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THE EFFECTS OF SELECTED PICTORIAL CONTEXTS
ON MEASURES OF READING COMPREHENSION
IN BEGINNING COLLEGE FRENCH

DISSERTATION

Presented in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy in the Graduate
School of The Ohio State University

By

Alice Catherine Ommaggio, B. S., M. A.

* * * * *

The Ohio State University

1977

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Major Field: Foreign Language Education

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Studies in Psychology of Language Learning
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Studies in Experimental Design and Statistics
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CHAPTER I

THE PROBLEM

Foreign language educators have long assumed that visual aids are beneficial to the learning of a second language. Suggestions for using visual materials can be found in most methods texts; second-language readers and grammar texts are very often attractively illustrated with colorful photographs and imaginative drawings. In a recent article, Tuttle (1975) states:

Foreign language students can benefit from many types of visual material...
the still or flat picture can prove to be a rich resource in the foreign language classroom (p. 9).

Little experimental evidence, however, has been obtained to validate that assumption. To date, the profession has virtually no empirical basis for promoting the use of visuals as aids to comprehension in the second language; we know practically nothing about how students benefit, if indeed they do, from visual materials. This lack of research knowledge is not limited to second-language learning; it extends into the area of reading comprehension in the first language as well. The extent to which visual materials enhance reading comprehension among young learners in their native language is yet to be determined. Goodykoontz (1936), in discussing the role of pictures in first-language reading comprehension, remarks that although pictures are said to "enrich experience, supply visual imagery, contribute to the text,"
ensure meaningful reading, and add to understanding and pleasure." (p. 125) the specific contribution pictures make to reading comprehension has not yet been clearly identified. Weintraub (1966), in a recent review of the literature on beginning reading, notes that most studies on the role of illustrations in readers are tangential to the question of their specific utility as aids to reading. He comments upon several studies that appear to address the question and concludes: "None of these studies gives us the final answer or even provides direction" (p. 66). Within the domain of second-language learning numerous theoretical reservations have been expressed about the total effectiveness of the picture as a means of conveying the meaning of an utterance (Taggart, 1975). Tardy (1975) points out the various ambiguities and possible interpretations that can be attached to even the "clearest" of visual materials and remarks that any attempt to limit students' interpretations of a given picture to a single meaning is more or less "doomed to failure" (p. 7).

Many questions related to the role of visual materials in language comprehension remain unanswered, and it is obvious that much work needs to be done to elucidate the possible contribution pictorial aids make to the language acquisition process. Studies are needed to investigate questions such as the effect of visuals on listening comprehension, reading comprehension, and vocabulary learning in both the first and second language; to classify visual aids according to type and function; to examine the role of size and color in visual materials; to analyze the differential effects of photographs, cartoons, and line drawings; to determine the effects of sequencing and integration
of visuals within textual materials; and to examine the relevance of illustrations to the content of the passage. This study is designed to investigate specifically the effect of several types of pictorial contexts on reading comprehension measures in beginning college French.

Theoretical Bases

It is this researcher's view that certain theories relating to the nature of the reading process as well as to the role of context and organization in language comprehension have implications for an approach to reading in the second-language classroom. In Goodman's view (1968) reading is a selective process in which the reader, guided by his knowledge of the language, relates graphic cues to syntactic, semantic, and phonological cues, decodes these choices, stores them, and then subsequently tests and associates them with future decoded choices. Smith (1973) hypothesizes that the efficient language user will take the most direct route to his goal of comprehension. He describes reading as a sampling process in which the reader predicts structures, tests them against the semantic context built up from the ongoing discourse, and then confirms or disconfirms his hypotheses as he processes further language. Yorio (1971) isolates the following factors in the reading process:

1) knowledge of the language (the code),
2) ability to predict or guess in order to make correct choices,
3) ability to remember the previous cues, and
4) ability to make the necessary associations between the different cues selected.
In the foreign language reading process, however, new and modified elements appear:

1) the reader's knowledge of the foreign language differs from that of the native speaker;

2) the guessing or predicting ability necessary to pick up the correct cues is hindered by his imperfect knowledge of the language;

3) the wrong or uncertain choices of cues make associations more difficult;

4) memory span in the foreign language is shortened in the early stages of its acquisition because of lack of training and unfamiliarity of the material, thereby making it more difficult to remember cues previously decoded; and

5) at all levels and at all times there is interference from the native language (pp. 108-09).

The foreign language reader therefore is at a disadvantage for several reasons: 1) rather than recalling cues with which he is familiar, "he is forced to recall cues that he knows imperfectly or not at all. Because of this, he will forget those cues much faster than he would cues in his native language" (p. 109); 2) he must simultaneously predict future cues and make associations with past cues—a slow and painful process in the second language for many inexperienced readers. In response to a questionnaire administered by Yorio (1971), thirty students at the English Language Institute reported that they feel they understand what they are reading while in the process of reading
it, but easily "lose the thread," forgetting what went on before as they process the subsequent sentence. Yorio attributes this difficulty to the need to concentrate on a triple process: storage of past cues, prediction of future cues, and associations between the two. "If they try to predict what is coming, they forget the past cues; if they try to concentrate on the past cues, prediction is impaired" (p. 111).

If, as Goodman and Smith suggest, reading is indeed an hypothesis-testing process in which the reader selects cues and makes predictions about the ongoing discourse on the basis of these selections, it would seem reasonable to hypothesize that the provision of supplementary cues drawn from sources outside the text would aid the reader in his task of comprehending the foreign language. If such supplementary cues can provide a conceptual basis for organizing the input the foreign language reader should be better prepared to make predictions and to formulate appropriate hypotheses when encountering words and expressions in a passage with which he is unfamiliar.

Four studies relating to listening comprehension conducted by Bransford and Johnson (1972) showed clearly that relevant contextual knowledge is a prerequisite for comprehending prose passages in the native language. In all four studies, subjects who were supplied with appropriate contextual information in the form of pictures before hearing the test passage demonstrated significantly better comprehension ratings and recall scores than did subjects who were not provided with a context or who were provided with a context after hearing the passage. Bransford and Johnson note the importance of finding a suitable organization of one's store of previous knowledge when faced with a prose
passage of considerable difficulty:

If one generally characterizes comprehension as a process requiring appropriate semantic contexts, then the conditions under which existing structures become activated are extremely important. If a passage does not provide sufficient cues about its appropriate semantic context, the subject is in a problem-solving situation in which he must find a suitable organization of his store of previous knowledge (p. 721).

Because the foreign language learner is often faced with input material (both in listening and reading tasks) that is by nature unfamiliar, difficult, and therefore unpredictable, additional contextual information should make the comprehension task easier by providing an organizational scheme for the passage as a whole. Coste (1975) points out that although a "situational" picture does not serve to translate a text in the foreign language for the reader, it does nevertheless give him certain indications about the relationship of events occurring in the passage, enabling the second-language reader to 1) make better predictions about what will occur and 2) eliminate various hypotheses that would mislead him in his task of comprehending the ongoing discourse if such a context were not provided.

