

THE UNIVERSITY OF CALGARY

THE EFFECT OF CULTURE ON  
READING COMPREHENSION

by

PHYLLIS REGIER PANKRATZ

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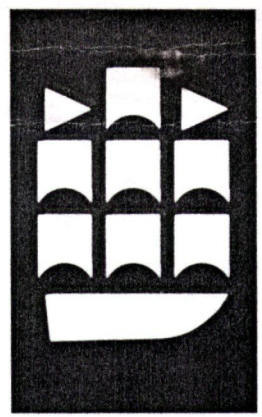
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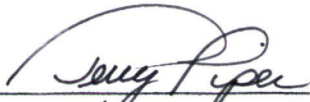
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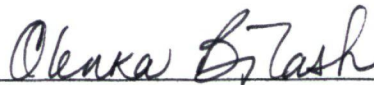
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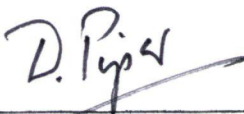
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## ABSTRACT

### The Purpose

The purpose of this study was to investigate the effect of culture on reading comprehension as measured by the cloze procedure.

### The Study

This study was a replication and expansion of a study done by Piper and McEachern (1988). Two cloze passages of equal length which were believed to require different background knowledge and experience for comprehension were selected in order to examine the effect of passage content on cloze scores. One passage was heavily loaded with Canadian cultural content and the other was scientific in content. The passages, which were determined to be of equal readability according to Fry's Readability Scale and the Dale-Chall Readability Formula, were given to three groups of subjects: (a) French-Canadians, (b) Japanese, and (c) Canadian native speakers of English.

The Japanese subjects were expected to score higher on the scientific passage than the culturally loaded passage. It was hypothesized that the native speakers would not perform in a significantly different manner on the two passages and that they would perform better than both of the other groups on both of the passages. The French Canadian subjects were expected to score higher on the culturally loaded passage than the Japanese group. It was also predicted that the French

Canadian subjects would perform better on the culturally loaded passage than the scientific one. These hypotheses were made on the basis of the findings of previous research on the effect of background knowledge and existing schemata on reading comprehension. Analyses of variance were performed on the scores and a series of post hoc t-tests were conducted.

### The Findings

All of the subjects scored significantly higher on the culturally loaded passage than the scientific one. The native speakers performed better on both passages than the other two groups and the French Canadian subjects scored significantly higher on both passages than the Japanese subjects. However, the difference in scores between the French Canadian and the Japanese on the culturally loaded passage was markedly greater than the difference in the scores between the two groups on the scientific passage. The findings of this study bring into question the cultural neutrality of scientific passages for ESL students and the reliability of readability measures. They also raise the issue of the vulnerability of the cloze procedure to content bias.

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## DEDICATION

To the memory of my father, Abram P. Regier, who many years ago was also a Master of Arts student at this university but because of deteriorating health did not have the opportunity to complete his thesis.

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## CHAPTER ONE

### Introduction

#### Background Knowledge

It is generally accepted that the background knowledge of the language student is a major factor in successful reading comprehension (Wilson & Anderson, 1986; Beck & McKeown, 1986; Farr et al., 1986; Melendez & Pritchard, 1985; Langer, 1984). Although significant progress has been made in the last decade in understanding the relationship between background knowledge and reading comprehension, the existence of this relationship was realized much earlier (Wilson & Anderson, 1986; Beck & McKeown, 1986).

Gray (1956), founder of the basal reading program, recognized the importance of children making use of what they already knew in constructing meaning from the ideas they were presented within print. Betts (1946) and Stauffer (1969) further refined Gray's ideas of how this could be facilitated in the basal reading lesson. Ausubel's (1963) advance organizer was intended to activate a reader's prior knowledge in a way that would help him organize and integrate the new text information. All of these approaches concerned themselves with activating existing background knowledge in relation to an upcoming story. Yet another method, the Language Experience Approach has children actually use their background knowledge to create stories which then comprise the

material for their initial reading (Lee & Allen, 1963; Stauffer, 1970).

Although concern with background knowledge in reading is not new, research regarding its specific effects is a recent development (Beck & McKeown, 1986). As a result of this research, Wilson & Anderson (1986) state: "We now possess more subtle and precise evidence that the knowledge a reader brings to a text is a principal determiner of how that text will be comprehended and what may be learned and remembered" (p. 32).

Readers construct meaning from a passage by analyzing it against the "backdrop of their own personal knowledge of the world" (Steffensen, 1986, p. 71). The reader relies on more than a purely linguistic analysis of a text in coming to understand it (Byrnes, 1984; Johnson, 1982). In fact, the greater the store of background knowledge readers bring to the task, the less they need to depend on strictly linguistic information (Byrnes, 1984). The process of comprehending discourse involves both what is explicitly stated and what follows from that information (Spiro, 1980).

Authors assume that their readers will bring certain kinds of knowledge to their reading and therefore they leave much unstated for readers to infer. One condition for comprehensibility is "the goodness of the match between the interpretive or inferential tendencies presumed of the reader and that actually possessed by the reader" (Adams & Bruce,

1982, p. 4). The reader is not expected to generate all possible inferences, but rather, he/she must make those inferences expected by the author. Alderson and Urquhart (1988) argue that no text is "neutral" across a range of readers. All texts presuppose some kind of background knowledge. This knowledge forms the basis for drawing inferences during comprehension and for relating to the content of the passage (Farr et al., 1986). The reader's prior knowledge allows interpretation of the author's intended message and leads to comprehension.

In order for efficient text processing to take place, a link with some previously acquired knowledge is necessary (Langer, 1982). A major determinant of a text's comprehensibility is whether the reader actually possesses the knowledge presumed by the author (Adams & Bruce, 1982). If this knowledge is lacking, a breakdown in comprehension may result. Research has shown that there is a relationship between the presence of background knowledge and comprehension (Beck & McKeown, 1986; Langer, 1984). The extent and quality of that knowledge determines how well a text is comprehended.

The question arises: Will readers' comprehension improve if they are helped to build background knowledge through pre-reading activities? Studies support the notion that increasing background knowledge can improve reading comprehension (Beck & McKeown, 1986; Carrell, 1988b). More research is needed, however, to answer a number of questions:

What types of information enhance a given passage (Stevens, 1982)? Which method of instruction is most effective: explicit instruction, deductive instruction, incidental instruction or symbolic experiences (Carrell, 1988b; Gunderson et al., 1988)?

Some comprehension difficulties stem from the lack of appropriate background knowledge but some

readers experience difficulty because they have not accessed appropriately related ideas; have not activated all available knowledge related to the topic, have not associated the information being presented in the text with their prior knowledge, or have not sufficiently organized the relevant concepts. (Langer, 1982, p. 153)

A concern for the need to activate background knowledge in readers has led to several organized approaches and methods for doing this.

All of these methods train the reader to do something before reading in order to activate appropriate background knowledge - either creating the text themselves (Language Experience Approach), setting a communication purpose for reading (Extending Concepts Through Language Activities), predicting what a text will be about (Directed Reading-Thinking Activity), sharing prior experiences on the topic (Experience-Text-Relationship method), free associating on the topic (the Pre-Reading Plan), or surveying the text (Survey-

Question-Read-Recite-Review method). (Carrell, 1988b, p. 248)

Background knowledge can be divided into subcomponents in several ways. It can be separated into (a) knowledge of the content area of the text, and (b) knowledge of the formal rhetorical organizational structure of the text (Carrell, 1988a). It can also be differentiated in terms of (a) conceptual knowledge (relevant words, real-world concepts), (b) social knowledge (imputation of intentions to the writer), and (c) story knowledge (story-world conventions) (Adams & Bruce, 1982). Still another division of background knowledge is (a) extralinguistic knowledge based on experiential background, and (b) culturally based linguistic knowledge which allows readers to draw on specific meaning associations (Byrnes, 1984). The latter distinction has particular significance in the area of English as a Second Language.

As stated before, authors presuppose certain types of knowledge in their readers. Much of this assumed knowledge is common to all members of the same culture. However, when readers are from a culture other than that of the author, they may not have this culture-specific background knowledge. Steffensen (1988) characterizes this knowledge as being the result of a number of factors such as age, sex, race, nationality and occupation, all of which constitute one's culture. Lack of culture-specific knowledge makes it difficult, if not impossible, to infer missing information and

even explicitly stated facts may be distorted because they are misinterpreted. Culture-specific knowledge includes knowledge of both the content and rhetorical structure of a text (Carrell, 1988a). Research has shown that

the implicit cultural knowledge presupposed by a text and the reader's own cultural knowledge interact to make texts based on one's own culture easier to read and understand than syntactically and rhetorically equivalent texts based on a less familiar culture. (Carrell, 1988b, p. 245)

Here again the pedagogical question of how to enhance a reader's culture-specific knowledge arises. A study done by Johnson (1982) examined the effect of various techniques. She found that the effect of knowledge gained from real experiences was much more effective than vocabulary instruction. More research is required in this area.

The research reported here continues the investigation of the effect of culture-specific background knowledge on reading comprehension. Using the cloze test to measure comprehension, it explores whether the lack of culture-specific background knowledge is shown to impede comprehension in learners of English as a Second Language. More specifically, do varying degrees of culture-specific content in passages of equal readability result in observable differences in comprehension? Investigating the effect of culture-specific background knowledge from still another

angle, this study examines the degree to which the possession of culture-specific background knowledge facilitates comprehension when linguistic proficiency is limited.

#### Definition of Terms

Cloze Test or Procedure is a language test in which the student has to fill in blanks in a continuous passage. There are many variations on the cloze test but in the basic type the test constructor selects a passage and then deletes every nth word.

Culture refers to the day-to-day living patterns of a group of people including the knowledge and beliefs needed in order to operate in a manner acceptable to the group.

Readability is the level of ease with which a passage can be read and understood, i.e., "a text [is] considered more readable if a) it [can] be read more quickly, and b) it [can] be remembered more easily" (Urquhart, 1984, p. 161).

Schemata are the mental structures that store a person's knowledge in memory. Different schemata represent knowledge of various concepts.

## CHAPTER TWO

### A Review of the Literature

The review of the literature pertaining to this study is divided into two major sections. The first is concerned with the literature regarding the instrument used in doing the research, that is, the cloze procedure. The second section deals with the literature regarding the content of this study. The focus here is on the theories of reading pertinent to the present research.

#### Testing Language Proficiency Using the Cloze Procedure

The cloze procedure is based on the Gestalt psychology notion that the mind is able to complete an incomplete pattern and on the notion of redundancy in language. An incomplete pattern is constructed by deleting every nth word in a text and redundancy is provided by natural language (Klein-Braley, 1983). The reduced redundancy resulting from the deletion of words forces the examinee to rely on his knowledge of linguistic rules to fill in the blanks in a way that maintains the meaning of the passage (Laesch & van Kleeck, 1987). It is assumed that a person who is reasonably proficient in English should be able to anticipate the words that belong in the blanks given the contextual clues (Hinofotis, 1980).

The cloze procedure was originally designed to test the readability of native-speaker reading materials (Taylor, 1953). However, it has subsequently found widespread use in

measuring the global English language proficiency of non-native speakers. "The cloze procedure has reached the status of a 'conventional' measure of reading comprehension alongside the more traditional techniques of responding to multiple-choice questions or retelling events or facts after reading a passage" (Shanahan et al., 1982, p. 230).

Cloze tests are constructed in the following manner. After selecting a reading passage, the test developer deletes every nth word (e.g., 6th, 7th or 8th) of the text. Usually the first and last sentences of the text are left intact to provide context. The student is then required to fill each of the resulting blanks with an appropriate word.

There are several reasons for the popularity of the cloze procedure. The ease with which it can be constructed, administered and scored makes it attractive. Also, cloze test scores have been claimed to be highly correlated with the scores on tests evaluating various specific language skills and many other types of language tests (Hinofotis, 1980; Shohamy, 1983; Levenston et al., 1984; Hanania & Shikhani, 1986). In addition to this, the test material is authentic and the behaviour of the examinee is an approximation of linguistic behaviour required in everyday life (Klein-Braley, 1985). As a result, the cloze test has enjoyed a reputation as an integrative test of communicative ability.

The ability to supply appropriate words in blanks requires a number of abilities that lie at the very heart

of competence in a language: knowledge of vocabulary, grammatical structure, and discourse structure, reading skills and strategies; and an internalized 'expectancy' grammar (that enables one to predict an item that will come next in a sequence). It is argued that successful completion of cloze items taps into all of those abilities, which are the essence of global language proficiency. (Brown, 1987, p. 229)

In spite of these claims, there has been considerable controversy as to the efficacy of the cloze procedure.

A considerable amount of research has been done to determine the validity and reliability of the cloze procedure and the results have led to conflicting conclusions. The cloze test's sensitivity to constraints across sentence boundaries has been investigated. Some studies have shown it to be sensitive in this regard (Oller, 1975; Chihara et al., 1977; Cziko, 1978; Chavez-Oller et al., 1985) whereas others (Alderson, 1979 & 1983; Porter, 1983; Shanahan et al., 1982) conclude that the cloze test is essentially sentence bound. Alderson (1979 & 1983) sees the cloze test as relating more closely to tests of grammar and vocabulary than tests of reading comprehension. He claims it tests linguistic skills of a relatively low order. Oller (in Alderson, 1983), on the other hand, points out that Alderson's conclusions are based on the assumption that the test to which he compared the cloze test (the ELBA test) actually tests grammar, vocabulary and

reading comprehension as it purports to do. Further support for Oller's position comes from a study by Laesch and van Kleeck (1987) in which they conclude that the cloze test provides a valid assessment of higher-level language proficiency.

The issue of word deletion has also received attention. Studies with native speakers found that providing more than 10 to 12 words of context has no effect on the predictability of a deletion but providing less than five words did have an effect (Alderson, 1979). Based on this, the accepted deletion rate in cloze tests has been from every 10th to every 5th word of text.

Again, there are conflicting opinions regarding the effect of varying deletion rates and starting points. Alderson (1979 & 1983), Farhady (1983), Klein-Braley and Raatz (1984) and Bachman (1985) all hold the view that different deletion rates and starting points applied to the same text produce tests of different difficulty, reliability and validity. However, Brown (1983) in his study showed cloze tests based on differing starting points to be equivalent. Oller in his rebuttal (editor's note) to Farhady (1983) also takes issue with the conclusions of the researchers mentioned above. He asks:

But isn't Farhady ... imposing requirements on cloze tests and other pragmatic procedures that he would not think of imposing on other tests? For instance, would

he argue that changing the items in a reading comprehension test (say of multiple choice format) is tantamount to changing the whole purpose of the test? (Oller in Farhady, 1983, p. 269)

A final area of controversy pertains to the method of scoring a cloze test. Two methods of scoring have become generally accepted: the exact scoring method and the semantic equivalent scoring method. With the first method, only those words which appear in the original passage are considered correct. With the second method, any semantically-equivalent and grammatically-correct response is accepted. Debate as to which method is most valid as well as most suitable for various populations continues.

Despite the criticism it has received, the cloze test continues to be widely used. Numerous studies in the area of reading in ESL have used the cloze test as a research instrument. Bowen et al. (1985) and Brown (1987) in their texts on teaching ESL recommend the cloze test as a way of testing English language proficiency. Hudson (1982) calls for further verification of his findings using the cloze test. Even those who are rather sceptical of the validity and reliability of the cloze test (Alderson, 1983; Klein-Braley, 1983) recommend its careful use.

