el doble significado de la fiesta.

Cuenta la leyenda de los Andes que en tiempos inmemoriales, el antiguo pueblo andino de los Urus llevó una vida disipada, pero que finalmente, conoció el arrepentimiento. Un día cambió su manera de vivir e hizo a un lado las malas costumbres. Sin embargo, al antiguo señor de los Urus, un espíritu maligno llamado Huari, no le gustó este cambio y resolvió vengarse. Trató de subyugar a los Urus enviándoles muchos y diferentes animales para que los eliminaran. Entonces surgió Ñusta, una princesa Inca, que transformó a algunos animales en esfinges de piedra dura y al resto de los animales que venían a atacarlos en minúsculos granos de arena.

Para muchos de los habitantes de la zona y para la mayor parte de los quechuas, la Ñusca es la Virgen del Socavón, patrona de los mineros y figura irremplazable de La Diablada. El desfile de músicos y bailarines es seguido con interés por lugareños y forasteros. El origen de la fiesta, los bailes característicos y los brillantes colores de la vestimenta de los participantes le dan a esta fiesta su espíritu único.

READING PASSAGE-UNFAMILIAR TOPIC (TRANSLATION)

La Diablada

La Diablada is held each year in Oruro, Bolivia. Most of the inhabitants in Oruro are Indians. Every year at Carnival time, in February or March, all the Indians leave their dangerous jobs in the mines to dance to the music of guitars and other traditional musical instruments. All the dancers wear masks which look like historical and mythological figures or like toads, snakes, and devils, hundreds of devils. They are part of a parade which marches through the streets of the town. Many of the tourists that come to see La Diablada do not know the double origin of the festival.

According to the Andean legend, a long time ago the ancient Andean Urus lead a very lascivious life. As time went by, they repented and changed their lifestyle. However, Huari, the Lord of the Urus, did not like this change and sought revenge. Huari sent several different animals to exterminate the Urus. Then Ñusca, an Incan princess, appeared and turned some of the animals into stone figures and others into small grains of sand.

For many inhabitants of the region and for most Indians, Ñusca is the Virgin of Socavón, protector of all the miners and central figure of La Diablada. The parade of musicians and dancers is avidly watched by residents and visitors. The origin of the festival, the traditional dances and the bright colors of the participants' costumes give this festival its unique spirit.

WRITTEN RECALL-UNFAMILIAR TOPIC

.....
(Name)

You have just read a short passage about **La Diablada**. In the space provided below, write in English as much information from the passage as you recall. Please, write down your ideas in the same order you think they were presented in the text. Use the back of this paper if necessary.

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COMPREHENSION ASSESSMENT-UNFAMILIAR TOPIC

(A) .....
(Name)

The questions below are about **La Diablada** . Read them carefully and choose one item 'a,' 'b,' 'c,' or 'd' that answers each question correctly

1. What is La Diablada?
   (a) A group of people
   (b) A celebration
   (c) A popular dance
   (d) A type of music

2. Where do people celebrate La Diablada?
   (a) In a Caribbean country.
   (b) In a country in South America.
   (c) In a region in Mexico.
   (d) On some Spanish islands.

3. What is the origin of La Diablada?
   (a) It's a mixture of myth and religion.
   (b) It's the history of a group of native Indians.
   (c) It's completely unknown.
   (d) It's the music of the Oruro region.

4. When is Carnival?
   (a) It changes from year to year.
   (b) One month after Easter.
   (c) Two weeks after Christmas.
   (d) The fourth month of the year.

5. Where do most of the people work in Oruro?
   (a) In a factory where musical instruments are made.
   (b) In the jungle in Bolivia.
   (c) In the mines in Oruro.
   (d) In a store where costumes are made.

6. What metal was extracted in large quantities from an area near Oruro?
   (a) Gold
   (b) Silver
   (c) Copper
   (d) Zinc

7. Who was Ñusca?
   (a) A figure brought by the conquistadors.
   (b) A goddess from Greek mythology.
   (c) A princess who saved her people.
   (d) The saint that protects the Oruro region.