Statement of the Problem

It is the purpose of this study to examine the effect of several types of visual contexts on reading comprehension measures in beginning college French. The following research questions will be considered:

1. What are the effects of various types of pictorial contexts used as advance organizers on measures of reading comprehension in beginning
college French?

2. What are the effects of these same pictorial contexts on identical measures of reading comprehension for the same text in the native language?

3. What information relevant to the comprehension measures can be obtained from the pictorial contexts alone, without reference to any textual material?

Operational Definitions

The following operational definitions were used in preparing materials for this study.

1. Picture

The term picture is used here to mean any graphic representation of a physical reality, a concept, or a mental state. The meaning of the term is restricted in the study to two-dimensional representations produced by artwork. The pictures selected are line drawings of a simplified style, reproduced by means of ditto masters.

2. Pictorial Contexts

The following criteria serve to define the levels of the visual context variable in the study:

a) No Context: No pictorial stimulus is provided for the reader.

b) Simple Line Drawing: A single object central to the theme of the story is depicted in the
picture.

c) **Prethematic Context:** A drawing is provided that depicts a scene from the beginning of the story but which is peripheral to the central action of the story.

d) **Thematic Context:** A drawing is provided which depicts a scene central to the main action of the story.

e) **Postthematic Context:** A drawing is provided that depicts a scene from the end of the story but peripheral to the central theme.

f) **Multiple Context:** All three drawings described in c, d, and e above are provided.

3. **Comprehension**

The term comprehension is considered in the study to be a global term comprising recognition and recall knowledge gleaned from exposure to the stimulus materials. Recall and recognition knowledge are considered as separate entities and are defined operationally by the criterion measures described below.

4. **Recall Knowledge**

Recall knowledge is a construct measured in the study by means of a 10-minute résumé written in English by the subject upon completion of the reading of the stimulus passage.
5. **Recognition Knowledge**

Recognition knowledge is a construct measured in the study by means of a 10-item multiple-choice test and a 10-item true-false test. Items are designed to test comprehension of facts and inferences that can be made from reading the passage.

**Value of the Experiment**

Because so little data exist relating to the role of illustrations in language comprehension, the foreign language teaching profession must rely on intuition and conjecture when using the many resources currently available in the realm of audio-visual materials. It is hoped that this study will reveal 1) whether or not certain pictorial contexts will aid comprehension of a story presented to adult learners of a second language (French); 2) whether the same pictorial contexts will have a similar effect on comprehension of the same story in the native language (English); and 3) what information can be gleaned from the pictorial contexts alone. The results of the study should provide empirical data that will have implications for the development of illustrated reading materials in second-language instruction, as well as provide direction for further research related to the role of pictorial material in language comprehension in general.
CHAPTER II
REVIEW OF THE LITERATURE

Introduction

Although visual aids of various types have long been an integral part of foreign language instruction, the specific contribution such materials make to language learning and comprehension remains unexplored. A review of the literature reveals that very few studies have been devoted to the role of visual materials in second-language comprehension, and those studies that address the question deal only with the learning of isolated words and sentences. The problem to be explored in this study is that of the effects of visual materials on the comprehension of connected prose. It must be emphasized that this is a very different problem (Weintraub, 1966).

Because the present study is an initial effort to elucidate the role of visual materials as aids to second-language reading comprehension, research contributing to the conceptualization of the study is drawn, for the most part, from the domain of native-language comprehension. The following topics will be considered in this chapter: 1) presently available classification systems for visual aids used in foreign-language instruction; 2) the role of illustrations in native language reading comprehension at the primary-grade level; 3) the role of illustrations in native-language listening comprehension among adult subjects; 4) the effects of imagery instructions on native-language
reading comprehension; and 5) the role of organizers in the native-language reading process.

Classification Systems for Visual Materials

The classification of visual aids is a complex process because of the multifaceted nature of visual representations. Considerations such as color, size, medium of presentation, animation or lack of animation, and degree of realism are only a few of many dimensions that must be taken into account in a classificatory scheme. Several attempts have been made to classify visuals according to function. Galisson (1973) proposes four functional categories of visual materials:

1) pedagogical function (to sustain the interest of the student),

2) linguistic function (to stimulate and guide a discourse),

3) semantic function (to elucidate the meaning of unknown terms), and

4) ethnographic function (to illustrate certain aspects specific to the foreign culture) (p. 22).

Jakobson classified visual representations into three functional categories:

1) referential function (code or situational context);

2) poetic function (connotative, evocative, and creative powers of representations); and

3) metalinguistic function (illustrating a grammatical
Coste (1975) has adapted Jakobson's schema and presents still a third classificatory scheme, illustrated graphically below:

Tardy (1975) outlines four functions of visual representations:

1) motivation (to captivate interest),
2) illustration (to designate meaning of a single lexical item),
3) creation (to invite creative expression), and
4) mediation (to provide nonlinguistic symbols to mediate in interpreting second-language linguistic expressions or concepts.)

Finally, Taggart (1974) states that visuals can provide four types of clues that guide students toward comprehension or linguistic performance:

1) clues to global meaning,
2) clues to lexical meaning,
3) clues to grammatical meaning, and
4) clues to articulatory positions or movements (p. 90-92).

Taggart has further classified pictures according to three stages: source, transmission, and reception.

1) Source: This stage includes iconic symbols or arbitrary symbols produced by means of live photography or artwork in varying color, style, size, and composition. Iconic symbols bear some resemblance to the reality they seek to represent, whereas arbitrary symbols do not.

2) Transmission: Pictures may be transmitted as still or moving pictures. Still pictures include slides, filmstrips, posters, cards, illustrations, etc. Moving pictures include films, television transmissions, and manual animation (flipbooks). Techniques of display include the use of mounted images (e.g.,
blackboard, felt board, magnetic board, etc.), projected or electronically transmitted images (e.g., slides, filmstrips, motion pictures, overhead projections, television), or printed images (book illustrations, posters, wall charts, flashcards, etc.).

3) Reception: The picture reaches the student either in a group or in isolation. Collective reception takes place in a classroom, auditorium, or theater; individual reception may occur in a classroom, study area, language laboratory, or home. Collective reception usually precludes the possibility of individual control over the visual presentation, whereas individual reception usually involves some active interaction by the viewer.

A complete description of a language-teaching picture may be illustrated by the following example. An animated cartoon viewed by students as a group is classified as follows:

Source: iconic, artwork
Transmission: moving, projected
Reception: collective (pp. 86-90).