#### Theories of Reading

Reading is currently considered to be a complex network of processes which must be integrated for fluent reading.

This view reflects a major shift in the understanding of reading which took place in the sixties and seventies. Until that time, reading was thought of as "a primarily perceptual, visually-based activity" (Dickinson et al., 1989, p. 232). Difficulties with reading were considered to be visual problems. Research in psycholinguistics and cognitive psychology challenged this assumption and showed that the nature of reading was language-based and that reading consisted of a number of linguistic processes (Beck & McKeown, 1986).

A wide range of models has emerged from this new view. Major differences in these models originate from the way in which the components are organized, the nature of their interaction, and the subprocesses that are involved in reading breakdown (Dickinson et al., 1989). These reading models can be divided into bottom-up and top-down models. Bottom-up models emphasize lower-level processes. They begin with the printed stimuli and are concerned with the rapid and accurate decoding of lexical and grammatical forms. Top-down models, on the other hand, begin with the higher-level processes. These processes are employed when the system makes general predictions based on contextual clues and then looks for information to confirm these predictions.

One of these top-down models is the psycholinguistic model of reading put forward by Goodman (1967, 1988) and Smith (1972, 1982). It is of particular interest here because it

has had a great impact on conceptions about reading instruction (Samuels & Kamil, 1988). It emphasizes almost exclusively the higher-level linguistic processes such as extraction of meaning, context and inference (Dickinson et al, 1989). An examination of the impact of culture on reading must take into account these processes. This model is in direct contrast to bottom-up models which stress phonic skills.

Out of the research done regarding both bottom-up and top-down models, a third one has been developed, the interactive model. The underlying assumption here is that the components of the reading process do not operate serially, but rather in flexible, interactive ways (Rumelhart, 1977). Various combinations of higher-level and lower-level processes are utilized in reading comprehension. One of the interactive models that has received considerable attention is that of schema theory. This model will be discussed at length since the research done based on it has direct relevance to the questions investigated by this study.

#### Goodman's Psycholinguistic Model of Reading

During the past decade, reading theory in ESL/EFL has been influenced by psycholinguistics and, in particular, Goodman's (1967) psycholinguistic model of reading (Carrell & Eisterhold, 1983).

Reading is a receptive language process. It is a psycholinguistic process in that it starts with a

linguistic surface representation encoded by a writer and ends with meaning which the reader constructs. There is thus an essential interaction between language and thought in reading. (Goodman, 1988, p. 12)

Goodman (1967) proposed that readers use graphophonic, syntactic and semantic information when they are involved in the act of reading. He (1988) describes reading in terms of four cycles which are employed sequentially but melt into each other as the reader moves toward meaning. These cycles, in the order they occur, are (a) optical, (b) perceptual, (c) syntactic, and (d) meaning. As the reader goes through these cycles, five processes are employed in the following sequence: (a) recognition of the graphic display, (b) prediction, (c) confirmation, (d) correction, and (e) termination of the reading task. By taking advantage of the redundancy inherent in language, the best readers use the least amount of text information possible in making and confirming predictions regarding the meaning of a text.

The distinctive characteristic of this model is its procedural preference for allowing the reader to rely on existing syntactic and semantic knowledge structures, so that reliance on the graphic display and existing knowledge about sounds associated with graphemes (graphophonemic knowledge) can be minimized. (Samuels & Kamil, 1988, p. 23)

This model allows for movement from symbol to sound to meaning but sees reliance on syntactic and semantic knowledge as most crucial to the reading process.

Breakdowns in reading comprehension are explained as short circuits in the form of wrong guesses which may occur at any point in the processes cited earlier (Goodman, 1988). Proficient readers will recover quickly from wrong guesses or miscues but poor readers will not. One criticism of the psycholinguistic model is that it only describes what happens for skillful, fluent readers and does not provide a true picture of what happens for poor readers (Clarke, 1980), including ESL readers.

Coady (1979) addresses this weakness and has expanded the above model. He suggests that the ESL/EFL reader's background knowledge interacts with conceptual abilities, background knowledge and process strategies to produce comprehension. Conceptual abilities are seen as general intellectual capacity whereas process strategies are the various subcomponents of reading ability (e.g., grapheme-morphophoneme correspondences, syllable-morpheme information, syntactic information, lexical meaning, contextual meaning, etc.). Although the psycholinguistic model of reading is seen as an interaction of factors, it does not put enough emphasis on the role of background knowledge (Carrell & Eisterhold, 1983; Carrell, 1984c).

### Schema Theory

Schema theory partly fills this void by attempting to formalize the role of background knowledge in language comprehension (Carrell & Eisterhold, 1983). Background knowledge is the basis for drawing inferences during comprehension and for relating to the content of a text. Sir Frederic Bartlett (1932) is generally acknowledged as the first psychologist to use the term schema as referring to the active organization of past experiences (Anderson & Pearson, 1988). Schema theory posits that when people encounter new information, they attempt to understand it by fitting it into what they already know about the world. This knowledge of the world is packaged into units which are called schemata.

A schema ... is a data structure for representing the generic concepts stored in memory. There are schemata representing our knowledge about all concepts...A schema contains, as a part of its specification, the network of interrelations that is believed to normally hold among the constituents of the concept in question. (Rumelhart, 1980, p. 34)

Fundamental to both the psycholinguistic model of reading and schema theory is the concept that texts, in and of themselves, do not carry meaning. The reader is an active participant in the act of reading (Spiro, 1980). Reading is an interactive process in which the schematic information a reader has about the topic of a given text is as important to

adequate comprehension as the information presented in print (Melendez & Pritchard, 1985). This view acknowledges the reader's semantic constructivity in the reading process (Perkins, 1983). In the process of interpreting a reading passage, each piece of input is mapped against existing schemata.

The concepts that constitute a schema are described as "slots" that can be instantiated with particular information. Wilson and Anderson (1986) note that "a well-formed text does not typically contain information for every slot in a schema. These slots must be instantiated by inference, a process in which the conceptual machinery of the schema plays a major role" (p. 33). Constraints exist on what kind of information can instantiate each slot. A reader comprehends a message when he/she constructs a schema that gives a coherent account of the objects or events described (Rumelhart, 1980; Wilson & Anderson, 1986).

From the perspective of schema theory, the reader brings two types of schemata to a text: (a) content schemata (knowledge relative to the content of the text), and (b) formal schemata (knowledge relative to the formal, rhetorical organizational structure of the text) (Carrell, 1987). Reading comprehension is dependent on the reader's possessing and activating the appropriate schemata in interaction with a text (Carrell, 1984b).

Activity and organization are two important aspects of schemata. Schemata are active in that there is a continual integration of old and new information (Bruner, 1960). Schemata are used to assimilate new information and they are also modified to accommodate new information (Anderson & Pearson, 1988). The reader checks to see if the new information is consistent with the information already stored. If it is not, he/she will reject it, but, if the new information is creditable, he/she will modify the schema.

Schemata are also organized in a hierarchical system, with the most abstract and inclusive ideas in the highest position and the most specific at the bottom (Ausubel, 1963). This hierarchical organization results in two modes of information processing: bottom-up (also referred to as data-driven or text-based processing) and top-down (also referred to as conceptually-driven or knowledge-based processing) (Carrell & Eisterhold, 1983).

Schema theory differs from the psycholinguistic model of reading in that schema theory holds that both types of processing should be occurring simultaneously (Rumelhart, 1980; Wilson & Anderson, 1986). In the psycholinguistic model, top-down processing is seen as of primary importance (Dickinson et al., 1989) but in schema theory the top-down and bottom-up processes are viewed as interactive and parallel. "Interactive refers to the interaction between information obtained by means of bottom-up decoding and information

provided by means of top-down analysis, both of which depend on certain kinds of prior knowledge and certain kinds of information-processing skills" (Eskey, 1988, p. 96).

Bottom-up processing allows readers to be sensitive to information that does not fit their hypotheses about a text and top-down processing allows them to resolve ambiguities in meaning. When there is a conflict between top-down predictions and bottom-up information, the reader must change his/her interpretations of the text in order to reconcile them (Carrell & Eisterhold, 1983). As a result, reading is not a process that proceeds in a strict order from the visual information to the overall interpretation of a text (Wilson & Anderson, 1986; Byrnes, 1987). "The reader is believed to understand the meaning of text when a sufficient threshold of information from all knowledge sources is reached" (Dickinson et al., 1989, p. 238).

In comprehending a text, a reader's personal schemata must interact with that of the text, that is, they must be activated. In order to do this the reader must intend to schematize and be able to relate new meanings to what is already known (Swaffer, 1988). Anderson and Pearson (1988) list three assumptions in schema activation. First, words mentioning any part of a schema, may bring to mind the whole schema. In addition, some words are more salient in this regard than others. Second, once the schema is activated, the reader may be reminded of the other components of that schema.

Third, when two or more parts of a schema are mentioned "the aggregate probability of the whole schema being activated is a function of the sum of the probabilities that the individual components will activate the schema" (p. 44).

To the extent that readers activate the appropriate schemata in interpreting a text, they can be said to have comprehended the text (Carrell, 1984b). In many cases, however, the reader does not succeed in comprehending the text. Lack of comprehension is explained by schema theory in terms of unidirectional processing. This can occur for several reasons.

First, the reader may not have the appropriate schemata and therefore does not understand what is being communicated (Rummelhart, 1980; Pearson & Spiro, 1982; Steffensen, 1986; Carrell, 1988a). In this case, the reader lacks the background knowledge necessary to make sense of the text. This includes both the reader's knowledge of text structure and text content. As a result, the reader must rely solely on text-based processing.

Second, the reader may have the appropriate schemata but the information given by the writer is not adequate to activate them (Rummelhart, 1980; Pearson & Spiro, 1982; Carrell, 1988a). A study by Carrell and Wallace (1983) showed that even when subjects were told which schema to activate when reading a text, if the text failed to signal the appropriate schema, the subjects relied primarily on bottom-

up processing when reading the text.

Third, the reader may find a plausible interpretation of the text which is not the one intended by the author (Rumelhart, 1980). The reader makes sense of the text but has misunderstood the author's message.

Fourth, the reader may have skill deficiencies in text-based processing (Carrell, 1988a; Eskey, 1988). These may be linguistic deficiencies (content vocabulary) or skill-based deficiencies. Without linguistic and skill-based abilities, interaction between bottom-up and top-down processing cannot occur.

Fifth, the reader may have mistaken conceptions about the reading task (Carrell, 1988a; Devine, 1988). The reader may see knowledge-based processing as inappropriate for certain reading tasks and rely only on text-based processing. Spiro (1979) has called this a "meaning is in the text" fallacy. Steffensen (1986) notes another way in which readers may misinterpret the reading task. She says readers may fail "to assign the linguistic signals to the appropriate register because there is an initial error in schema selection which blocks the correct processing" (p. 76).

Sixth, for some readers the underutilization of prior knowledge may be a matter of cognitive style in processing incoming information. Carrell (1988a) explains this as follows: "Text is an external stimulus with a structure; interactive reading requires that relevant internal knowledge

structures be superimposed on the text. Those who are overly text-bound in reading situations may tend to be stimulus-bound in general" (p. 109).

#### Schema Theory in Second Language Research

The research which has been done in support of schema theory in second language acquisition can be divided into four categories. These studies investigate the effects on reading comprehension of (a) rhetorical structure, (b) story grammar, (c) prior knowledge or experience of a subject, and (d) culture-specific content knowledge. The first two categories are concerned with the reader's knowledge of text structure and the last two categories deal with the reader's knowledge of text content. Although there is some overlap between these categories, each one will be considered separately.

##### Rhetorical structure.

Several research studies have focused on the formal schema the reader brings to a text. In his work, Kaplan (1980) outlines variations in rhetorical or formal structure from one culture to another. He states: "Rhetoric ... is not universal ... but varies from culture to culture and even from time to time within a given culture" (Kaplan, 1980, p.400). From an analysis of the writing of his foreign students, Kaplan claims that Semitic writing relies heavily on parallelism whereas Oriental writing circles around the subject from different views. He also notes that French and Spanish writing allow for more digression and extraneous

material than does English writing which is primarily linear in nature.

Drawing on his study of Vietnamese, Schafer (1981) points out the importance and prevalence of the rhetorical device of coupling in Vietnamese writing and speech. Coupling is the juxtaposing of two items that are antithetical in meaning placed in topographically equivalent places in a text. Although English also uses coupling, the insertion of articles, prepositions and subordinating connectives makes the opposition of words less pronounced than they are in Vietnamese. In English, coupling is a matter of style but in Vietnamese it is special a way of solving problems. "Coupling is undoubtedly an important ingredient of many Vietnamese texts...because it is part of the inference-generating process the text creators went through preparatory to writing down their ideas" (Schafer, 1981, p. 120). Schafer (1981) hypothesizes that comprehending second language text is difficult because the inference-making processes that contributed to the format of the text are unfamiliar.

Support for Kaplan and Shafer's findings was found in a study on contrastive rhetoric done by Hinds (1983). His results indicated that the discourse patterns of texts in Japanese and Arabic differ from common patterns in English.

Connor and McCagg (1983) investigated whether the tendency to transfer cultural patterns in a task of free recall would be strong enough to emerge in an immediate recall

paraphrase task. They used a weighting system of macro- and micro-information when they analyzed the subjects' recall protocols. They found culture specific patterns did not emerge on this type of task. In fact, non-native speakers replicated the propositional order of the passage more closely than native speakers did. However, attention to subordinate ideas was much weaker among the nonnative English speakers. Connor and McCagg (1983) explain these findings by saying that the difference between native and nonnative subjects may be better accounted for by differences in language proficiency than by cultural differences.

Investigating the effect of rhetorical organization but implementing another research design, Carrell (1984a) used five types of expository organization in a study of L2 students. The five types were: collection, description, causation, problem/solution, and comparison. The results indicate that "the more tightly organized comparison, causation, and problem/solution types tend to be more facilitative of recall of specific ideas from a text than is the more loosely organized collection of descriptions" (Carrell, 1984a, p. 464). In addition to this, Carrell found significant differences among native language groups as to which English discourse type was more facilitative of recall.

In explaining the difference in the results between Connor and McCagg's (1983) study and Carrell's (1984a) study, Swaffer (1988) points out:

Because a text-based rating scale for text structure was used [by Connor and McCagg], the higher native speaker-recall suggests that either background schema or language ability enhances recall of subordinate idea units. Allowance for reader-based logic might change these findings ... The issue here is the extent to which variance in describing and weighting patterns of propositions focuses on the researchers' rather than the readers' configurations ... Flexibility in accounting for several acceptable ways to structure gist and detail could acknowledge reader as well as rater concepts of text structure. (p. 127)

Whether or not propositions are weighted in importance has a significant impact on the results of studies on formal structure.

D. Piper (1985a) investigated the effect of rhetorical structure further by focusing on the simultaneous effects of culture-specific schemata and formal schemata in stories. A Vietnamese fable and one of Aesop's fables were chosen for the study because they contained the formal as well as content features typical of other similar stories in each culture. Two additional versions of these stories were constructed which varied from the original stories in terms of key Western and Vietnamese formal features. Adult Vietnamese immigrant students were asked to read and recall the four stories. As was expected, the original version of the Vietnamese fable was

recalled most accurately. Cultural background knowledge about content and about form were found to be equally significant.