8. Why did Huari want revenge on the Urus?
   (a) Because the Urus changed their lifestyle.
   (b) Because the Urus worshipped serpents.
   (c) Because the Urus declared war on Huari.
   (d) Because Huari did not like animals.

9. Why were the animals turned into stone and sand?
   (a) So that they could not attack the Urus.
   (b) Because they did not obey Huari.
   (c) Because they turned into gods for the Incas.
   (d) Because Huari wanted revenge on the Urus.

10. What country took advantage of the natural resources of the Oruro area?
    (a) England.
    (b) Germany.
    (c) Portugal.
    (d) Spain.

11. Where is Oruro?
    (a) Perhaps in a flat region.
    (b) Perhaps in the jungle.
    (c) Perhaps in the desert.
    (d) Perhaps in a mountainous region.

12. What can we say about today's miners of the Oruro region?
    (a) They seem to be religious people.
    (b) They make their own costumes for the festival.
    (c) They still worship Greek gods.
    (d) They wear bright colors only for this festival.

COMPREHENSION ASSESSMENT-UNFAMILIAR TOPIC

(B) .....

(Name) --

The questions below are about **La Diablada** . Read them carefully and choose one item 'a,' 'b,' 'c,' or 'd' that answers each question correctly

1. What is the origin of La Diablada?
   (a) It's a mixture of myth and religion.
   (b) It's the history of a group of native Indians.
   (c) It's completely unknown.
   (d) It's the music of the Oruro region.

2. Where do people celebrate La Diablada?
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10. What metal was extracted in large quantities from an area near Oruro?
    (a) Gold
    (b) Silver
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    (d) Zinc

11. Where is Oruro?
    (a) Perhaps in a flat region.
    (b) Perhaps in the jungle.
    (c) Perhaps in the desert.
    (d) Perhaps in a mountainous region.

12. What country took advantage of the natural resources of the Oruro area?
    (a) England.
    (b) Germany.
    (c) Portugal.
    (d) Spain.

APPENDIX B

ADDITIONAL HISTOGRAMS FOR RECALLS AND COMPREHENSION

APPENDIX B
HISTOGRAMS FOR RECALLS AND COMPREHENSION

N= 62 bckgrnd= 0

Midpoint	Count	
2	1	*
3	0	
4	2	* *
5	5	* * * * *
6	10	* * * * * * * * * *
7	13	* * * * * * * * * * * * *
8	9	* * * * * * * * *
9	6	* * * * * *
10	12	* * * * * * * * * * * *
11	3	* * *
12	1	*

FIGURE 13
COMPREHENSION SCORES FOR UNFAMILIAR TEXT

N= 62 bckgrnd= 1

Midpoint	Count	
2	0	
3	0	
4	1	*
5	4	* * * *
6	4	* * * *
7	6	* * * * * *
8	7	* * * * * * *
9	18	* * * * * * * * * * * * * * * * * *
10	9	* * * * * * * * *
11	12	* * * * * * * * * * * *
12	1	*

FIGURE 14
COMPREHENSION SCORES FOR FAMILIAR TEXT

N= 63 vcbdiff= 0

Midpoint	Count	
2	1	*
3	0	
4	1	*
5	6	* * * * * *
6	7	* * * * * * *
7	10	* * * * * * * * * *
8	7	* * * * * * *
9	14	* * * * * * * * * * * * * *
10	9	* * * * * * * * *
11	8	* * * * * * * *
12	0	

FIGURE 15
COMPREHENSION SCORES FOR HARD VERSION

N= 62 vcbdiff= 1

Midpoint	Count	
2	0	
3	0	
4	2	* *
5	3	* * *
6	7	* * * * * * *
7	9	* * * * * * * * *
8	9	* * * * * * * * *
9	10	* * * * * * * * * *
10	12	* * * * * * * * * * * *
11	7	* * * * * * *
12	2	* *