Research on the Role of Illustrations: Native Language in the Primary Grades

As Vernon (1953) points out, the use of pictures as an accompaniment to the verbal content of a passage may have one of three very different effects: 1) the reader may be helped to understand and
encouraged to remember what the text stated; 2) the reader's attention might be distracted by the pictures from what he is reading so that he remembers the text less well; or 3) the picture will have no effect on comprehension or memory. Several researchers have attempted to determine which of these effects holds true for beginning readers in the native language. Results are contradictory and inconclusive. Miller (1938) and Goodykoontz (1936) concluded that the addition of pictures to reading material did not enhance comprehension. Weintraub (1960) concluded that subjects reading a text without accompanying pictures attained better comprehension scores than did subjects reading the illustrated material, but he notes in a later study (1966) that there were confounding effects in that research. Vernon (1953, 1954) did a series of studies investigating the effects of pictures on the retention of details, the sequencing of facts, and the major points of a long and difficult passage. She concluded (1964) that pictures enhance the recall of facts but tend to overemphasize some facts at the expense of others and inhibit a more global comprehension of the passage. Koenke (1968) also concluded that pictures did not enhance comprehension of main ideas. Bluth (1973) found that for good and poor readers in the second grade an illustrated passage did not enhance reading comprehension for poor readers, but the illustrated material was highly beneficial to good readers. Lewerenz (1929) found approximately 15% additional comprehension of a text with the addition of illustrations when eighth-grade students had been instructed to look at the picture for its informational value as compared to a group with no pictures. Goldberg (1974) found that in an incidental learning task where fifth-grade children were
instructed to underline proper and common nouns in a reading passage, a test of comprehension of the content of the passage revealed that illustrations facilitated the retention of the content, regardless of reading ability. Matz and Rohwer (1971) showed that a pictorial representation of textlike materials is more easily learned than a printed representation of the same materials.

Native-Language Comprehension of Illustrated Materials: Adult Subjects

Four studies relating to listening comprehension conducted by Bransford and Johnson (1972) showed clearly that relevant contextual knowledge is a prerequisite for comprehending prose passages in the native language. In all four studies, subjects who were supplied with appropriate visual contexts before hearing the test passage demonstrated significantly better comprehension ratings and recall scores than did subjects who were not provided with a context or who were provided with a context after hearing the passage. The context used in these studies was a picture that provided information underlying the stimulus passage. The passage did not simply describe the picture, but instead described various events that could happen given the context of the picture as a conceptual base. Subjects having the pictorial context before hearing the passage rated it as being significantly more comprehensible than did subjects without such prior exposure to the picture. The Context-Before group also recalled significantly greater numbers of ideas than subjects in the other conditions. Bransford and Johnson attributed the effects to the fact that the passage presented a problem-solving task for the subjects and that the pictorial context provided a suitable
organization of their store of previous knowledge. These studies revealed that the picture greatly improved comprehension and recall scores, despite the fact the subjects in the Context-Before group had no more explicit information about the topic than did subjects in the other groups. Pilot studies showed that subjects receiving statements about the topic of the passage before hearing it were still clearly inferior in comprehension and recall scores to subjects having the picture before listening to the passage.

**Imagery Studies: Native Language**

The basic premise behind imagery research is that "visual imagery constitutes an effective organizational strategy which will serve to improve one's comprehension and recall of connected discourse" (Levin and Divine Hawkins, 1973, p. 1). In most visual imagery studies subjects are instructed either to have a picture in their minds as they read or to draw a cartoon or construct a picture from cut-outs. In all these cases, very little control over the visual or imagined pictorial stimulus variable can be exercised by the researcher. Nevertheless, most studies report that imagery instructions had a facilitative effect on the learning of sentences or word pairs (Anderson and Kulhavy, 1972; Cunningham, 1972; Kulhavy and Swenson, 1975; Lesgold, 1974; Levin and Divine Hawkins, 1974; Montague and Carter, 1973; Yuille and Paivio, 1969). Lesgold (1974) found that imagery instructions facilitate retention and learning of information from connected prose. Lesgold offers the hypothesis that "attention" and "foregrounding" may be responsible
for the effectiveness of mental imagery in prose learning.

The images that our subjects have in mind as they read may function as a foreground or context for comprehending what comes next. Specifically, we argue that each sentence is understood and remembered relative to a context established by preceding sentences. The general picture of what is going on may be very important. Part of understanding a passage involves interrelating all information about a single person or thing. It is necessary to tie each new assertion to previous information about the same referents (pp. 7-8).

Little research has been conducted other than Lesgold’s study described above regarding the effects of imagery instructions on the comprehension of written prose. Most of the studies to date have investigated the effects of such instructions on the learning of words and sentences out of context.

The Role of Organizers in the Reading Process

Studies relating to the role of organizers in reading comprehension have dealt with various types of organizational aids. Sherman (1975) found that subjects receiving pictorial organizers recalled more than those receiving verbal organizers and that recall was greater for concrete paragraphs than for abstract paragraphs. He concluded that knowledge of the theme and context of a particular passage is critical for comprehension. Dabija (1973) found that the speed and degree of understanding a passage dealing with economies were significantly higher when subjects had been given the text preceded by either key words or key images than when no words or images had been provided. Ausubel (1960) and Ausubel and Fitzgerald (1962) found that mean retention
scores on an unfamiliar 2500-word passage were significantly better for subjects who had been provided with an introductory 500-word passage providing more abstract background material than for subjects not receiving such an organizer.

Contradictory results have been obtained, however, by Christensen and Stordahl (1955) and Schumacher, Liebert, and Foss (1975). In these studies, either no significant facilitative effect was found for subjects having an advance organizer, or subjects having paragraph cues or advance organizers recalled less than those having no such organizational aids. Schumacher et al. conclude:

Inconsistent results from studies on advance organizers suggest that the specific conditions under which organizers are beneficial have yet to be determined. Specifically, in passages where the structure is evident and simple, advance organizers may be redundant and hence unimportant (p. 173).

Smirnov and Zinchenko (1969) reported that subject-generated plans for a passage lead to better recall than experimenter-generated plans. They conclude that there seems to be a need for subjective activity in the retention of prose material.

Summary

A review of the literature relating to the role of pictorial materials and organizational aids in reading comprehension reveals that many important questions remain essentially unanswered or unexplored. The area of second-language reading comprehension has been left virtually untouched in this regard. There is a reasonable amount of evidence, however, from research on first-language reading comprehension to suggest
that contextual support from outside the reading passage can be greatly beneficial to the comprehension of the text, especially when the material is unpredictable, unfamiliar, or difficult. Because the foreign language reader is often faced with material that is by nature unfamiliar, difficult, and therefore unpredictable, it seems reasonable to hypothesize that additional contextual information would make the comprehension task easier. This study will address that question.
CHAPTER III
DESIGN AND PROCEDURES

Design

To maximize information yield and design efficiency, a two-factor 6 x 3 factorial design was used in the study. The first independent variable consisted of six levels of pictorial context as described below:

1) no visual context,
2) simple line drawing (depicting a single object central to the theme of the story),
3) prethematic context (depicting a scene from the beginning of the passage but peripheral to the central action of the story),
4) thematic context (depicting a scene central to the main action of the story),
5) postthematic context (depicting a scene from the end of the story but peripheral to the central theme), and
6) multiple context (a series of the three pictorial contexts described in 3, 4, and 5 above).