Another study done by Carrell (1987) supports Piper's finding that familiar content and form are most facilitative of recall. However, her results differ regarding the relative importance of content and form. Her subjects were two groups of high-intermediate level ESL students of either Catholic or Muslim religion. Religion was the defining characteristic of each group and the cultural origin of the texts was also based on religion. A text typical of each culture was used and two additional texts were created by varying the original stories in terms of key formal features typical of the other culture. Students performed best on those passages that were familiar in terms of both content and form. In contrast to D. Piper's (1985a) results, when either form or content was unfamiliar, content caused more difficulties than unfamiliar form. Carrell (1987) qualifies her conclusions by stating that "each component--content and form--plays a significant, but different, role in the comprehension of text." (p. 476)

The research shows that rhetorical structure varies from culture to culture. It affects reading comprehension in significant ways; however, more research is needed to understand the effects of readers' formal schemata more fully.

#### Story grammar.

Another approach to investigating the interaction between reader and text has been the formulation of story grammars.

The usual formalism for describing a story grammar is a series of rules which specify the permissible sequence of events in a well-formed story. In addition to these syntactical descriptions, most story grammarians provide a description of semantic relations (Meyer & Rice, 1984). Several alternative representations of story structure have been proposed by researchers (Rumelhart, 1975; Schank, 1975; Mandler & Johnson, 1977; Thorndyke, 1977; Stein and Glenn, 1979).

A story grammar is not only a descriptive tool but also has implications for comprehension. A story grammar

provides an accurate system for making comparisons between the structure of any particular story and how well it is recalled ... A story schema operates as a set of expectations which aids in the comprehension and recall of stories; it thus follows that the closer the match between the stimulus story and the story schema in a particular listener/reader's mind, the more exact and structured will be the recall. (Cronin, 1982, pp. 4-5)

One of the earliest studies on story grammar was done by Bartlett (1932). His research was done to demonstrate that individuals construct and reconstruct given information in memory and that in the process of doing this, they are likely to make their interpretations fit their own cultural experience. Bartlett's study examined the protocols produced by educated Englishmen in attempting to recall the North American Indian folktale, The War of the Ghosts. When

recalling the tale, the subjects typically modified it in a manner consistent with their own culture.

Similarly, Kintsch and Greene (1978) did a study in which American college students read and recalled one of Grimm's fairy tales and an Apache Indian tale. The subjects produced a significantly greater number of the important propositions in the Grimm fairy tale than they did for the Indian story. Kintsch and Greene argue that story schemata are culture specific and that the schema for stories of European cultural background may vary greatly from the story telling conventions of other cultures.

Some developmental studies have found patterns of story recall to be similar among subjects from different cultural backgrounds and different age groups (Mandler, 1978; Mandler & Johnson, 1977; Mandler & Robinson, 1978). Based on their research, Mandler and Johnson (1977) outlined an explicit set of rules governing the structure of episodes in various kinds of stories. They propose that knowledge of this general set of rules helps the reader to organize propositions in the stories that they read. Like Kintsch and Greene (1978), Mandler & Johnson (1977) support the theory that comprehending a story as well as recalling it is facilitated by the availability of a story schema. However, they go one step further by claiming that the rules of story grammar that they have outlined are universal. The latter claim has sparked considerable debate in the research.

The results of a study done on story grammar by Mandler et al. (1980) contrast with those of Kintsch and Greene (1978). This study made cross-cultural comparisons between schooled and unschooled populations. Mandler et al. (1980) operated under the assumption "that the organization of simple stories is a cultural universal and, furthermore, that it is consistent with daily modes of comprehension and remembering that are also universal, regardless of type of culture or amount of schooling" (p. 21). Their subjects were native Vai-speaking people from Liberia. Five stories were used, only one of which was a Vai tale. Each subject was orally told from two to five of the stories and then asked to recall it. These unschooled adults and children recalled stories in a very similar way to schooled children and adults from literate industrialized societies. The type of recall that was demonstrated was not culture specific, but seemed to reflect universal ways of structuring experience. In terms of recall, the cultural content was less important than the form in which the story was told.

Mandler et al. (1980) explain the difference between their results and those of Kintsch and Greene (1978) by saying the type of story schema that they studied was different in type from that of Kintsch and Greene.

The structure of the Apache story was 'then-connected' (Mandler & Johnson, 1977), a story form in which episodes are only loosely temporally connected. The Grimm tale

had a tighter structure, consisting of causally connected episodes. However, within any given culture, both kinds of stories are found, and, in general, people recall less of then-connected stories because they tend to forget whole episodes (Mandler, 1978). (Mandler et al., 1980, p. 25)

Mandler et al. (1980), then, are not arguing that the patterns of recall of all stories are universal. They qualify this to say that stories with the kind of schematic form they studied in this study are recalled by peoples of different ages and different backgrounds in highly similar ways. Stories which closely approximate this "ideal" story structure facilitate good recall. Mandler et al. go on further to say that stories from an oral tradition have the form that they do because it makes them easy to remember.

Cronin (1982) is sceptical of Mandler et al.'s (1980) claims. She states that many Amerindian tales do not follow conventional fairytale structure. This is because the organization of social relations in traditional Amerindian cultures is different from the White culture. Her study was an attempt to provide further evidence in the debate between Mandler et al. (1980) and Kintsch and Greene (1978). Grade six Cree children were given a conventional folktale and a traditional Cree narrative. Contrary to Cronin's expectations, the results of this study were in general agreement with the position of Mandler et al. These results

are not really surprising considering that the subjects were in grade six and therefore would probably have had exposure to the ideal story structure in school. The Cree subjects were acculturated to the White culture to a greater degree than Cronin had expected and, therefore, "it cannot be asserted that this finding points to the universality of the ideal structure" (Cronin, 1982, p. 13).

Whereas Cronin (1982) used children as subjects, Carrell (1984a) did a study on the effects of simple narrative schemata in comprehension using ESL adult students of various ethnic backgrounds. Three stories were constructed using Mandler and Johnson's (1977) story grammar. A further three stories were created by rearranging the three original stories. The subjects were given either three standard versions or three interleaved versions of the stories to read and then after a twenty-four hour delay, they were asked to write down as much as they could about each story. The analysis of the recall protocols showed that the quantity of recall was superior when the story was constructed according to the "ideal" story grammar than when it did not follow this structure. The recalls of those subjects who read the interleaved versions "showed a strong schema effect in the tendency of the temporal sequencing to reflect the story schematic order rather than the input order" (Carrell, 1984a, p. 103). These findings support the universality of Mandell and Johnson's (1977) story grammar.

In order to further illuminate the issue of universal story grammar, Walters and Wolf (1986) did a study exploring the factors of language ability, text content and order of presentation in story processing. Their subjects were two groups of Hebrew EFL university students at two different levels of English proficiency. Three stories were used and three versions of each were developed: the standard order, a partially-mixed order and a fully-scrambled order. Each subject received three stories, one of each type. The results showed that an increase in language proficiency led to an overall increase in recall without any necessary pattern to that recall.

Walters and Wolf (1986), however, caution that this conclusion requires further investigation. In terms of text content, the results led to the conclusion that it is possible to identify stories which obey text-like rules of recall and these rules will be distinguishable from rules for memory of unrelated verbal material. Regarding order of presentation, it was found that language proficiency can overcome the structural ambiguity reflected in the various orders of presentation. Based on these findings, Walters and Wolf (1986) conclude:

Our analysis of the story grammar literature and our own findings ... lead to the conclusion that claims about robustness and universality may be premature ... Our findings point out the possibility that both the

narrative content and narrative structure (discourse order) can modify the expected recall pattern of the story grammar ... Similarly, an underlying story schema is not powerful enough to override the order effects of near-random presentation ... Both of these findings question the strength of the story grammar model. (pp. 61-61)

Clearly, the debate regarding the universality of story grammar has not yet been resolved.

Prior knowledge or experience of a subject.

The role of prior knowledge regarding a subject in reading comprehension has been viewed as a major factor in successful reading comprehension (Cates & Swaffer, 1979; Coady, 1979; Romatowski, 1981; Krashen & Terrell, 1983; Wilson & Anderson, 1986; Goodman, 1988). Adams and Bruce (1982) strongly emphasize its importance.

To say that background knowledge is often used, or is useful, in comprehending a story is misleading. It suggests that a reader has the option of drawing on background knowledge ... A more correct statement of the role of background knowledge would be that comprehension is the use of prior knowledge to create new knowledge. Without prior knowledge, a complex object, such as a text, is not just difficult to interpret; strictly speaking, it is meaningless. (pp. 22-23)

Accessing related schemata facilitates a cognitive link with past experiences and enables the reader to formulate expectations about the language and content of a text. The reader's prior knowledge allows him to interpret the author's message and this results in comprehension (Langer, 1982). A large number of studies have examined the relationship between background knowledge and comprehension (Anderson, 1974 & 1978; Jarvella, 1970 & 1971; Kintsch, 1977; Chi, 1978; Pearson, Hansen & Gordon, 1979; Omaggio, 1979; Tannen, 1979; Gagne, Bell, Weidemann & Yarborough, 1980; Adams, 1982).

In one of the more recent studies, Johnson (1982) demonstrated the impact on reading comprehension of building background knowledge. She investigated the effect of ESL students' prior experience of an American custom on reading comprehension. University-level ESL students read a passage about Halloween which contained familiar and unfamiliar information depending on the subjects' recent experience. The subjects were assigned to four different vocabulary study conditions before reading the passage. Analysis of the results indicated that exposure to the meanings of target vocabulary words by any of the treatments did not have a significant effect on reading comprehension. However, prior experience did prepare the readers for comprehension of the familiar information in the passage.

Hudson (1982) explored the negative effects prior knowledge can have on reading comprehension. He identified

three components of reading breakdown: (a) basal elements, (b) the reader's hypothesis and testing, and (c) affective features which surround the reader. A "short circuit" in the good reader's system can be caused by any of these components. Hudson focuses on the second component in his study and investigates whether schema theory can explain the role of second component factors in the occurrence of a "short circuit" in reading comprehension.

ESL students were presented with reading passages using three types of intervention. The results showed that different types of intervention were effective at different levels of proficiency.

The results of the study indicate that schemata production is involved in the short circuit of L2 reading, that the effectiveness of externally induced schemata is greater at lower levels of proficiency than at high levels, and that induced schemata can override language proficiency as a major factor in comprehension.

(Hudson, 1982, p.1)

Levine and Haus (1985) point out that the majority of the studies done on the effects of background knowledge have focused on university-level subjects. To correct this narrowness of subject population, they did a study with high school students, who were at two levels in studying Spanish as a Foreign Language. The subjects were asked to read an authentic report of a baseball game from a Spanish language

newspaper. The results indicated that background knowledge was a significant factor affecting comprehension across both textually explicit and textually implicit questions when the reading material was at an "instructional" level. They also found that background knowledge could be more important than language level in comprehending such material. These findings support those of Hudson (1982).

The majority of studies on background knowledge and L2 reading show that prior knowledge has a significant effect on reading comprehension. However, one study done by Carrell (1983) showed that non-native readers exhibited no significant effects of prior knowledge when they recalled a reading passage in their second language. Two levels of ESL students and one group of native speakers were presented with three different treatments in order to study three components of background knowledge: a) familiar versus novel content; b) context versus no context in the text; and c) transparent versus opaque lexical items. Members of each group were asked to write in English as much as they could remember of the passages that they had read. The findings were that non-native readers showed no significant effects of background knowledge but native speakers showed the effect of all three components of background knowledge in recalling the text.

Lee (1986) replicated Carrell's (1983) study but asked his subjects to use their native language in writing recalls of what they had read. His findings do not agree with

Carrell's. He found that there was an interaction between the background knowledge components of topic familiarity and clear context. The language of recall had a major effect on the results of these two studies. Lee (1986) concludes that when being assessed in their second language, subjects are not able to demonstrate their comprehension fully. Assessing their comprehension with the native language gives a more accurate representation of their comprehension.

These studies confirm the theory that familiarity with the subject matter will facilitate reading comprehension.

The knowledge and experience an individual brings to a reading task are critical factors in comprehension. In drawing meaning from text, readers build their own elaborations; they "read" situational demands, review personal knowledge, and select what seems most appropriate and useful for the task at hand. (Langer, 1984, p. 469)

Culture-specific content knowledge.

Related to prior knowledge or experience of a topic, and perhaps a subset of it, is the culture-specific content knowledge a reader brings to a text. "The common experience, concepts, interests, views, and life styles of readers with common social and cultural backgrounds will...be reflected by how...people read and what they take from their reading" (Goodman, 1988, p. 13). The existence of appropriate cultural schemata can enhance the reader's understanding of a text, but

the lack of it can inhibit comprehension (Melendez & Pritchard, 1985). Typically, researchers have studied the recall and comprehension of passages regarding events and settings that are not common to the readers' cultural background. An early study by Yousef (1968) evaluated the effects of cultural instruction on reading comprehension. The results indicated an improvement in reading performance after cultural instruction. However, Yousef's (1968) subjects, Middle Eastern males in the U.S. on a business training program, unconsciously reacted to certain aspects of American culture so strongly that improvement was seen only after intensive direct instruction.

Various other studies have been done which included subjects from different backgrounds although not from different cultures. Anderson, Reynolds, Schallert and Goetz (1977) did a study which involved female music majors and male physical education majors. Each group of subjects gave a distinct interpretation, which differed from the other experimental group, to the same reading passage. In a replication study, Sjogren and Timpson (1979) found that both the sex of the subjects and their college major were related to passage interpretation.

A landmark study by Steffensen, Joag-dev, and Anderson (1979) found that if readers do not have the necessary cultural knowledge, comprehension is inhibited. Subjects from the United States and India read letters about an Indian and

an American wedding and recalled them. The passage native to the subjects was read more rapidly, recalled in greater detail and produced with more culturally-appropriate elaborations. The foreign passage, on the other hand, was produced with more culturally-based distortions than the native passage. These results reveal the pervasive influence of cultural schemata on comprehension and memory. They provide evidence for the claim that if the reader and writer of a text share the same cultural background, reading will be facilitated.

An experiment by Steffensen and Colker (1982) replicated the above study in an oral form. American and Australian Aboriginal women listened to two texts about illness and treatment, one based on Aboriginal beliefs and one on Western beliefs. After hearing one text, the subjects completed an interpolated task designed to inhibit short term memory and then were asked to recall the text orally. The same procedure was repeated with the second text. An analysis of the recall protocols showed that there were more elaborations of ideas in the native passage and more distortions of ideas in the foreign passage. Steffensen and Colker (1982) claim these results are "evidence of the similarity between reading and listening comprehension...and indicate that previous knowledge is a factor in comprehending text, regardless of modality" (p. 73).

In her study, Johnson (1981) investigated the effects of the complexity of the English language and the cultural origin

of prose on reading comprehension. Her subjects were Iranian intermediate/advanced ESL students half of whom read two story texts, one from Iranian folklore and one from American folklore; the other half of the subjects read the same stories in simplified English. The results indicated that the level of syntactic and semantic complexity of an English language text had a lesser effect on reading comprehension than did the cultural origin of the text.

Readers' reliance on cultural knowledge when reading an ambiguous text was demonstrated in a study by Reynolds et al. (1982). Black and white eighth-grade students were given a passage that dealt with "sounding," a form of verbal ritual insult predominantly found in the black community. Black subjects interpreted the passage as being about verbal aggression while the white subjects viewed it as physical aggression. The evidence showed that cultural schemata can influence how prose material is interpreted and that the shared cultural orientation of the author and reader significantly increases comprehension.