FIGURE 16
COMPREHENSION SCORES FOR EASY VERSION

N= 62 Ctrl-Id bckgrnd= 0

Midpoint	Count	
0	10	**********
1	26	**************************
2	12	************
3	9	*********
4	2	**
5	2	**
6	0	
7	1	*

FIGURE 17
CENTRAL IDEAS OF UNFAMILIAR TEXT

N= 62 Ctrl-Id bckgrnd= 1

Midpoint	Count	
0	15	***************
1	15	***************
2	17	*****************
3	10	**********
4	4	****
5	1	*
6	0	
7	1	*

FIGURE 18
CENTRAL IDEAS OF FAMILIAR TEXT

N= 62 Sprtng-Id bckgrnd= 0

Midpoint	Count	
0	11	* * * * * * * * * * *
1	15	* * * * * * * * * * * * * * *
2	23	* *
3	10	* * * * * * * * * *
4	2	* *
5	1	*
6	0	

FIGURE 19
SUPPORTING IDEAS OF UNFAMILIAR TEXT

N= 62 Sprtng-Id bckgrnd= 1

Midpoint	Count	
0	2	* *
1	9	* * * * * * * * *
2	17	* * * * * * * * * * * * * * * * *
3	20	* * * * * * * * * * * * * * * * * * * *
4	5	* * * * *
5	8	* * * * * * * *
6	1	*

FIGURE 20
SUPPORTING IDEAS OF FAMILIAR TEXT

N= 62 Ctrl-Id vcbdiff= 0

Midpoint	Count	
0	15	* * * * * * * * * * * * * * *
1	19	* * * * * * * * * * * * * * * * * * *
2	20	* * * * * * * * * * * * * * * * * * * *
3	8	* * * * * * * *
4	1	*
5	0	
6	0	
7	0	

FIGURE 21
CENTRAL IDEAS OF HARD VOCABULARY

N= 62 Ctrl-Id vcbdiff= 1

Midpoint	Count	
0	10	* * * * * * * * * *
1	22	* *
2	9	* * * * * * * * *
3	11	* * * * * * * * * * *
4	5	* * * * *
5	3	* * *
6	0	
7	1	*

FIGURE 22
CENTRAL IDEAS OF EASY VOCABULARY

N= 62 Sprtng-Id vcbdiff= 0		
Midpoint	Count	
0	11	**********
1	13	************
2	23	**********************
3	9	*********
4	2	**
5	4	****
6	1	*

FIGURE 23
SUPPORTING IDEAS OF HARD VOCABULARY

N= 62 Sprtng-Id vcbdiff= 1		
Midpoint	Count	
0	2	**
1	11	**********
2	17	*****************
3	21	*********************
4	5	*****
5	5	*****
6	0	

FIGURE 24
SUPPORTING IDEAS OF EASY VOCABULARY

N= 62 Explt-Qs bckgrnd= 0		
Midpoint	Count	
0	0	
1	3	* * *
2	15	* * * * * * * * * * * * * * *
3	23	* *
4	21	* *

FIGURE 25
EXPLICIT QUESTIONS OF UNFAMILIAR TEXT

N= 62 Explt-Qs bckgrnd= 1		
Midpoint	Count	
0	2	* *
1	6	* * * * * *
2	12	* * * * * * * * * * * *
3	16	* * * * * * * * * * * * * * * *
4	26	* *

FIGURE 26
EXPLICIT QUESTIONS OF FAMILIAR TEXT

N= 62 Impl-Qs bckgrnd= 0		
Midpoint	Count	
0	3	* * *
1	9	* * * * * * * * *
2	22	* *
3	19	* * * * * * * * * * * * * * * * * * *
4	9	* * * * * * * * *

FIGURE 27
IMPLICIT QUESTIONS OF UNFAMILIAR TEXT

```
N= 62    Impl-Qs   bckgrnd= 1
         Midpoint        Count

             0              2  **
             1             16  ****************
             2             21  *********************
             3             21  *********************
             4              2  **
```