The second independent variable consisted of three levels of textual material:

1) no text,
Two dependent variables were used in the study; each one tested a separate facet of reading comprehension. The two dependent variables were:

1) a résumé (a measure of recall knowledge), and
2) a multiple-choice/true-false test (20 items measuring recognition knowledge).

The design of the experiment is illustrated in Figure 2.

<table>
<thead>
<tr>
<th>Pictorial Context</th>
<th>No Text</th>
<th>English</th>
<th>French</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Picture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Object</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prethematic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thematic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postthematic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple Context</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 2. Experimental Design: Pictorial Context by Textual Material.
Sample

The sample consisted of 664 students enrolled at The Ohio State University during the Fall and Winter Quarters of 1976-1977. The subjects for the six French treatment conditions were 233 students enrolled in 18 intact classes of French 102 during the Winter Quarter of 1977. An additional 431 subjects were obtained from the subject pool composed of students enrolled in Psychology 100 during the Fall Quarter of 1976. These subjects served in the twelve remaining treatment conditions. Subjects from the Psychology 100 pool were students who had not been enrolled in French 101, 102, 103, or 104 at The Ohio State University previous to or during the quarters in which the study was conducted. This restriction was made so that no students in the pool would have been exposed to the French materials during the pilot stage of the experiment or serve in the French textual conditions during the subsequent quarter. For these twelve groups, individual students were assigned randomly to each of the treatment conditions. In the case of the French 102 subjects, three intact classes were assigned randomly to each of the six experimental conditions by means of a random numbers table.

Materials

During discussions with both the Chairman of the Department of Romance Languages and Literatures and the Director of the French 102 program, it was agreed that the experiment would be designed so that ongoing instruction would not be interrupted and so that the experimental treatments would contribute to student learning as specified by
the department course syllabus. Therefore, the textual materials and
criterion instruments were chosen and designed to be congruent with the
goals of the French 102 program.

The text used in the French classes was a 650-word short story
adapted from Sempé and Goscinny's reader, Joachim a des ennuis (1967)
and entitled "La Lampe de poche" ("The Flashlight"). However, no title
was provided to the students in the experiment. This precaution was ta­
ten to avoid possible confounding effects due to the fact that titles
may serve as advance organizers and thereby enhance reading comprehen­
sion scores (Dooling and Lachman, 1971). The reading selection was
edited by the researcher working with the Director of the French 102
program during the pilot phase of the study to ensure that the text was
at the appropriate level of difficulty for French 102 students. A
minimal number of lexical items and structures were glossed in English
in the margin, a procedure that is normally followed by the French
department when supplementary reading materials are used. The text
was constructed so that it could be read in 15 minutes by French 102
students. The text used in the main study can be found in Appendix B.

The text used in the English textual conditions was a transla­
tion of the story given to the French students. The translation was
done by the researcher. It can be found in Appendix B.

In all three textual conditions, six pictorial contexts were
used to comprise the six levels of the pictorial context variable.
The pictures used in the main study are found in Appendix B. According
to Taggart's (1974) classificatory scheme described in Chapter II, the
visuals used can be described as still printed images composed of
iconic symbols produced by means of artwork. They were reproduced by means of ditto masters and consisted of cartoon-like drawings in purple and white on 8½-by-11-inch paper. The visuals were drawn by the researcher, using as a model illustrations accompanying the original text. Students were exposed to the visuals on an individual basis. The picture or pictures were attached to the front of the two-page reading passage in the 12 textual conditions; in the 6 treatment groups where no text was provided students were given one of the pictorial contexts without any attached reading passage.

The researcher used both a functional and a temporal scheme to classify the pictures further. The pictures in levels 2 through 6 of the context variable served a referential function and provided clues to the global meaning of the text to be read (Taggart, 1974). Level 2 (drawing of a flashlight) served as a referent to the title of the original story, "La Lampe de poche" ("The Flashlight"). The three contextual pictures composed of scenes (Levels 3 through 6 of the context variable) can be classified temporally according to their relationship to the sequence of events in the story. Level 3 (prethematic context) depicted a scene from the opening paragraphs of the passage; Level 4 (thematic context) depicted a scene from the central or main portion of the story; Level 5 (postthematic context) depicted a scene from the last paragraph of the story; and Level 6 (multiple context) provided three scenes that depicted events in the beginning, central, and final portions of the text.

Subjects in the group having no text were instructed to examine the picture or pictures prior to receiving the criterion instruments.
Subjects in both the English and French textual conditions were instructed to look at the picture(s) and then read the attached text before completing the tests. In the textual conditions, subjects had 15 minutes to read the text before it was collected. Subjects in the no-text condition looked at the visuals for only 5 minutes to avoid the possibility that they would have a significantly longer time to study the picture than would the subjects who were required to read a text as well.

**Instrumentation**

The same two criterion measures were administered in all 18 experimental treatment groups in the study. Each instrument was designed to test a facet of reading comprehension. "Comprehension" is considered by this researcher to be a global term comprising recognition and recall knowledge. "Recognition knowledge" and "recall knowledge" are operationally defined by the criterion measures described below:

1. **Résumé**: After reading the passage, students handed in the text and/or visuals and wrote in English a résumé of the passage, recalling as many details as possible in the 10 minutes allotted. This résumé represents a measure of recall knowledge. In the six treatment groups where no text was provided, subjects were asked to write a résumé of a story that may have accompanied the visual they examined and that would be typical of a story read
in a French language class. The no-text-no-visual treatment group constituted the zero-information control condition.

The recall measure was scored by tallying the number of facts and legitimate inferences students made from reading the story and/or examining the visual materials. The list of acceptable facts used as a basis for the tally can be found in Appendix B. This list was composed of the simple propositions that underly each sentence of the passage. Inferences were judged to be legitimate or unacceptable by the researcher and were tallied separately. A second rater tallied the facts and legitimate inferences of a random sample of the résumés; intrarater reliabilities were .99 and .98 for the tally of facts and the tally of inferences, respectively. Intrarater reliabilities were .99 and .99, respectively.

A third tally was kept of all falsehoods and unacceptable inferences reported in the résumé. A list of falsehoods can be found in Appendix B.

2. **Multiple-choice/true-false test:** Students completed a 10-item multiple-choice test and a 10-item true-false test in English. The items tested comprehension of facts and inferences that could be made from reading the passage. These 20 items are considered a recognition
measure. Test reliability for the recognition measure was determined for the combined 20 items and was found to be .92 using the Spearman-Brown split-half reliability formula.

Criterion measures were written in English for all conditions. Testing time was allotted as follows:

1. Résumé: 10 minutes
2. Multiple-choice/true-false test: 10 minutes.

All criterion measures used in the main study can be found in Appendix B.