Most of the studies cited above made use of ambiguous passages to establish that readers with different backgrounds and different expectations understand text differently. A study done by Lipson (1983) covered new ground on several fronts. She used children as subjects and these children represented two different American subcultures: Catholic and Jewish. In addition to this, Lipson used passages that were

not at all ambiguous. The reading comprehension of the subjects was tested using three expository passages: (a) a "culturally neutral" passage, (b) a passage culturally specific to Jewish children, and (c) a passage culturally specific to Catholic children. The findings revealed that prior religious knowledge about a topic was a significant factor in post-reading performance. Both groups showed superior recall of the culturally-familiar passage. These findings support those obtained in research on adult subjects using culturally ambiguous texts.

Another study using unambiguous passages looked at the effect of a mismatch in background knowledge between text and reader (Aron, 1986). Aron was particularly interested in how this mismatch would affect the placement of ESL students into college remedial reading classes. Two groups of college students, one composed of native speakers and the other of nonnative speakers, were given two passages to read and then asked to recall them orally. One passage regarding mankind's development of language was considered to be universal in theme. The other passage was about native American history and bound to U.S. culture. An analysis of the oral protocols showed no significant difference between the two groups on the passage with the universal theme. In contrast, there was a significant difference on the cultural passage. Aron (1986) concludes: "Thus, while native and nonnative subjects appeared to bring similar previous knowledge of the passage

with a universal theme, they seemed to bring differing degrees of pertinent, previously acquired knowledge to the passage with a culture-bound theme" (p. 139). Lack of cultural-bound background knowledge may discriminate against ESL students on standardized tests.

Studying cultural impact on reading comprehension from a different angle, Steffensen (1986) did a clause-analysis of comprehension using the letter about an Indian wedding which had been used by Steffensen et al. (1979). The letter was converted into booklet form in which the first clause was exposed on the first page with all the remaining text blacked out. One more clause was exposed on each following page. The subject, an Indian and an American woman, read the text, a clause at a time, in an interview setting, and described what they had already learned from the text and what they expected to follow. As was expected, the Indian woman identified the register (equals addressing each other) and field (an Indian wedding) of the text much earlier than the American woman. The Indian woman was also able to get much more information from the text and predict more correctly. Steffensen (1986) concludes:

There is evidence from the clause-based analysis that when the appropriate schema is accessed, it raises other linguistic reflexes of that register to a level of 'readiness'. This is probably an important factor in the speed of reading and the depth of comprehension: when

a text is based on a known topic, the reader anticipates other exemplars of the register in the text and these, in turn, affect the accessing of sub-schemata as the text is processed. (p. 83-84)

Further evidence that readers understand and remember their reading more when they possess relevant cultural knowledge was found in a study done by Nelson (1987) with adult Egyptian university students. The subjects were given four pairs of matched readings with one of each pair from an Egyptian perspective and the other from an American perspective. The results indicated that recall was significantly higher when the subjects were reading about their own culture and that they also preferred stories and articles from their own culture.

Nelson (1989), together with Schmid, investigated further the effect of cultural content on reading comprehension by asking: "Will the improved reading comprehension skills acquired using reading passages on native culture transfer to improved performance on reading passages on standardized reading tests?" (p. 539). Egyptian university students were assigned to two conditions for reading instruction. The experimental groups received reading instruction based on Egyptian or Arabic culture readings. The control groups read passages on American culture. Both groups were taught using the same teaching methods and techniques. Following eight weeks of instruction, the experimental groups made a

significantly larger improvement on a standardized reading test than did the control groups. These results differ from previous studies in that they show that, for intermediate-level students, improved reading skills developed by reading about their native culture are transferrable to nonnative reading passages. This provides further support for the importance of content schemata in developing reading skills.

Research into the effects of cultural background on reading comprehension has supported the conclusion that appropriate cultural knowledge results in superior recall of a passage. It also influences the interpretations and elaborations made by readers about a text. Awareness of cultural differences is part of understanding a foreign language and gives the reader an advantage in comprehending a text (Bensoussan, 1986). Readers who possess the schemata assumed by the writer are able to understand what is written and make the expected inferences. If they do not have the appropriate schemata, they distort meaning as they attempt to fit the information into their own pre-existing schemata (Steffensen & Joag-Dev, 1984).

The results of a study done by Piper and McEachern (1988), however, contrast with the studies cited above. The results of their research raise questions about the widely-accepted conclusion that cultural background significantly affects reading comprehension. In their study, they used two passages with differing amounts of cultural content. Two

cloze tests, based on passages balanced for length and difficulty, were given to adult learners in the People's Republic of China. One passage which described a California wedding was culturally-foreign to the subjects. The other one was a scientific text about the beginnings of life. It was hypothesized that the subjects would perform better on the scientific text. Surprisingly, however, the subjects performed significantly better on the culturally-foreign passage about a California wedding. These research findings raise questions regarding the current understanding of the extent of the impact of cultural background and of what constitutes cultural relevance.

#### Summary of Relevant Research

The results of studies done on reading comprehension have led to the conclusion that the schemata of the reader affect reading comprehension in a significant way. This is consistent with schema theory which holds that reading comprehension is an interactive process between the text and the reader's prior background knowledge (Carrell & Eisterhold, 1983).

The reader brings both content schemata and formal schemata to the reading task. Two types of processing are used by the reader when approaching a text: bottom-up (decoding) and top-down (making predictions). These processes are seen as interactive and lack of comprehension is explained in terms of unidirectional processing.

Research on schema theory and second language acquisition has been approached from several perspectives. Studies on rhetorical structure have shown it to vary from culture to culture and that it affects reading comprehension in significant ways. Research on story grammar has led to considerable debate as to the universality of story grammar and this issue has not been resolved to date. Studies on the prior knowledge of the reader have shown it to have a significant facilitating effect on reading comprehension. Research into the effects of cultural background has supported the conclusion that appropriate cultural knowledge results in superior recall of a passage and also influences the interpretations made by readers of a text. The results of Piper and McEachern's (1988) study are unexpected given schema reading theory and the research done to date.

#### Rationale for the Study

The present research, an extended replication of Piper and McEachern (1988), further investigates and seeks to find explanations for these surprising findings. In discussing their results, the researchers suggest several possible explanations for their findings. They indicate that current notions of what constitutes cultural relevance in text may need rethinking. It is also possible that the instruments used to measure the readability of the passages used are context-biased and may not give accurate readability measures for all types of content. In addition, the limited size of

the sample (20 subjects) and the fact that only one cultural group was used limited the generalizability of their results.

The present study increases the sample size, includes two culturally-different groups of subjects as well as a control group, and uses two instruments to measure the readability of the passages used.

## CHAPTER THREE

### Design, Procedure and Hypotheses

#### Test Construction

##### Selection of Passages

Two passages believed to require different background knowledge and experience for comprehension were selected in order to examine the effect of passage content on cloze scores. One passage was heavily culturally loaded and the other was scientific in content (less culturally specific). The first passage was about marriage customs in Canada, primarily regarding the wedding day itself. The second passage was about hibernation, describing the physiological and behavioural changes in hibernating animals.

The passages used were based on readings selected from ESL textbooks. Both passages were of equal length (277 words) and the readability levels were determined using Fry's Readability Scale and the Dale-Chall Readability Formula. Piper and McEachern (1988) suggested the possibility that Fry's Readability Scale might be context biased since it measures only sentence length and number of syllables. In order to verify further the readability levels of the passages used, the Dale-Chall Readability Formula was used in addition to Fry's Readability Scale. This formula controls for frequency of vocabulary as well as sentence length and number of syllables.

The following are the sources and the readability levels of the two passages.

a) Engkent, L. P. & Bardy, K. P. (1986). Courtship and marriage. In Take part: speaking Canadian English (p. 47). Scarborough, Ontario: Prentice-Hall Canada Inc.

Fry Readability Scale - Grade 8.

Dale-Chall Readability Formula - 6.91 (Grade 8).

b) Lewis, R. D. (1982). Winter sleep. In Reading for adults: book two (pp. 74-57). Essex, England: Longman Group UK Limited.

Fry Readability Scale - Grade 8.

Dale-Chall Readability Formula - 6.90 (Grade 8)..

### Mutilation

Following the standard procedure, and that used by Piper and McEachern (1988), cloze tests were constructed by leaving the first and last sentences in each passage intact. Every seventh word was deleted in the remainder of each passage for a total of thirty-four blanks in each passage (see Appendixes A and B).

### Scoring Method

Cloze tests are most frequently scored in two ways: the exact word scoring method and the semantic equivalent scoring method. To date, the research as to which method is preferable has been contradictory (Hinofotis, 1980; Alderson, 1983). The exact word scoring method has the advantage of

objectivity and ease of marking because only those words that appear in the original text are considered correct. However, when native speakers are given a cloze test, they generally do not get a perfect score when this method of scoring is used (Klein-Braley, 1985; Klein-Braley & Raatz, 1984; Alderson, 1980). Using the exact scoring method is problematic for native speakers because English has so many synonyms.

The semantic equivalent scoring method accepts any grammatical, semantic equivalent of the original word. The disadvantage of this method is that it allows for subjectivity in scoring and inter-rater reliability is more difficult to achieve. However, the semantic equivalent scoring method seems to allow finer discrimination among levels of proficiency for ESL students (Alderson & Urquhart, 1988; Alderson, 1983; Hinofotis, 1980; Oller, 1972).

Both methods of scoring were used and both types of scores are reported for each passage. The developer used the following criteria for the semantic equivalent scoring method. Spelling errors and minor syntactic differences (e.g., inflection for tense or person) were ignored if the word was otherwise semantically acceptable. Decisions regarding which synonyms were regarded as acceptable were guided by Rodale's The Synonym Finder. Where semantically and grammatically acceptable, possessive pronouns were accepted in place of articles and adjectives. A list of acceptable answers for each passage is provided (see Appendix C).

For both scoring methods, every correct response was given one point, while an incorrect answer or non-response was given zero. There was a possible total score of 34 for each passage.

### Subjects

Three groups with 31 subjects in each were tested: a control group, a Japanese group and a French Canadian group.

The control group was comprised of native speakers of English. They were graduate diploma and Master's students at the University of Calgary. The sample consisted of 30 females and 1 male. They were chosen because of their familiarity with North American English culture and their knowledge of English.

The Japanese sample was comprised of students from Japan who were participating in three-week study tour programs at the University of Calgary (Otsuma Seminar) and Mount Royal College (English Language Study Tour Program). The sample consisted of 30 females and 1 male. They ranged in age from 16-20 years. Twenty-seven of them were Grade 11 high school students who had studied English an average of 5 years and four of them were university students who had studied English an average of 8 years.

The Japanese subjects were chosen because their exposure to North American culture was considerably less than for the control group and the French Canadian group. This was the first visit to Canada for all of these subjects. These

particular subjects were chosen because they were at an intermediate level of English proficiency.

The French Canadian sample was comprised of students from Quebec who were participating in the 6-week Summer Language Bursary Program at the University of Calgary. The sample consisted of 17 females and 14 males. They ranged in age from 18 to 33 years, with an average age of 19 years. All of them were students at post-secondary institutions in Quebec. The majority were attending junior colleges with the remainder attending university. All of them had studied English for a minimum of 2 years with the majority of them having studied English for 4 years (Grades 9-12).

The French Canadian subjects were chosen because although they were not native speakers of English, they were learning English and at an intermediate level of proficiency. Also, they had been exposed to the North American English culture to a much greater degree than the Japanese subjects. It was expected that although their language skills were poorer, the French Canadian subjects would behave more like the native speakers of English than the Japanese subjects because they shared similar cultural experience.

Subjects from both nonnative speaker groups who were studying at the University of Calgary were given a written placement test. They were given The Diagnostic Test for Students of English as a Second Language (A. Davis). The scores of the Japanese group ranged from 112-123 and the

scores of French Canadian group ranged from 104-139.

#### Data Collection

Each group of subjects was given the two cloze passages at one sitting. Half of the subjects were given the science passage first and half were given the marriage passage first to eliminate a passage order effect in the analysis. Subjects were told briefly what each passage was about and then instructed to fill in the blanks with appropriate English words. They were not allowed to use dictionaries or any other aids. No time limit was placed on their completing the task. The French Canadian subjects were tested on June 7, 1989; the Japanese subjects on August 3 and 16, 1989; and the control group on November 15, 20 and 23, 1989.

#### Hypotheses

Given two cloze passages, based on passages of equivalent length and difficulty, one scientific in content (less culturally specific) and another culturally loaded with North American English cultural content:

- 1) the Japanese subjects would produce higher test scores on the scientific passage than on the culturally loaded one because they will have more prior knowledge of the scientific passage than the culturally loaded one.
- 2) the French Canadian subjects would produce higher test scores on the culturally loaded passage than the scientific one because they will be more familiar with the content of the culturally loaded passage than the

scientific one.

3) the Canadian subjects, both the native speakers of English and the French Canadians, would produce higher test scores on the culturally loaded passage than the Japanese subjects because the Canadian subjects will have greater familiarity with North American English culture than the Japanese subjects.

4) the subjects in the control group would produce higher test scores on both passages than the Japanese subjects and French Canadian subjects because they are native speakers of English.

5) the subjects in the control group would produce scores on both passages that are not significantly different because, according to the readability measures used, the passages are of equal readability.

## CHAPTER FOUR

### Analysis and Results

The data were analyzed using two analyses of variance and Pearson Correlation Coefficients. Data from the two scoring methods were treated separately. The strength of the correlation between the two scoring methods within each passage was measured using the Pearson Correlation Coefficient. For the Marriage Passage the correlation of the scoring methods was  $r = .98$  and the Hibernation Passage,  $r = .97$ . This correlation showed the two scoring methods to be essentially redundant in this study. Therefore, a multivariate approach was deemed unnecessary.

#### Exact Scoring Method

The first mixed ANOVA (analysis of variance) 2(passage) x 3(group) was carried out on the scores from the cloze passages based on the exact scoring method.

This ANOVA indicated 2 main effects and a significant interaction (see Table 1 for summary). These are as follows:

- 1) A main effect for group, where  $F = 268.11$ ,  $p < .001$ .
- 2) A main effect for passage, where  $F = 267.97$ ,  $p < .001$ .
- 3) A significant interaction between group and passage, where  $F = 16.03$ ,  $p < .001$ . The control group scores were higher than the French Canadian scores and the French Canadian scores were higher than the Japanese scores (Control  $\bar{X} = 24.05$ ; French Canadian  $\bar{X} = 14.47$ ; Japanese

$\bar{X} = 9.21$ ) for both passages. The control group, the French Canadian group and the Japanese group scored higher on the Marriage Passage ( $\bar{X} = 18.59$ ) than on the Hibernation Passage ( $\bar{X} = 13.23$ ). A series of post hoc t-test comparisons (see Table 3) indicate that the control group scored higher than the French Canadian and Japanese groups, differing significantly in all means. The French Canadian group scored higher than the Japanese group, especially on the Marriage Passage, and differing significantly in all means except French Canadian scores on the Hibernation Passage compared to Japanese scores on the Marriage Passage (see Table 2 for means and Figure 1 for a pictorial representation of the interaction).

#### Semantic Scoring Method

The second mixed ANOVA 2(passage) x 3(group) was done using scores from the cloze passages based on the semantic scoring method.