FIGURE 28
IMPLICIT QUESTIONS OF FAMILIAR TEXT

```
N= 62    Scrpl-Qs  bckgrnd= 0
         Midpoint      Count

             0            1  *
             1           12  ************
             2           21  *********************
             3           21  *********************
             4            7  *******
```

FIGURE 29
SCRIPTICALLY IMPLICIT QUESTIONS OF UNFAMILIAR TEXT

```
N= 62    Scrpl-Qs bckgrnd= 1
      Midpoint      Count

             0          0
             1          0
             2          1  *
             3         15  ***************
             4         46  ***********************
                           ***********************
```

FIGURE 30
SCRIPTICALLY IMPLICIT QUESTIONS OF FAMILIAR TEXT

N= 62 Explt-Qs vcbdiff= 0

Midpoint	Count	
0	2	* *
1	6	* * * * * *
2	15	* * * * * * * * * * * * * * *
3	19	* * * * * * * * * * * * * * * * * * *
4	21	* *

FIGURE 31
EXPLICIT QUESTIONS OF HARD VOCABULARY

N= 62 Explt-Qs vcbdiff= 1

Midpoint	Count	
0	0	
1	3	* * *
2	12	* * * * * * * * * * * *
3	20	* * * * * * * * * * * * * * * * * * * *
4	26	* *

FIGURE 32
EXPLICIT QUESTIONS OF EASY VOCABULARY

N= 62 Impl-Qs vcbdiff= 0

Midpoint	Count	
0	1	*
1	16	* * * * * * * * * * * * * * * *
2	21	* *
3	20	* * * * * * * * * * * * * * * * * * * *
4	5	* * * * *

FIGURE 33
IMPLICIT QUESTIONS OF HARD VOCABULARY

N= 62 Impl-Qs vcbdiff= 1

Midpoint	Count	
0	4	****
1	9	*********
2	22	**********************
3	20	********************
4	6	******

FIGURE 34
IMPLICIT QUESTIONS OF EASY VOCABULARY

N= 62 ScrpI-Qs vcbdiff= 0

Midpoint	Count	
0	1	*
1	6	******
2	10	**********
3	17	*****************
4	29	**************************
		******

FIGURE 35
SCRIPTICALLY IMPLICIT QUESTIONS OF HARD VOCABULARY

N= 62 ScrpI-Qs vcbdiff= 1

Midpoint	Count	
0	0	
1	6	******
2	12	************
3	19	*******************
4	25	*************************

FIGURE 36
SCRIPTICALLY IMPLICIT QUESTIONS OF EASY VOCABULARY

APPENDIX C
ADDITIONAL STATISTICAL ANALYSIS OF THE DATA

APPENDIX C
ADDITIONAL STATISTICAL ANALYSIS OF THE DATA

TABLE 30
MULTIVARIATE ANALYSIS OF COVARIANCE FOR AGE

MANCOVA for age s= 1 m= 1.5 n= 53.5

CRITERION	TEST STATISTIC	F	DF	P
Wilk's	0.98813	0.262	(5, 109)	0.933
Lawley-Hotelling	0.01202	0.262	(5. 109)	0.933
Pillai's	0.01187	0.262	(5, 109)	0.933
Roy's	0.01202			

TABLE 31
MULTIVARIATE ANALYSIS OF COVARIANCE FOR GENDER

MANCOVA for gender s= 1 m=1.5 n=53.5

CRITERION	TEST STATISTIC	F	DF	P
Wilk's	0.97260	0.614	(5, 109)	0.689
Lawley-Hotelling	0.02818	0.614	(5. 109)	0.689
Pillai's	0.02740	0.614	(5, 109)	0.689
Roy's	0.02818			

TABLE 32
MULTIVARIATE ANALYSIS OF COVARIANCE FOR YEARS OF LANGUAGE STUDY

MANCOVA for years of language study s= 1 m= 1.5 n= 53.5

CRITERION	TEST STATISTIC	F	DF	P
Wilk's	0.92081	1.875	(5, 109)	0.105
Lawley-Hotelling	0.08600	1.875	(5. 109)	0.105
Pillai's	0.07919	1.875	(5, 109)	0.105
Roy's	0.08600			