Pilot Study

During the Spring Quarter of 1976 a pilot study was conducted in six French 102 classes in order to 1) determine appropriate length and difficulty of the reading passage, 2) refine the criterion instruments, and 3) conduct multivariate and univariate tests of significance on the data obtained to see if there were any significant differences between levels of the pictorial context variable on the criterion measures.

The text used in the French classes for the pilot study was an adaptation of Sempé and Goscinny's (1967) short story, "La Lampe de poche" ("The Flashlight"). The text was edited by the researcher in consultation with the Director of the French 102 program and a minimal number of lexical items and structures were glossed in English in the margin.

The visual context variable in the pilot phase consisted of
three levels:

1) no pictorial context,

2) a simple line drawing of a flashlight, and

3) a thematic context depicting a scene from the central portion of the story.

Two dependent variables were used in the pilot phase to test comprehension of the passage. A recognition measure (a 20-item test in English consisting of 10 multiple-choice and 10 true-false items) tested recognition of facts and inferences that could be made from the story. The recall measure was a 10-minute résumé to be written by the student in English upon completion of the reading of the story. The recall measure was scored by tallying the number of facts and legitimate inferences that were recalled by the student in his résumé. All materials used in the pilot study can be found in Appendix A.

Three French 102 instructors agreed to participate in the pilot study. Each of the instructors had two intact French 102 classes that were assigned randomly to one of the three levels of the pictorial context variable. A total of 69 students participated in the pilot study. The instructors cooperated fully with the researcher in conducting the experiment and were aware of the procedures and time schedule to be followed. On the day of the pilot study the instructors administered the treatments according to the following schedule:

1. 15 minutes: Each student received a copy of the reading passage. In the two conditions where a visual was provided, the picture was attached to the passage. Students
read the story without aid from the instructor.

2. 10 minutes: The text and pictures were collected and students were instructed to write a résumé of the story in English, recalling as many details as possible.

3. 10 minutes: Students handed in the résumé and received a 20-item recognition test consisting of multiple-choice and true-false items in English.

4. 10 minutes: The remaining portion of the class period was devoted to language-learning activities stemming from the reading passage.

The tests were scored by the researcher and the data submitted to a multivariate analysis of variance using the Clyde MANOVA program. The design of the pilot study and the results of the analysis are reported in Appendix A. The analysis showed that subjects having the thematic contextual picture (Level 3 of the pictorial context variable) scored significantly higher ($p < .001$) on the recall measure than did subjects in either the no-picture condition or the single-object pictorial condition. Subjects in Level 3 also scored significantly higher ($p < .05$) than subjects in the other two conditions on the multiple-choice portion of the recognition measure. No significant differences were obtained on the true-false portion of the test. No significant differences were found on either the recall or recognition measure between subjects in the no-picture condition and the subjects in the single-object pictorial condition (Levels 1 and 2 of the context variable).
Discussions with the instructors conducting the experiment revealed that certain changes might be made as a result of the pilot study:

1. Because the text appeared to be fairly easy for most students and could be read in less than 15 minutes, the researcher added more information from the original story in preparing materials for the main study. Also, fewer words were glossed in English in the revised materials.

2. The recognition measure was revised to reflect the additional content of the new version of the passage. Certain true-false items were changed to make the items more inferential in nature.

3. Because the visual depicting a thematic context seemed to enhance reading comprehension scores in the pilot study, three additional contextual pictures were designed by the researcher to determine whether the temporal position of the scenes depicted in the sequence of the events of the story would yield differential effects on the criterion measures. The thematic context picture was also changed slightly for the main study.

4. A second independent variable, Reading Level, which consisted of three levels of reading ability, had been included in the pilot study. This factor was eliminated from the main study for several reasons:
a. "Reading Level" was determined by dividing subjects within intact classes into three general ability groups: High, Medium, and Low. This ability grouping was considered to be a fairly crude measure of reading level and was eliminated in the main study.

b. In the main study, it would be extremely difficult to obtain a measure of reading level for subjects in the English and no-text conditions.

c. No significant interaction between "Reading Level" and Pictorial Contexts was found in the analysis of the data obtained in the pilot study.

According to the instructors, the administrative procedures used seemed appropriate and were therefore not changed for the experiment.

General Procedures: Psychology 100 Subjects

During the Fall Quarter of 1976 the researcher requested subjects from the pool of Psychology 100 students and was assigned an experiment number. Students in Psychology 100 desiring to earn one hour of credit for participating in an experiment can sign up for any approved experiment they wish. A total of 431 students signed up for the present study. Of these, 241 signed up for an 11:00 a.m. hour and the remainder (190) signed up for the noon hour of the same day. The researcher scheduled two experimental sessions both to accommodate the large number of students and to separate the six groups of students in the no-text
condition from the six groups in the English-text condition. A large classroom amphitheater was obtained for the experiment. The subjects in the 11:00 session served in the no-text condition. The researcher, assisted by five colleagues, assigned subjects randomly to experimental treatments by means of the following procedure: six separate sections of the auditorium were designated to correspond to the six pictorial contextual conditions; as each subject entered the auditorium, he was asked to sit in one of the six sections. The sections were designated in numerical succession as each participant came in: e.g., subject 1 was asked to sit in Section 1, subject 2 in Section 2, etc.

Each of the five assistants and the researcher assumed responsibility for handing out and collecting materials for subjects in one section of the room. All materials and criterion instruments were kept separate in marked envelopes.

In the two sessions, students were informed that they were participating in an experiment in reading comprehension. They were told that the researcher was interested in learning about the effects of visual aids in comprehension and that they were serving in "control" conditions for a dissertation study dealing with reading comprehension in French. Subjects in the groups with an English text were given 15 minutes to read the two-page passage. Subjects in the non-text condition were given only 5 minutes for this portion of the experiment. These materials were then collected by the assistants and subjects were given paper and asked to write a résumé of the story. The subjects having no text were asked to write a résumé of a story they might have read in a French class, using the visual(s) as a stimulus for the
story. Students with no text and no visual (the zero-information control group) were simply asked to write a résumé of a story they might have read in a French class. Students had 10 minutes for the résumé. When these résumés were collected, subjects received and completed the 20-item recognition test (10 minutes). This was then collected and stored in marked envelopes designating the treatment condition. In order to coordinate the two tests for each individual subject, students were asked to place their names on every page of the tests and résumés. To further ensure that the data were properly classified, the researcher had placed a code designating the treatment condition on the objective tests before they were administered.

**General Procedures: French Classes**

Early in the Winter Quarter of 1977 all instructors teaching the 18 sections of French 102 were contacted and asked to come to a meeting. At this meeting, the researcher explained the problem, design, and procedures of the experiment to the instructors and obtained their full cooperation. The reading text had been scheduled into the course syllabus by the French 102 Coordinator for March 1, 1977. French 102 students were given no special instructions prior to this scheduled reading but were told that it was included to help them prepare better for the reading portion of the final exam. All instructors were given an information sheet at this initial meeting describing in detail the experimental procedures. No teacher received the texts, pictures, or criterion measures until the day of the experiment. Conversations with teachers emphasized the importance of adhering to the time schedule,
and all instructors indicated that they understood the necessity of following explicitly the directions.