This ANOVA indicated 2 main effects and a significant interaction (see Table 4 for summary). These are as follows:

- 1) A main effect for group, where  $F = 269.26$ ,  $p < .001$ .
- 2) A main effect for passage, where  $F = 97.86$ ,  $p < .001$ .
- 3) A significant interaction between group and passage, where  $F = 8.38$ ,  $p < .001$ . The control group scores were higher than the French Canadian scores and the French Canadian scores were higher than the Japanese scores (Control  $\bar{X} = 29.50$ ; French Canadian  $\bar{X} = 19.53$ ; Japanese

$\bar{X} = 12.85$ ) for both passages. The control group, the French Canadian group and the Japanese group scored higher on the Marriage Passage ( $\bar{X} = 22.45$ ) than on the Hibernation Passage ( $\bar{X} = 19.01$ ). A series of post hoc t-test comparisons (see Table 6) indicate that the control group scored higher than the French Canadian and Japanese groups, differing significantly in all means; and that the French Canadian group scored higher than the Japanese group, also differing significantly in all means (see Table 5 for means and Figure 2 for a pictorial representation of the interaction).

#### Summary of Results

- 1) All subjects found the Marriage Passage easier than the Hibernation Passage. The scores of all the subjects were higher on the Marriage Passage than on the Hibernation Passage.
- 2) The Control Group performed significantly better on both passages than the French Canadian and Japanese subjects.
- 3) The French Canadian subjects performed significantly better on both passages than the Japanese subjects. The difference in their performance was more marked on the Marriage Passage than on the Hibernation Passage.
- 4) The French Canadian subjects' performance paralleled that of the control group on both passages, particularly when the exact scoring method was used.

Table 1

Summary of Analysis of Variance due to Passage and Group:  
Exact Scoring Method

| Source of Variance | <u>df</u> | M.S.    | <u>F</u> |
|--------------------|-----------|---------|----------|
| Group              | 2         | 3509.44 | 268.11*  |
| Passage            | 1         | 1338.72 | 267.97*  |
| Group X Passage    | 2         | 80.09   | 16.03*   |

\*  $p < .001$

Table 2

Cell Means and Standard Deviations for Exact Scoring Method:  
Passage x Group

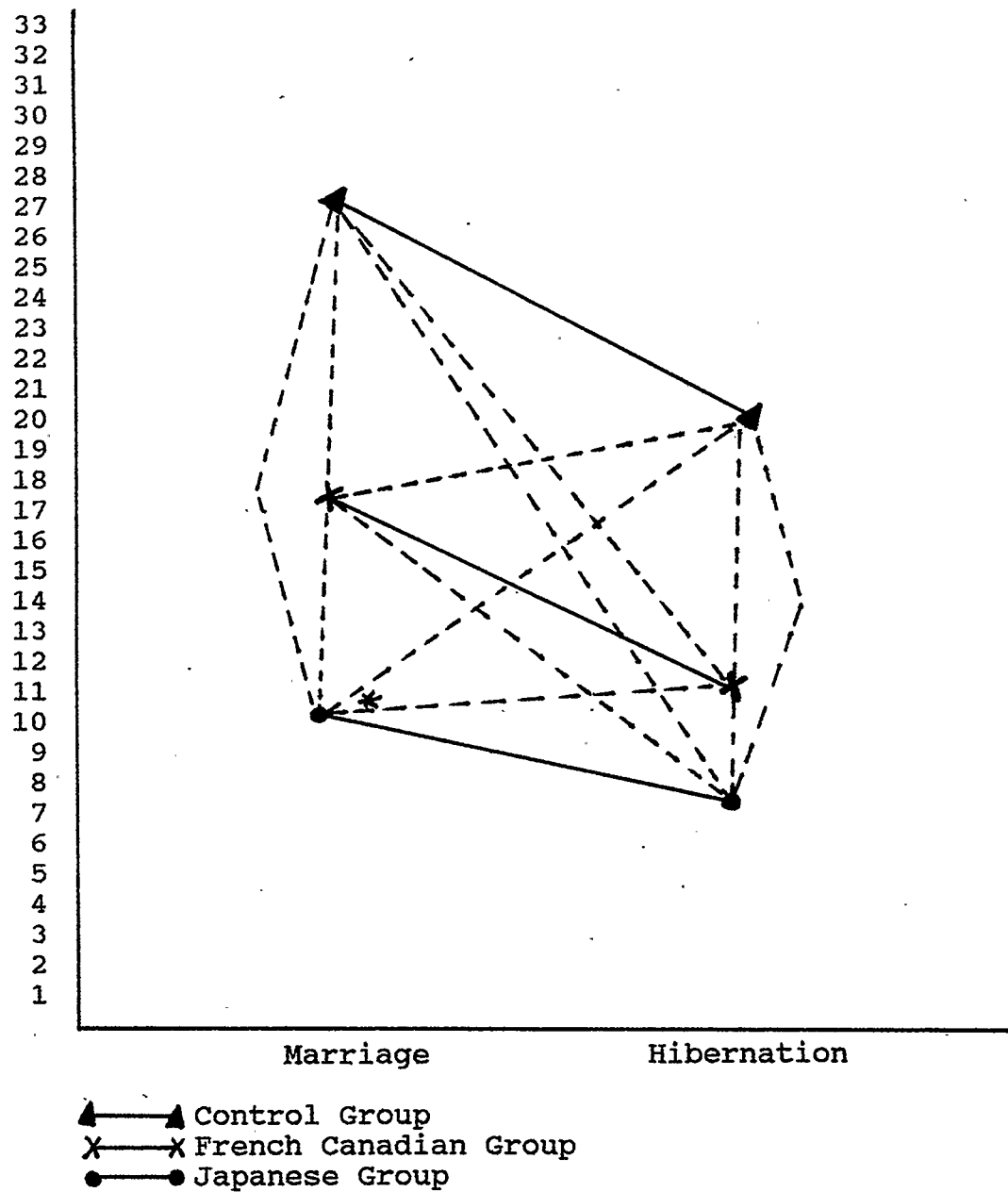
| Passage     | French Canadian |       | Japanese  |       | Control   |       |
|-------------|-----------------|-------|-----------|-------|-----------|-------|
| Marriage    | $\bar{X}$       | 17.77 | $\bar{X}$ | 10.58 | $\bar{X}$ | 27.42 |
|             | s.d.            | 3.99  | s.d.      | 2.29  | s.d.      | 1.82  |
| Hibernation | $\bar{X}$       | 11.16 | $\bar{X}$ | 7.84  | $\bar{X}$ | 20.68 |
|             | s.d.            | 3.39  | s.d.      | 3.07  | s.d.      | 2.98  |

Table 3

Post Hoc T-tests for Exact Scoring Method

| Pair Being Compared | t Value | Probability |
|---------------------|---------|-------------|
| *CT-M vs. CT-H      | 10.74   | $p < .001$  |
| FC-M vs. FC-H       | 7.04    | $p < .001$  |
| JP-M vs. JP-H       | 3.99    | $p < .001$  |
| CT-M vs. FC-M       | 12.25   | $p < .001$  |
| CT-M vs. JP-M       | 32.03   | $p < .001$  |
| FC-M vs. JP-M       | 8.71    | $p < .001$  |
| CT-H vs. FC-H       | 11.74   | $p < .001$  |
| CT-H vs. JP-H       | 16.71   | $p < .001$  |
| FC-H vs. JP-H       | 4.05    | $p < .001$  |
| CT-M vs. FC-H       | 23.54   | $p < .001$  |
| CT-M vs. JP-H       | 30.56   | $p < .001$  |
| FC-M vs. JP-H       | 10.99   | $p < .001$  |
| CT-H vs. FC-M       | 3.25    | $p < .001$  |
| CT-H vs. JP-M       | 14.95   | $p < .001$  |
| FC-H vs. JP-M       | 0.79    | $p < .5$    |

\* CT - Control Group  
 FC - French Canadian Group  
 JP - Japanese Group  
 M - Marriage Passage  
 H - Hibernation Passage



All comparisons are significant at  $p < .001$  with the exception of that marked with an asterisk. This comparison is not significant.

Figure 1. Interaction - Exact Scoring Method

Table 4

Summary of Analysis of Variance due to Passage and Group:  
Semantic Scoring Method

| Source of Variance | df | M.S.    | F       |
|--------------------|----|---------|---------|
| Group              | 2  | 4350.39 | 269.26* |
| Passage            | 1  | 487.10  | 97.86*  |
| Group X Passage    | 2  | 41.70   | 8.38*   |

\*  $p < .001$

Table 5

Cell Means and Standard Deviations for Semantic Scoring  
Method: Passage x Group

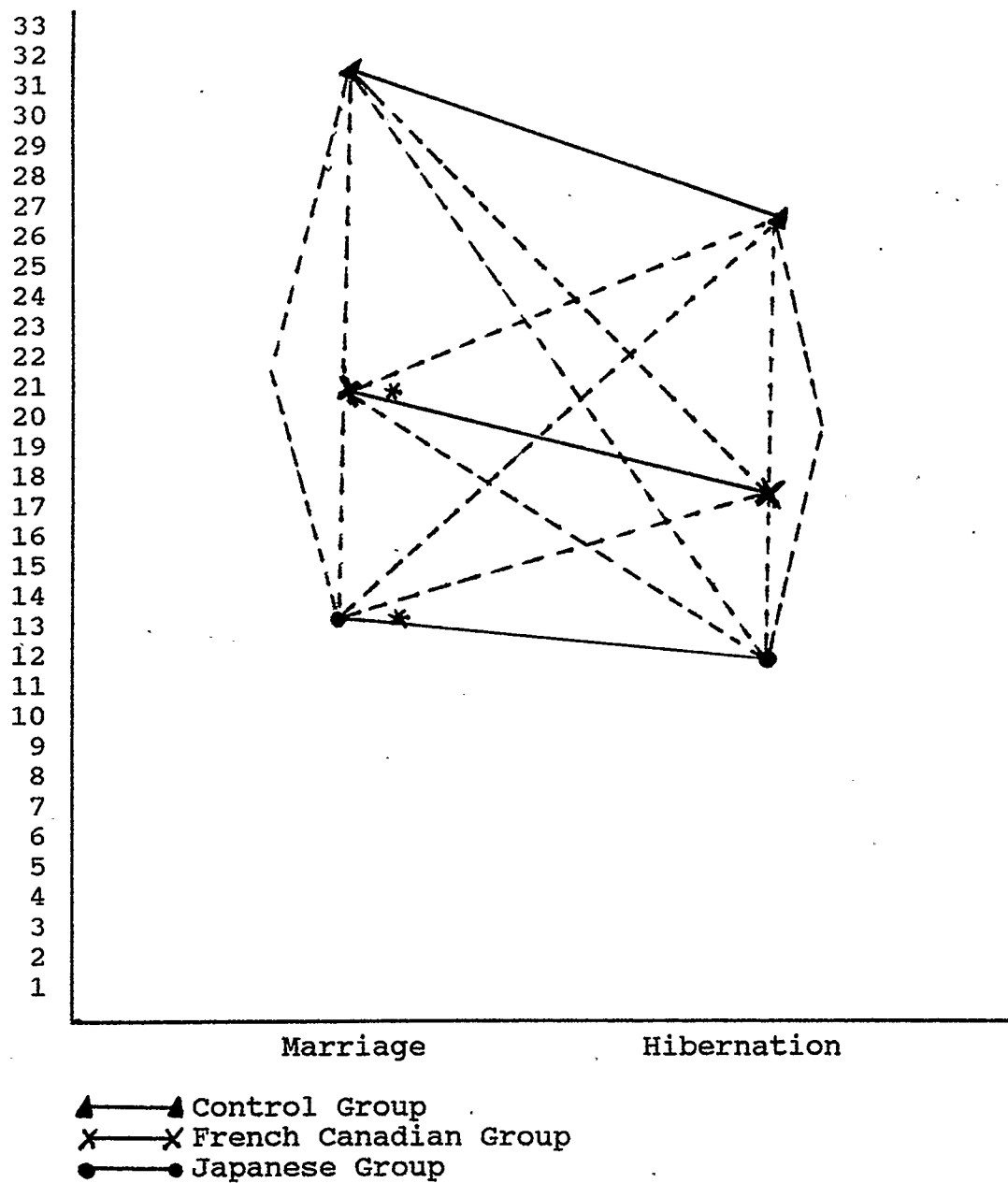
| Passage     | French Canadian |       | Japanese  |       | Control   |       |
|-------------|-----------------|-------|-----------|-------|-----------|-------|
| Marriage    | $\bar{X}$       | 21.32 | $\bar{X}$ | 13.58 | $\bar{X}$ | 31.83 |
|             | s.d.            | 4.00  | s.d.      | 2.62  | s.d.      | 1.44  |
| Hibernation | $\bar{X}$       | 17.74 | $\bar{X}$ | 12.13 | $\bar{X}$ | 27.16 |
|             | s.d.            | 4.58  | s.d.      | 2.97  | s.d.      | 2.93  |

Table 6

Post Hoc T-tests for Semantic Scoring Method

| Pair Being Compared | t Value | Probability |
|---------------------|---------|-------------|
| *CT-M vs. CT-H      | 7.97    | $p < .001$  |
| FC-M vs. FC-H       | 3.28    | $p < .01$   |
| JP-M vs. JP-H       | 2.04    | $p < .05$   |
| CT-M vs. FC-M       | 13.76   | $p < .001$  |
| CT-M vs. JP-M       | 34.03   | $p < .001$  |
| FC-M vs. JP-M       | 9.01    | $p < .001$  |
| CT-H vs. FC-H       | 9.64    | $p < .001$  |
| CT-H vs. JP-H       | 20.03   | $p < .001$  |
| FC-H vs. JP-H       | 5.72    | $p < .001$  |
| CT-M vs. FC-H       | 16.34   | $p < .001$  |
| CT-M vs. JP-H       | 33.20   | $p < .001$  |
| FC-M vs. JP-H       | 10.26   | $p < .001$  |
| CT-H vs. FC-M       | 6.55    | $p < .001$  |
| CT-H vs. JP-M       | 19.23   | $p < .001$  |
| FC-H vs. JP-M       | 4.39    | $p < .001$  |

\* CT - Control Group  
 FC - French Canadian Group  
 JP - Japanese Group  
 M - Marriage Passage  
 H - Hibernation Passage



All comparisons are significant at  $p < .001$  with the exception of those marked with an asterisk. These comparisons are significant at  $p < .05$ .

Figure 2. Interaction - Semantic Scoring Method

## CHAPTER FIVE

### Discussion and Implications

Analysis of the data showed support for Hypotheses 2, 3 and 4 which are as follows:

2) The French Canadian subjects would produce higher test scores on the culturally loaded passage than on the scientific one.

3) The Canadian subjects would produce higher test scores on the culturally loaded passage than the Japanese subjects.

4) the subjects in the control group would produce higher test scores on both passages than the Japanese subjects and the French Canadian subjects.

Hypotheses 1 and 5, however, were not supported by the data.

1) The Japanese subjects would produce higher test scores on the scientific passage than on the culturally loaded one.

5) The subjects in the control group would produce scores on both passages that are not significantly different.

The results of this study will be discussed first in terms of the hypotheses that were met, followed by consideration of possible explanations for the lack of support in the data for Hypotheses 1 and 5.