TABLE 33
MULTIVARIATE ANALYSIS OF COVARIANCE FOR SPANISH-SPEAKING FRIENDS/RELATIVES

MANCOVA for Spanish-speaking friends/relatives
s= 1 m= 1.5 n= 53.5

CRITERION	TEST STATISTIC	F	DF	P
Wilk's	0.96249	0.850	(5, 109)	0.518
Lawley-Hotelling	0.03897	0.850	(5. 109)	0.518
Pillai's	0.03751	0.850	(5, 109)	0.518
Roy's	0.03897			

TABLE 34
MULTIVARIATE ANALYSIS OF COVARIANCE FOR STUDENTS' VISITS TO A SPANISH SPEAKING COUNTRIES

MANCOVA for visit a Spanish-speaking country
s= 1 m= 1.5 n= 53.5

CRITERION	TEST STATISTIC	F	DF	P
Wilk's	0.97226	0.622	(5, 109)	0.683
Lawley-Hotelling	0.02853	0.622	(5. 109)	0.683
Pillai's	0.02774	0.622	(5, 116)	0.683
Roy's	0.02853			

TABLE 35
MULTIVARIATE ANALYSIS OF COVARIANCE FOR LENGTH OF STAY IN SPANISH SPEAKING COUNTRIES

MANCOVA for stay in Spanish-speaking country

CRITERION	TEST STATISTIC	F	DF	P
Wilk's	0.95379	1.056	(5, 109)	0.389
Lawley-Hotelling	0.04845	1.056	(5. 109)	0.389
Pillai's	0.04621	1.056	(5, 116)	0.389
Roy's	0.04845			

TABLE 36
MULTIVARIATE ANALYSIS OF COVARIANCE FOR CONTACT WITH THE LANGUAGE OUTSIDE THE CLASSROOM

MANCOVA for language contact s= 1 m= 1.5 n= 53.5

CRITERION	TEST STATISTIC	F	DF	P
Wilk's	0.96826	0.715	(5, 109)	0.614
Lawley-Hotelling	0.03279	0.715	(5. 109)	0.614
Pillai's	0.03174	0.715	(5, 109)	0.614
Roy's	0.03279			

TABLE 37
MULTIVARIATE ANALYSIS OF COVARIANCE FOR BACKGROUND KNOWLEDGE

MANCOVA for topic familiarity s= 1 m= 1.5 n= 53.5

CRITERION	TEST STATISTIC	F	DF	P
Wilk's	0.40381	32.186	(5, 109)	0.000
Lawley-Hotelling	0.47640	32.186	(5. 109)	0.000
Pillai's	0.59619	32.186	(5, 109)	0.000
Roy's	1.47640			

TABLE 38
MULTIVARIATE ANALYSIS OF COVARIANCE FOR VOCABULARY

MANCOVA for vocabulary s= 1 m= 1.5 n= 53.5

CRITERION	TEST STATISTIC	F	DF	P
Wilk's	0.91606	1.997	(5, 109)	0.085
Lawley-Hotelling	0.09163	1.997	(5. 109)	0.085
Pillai's	0.08394	1.997	(5, 116)	0.085
Roy's	0.09163			

TABLE 39

MULTIVARIATE ANALYSIS OF COVARIANCE FOR INTERACTION BETWEEN BACKGROUND AND VOCABULARY

MANCOVA for topic familiarity and vocabulary interaction s= 1 m= 1.5 n= 53.5

CRITERION	TEST STATISTIC		F	DF	P
Wilk's	0.96444	0.804	(5,	116)	0.549
Lawley-Hotelling	0.03687	0.804	(5.	116)	0.549
Pillai's	0.03556	0.804	(5,	116)	0.549
Roy's	0.03687				

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