Experimental treatments were assigned to each of the 18 classes by means of a random numbers table. Each instructor received the appropriate packet of materials for his treatment condition, consisting of a text and visual(s), criterion instruments, and a detailed instruction sheet. All instructors administered the treatment according to the schedule provided and returned all materials to the researcher by the end of the day. Instructors were permitted to tell students about being participants in an experiment, if they desired to do so, after the experiment had been conducted. The instruction sheet for French 102 instructors is included in Appendix B.

Statistical Analysis

The data were first submitted to a series of multivariate analyses of variance (MANOVA) to ensure protection against alpha error. Scores for number of facts, inferences, falsehoods, and facts plus inferences were entered separately for the recall measure; scores for the multiple-choice test (10 items), true-false test (10 items), and a total score for the recognition measure (20 items) were entered separately.

Because recognition knowledge and recall knowledge are considered as separate entities or facets of reading comprehension, the researcher then submitted the data to univariate analyses of variance (ANOVA) where pictorial context and textual material served as independent variables.

All data were analyzed on an IBM 370 computer by the Instruction and Research Computer Center at The Ohio State University. Because
treatment group Ns were unequal, the data were submitted to four
programs analyzing unequal cell frequencies to observe the results.

The following null hypotheses were tested:

(1) $H_0$: There will be no significant difference
attributable to variation in the pictorial
context variable on measures of reading
comprehension.

(2) $H_0$: There will be no significant difference
attributable to variation in the textual
materials variable on measures of reading
comprehension.

(3) $H_0$: There will be no significant interaction
between the pictorial context variable and
the textual materials variable on measures
of reading comprehension.
CHAPTER IV
RESULTS AND DISCUSSION

Introduction

A 6 X 3 factorial design was used in this study to observe the effects of several types of visual context and textual materials on measures of reading comprehension. The pictorial context variable consisted of the following six levels:

1) no picture,
2) a picture depicting a single object related to the theme of the passage,
3) a picture depicting a prethematic context,
4) a picture depicting a thematic context,
5) a picture depicting a postthematic context, and
6) a series of three pictures as described in levels 3 through 5 above.

The three levels of the textual materials variable were:

1) no text,
2) the text in English, and
3) the text in French.

Operational definitions of the levels of each of the independent and dependent variables are provided in Chapter I.
The criterion measures consisted of two dependent variables:

1) a 20-item recognition test and
2) a résumé measuring recall knowledge.

The 20-item recognition test was further subdivided in the analysis into two subsections: 1) a 10-item multiple-choice test and 2) a 10-item true-false test. Test reliability for the recognition measure was determined for the combined 20 items and was found to be .92 using the Spearman-Brown split-half reliability formula. The recall measure was further subdivided in the analysis into three separate tallies:

1) number of acceptable facts reported in the résumé,
2) number of acceptable inferences, and
3) number of falsehoods and/or unacceptable inferences reported (errors). Criteria for determining acceptability of facts and inferences are found in Appendix B. Interrater and intrarater reliabilities for the recall measure were found to be .99 and .99, respectively.

A series of multivariate analyses of variance (MANOVA) were conducted on the following sets of data:

1) total scores for the recognition measure and the recall measure,
2) recognition subtest scores (multiple-choice and true-false tests), and
3) recall subtest scores (tally of facts and tally of inferences).

A series of two-way analyses of variance (ANOVA) were then conducted on the following seven sets of data:
1) a total recognition score (combining scores on the multiple-choice and true-false subtests),
2) a total recall score (combining the number of facts and the number of inferences reported in the résumé),
3) scores on the multiple-choice test,
4) scores on the true-false test,
5) tallies of the number of acceptable facts in the résumé,
6) tallies of the number of acceptable inferences in the résumé, and
7) tallies of the number of falsehoods in the résumé.

Although the researcher attempted to design the experiment so that equal or proportionate cell frequencies would be obtained, the need to use intact classes of varying sizes in the French textual condition as well as the fact that subject pools of unequal size were obtained for the two non-French textual conditions precluded equal Ns for all 18 groups. Therefore, a classic regression approach to the analysis of variance for factorial designs with unequal cell frequencies was used. This approach partitions individual effects by adjusting for all other effects; that is, a given effect is examined only after all other effects (including interaction) have been accounted for. This approach was chosen to ensure that the analysis of both main effects and the interaction effect would be adjusted maximally for nonorthogonality. The classic regression approach is available as an option in the SPSS (Statistical Package for the Social Sciences) ANOVA subprogram.
The results of the analysis are discussed in this chapter and the findings are related to the three null hypotheses that were tested. A summary of findings and conclusions is found in Chapter V.

The remainder of the chapter is divided into the following subsections:

1) description of the data collected on the recognition and recall measures,
2) discussion of the results of the multivariate analyses of variance (MANOVA) of the total scores for recognition and recall knowledge and of the four submeasures,
3) discussion of the results of the univariate analyses of variance (ANOVA) for the recognition measure and its two submeasures,
4) discussion of the results of the univariate analyses of variance for the recall measure and its two submeasures (facts and inferences), and
5) discussion of the results of the univariate analyses of variance for the recall error tally.

I. Description of the Data

Table 1 contains main-effect means and standard deviations for the total 20-item recognition measure as well as for its two subtests: the multiple-choice measure (10 items) and the true-false measure (10 items).
Table 1. Main-Effect Means and Standard Deviations for the Recognition Measures.

### Effects of Visual Context Variable

<table>
<thead>
<tr>
<th>Test</th>
<th>No Picture</th>
<th>Single Object</th>
<th>Prethematic</th>
<th>Thematic</th>
<th>Postthematic</th>
<th>Multiple</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n=107)</td>
<td>(n=101)</td>
<td>(n=119)</td>
<td>(n=120)</td>
<td>(n=124)</td>
<td>(n=93)</td>
</tr>
<tr>
<td><strong>Multiple</strong></td>
<td><strong>X</strong> 6.65</td>
<td>6.94</td>
<td>7.35</td>
<td>7.08</td>
<td>6.73</td>
<td>7.00</td>
</tr>
<tr>
<td></td>
<td><strong>S.D.</strong> 3.14</td>
<td>2.94</td>
<td>3.05</td>
<td>2.98</td>
<td>3.20</td>
<td>2.73</td>
</tr>
<tr>
<td><strong>True-False</strong></td>
<td><strong>X</strong> 6.98</td>
<td>7.07</td>
<td>7.63</td>
<td>7.08</td>
<td>7.23</td>
<td>7.18</td>
</tr>
<tr>
<td></td>
<td><strong>S.D.</strong> 2.25</td>
<td>2.31</td>
<td>2.27</td>
<td>2.42</td>
<td>2.46</td>
<td>2.12</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>X</strong> 13.64</td>
<td>14.01</td>
<td>14.98</td>
<td>14.17</td>
<td>13.96</td>
<td>14.18</td>
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<tr>
<td></td>
<td><strong>S.D.</strong> 5.03</td>
<td>4.99</td>
<td>5.08</td>
<td>5.13</td>
<td>5.37</td>
<td>4.58</td>
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</table>