### Supported Hypotheses

#### Hypothesis Two

The results of this study show a significant difference between the scores of the French Canadian group on the Marriage Passage and on the Hibernation Passage . The French Canadian group performed significantly better on the Marriage Passage with a mean of 17.77 than on the Hibernation Passage with a mean of 11.16. This is in keeping with Hypothesis 2.

This hypothesis was based on the expectation that the French Canadian subjects would have greater background knowledge of Canadian marriage customs than of the hibernating behaviour of animals. According to the schema theory model, schemata, which are based on experience, are abstractions of that experience which are constantly being restructured according to the new information received (Pearson & Spiro, 1982). In addition to this, the use of a schema depends on its accessibility in memory. "Accessibility of a schema depends upon such factors as ... the recency and the frequency of previous activations. Each time a schema is activated for use, it becomes more accessible for successive activations" (Thorndyke & Hayes-Roth, 1979, pp. 86-87).

It is very probable that the urban French Canadian subjects' experience of weddings in their daily lives was much greater than their experience of hibernating animals. Therefore, their schemata regarding marriage customs would be more fully developed and accessible than their schemata for

hibernation. This would result in greater reading comprehension for the Marriage Passage. This explanation appears to be supported by the data.

### Hypothesis Three

The results of the study also showed that the Canadian subjects, both the native English speakers and the French Canadians, performed significantly better on the Marriage Passage than the Japanese subjects did. This is in agreement with Hypothesis 3.

In fact, the Canadian subjects performed better on both passages than the Japanese subjects. This was to be expected for the control group but not for the French Canadian group since both the Japanese and the French Canadian subjects were of relatively equal English proficiency levels according to the University of Calgary placement measure.

It might be argued that the French Canadian subjects had more knowledge of both topics, Canadian marriage customs and hibernation, than the Japanese subjects did, and that this accounts for their superior performance on both passages. However, explaining these results in terms of more extensive background knowledge on the part of the French Canadians is too simplistic.

A significant interaction was found between group and passage. The lines joining the means of the two passages for each group are not parallel (see Figure 1 and 2). On the Hibernation Passage, the mean for the French Canadian group

is 11.16 and the mean for the Japanese group is 7.84. On the Marriage Passage, however, the mean of the French Canadian group is 17.77 and the mean for the Japanese group is 11.16. The difference between the scores of the two groups on the Marriage Passage is greater than the difference on the Hibernation Passage.

These results are consistent with the assumption that the French Canadian subjects had greater background knowledge and more developed schemata for Canadian marriage customs than the Japanese subjects did. This gave the French Canadian subjects an advantage in comprehending the reading passage on Canadian marriage customs, independent of their English proficiency level. These results are in keeping with other studies (Steffensen et al., 1979; Johnson, 1981; Carrell, 1981) which have shown that the implicit cultural knowledge presupposed by the text and the reader's own cultural knowledge interact to make texts based on one's own culture easier to read and understand.

#### Hypothesis Four

Hypothesis 4 is also supported by the data. The scores of the control group (see Table 2 and 5 for cell means) are significantly higher than the French Canadian group on both the Marriage Passage and the Hibernation Passage. With the Japanese group, there is also a significant difference in favour of the control group on the Marriage Passage and the Hibernation Passage.

In addition to this, as was the case with both experimental groups, the control group scored significantly higher on the Marriage Passage than on the Hibernation Passage. In fact, when lines are drawn to connect the scores of each group on the two passages, they are almost parallel (see Figure 1 and 2). The amount of difference in the means of the two groups on the Marriage Passage is very similar to the difference in the means on the Hibernation Passage. This would seem to indicate that the primary difference between the Control group and the French Canadian group was one of linguistic ability in English rather than a cultural one.

#### Unsupported Hypotheses

##### Hypothesis One

The performance of the Japanese subjects on the two passages did not support Hypothesis 1. Similar to the French Canadian group, the scores of the Japanese group on the two passages were significantly different. However, the direction of the difference in the scores was opposite to that stated in Hypothesis 1. The Japanese scores were consistent with the direction of the French Canadian scores, that is, the Japanese scores on the Marriage Passage were higher than the scores on the Hibernation Passage. These results are in keeping with those of Piper and McEachern (1988) and call for speculation as to the reasons for their occurrence.

### Hypothesis Five

The performance of the subjects in the control group did not support Hypothesis 5. Implicit in the understanding of the concept of readability is the premise that if two passages are of equal readability, they are of equal difficulty to comprehend for native speakers of the language in which the passages are written. The fact that comprehension of the two passages was measured using the cloze procedure has a bearing on the results of this research. As mentioned earlier, even native speakers, particularly when the exact scoring method is used, frequently do not complete cloze tests with one hundred percent accuracy. Because of this, it would be expected that there would be some variation in the scores on the two passages. This variation would not be significant, however.

In the present study, the variation of the scores on the two passages was significant and this undermines the claim that the two passages were of equal readability. The cloze scores indicate that the Hibernation Passage is at a higher level of readability than the Marriage Passage. The difference in the number of blanks left by the Control Group in the two passages also points in this direction. In the Marriage Passage, four blanks were left by four subjects whereas, in the Hibernation Passage, eighteen blanks were left by eight subjects. This may indicate a reluctance to guess, but the amount of variation in the performance of the Control

Group on both passages also calls into question the reliability of the readability measures used.

Given the lack of support for Hypotheses 1 and 5, the following will offer a number of possible explanations to account for these discrepancies.

#### Science - Acultural or Cultural?

One explanation for the results may be found by considering the assumption, underlying Hypothesis 1, that science is basically acultural or at least not specific to any particular culture. In this study, it was assumed that the Marriage Passage was more culturally loaded than the Hibernation Passage. The Marriage Passage contained many details that were specific to North American weddings, e.g., bridal showers, stag parties, toasts, tinkling of glasses, throwing of the bouquet and garter, etc. The Hibernation Passage, however, appeared to be less culture specific. It described physiological changes in hibernating animals, e.g., lowering of body temperature, reduction of body processes and movement, etc.

Based on the assumption that science is acultural or transcends all cultures, the Japanese subjects should have performed better on the Hibernation Passage because a scientific text is not considered to be culture-bound. In support of this position, it may be argued that the Japanese subjects' low performance on the Hibernation Passage can be attributed to the fact that these subjects had no prior

knowledge of hibernation. This was not the case, however, because at the time of testing the subjects indicated orally to the researcher that they were familiar with hibernation and the fact that animals in Japan hibernated. In view of the prior knowledge of the subjects regarding the scientific topic discussed in the reading passage, the assumption that science is acultural appears to require re-evaluation given the data.

In the discussion of their results, Piper and McEachern (1988) suggest that they may have been wrong about their assumptions either about the importance of cultural background or about what constituted cultural neutrality. In regard to the importance of cultural background they state: "That cultural experience plays no role, or even a lesser role than previously expected, is difficult to accept given our current state of knowledge" (p. 44). Numerous studies have shown that cultural background is a significant factor in reading comprehension (Steffensen et al., 1979; Johnson, 1981; Reynolds et al., 1982; Lipson, 1983; Aron, 1986; Nelson, 1987). This leads to the conclusion that it is not the importance of cultural background that needs to be reconsidered, but rather present notions of what constitutes cultural relevance in a text. Doing this involves rethinking the cultural content of science.

The notion that science is not exempt from cultural bias is in keeping with post-positivist thinking. Widdowson (1979), in his discussion of teaching English for science and

technology, argues that science is a culture in itself.

I assume that the concepts and procedures of scientific inquiry constitute a secondary cultural system which is independent of primary cultural systems associated with different societies. So although, for example, a Japanese, and a Frenchman, have very different ways of life, beliefs, preoccupations, preconceptions, and so on deriving from the primary cultures of the societies they are members of, as scientists, they have a common culture. (p. 51)

Widdowson discusses both the discourse of scientific instruction and that of scientific journalism. In scientific instruction, science is treated as a subject. At the early stages, scientific instruction refers to the learner's own experience and relates to his primary culture. As instruction progresses, the student begins to approximate the scientist and the secondary culture is developed. In scientific journalism, the movement from primary culture to secondary culture is reversed. Scientific journalism, which treats science as a topic, begins with the secondary culture and "recasts the findings of the secondary culture into primary culture terms, making appeal, and making concession, to social beliefs, attitudes, views of the world" (Widdowson, 1979, p. 52). In both cases, scientific instruction and scientific journalism, the influence of the primary culture is present.

Widdowson's (1979) discussion of scientific journalism has particular relevance to the scientific cloze passage used. This passage is an example of scientific journalism in that it treats science as a topic. The phenomena described originate in the secondary culture (science) in that the behaviour of animals does not vary from one primary culture of society to another, only from climate to climate. In describing the behaviour of hibernating animals, the scientific journalist moves from the secondary culture (science) to a particular primary culture, Western culture in this case. The behaviour of hibernating animals is described in keeping with the Western "social beliefs, attitudes, views of the world" (Widdowson, 1979, p. 52). This coincides with Anderson and Urquhart's (1988) claim that, contrary to the traditional position regarding texts, it is not possible to find "texts which are so neutral in content and cultural assumptions that they will not in any significant way favour any particular group" (p. 168). Included in the background scientific knowledge the reader brings to the text are the beliefs and preconceptions that are part of that knowledge. Laws of nature may not vary from culture to culture but the way in which they are perceived and understood does.

Studies on culture-specific content knowledge which used ambiguous passages or culturally contrasting passages to test the effect of culture on reading comprehension (Steffensen et al., 1979; Steffensen & Colker, 1982; Johnson, 1981; Reynolds

et al., 1982; Lipson, 1983; Nelson, 1987) have shown cultural knowledge to be a significant factor in reading comprehension. It may be that studies using highly contrasting situations show the impact of culture most clearly. In the study done by Steffensen et al. (1979), the two passages about weddings that were used contained highly contrasting cultural material. A clear difference was seen in comprehension between the two passages with the subjects demonstrating greater comprehension on the passage culturally familiar to them. In the present study, it is possible that the cultural contrast between the two passages used was not as great as assumed because the Western perspective was present in both passages.

#### Prior Knowledge

Even if the notion of science as an acultural entity must be abandoned, there is another possible reason for the lack of support for Hypothesis 1 which must be considered. The Japanese group and the French Canadian group were expected to bring differing amounts of background knowledge to the Marriage Passage. They were expected, however, to bring a similar amount of previous knowledge to the scientific text. Given the educational background of the Japanese subjects (high school or university education), it seems reasonable to assume that their knowledge of hibernation would be equal to that of the French Canadian subjects (junior college or university education). The expectation, that members of different cultures but of equal levels of education would have

similar amounts of scientific knowledge, is also held by publishers of ESL reading texts. These texts contain many reading passages on scientific topics. Students are expected to have more scientific background knowledge than cultural background knowledge of the target culture to bring to the reading task.

All other things being equal, it is possible to interpret the results of this study as indicating that the Japanese subjects' knowledge of a scientific topic such as hibernation may not have been equal to that of the French Canadians'. Although the specific customs involved in Canadian weddings were not familiar to the Japanese subjects, their schemata for marriage customs in general may have been more well developed than for the hibernating behaviour of animals. As a result, interpretation of the Marriage Passage was easier because they were able to make more inferences and predictions than on the Hibernation Passage.

#### Affective Involvement

One factor which may be operating in the superior performance of the Japanese subjects on the Marriage Passage is affective involvement. It is possible that notions of marriage, in general, were more significant and interesting to these subjects than notions of hibernation. Bates and MacWhinney (1979) propose that "speakers are particularly likely to choose as a starting point the element with the greatest 'closeness to ego'...we focus first on things we care

about" (p. 180). This could be interpreted to mean that personal significance affects language processing. Marriage, a pertinent topic across all cultures, may provide a domain which is closer to the Japanese subjects' egos and, therefore, more easily processed than a less familiar topic such as hibernation. The effect of domain-specificity has been shown in research. Cole and Scribner (1974) report that their Liberian subjects' performance in solving a problem improved greatly when the problem was embedded in a setting that the subjects encountered daily. In a study with rather surprising results, McClosky (1983) also found that his subjects solved problems differently according to the context in which they were presented. Faced with predicting the movement of an object when it was thrown from some height, the subjects predicted the movement more accurately when the object was being thrown off a cliff than when the object was being thrown out of a plane.

It would not be surprising if the topic of marriage was a domain of particular relevance to the Japanese subjects since they were between 16 and 20 years of age, ages when marriage customs may be of special interest. Extrapolating from this, if the subjects were more affectively involved in reading the Marriage Passage, they may have expended more effort in completing it and may also have found it easier to process.

### Perception of the Reading Task

Another possible explanation for the results of this study may come from the subjects' perception of the task they were given. Carrell (1988a) raises the question of whether ESL readers suffer from misconceptions about reading tasks. Readers who see reading as a primarily bottom-up or text-based process may fail to make use of the extra-textual knowledge they have. Devine (1988) points out that the theoretical orientation of the reader "may determine the extent to which low second language proficiency restricts reading ability in the second language" (p. 136). A bottom-up approach combined with low proficiency may restrict the transfer of effective reading skills to the second language. A top-down or knowledge-based approach, on the other hand, may help balance some of the effects of low proficiency in that the reader makes use of his prior knowledge in the comprehension task.

It is possible that in this study the Japanese subjects' perceptions of each of the cloze passages may have affected the type of processing they used in reading it. It may be the case that the Japanese subjects were more text-based than knowledge-based in their processing of the Hibernation Passage than they were in the Marriage Passage. A predominant concern with text-based processing could result in an unwillingness to guess at the right answer. Consequently, more spaces would be left blank.

Piper and McEachern (1988), in discussing their subjects' performance on the science passage in their study, suggest that

subjects perhaps reasoned that because the material was factual, there could only be one correct response for each blank...If the subjects perceived that this was true, and knowing the limitations of their knowledge about the subject matter, consequently refused to guess, then their relatively poor performance might be explained. (p. 45)

To verify that this was the case in the present study, an analysis of the number of spaces left blank was done. It showed that more spaces were, in fact, left blank in the Hibernation Passage (205 blanks left by 36 subjects) than in the Marriage Passage (129 blanks left by 27 subjects). The same trend was evident within each group of subjects. This is in keeping with Piper and McEachern's (1988) findings. From this data, it seems that all of the subjects were more text-based in their processing of the Hibernation Passage than of the Marriage Passage.

This is in keeping with Piper and McEachern's (1988) findings. For the Japanese group, a total of 139 blanks were left by 19 students on the Hibernation Passage and a total of 94 blanks were left by 17 students on the Marriage Passage. The same trend was shown by the French Canadian subjects and the Control Group but this difference was most pronounced with

the Japanese group. From this data, it seems possible that the Japanese subjects were more text-based in processing the Hibernation Passage.

As part of the instructions for completing the cloze passages, all of the subjects were told that any semantically correct response would be accepted and were encouraged to guess. The Japanese subjects, however, left a remarkably greater number of blanks on both passages than the French Canadian subjects. Although this reluctance to guess may be cultural, it may also indicate that the Japanese subjects were more text-based overall in their processing. They may have been under the misconception that all "meaning is in the text" (Spiro, 1979). The Japanese subjects may have thought that knowledge-based processing was not an appropriate activity in academic reading. It is possible that they viewed the reading passages as "insular and lacking in relevance to existing knowledge and reader interests" (Carrell, 1988a, p. 109). As a result, they may have failed to use the extra-textual knowledge they had as much as they could have.

#### Efficacy of the Cloze Procedure

Still another consideration is the possibility that the cloze procedure itself may have had an effect on the results. As noted earlier, controversy exists as to whether varying deletion rates and starting points affect the difficulty of a cloze passage. In this study, the fixed ratio method was used for deleting words, i.e., every seventh word was deleted.

This type of deletion is based on the assumption that redundancy is randomly distributed in text.

Bachman (1985) points out several weaknesses in this assumption. First, it is not clear that all words carry the same amount of information or are equally redundant. More information may be lost with some deletions than with others and, therefore, individual deletions vary in difficulty. Second, not all words function at only one or the same structural level and, as a result, all deletions do not depend equally on the same level or range of context for closure. Third, different deletion patterns will not necessarily yield equal proportions of deletions across different levels. It may be argued that if enough deletions are made, these differences will level out. However, this cannot be claimed with certainty for any given cloze passage. It is possible that the system of random deletion used here may not have produced a proportional sample of the elements in the text and may not have produced cloze passages of equal difficulty.

Piper and McEachern (1988), in accounting for the perceived difference reported by their subjects regarding the difficulty of the two cloze passages used, analyzed the deletions in the passages in terms of function words (determiners, prepositions and conjunctions) and content words. Their subjects thought that the science passage was more difficult because there were more function word deletions in that passage. However, analysis of the deletions showed

that the number of function word deletions in both passages was equal.

The deletions in the passages in the present research were also analyzed in terms of function words and content words. It was found that there were 10 function word deletions in the Marriage Passage and 6 in the Hibernation Passage. This supports Bachman's (1985) claim that random deletion does not necessarily result in the deletion of equal proportions of the elements in a text. If function word deletions are, in fact, more difficult to complete than content word deletions, the Marriage Passage should have been found to be more difficult to complete than the Hibernation Passage. This was not the case and, therefore, consideration of the number of function word deletions in each passage does not help to explain the present findings.

Piper and McEachern (1988) suggest that the cloze itself, regardless of system of deletion, may be implicated by results such as those of the present research. The cloze holds a reputation as an indicator of general language proficiency (Hinofotis, 1980; Shohamy, 1983; Levenston et. al., 1984; Hanania & Shikhani, 1986; Brown, 1987). Oller (1979) has gone so far as to claim that it is an indicator of general proficiency regardless of the text chosen for test construction. He states: "In spite of the natural feeling that just any old text will not do, or that a suitable text must be carefully chosen and possibly edited, research has

shown that the cloze procedure is probably appropriate to just about any text" (p. 364).

Klein-Braley (1983) takes exception to the assumption that all cloze passages are parallel or equivalent in determining general language proficiency. Klein-Braley and Raatz (1984) also argue that text selection for cloze test construction must be done keeping in mind the suitability and difficulty of the passage for the sample envisaged. The fact that both groups of subjects in this study performed in significantly different ways on the two cloze passages they were given lends support to Klein-Braley's position. Piper and McEachern (1988) conclude regarding the results of their study: "Warnings given by researchers such as Klein-Braley and Raatz (1984) about the possibility of content bias seem well justified, given the present findings" (p. 46). Since the findings of this study are similar to the ones referred to above, the same conclusion can be applied here as well.

#### Reliability of Readability Measures

Yet another explanation for the results of this study may be found through an examination of the readability measures used to determine the readability of the two passages. The two measures used were Fry's Readability Scale and the Dale-Chall Readability Formula. Both of these measures have been widely used in determining text readability (Klare, 1984). Fry's Readability Scale determines the readability of a passage by considering sentence length and the number of

syllables in a 100-word passage. The Dale-Chall Readability Formula also uses sentence length but uses a list of familiar words rather than number of syllables to determine semantic difficulty. According to both of these measures, the Marriage Passage and the Hibernation Passage were of equal readability. However, the performance of the native speakers on the cloze tests for both passages suggest that this was not the case since the Control Group performed significantly better on the Marriage Passage.

Although the above measures have been widely used and can be applied with considerable ease and rapidity, they have come under considerable criticism (Klare, 1984). The question has been raised as to whether measuring sentence length, word length and familiarity of vocabulary is indeed measuring readability (Davison & Kantor, 1982). Critics of traditional readability measures find these measures too simplistic in their approach. They make the objection that the shorter and simpler a passage is does not always make it more readable (Pearson & Spiro, 1982). Length and complexity of sentences and vocabulary may reflect readability but are not sufficient measures in themselves (Davison & Kantor, 1982).

Traditional readability measures look at vocabulary in a very simple way. They assume that longer words are more difficult and are learned later. Fry's Readability Scale takes into account only the number of syllables in a word in determining the level of vocabulary difficulty. This is

problematic because a "difficult" vocabulary item with many syllables may not have a more frequent synonym and, therefore, its simplification would require a paraphrase, adding a clause or phrase to the sentence (Davison & Kantor, 1982). The end result of this may not ease comprehension at all. Fry's Readability Scale disregards the fact that the length of a vocabulary item does not always determine its difficulty.

The Dale-Chall Readability Formula takes into account frequency of vocabulary but it is not sensitive to the fact that lexical items may have more than one meaning. When the less common meaning of a word is used, this is not taken into account by word lists (Davison & Kantor, 1984). Assessment of vocabulary difficulty is a much more complex process than traditional readability measures recognize.

Several other variables not taken into account by traditional readability measures have been put forward. One of these variables is text organization. Anderson and Armbruster (1986) emphasize the importance of textual coherence. They break coherence down into global coherence, achieved through integration of high-level important ideas; and local coherence, achieved by connecting ideas together between and within sentences. Lack of attention to text organization is a weakness of traditional readability measures (Davison & Kantor, 1982; Beck & McKeown, 1986; Anderson & Armbruster, 1986).

Integral to local coherence is the inference load of a passage. Sentence length is a crucial feature according to traditional readability measures and it is assumed that a compound or complex sentence is more difficult to comprehend than the same material divided into several shorter sentences. In actuality, however, sentence length does not always contribute to complexity. The "simplification" of sentences by dividing them up leaves the reader with the task of inferring the relationship between the component parts. This may add to complexity rather than reduce it (Davison & Kantor, 1982; Klare, 1984; Beck & McKeown, 1986). The following sentence from the Marriage Passage exemplifies this: "While the guests are seated for the meal, there are speeches and toasts." The subordinator "while" in this sentence is crucial in indicating the time relationship between the two events. Deleting the word "while" and dividing this sentence into two sentences would lower the readability level on traditional reading measures, but would, in actuality, make comprehension more difficult because the relationship between the two events would then be unclear. Anderson and Armbruster (1986) report:

More cohesive text is read faster and remembered better because it helps readers construct a coherent model or interpretation of the text. When an incohesive text makes this difficult, readers spend extra time and cognitive energy to remediate the problem. They reread

for the link, search through their memories to retrieve the connection, or make an inference about a possible relationship. (p. 160)

Attributing sentence length with primary importance in determining readability disregards the crucial role of cohesion.

Traditional readability measures also fail to take into account the various types of cohesive devices used. For example, not only connecting words (conjunctions, subordinators, transition words), but also punctuation marks (colons, semicolons, dashes) can be used as cohesive devices. It would appear that connecting words establish the relationship between ideas or sentences in a more explicit way than punctuation marks.

The following sentence from the Hibernation Passage is an example of this. "The second is tied to the \_\_\_\_\_ [primary] use the body makes of food--\_\_\_\_\_ [to] supply the energy for movement." The use of a dash here would seem to make the blank following it more difficult to complete. The data support this claim. It is to be expected that because the Control Group was comprised of native speakers, this group would have the greatest likelihood of providing the correct completion for the blank requiring "to" in the above sentence. An analysis of the responses of the Control Group showed that only 14 out of the 31 subjects correctly completed this blank. In addition, out of the 18 blanks left by all of the subjects

in the Control Group on the Hibernation Passage, five of these were for the blank in question. Perhaps the subjects would have had less difficulty if a new sentence had been started at this point stating: This is \_\_\_\_\_ supply the energy for movement.

There is a difference in the amount of connecting punctuation used in the two passages. The Marriage Passage has one semicolon which appears in the initial intact sentence. The Hibernation Passage, on the other hand, has two semicolons, one colon and one dash, all of which appear in the main body of the cloze. This would suggest that the connections between ideas in the Hibernation Passage may have been more difficult for the reader to make and also raises the question of how punctuation is interpreted.

The inference load of a passage is related not only to cohesive devices but also to the prior knowledge of the reader. The author of a passage takes for granted that the reader will infer information that is not explicitly stated, but is, nevertheless, crucial to understanding. If this prior knowledge is lacking, the difficulty in comprehending the passage is increased (Klare, 1984). This variable, then, is subject specific and the readability of a passage varies from reader to reader in this regard.

Another variable that needs to be considered in the measurement of readability is content. Content can be analyzed by counting the number of content or meaning units

in a passage (Klare, 1984). It can also be analyzed in terms of concept difficulty (Beck & McKeown, 1986). The same concept can be expressed using multisyllabic, low-frequency words or using short, high-frequency words. According to traditional readability measures, the use of short, high-frequency words would lower the readability level. This, however, does not take into account the fact that the difficulty of the original concept has not been eased (Beck & McKeown, 1986).

Consideration of the reliability of the readability measures used to determine the readability of the passages used in this study clearly raises questions as to whether the two passages are truly of equal difficulty. It is possible that a more indepth analysis of the passages in terms of text organization and content would reveal that the Hibernation Passage is, in fact, more difficult to comprehend. This would provide yet another explanation for the findings.

#### Limitations

There are several limitations as to the generalizability of the findings of the present research. First, although there was no evidence to indicate that the subjects' performance on the tasks given to them was atypical, the samples were not random. Second, the intent was to compare the comprehensibility of a culturally loaded passage with that of a culturally neutral passage; however, the existence of a culturally neutral text is highly questionable. The optimal

condition that could be attained was the comparison of a relatively less culturally loaded passage with a heavily loaded one. Third, that the subjects in all three groups brought relatively equal background knowledge to the reading of the scientific passage was assumed, not verified.

#### Pedagogical Implications

Educational research is ultimately concerned with effective instruction and the relevance of research findings to the classroom. In light of this, several pedagogical implications can be drawn from the present study.

As mentioned previously, passages on scientific topics are frequently used in reading texts for ESL students. One of the assumptions behind this practice is that second language learners bring adequate background knowledge to these texts, provided they have had some previous education in their native country. Instructors must be careful of the assumptions they make regarding language learners' background knowledge of scientific facts. They should seek an optimum balance between the reader's background knowledge and that presupposed by the text (Carrell & Eisterhold, 1983). This involves more than just looking at the difficulty of the vocabulary and complexity of syntax in a reading passage.

However much the vocabulary and syntax of a highly technical or scientific text are simplified, it is unlikely that any reader (adult, child, native or nonnative) will comprehend it without first acquiring the

requisite background of scientific knowledge. (Carrell, 1988a, pp. 103-104)

Beck and McKeown (1986) point out that a little knowledge is not enough for comprehension and that "teachers need to be alert for knowledge problems masquerading as reading problems" (p. 133). The teacher must determine the extent and quality of the learner's background knowledge of a subject before expecting him/her to comprehend a given text. Following this, the teacher's task is to build the necessary background knowledge (e.g., through prereading activities and vocabulary development) and also to activate the existing background knowledge (e.g. through comprehension instruction and materials selection) (Andersson & Barnitz, 1984; Carrell, 1984c).

The comprehension of scientific texts may require more than just knowledge of scientific facts. Given that scientific journalism interprets the results of scientific investigation in terms of the target primary culture (Widdowson, 1979), texts on scientific topics may presuppose some cultural knowledge in addition to knowledge of scientific facts. The language instructor should be cognizant of this and analyze the appropriateness of texts in light of possible cultural loading.

Given the possible cultural content in all texts, the language instructor must guard against taking for granted the cultural background knowledge required for the comprehension

of a text. When comprehension breakdown occurs, the teacher needs to investigate the cause. Where the cause is lack of cultural background knowledge, the instructor needs to move beyond recognizing the source of the interference to helping the student make the bridge that is necessary to the target culture. Once the scope of the interference is determined

an appropriate interpretation can be encouraged either by contrasting the event to a formally or functionally similar one in the native culture or by providing enough information about such events so that the students had some of the necessary cultural content (Steffensen & Joag-Dev, 1984, p. 60).

As with other types of texts, when dealing with scientific texts, the language instructor must be alert to the possible need for cultural background knowledge in achieving comprehension.

Another pedagogical implication of the present study pertains to the reader's perception of the reading task. As noted earlier, all of the subjects left more spaces blank on the Hibernation Passage than on the Marriage Passage. It was suggested that this could be the result of greater text-boundedness on the part of the subjects in trying to comprehend the Hibernation Passage. This suggests that language instructors need to be aware of how their students perceive a specific reading task.

Just as second language learners bring with them their knowledge of language in general and then apply this knowledge to learning specific features of another language, so readers of a second language seem to bring with them their knowledge of the reading process and of approaches to tasks and then apply these to specific language features in a text. (Block, 1986, p. 485).

The reader's theoretical orientation to reading may affect the amount of top-down or knowledge-based processing he/she engages in (Devine, 1988). Language learners should be aware of the effectiveness of making use of the extra-textual knowledge they have in the comprehension of every reading passage. Although knowledge-based processing is important to reading comprehension, it should not be emphasized at the expense of acknowledging the importance of text-based processing as well. Either kind of unidirectional processing, top-down or bottom-up, can lead to breakdowns in comprehension (Carrell, 1988a; Eskey & Grabe, 1988). Byrnes (1984) describes the teacher's task in guiding students to an effective perception of the reading task as follows:

"We should encourage learners to process holistically rather than to decode in an additive fashion. At the same time we should make them aware of the continuous interaction between text-derived and background-derived meanings." (p. 179)

The importance of the recognition of the knowledge presupposed by texts applies not only to reading materials used in the second language classroom but also to tests given to language learners. Research has shown that standardized tests discriminate against ESL students because they presuppose background knowledge, particularly cultural background knowledge, that these students do not possess (Aron, 1986; Farr et al., 1986). This results in an inaccurate assessment of the students' linguistic ability. Test items need to be examined carefully (Andersson & Barnitz, 1984) and "selected on the basis of valid information needs that are clearly defined and related to assessable instructional goals for the particular population" (Farr et al., 1986, p. 140).

Yet another implication of the present study for the second language instructor regards the determination of the comprehensibility of a text. The publisher-determined readability level of a text, based on traditional readability measures, should be viewed critically. Scores from readability measures are best viewed as probability statements rather than final judgements (Klare, 1982). Klare (1984) views the use of formulas and human judgement as complementary in the process of determining readability levels.

Davison and Kantor (1982), however, take a different stance. In giving advice to writers of reading texts, they urge writers to rely on their own judgements about the

appropriateness of the language for the intended reader, and not on stereotyped notions, or readability formulas. The same advice would seem to apply to instructors in their choice of texts for their second language students. Whether or not teachers give consideration to readability formulas in their judgement of the appropriateness of a passage for the prospective reader, they must look beyond the complexity of sentence structure and vocabulary to the concepts in a text. The number of concepts, the complexity of these concepts and the students' familiarity with them must all be considered in choosing a reading passage. The teacher should be able to recognize those aspects of a text that can influence a reader's comprehension (Beck & McKeown, 1986).