### Effects of Textual Materials Variable

<table>
<thead>
<tr>
<th>Test</th>
<th>No Text</th>
<th>English</th>
<th>French</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n=241)</td>
<td>(n=190)</td>
<td>(n=233)</td>
</tr>
<tr>
<td><strong>Multiple</strong></td>
<td><strong>X</strong> 3.36</td>
<td>9.40</td>
<td>8.71</td>
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<tr>
<td></td>
<td><strong>S.D.</strong> 1.48</td>
<td>0.81</td>
<td>1.35</td>
</tr>
<tr>
<td><strong>True-False</strong></td>
<td><strong>X</strong> 4.75</td>
<td>8.97</td>
<td>8.30</td>
</tr>
<tr>
<td></td>
<td><strong>S.D.</strong> 1.43</td>
<td>0.95</td>
<td>1.59</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>X</strong> 8.11</td>
<td>18.37</td>
<td>17.01</td>
</tr>
<tr>
<td></td>
<td><strong>S.D.</strong> 2.03</td>
<td>1.35</td>
<td>2.56</td>
</tr>
</tbody>
</table>
Table 2 contains the main-effect means and standard deviations for the total recall measure as well as for its three subparts: 1) tally of facts, 2) tally of inferences, and 3) tally of errors.

Cell means and standard deviations for the composite recognition scores are found in Table 3. Cell means and standard deviations for the multiple-choice subtest and the true-false subtest are reported in Tables 4 and 5.

Cell means and standard deviations for the composite recall measure are reported in Table 6. Tables 7, 8, and 9 contain the cell means and standard deviations for the tallies of facts, inferences, and errors, respectively.

II. Results of the Multivariate Analyses of Variance (MANOVA)

Table 10 summarizes the results of the multivariate analysis of variance of the total recognition and total recall scores obtained in the experiment. Examination of the results of the multivariate and univariate analyses reveals F-ratios significant at the .001 level. Tables 11 and 12 summarize the results of the analysis of the recognition and recall submeasures, respectively. Significant F-ratios were also obtained for these data.

Because results of the multivariate analyses were significant beyond the .05 level for all measures, the data were then submitted to follow-up univariate analyses of variance using the classic regression approach available in the SPSS ANOVA subprogram. The results of these analyses are discussed in Sections III, IV, and V of this chapter.
Table 2. Main-Effect Means and Standard Deviations for the Recall Measures.

**Effects of Visual Context Variable**

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**Effects of Textual Materials Variable**

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Recall

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* p < .05
** p < .01
*** p < .001
Table 11. Summary of Analyses of Variance for Recognition Subtests: Multiple-Choice and True-False.

<table>
<thead>
<tr>
<th>Source</th>
<th>Multivariate F-ratios</th>
<th>Univariate F-ratios</th>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pictorial Contexts</td>
<td>(10,1290) 3.52***</td>
<td></td>
<td>Pictorial Contexts</td>
<td>5</td>
<td>7.35</td>
<td>4.71***</td>
</tr>
<tr>
<td>Text</td>
<td>(4,1290) 520.62***</td>
<td></td>
<td>Text</td>
<td>2</td>
<td>2483.80</td>
<td>1593.29***</td>
</tr>
<tr>
<td>Pictorial Context X</td>
<td>(20,1290) 1.65*</td>
<td></td>
<td>Pictorial Context X</td>
<td>10</td>
<td>3.17</td>
<td>2.03*</td>
</tr>
<tr>
<td>Text</td>
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<td>Text</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
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<td>Multiple-Choice</td>
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</tr>
<tr>
<td>True-False</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Pictorial Context</td>
<td>(5) 6.12 3.32**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Text</td>
<td>(2) 1157.00 627.02***</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Pictorial Context X</td>
<td>(10) 2.89 1.57</td>
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<tr>
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<td></td>
<td></td>
<td>Error</td>
<td>646</td>
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<td></td>
</tr>
</tbody>
</table>

* p < .05
** p < .01
*** p < .001
### Table 12. Summary of Analyses of Variance for Recall Subtests: Facts and Inferences.

<table>
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<tr>
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<th>Source</th>
<th>df</th>
<th>MS</th>
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<tbody>
<tr>
<td><strong>Facts</strong></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Pictorial Contexts</td>
<td>(10,1290)</td>
<td>2.67**</td>
<td>Pictorial Contexts</td>
<td>5</td>
<td>355.93</td>
<td>4.63***</td>
</tr>
<tr>
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<td>(4,1290)</td>
<td>488.62***</td>
<td>Text</td>
<td>2</td>
<td>95544.88</td>
<td>1242.11***</td>
</tr>
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<td>5.70***</td>
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<td>402.25</td>
<td>5.23***</td>
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</tr>
<tr>
<td>Error</td>
<td>646</td>
<td></td>
<td>Error</td>
<td>646</td>
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</tr>
<tr>
<td><strong>Inferences</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>1.48</td>
<td>Pictorial Contexts</td>
<td>5</td>
<td>1.48</td>
<td>1.13</td>
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<tr>
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<td>Text</td>
<td>2</td>
<td>124.07</td>
<td>94.95***</td>
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<td>6.43</td>
<td>Pictorial Context X</td>
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<td>6.43</td>
<td>4.92***</td>
</tr>
<tr>
<td>Text</td>
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<td>Text</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>646</td>
<td></td>
<td>Error</td>
<td>646</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < .05
** p < .01
*** p < .001
III. Results for the Recognition Measure

Table 1 contains the main-effect means and standard deviations for the multiple-choice measure, the true-false measure, and the combined 20-item recognition measure. Cell means and standard deviations for each of these measures are reported in Tables 3, 4, and 5. Table 11 summarizes the results of the multivariate analysis of variance of the total recognition measure as well as univariate analyses of the two submeasures. Table 13 summarizes the results of the follow-up univariate analysis of variance on these measures using the classic regression approach.

Hypothesis I: There is no significant difference attributable to variation in the pictorial context variable on the following measures of reading comprehension: Multiple-Choice, True-False, and Composite Recognition Measure. This hypothesis must be rejected. Examination of the multivariate and univariate analyses of variance for the Multiple-Choice, True-False, and Composite Recognition Measures reveals F-ratios significant at the .001 and .01 levels. For the True-False measure, the univariate analysis of variance using the classic regression approach revealed no significant differences, however. When averaging scores across all textual conditions (see Table 1), the highest means occurred in the groups with the Prethematic Pictorial Context (7.35, 7.63, and 14.98 for the Multiple-Choice, True-False, and Composite Measure, respectively) and the lowest means in the groups having no picture (6.65, 6.98, and 13.64). An examination of Tables 3, 4, and 5 reveals that when means are considered in terms of the textual variable,
Table 13. Summary of Analyses of Variance for the Recognition Measures.