#### Implications for Future Research

The findings of the present study raise several questions. The fact that the Japanese subjects performed significantly better on the Marriage Passage than on the Hibernation Passage has implications for the determination of both the cultural content and the readability of texts.

The results of this research indicate that the determination of cultural loading may not be as simple as it appears on the surface. Scientific content does not preclude the existence of cultural bias. Reynolds et al. (1982) point out that

because of cultural overlap and because the educational publishing industry tries to avoid bias, such cultural

loading as may be present in standardized tests, basal readers, and other school reading material is subtle...We know such material exists, but no one currently has hard evidence about the pervasiveness of the problem. (p. 365)

As Piper and McEachern (1988) indicate, there is a need for further research into what constitutes cultural relevance in a text. Continuing research into the extent of cultural loading in ESL reading materials and its effect on reading comprehension is needed.

Another implication for future research pertains to readability measures. Based on the performance of the Control Group on the two reading passages, it seems highly unlikely that the texts were of equal readability although both Fry's Readability Scale and the Dale-Chall Readability Formula determined them to be such. Simple, efficient and popular as these two-variable measures are, they do not appear reliable in determining how difficult a passage is to comprehend. This leads to speculation as to which variables should be considered in the determination of readability.

In summarizing the research on selecting language variables for prediction of readability, Klare (1984) claims that the variables of semantic and syntactic difficulty account for much of the variance in the prediction of readable writing and that semantic difficulty typically accounts for a greater amount of this variance. He also points out that adding new and different variables in measuring readability

has been a frustrating task and has not accounted for much added variance. Beck and McKeown (1986), however, do not hold with the latter point of view. "Although recent work on the influence of text variables on comprehension has not enabled the creation of some sure-fire readability formula, notions have become refined enough to be useful in describing and evaluating texts" (p. 129).

Assessment of readability must go beyond the mere measurement of vocabulary difficulty and sentence length. Continued research regarding text structure may well lead to new insights (Beck & McKeown, 1986). Features such as clause connections, topic, focus, inference load and point of view need to be investigated further (Davison & Kantor, 1982). "If we can reach a better understanding of what constitutes readability, it will be possible to break with the conventional wisdom reinforced by readability formulas" (Davison & Kantor, 1982).

### Conclusion

The present research was concerned with the effect of the cultural content of a text on reading comprehension. It approached this issue by comparing reading comprehension on two passages containing varying amounts of cultural content. Three groups of adult subjects were tested: native speakers of English, French Canadians and Japanese. The cloze procedure was used to measure the comprehension of the subjects of a passage about Canadian wedding customs and a

passage about hibernation. Both of these passages were of equal length and readability according to standard readability measures.

As was hypothesized, the subjects in the Control Group produced higher scores than the other groups on both passages. As was also expected, both groups of Canadian subjects produced higher scores on the Marriage Passage than the Japanese subjects. In addition to this, the French Canadians performed better on the Marriage Passage than on the Hibernation Passage.

The hypothesis that the Japanese subjects would score higher on the Hibernation Passage was not supported. The Japanese subjects performed significantly better on the Marriage Passage. Another hypothesis that was not supported by the data was that the Control Group would produce scores on both passages that were not significantly different. The Control Group performed significantly better on the Marriage Passage than on the Hibernation Passage.

There are several explanations for the data that were collected. The assumption that the science passage was acultural and therefore easier to comprehend is problematic because the Japanese subjects performed better on the Marriage Passage than on the Science Passage. Lack of knowledge regarding the subject of hibernation cannot account for the results since the Japanese subjects indicated knowledge of the hibernating behaviour of animals prior to testing. Post-

positivist thinking does not view science as acultural. Widdowson (1979) argues that scientific journalism reports the findings of scientific investigation in terms of the primary culture of a society. Therefore, scientific journalism, as in the scientific passage used in this research, reflects a cultural bias.

Another explanation for the data is that the amount of background knowledge the subjects brought to the reading task was different from that expected. The subjects were expected to bring similar amounts of background knowledge to the scientific passage but differing amounts of background knowledge to the Marriage Passage. The superior performance of the Japanese subjects on the Marriage Passage may be the result of more developed schemata for wedding customs than for the hibernating behaviour of animals.

The data may also be explained in terms of affective involvement. Given the ages of the Japanese subjects (16-20 years of age), the topic of marriage may have been inherently more interesting than that of hibernation, and so the Japanese subjects may have expended more effort in completing it. The subject's perception of the reading task may also account for their performance. All groups of subjects left more blanks in the Hibernation Passage than the Marriage Passage. This may indicate that the subjects were more text-bound in the Hibernation Passage and therefore less willing to guess and draw on extra-textual knowledge.

Yet another explanation for the data may be related to the efficacy of the cloze procedure. The system of random deletion that was used may have resulted in passages of varying difficulty since deletions may contain varying amounts of information and function at different structural levels (Bachman, 1985). The findings support the possibility that content bias may exist in a cloze passage.

The most powerful explanation for the data regards the readability measures used to determine the readability levels of the two passages. Standard readability measures (Fry's Readability Scale and the Dale-Chall Readability Formula) indicated that both passages were at a Grade 8 reading level. The significant difference in the performance of the Control Group on the two passages calls into question whether, in fact, both passages were of equal difficulty to comprehend.

Critics of standard readability measures have pointed out a number of the shortcomings of these instruments. First, they look at vocabulary in a very simplistic way. Second, standard readability measures do not take into account textual coherence, inference load and the various types of cohesive devices employed. Third, the number of concepts and the difficulty of these concepts are not considered in the measurement of reading difficulty. The existence of all of these weaknesses strongly supports the notion that the two reading passages were not of truly equal difficulty. The inadequacy of standard readability measures is a major factor

in accounting for the performance of all of the subject groups on the two passages.

Several pedagogical implications arise from this research. Teachers should guard against false assumptions regarding the background knowledge students possess in relation to scientific topics. Instructors should also be aware of possible cultural loading in scientific passages and of the interference this may cause in comprehension. Since comprehension also involves the reader's perception of the reading task, students should be encouraged to use both top-down and bottom-up processing in reading. The above factors are also crucial in assessing the validity of test items. Finally, teachers should view with caution the publisher-determined readability levels of texts. They should make informed judgements as to whether or not a text is appropriate for their students.

The findings of the present study raise questions for further research. The determination of what constitutes cultural relevance requires further attention. Assumptions regarding the universal appropriateness of scientific passages must be investigated. In addition to this, perhaps the most significant issue is the need for the development of a more accurate and reliable approach to determining the appropriateness of reading passages for ESL students.

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## APPENDIX A

In countries with moderate climates, where winters are not extremely long or cold, hibernation is not necessary. In very cold areas of the \_\_\_\_\_, like northern Russia, not many animals \_\_\_\_\_; the ground is so hard that \_\_\_\_\_ cannot make a deep hole to \_\_\_\_\_ the winter in. But animals in \_\_\_\_\_ large part of the northern hemisphere \_\_\_\_\_ each winter fast asleep.

Hibernation is \_\_\_\_\_ than sleep; it is a very \_\_\_\_\_ sleep. The animal's temperature drops to \_\_\_\_\_ over 0°C, and its \_\_\_\_\_ beats extremely slowly. People who find \_\_\_\_\_ animals asleep often conclude that they \_\_\_\_\_ dead: the body feels frigid, and \_\_\_\_\_ creature may breathe only once in \_\_\_\_\_ minutes. A hibernating animal cannot feel \_\_\_\_\_ pain; you can touch it, or \_\_\_\_\_ give a hard pull to its \_\_\_\_\_, without causing it to move or \_\_\_\_\_ up. In its hibernating state it \_\_\_\_\_ even live in a poisonous atmosphere \_\_\_\_\_ a long time without negative effects.

\_\_\_\_\_ in that way, the creature can \_\_\_\_\_ all through the winter. You might \_\_\_\_\_ how it manages to live without \_\_\_\_\_ for so many months. The answer

\_\_\_\_\_ in two facts. The first is \_\_\_\_\_  
it has stored supplies of fat \_\_\_\_\_ its body during  
the summer and \_\_\_\_\_. The second is tied to the  
\_\_\_\_\_ use the body makes of food--\_\_\_\_\_  
supply the energy for movement. We \_\_\_\_\_ seen that  
the hibernating animal reduces \_\_\_\_\_ to far below  
the ordinary level. \_\_\_\_\_ the movements of the  
heart and \_\_\_\_\_ are sizably reduced. The animal  
makes hardly any movement, uses hardly any energy, and needs  
hardly any food.

In countries with moderate climates, where winters are not extremely long or cold, hibernation is not necessary. In very cold areas of the world, like northern Russia, not many animals hibernate; the ground is so hard that they cannot make a deep hole to spend the winter in. But animals in a large part of the northern hemisphere spend each winter fast asleep.

Hibernation is more than sleep; it is a very deep sleep. The animal's temperature drops to slightly over  $0^{\circ}\text{C}$ , and its heart beats extremely slowly. People who find hibernating animals asleep often conclude that they are dead: the body feels frigid, and the creature may breathe only once in five minutes. A hibernating animal cannot feel any pain; you can touch it, or even give a hard pull to its tail, without causing it to move or wake up. In its hibernating state it can even live in a poisonous atmosphere for a long time without negative effects.

Hibernating in that way, the creature can sleep all through the winter. You might wonder how it manages to live without eating for so many months. The answer lies in two facts. The first is that it has stored supplies of fat in its body during the summer and fall. The second is tied to the primary use the body makes of food--to supply the energy for movement. We have seen that the hibernating animal reduces movement to far below the ordinary level. Even the movements of the heart and lungs are sizably reduced. The animal makes hardly any movement, uses hardly any energy, and needs hardly

any food.

Note. From Reading for adults: book two (pp. 74-75) by R. D. Lewis, 1982, Essex, England: Longman Group UK Limited. Copyright 1982 by Longman Group UK Limited. Reprinted with permission.

## APPENDIX B

In Canada, marriage customs tend to reflect the diverse ethnic backgrounds in the country; at the same time, there are definable Canadian customs for marriage.

Before the wedding, the bride may \_\_\_\_\_ given a number of "showers" by \_\_\_\_\_ friends. During these small (usually all-female) \_\_\_\_\_, the bride is "showered" with gifts \_\_\_\_\_ the home. Friends of the groom \_\_\_\_\_ a bachelor party before the wedding \_\_\_\_\_. This is an all-male affair, sometimes \_\_\_\_\_ a "stag" party.

On the day \_\_\_\_\_ the wedding, it is considered bad \_\_\_\_\_ for the groom to see the \_\_\_\_\_ before the ceremony. The bride usually \_\_\_\_\_ a white gown (a traditional sign \_\_\_\_\_ purity) with a veil. She should \_\_\_\_\_ "something old, something new, something borrowed \_\_\_\_\_ something blue." The groom often wears \_\_\_\_\_ tuxedo.

In the church, the groom \_\_\_\_\_ at the altar with the best \_\_\_\_\_. The ushers seat the wedding guests. \_\_\_\_\_ walk up the aisle followed by \_\_\_\_\_ bride, who is accompanied by her \_\_\_\_\_. A minister or priest performs the \_\_\_\_\_ and the maid (or matron) of \_\_\_\_\_ and the best man act as \_\_\_\_\_ witnesses.

The reception after the ceremony \_\_\_\_\_ usually

a dinner followed by an \_\_\_\_\_ of dancing. While the guests are \_\_\_\_\_ for the meal, there are speeches \_\_\_\_\_ toasts. When the guests clink their \_\_\_\_\_ with silverware, the bride and groom \_\_\_\_\_ expected to stand up and kiss \_\_\_\_\_ other.

Before the wedding couple leaves \_\_\_\_\_ reception, the bride throws her bouquet \_\_\_\_\_ the unmarried women. The woman who \_\_\_\_\_ it is said to be the \_\_\_\_\_ to be married. The groom throws the bride's garter to the unmarried men.

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Before the wedding, the bride may be given a number of "showers" by her friends. During these small (usually all-female) parties, the bride is "showered" with gifts for the home. Friends of the groom throw a bachelor party before the wedding day. This is an all-male affair, sometimes called a "stag" party.

On the day of the wedding, it is considered bad luck for the groom to see the bride before the ceremony. The bride usually wears a white gown (a traditional sign of purity) with a veil. She should have "something old, something new, something borrowed and something blue." The groom often wears a tuxedo.

In the church, the groom waits at the altar with the best man. The ushers seat the wedding guests. Bridesmaids walk up the aisle followed by the bride, who is accompanied by her father. A minister or priest performs the ceremony and the maid (or matron) of honour and the best man act as official witnesses.

The reception after the ceremony is usually a dinner followed by an evening of dancing. While the guests are seated for the meal, there are speeches and toasts. When the guests clink their glasses with silverware, the bride and groom are expected to stand up and kiss each other.

Before the wedding couple leaves the reception, the bride throws her bouquet to the unmarried women. The woman who catches it is said to be the next to be married. The groom throws the bride's garter to the unmarried men.

Note. From Take part: speaking Canadian English (p. 47) by L. P. Engkent and K. P. Bardy, 1986, Scarborough, Ontario: Prentice-Hall Canada, Inc. Copyright 1986 by Prentice-Hall Canada Inc. Reprinted by permission.

## APPENDIX C

### Acceptable Answers for Cloze Passages

#### Hibernation Passage

1. WORLD\*, earth, planet, globe
2. HIBERNATE
3. THEY, animals
4. SPEND, pass
5. A
6. SPEND, pass
7. MORE, deeper
8. DEEP, intense
9. SLIGHTLY, just, down, barely, somewhat
10. HEART
11. HIBERNATING, these, those, such
12. ARE
13. THE, this
14. FIVE, some, many (any number over 1)
15. ANY, some
16. EVEN, can, may
17. TAIL, body, members, limbs (any exterior part of the body)
18. WAKE, get, sit, stand, jump, look
19. CAN, may, could, will, might
20. FOR, during

21. HIBERNATING, sleeping, so, thus, living, consequently,  
asleep, resting
22. SLEEP, hibernate
23. WONDER, question, ask
24. EATING, food
25. LIES, is
26. THAT
27. IN, within, inside, throughout
28. FALL, autumn
29. PRIMARY, first, main, major
30. TO
31. HAVE
32. MOVEMENT, motion, activity, action
33. EVEN, both
34. LUNGS, body, (any internal part of the body)

Marriage Passage

1. BE
2. HER, close, some, female
3. PARTIES, get-togethers, receptions, celebrations,  
showers, affairs
4. FOR
5. THROW, have, give, organize, prepare
6. DAY, ceremony, celebration, party, date
7. CALLED, named
8. OF
9. LUCK, chance, fortune, etiquette, form, taste

10. BRIDE, wife, woman
11. WEARS, puts on, has
12. OF, showing, symbolizing
13. HAVE, wear
14. AND
15. A, his
16. WAITS, stays, remains, stands, kneels
17. MAN
18. BRIDESMAIDS, attendants
19. THE
20. FATHER
21. CEREMONY, service, wedding, marriage, mass
22. HONOUR
23. OFFICIAL, the, two, eye, legal
24. IS
25. EVENING, night, hour
26. SEATED, sitting, there, present
27. AND
28. GLASSES, cups
29. ARE
30. EACH
31. THE, their, this
32. TO, toward, for
33. CATCHES, holds, get, receives
34. NEXT, earliest

\* Words in capital letters are the words that appeared in the original passages.