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>ms</th>
<th>F</th>
<th>df</th>
<th>ms</th>
<th>F</th>
<th>df</th>
<th>ms</th>
<th>F</th>
</tr>
</thead>
<tbody>
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<td>235.52</td>
<td>151.16***</td>
<td>7</td>
<td>99.77</td>
<td>54.07***</td>
<td>7</td>
<td>635.97</td>
<td>153.89***</td>
</tr>
<tr>
<td>Pictorial Context</td>
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<td>7.41</td>
<td>4.76***</td>
<td>5</td>
<td>3.19</td>
<td>1.73</td>
<td>5</td>
<td>13.60</td>
<td>3.29**</td>
</tr>
<tr>
<td>Text</td>
<td>2</td>
<td>442.08</td>
<td>283.74***</td>
<td>2</td>
<td>164.19</td>
<td>88.98***</td>
<td>2</td>
<td>1139.91</td>
<td>275.82***</td>
</tr>
<tr>
<td>Pictures X Texts</td>
<td>10</td>
<td>3.17</td>
<td>2.04*</td>
<td>10</td>
<td>2.89</td>
<td>1.57</td>
<td>10</td>
<td>9.53</td>
<td>2.31**</td>
</tr>
<tr>
<td>Explained</td>
<td>17</td>
<td>296.24</td>
<td>190.14***</td>
<td>17</td>
<td>139.62</td>
<td>75.67***</td>
<td>17</td>
<td>839.29</td>
<td>203.08***</td>
</tr>
<tr>
<td>Residual</td>
<td>646</td>
<td>1.56</td>
<td>1.85</td>
<td>646</td>
<td>4.13</td>
<td>4.13</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < .05  
** p < .01  
*** p < .001
this pattern of high and low scores occurs only in the French groups. In the English and No-Text groups, only slight variations in mean scores can be seen across the six levels of the pictorial context variable. The highest means for the total recognition measure in both the English and French conditions (18.85 and 18.02, respectively) occurred in the groups having the prethematic pictorial context; for those groups with no text, however, the highest mean (8.94) occurred among subjects having three contextual pictures. This mean score was less than 1.5 points above that which would be expected by chance (7.50), suggesting that the pictures in and of themselves contributed very little factual information about the story content as it was tested on the recognition measure. The significant results for the main effect of the pictorial context variable must be interpreted with caution in view of the fact that there are interaction effects between the textual variable and the pictorial context variable. These interaction effects will be discussed under Hypothesis III.

Hypothesis II: There is no significant difference attributable to variation in the textual materials variable on the following measures of reading comprehension: Multiple-Choice, True-False and Composite Recognition Measures. This hypothesis must be rejected. Examination of the analyses of variance (both multivariate and univariate) reveals F-ratios significant at the .001 level. When averaging scores across all pictorial conditions, the highest means occurred in the groups reading the text in English (9.40, 8.97, and 18.37) and the lowest means for the groups having no text (3.36, 4.75, and 8.11). This pattern
of mean scores is consistent for all six pictorial contexts. It is possible that subjects reading the text in their native language have a slight advantage over subjects reading the text in French for the facet of reading comprehension measured by the recognition test. A post-hoc analysis of the differences between pairs of means occurring in the French and English conditions reveals, however, that these differences are not statistically significant at the .05 level. (A discussion of follow-up tests of significance can be found under Hypothesis III.) Significant differences (p < .001) occur only between the means for the groups with no text and the groups having a text in either French or English. The main effect for the textual variable must therefore also be interpreted in light of the interaction effects discussed under Hypothesis III.

Hypothesis III. There is no significant interaction between levels of the pictorial context variable and the textual materials variable on the following measures of reading comprehension: Multiple-Choice, True-False, and Composite Recognition Measures. The hypothesis is rejected for the Multiple-Choice and Composite Recognition Measures. Although the interaction effects were not significant on the true-false subsection of the recognition test, an examination of the multivariate and univariate analyses of variance reveals F-ratios significant at the .05 and .01 levels for the multiple-choice submeasure and the total 20-item measure. In order to interpret this interaction effect, post-hoc tests of significance were performed on the mean scores of the composite 20-item test. Prior to submitting these data to
post-hoc analysis a separate one-way analysis of variance was performed on the total recognition scores for the six French groups (see Table 14). The analysis yielded an F-ratio significant at the .01 level. The results of the analysis served as a basis for examining differences between the French treatment-group means. This procedure was followed for several reasons: 1) the effects obtained in the French groups across the six levels of the pictorial context variable are of main interest in the study; 2) a plotting of cell means (Figures 3 and 4) reveals that a marked variation in scores is obtained only in the French groups; and 3) greater statistical power can be obtained in the post-hoc analysis when the one-way analysis of variance serves as a basis for the test statistic. The Scheffé method of post-hoc analysis was chosen because of its versatility in dealing with multiple pairwise and compound comparisons and unequal treatment-group size. A correction factor based on the number of treatment groups entering into the analysis of variance is needed for this test; a large number of groups will necessitate a substantial upward adjustment of the F-statistic, thereby making it much more difficult to obtain significant results in the post-hoc comparisons. When the one-way analysis of variance is used as a basis for computing the test statistic, the number of groups involved is reduced from 18 to 6. The analysis of mean differences among the six French groups is therefore performed on the basis of the one-way analysis of variance reported in Table 14. All other comparisons are based on the two-factor analysis reported in Table 13.

Figures 3 and 4 depict the treatment-group means for the 20-item recognition measure in all three textual conditions and for all six

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>ms</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pictorial Context</td>
<td>5</td>
<td>20.09</td>
<td>3.22**</td>
</tr>
<tr>
<td>Error</td>
<td>227</td>
<td>6.25</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>232</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** p < .01
Figure 3. Treatment-Group Means for the 20-Item Recognition Measure: Pictorial Contexts by Textual Materials.
Figure 4. Treatment-Group Means for the 20-Item Recognition Measure: Textual Materials by Pictorial Contexts.
pictorial contexts. The interaction between pictures and texts is disordinal, with the greatest variation in scores occurring in the French textual conditions. In order to ascertain whether these differences are statistically significant, a post-hoc analysis of all possible pairs of means among the French groups was performed using the Scheffé method of multiple comparisons. The differences between the pairs of means appear in the Mean Comparison Matrix presented in Table 15. The results of the analysis reveal that the only significant pairwise difference occurred between the mean for the group with no picture (15.80) and the mean for the group with the prethematic context (18.02). This difference (2.22 points) was significant at the .01 level. A compound comparison of the composite means for the groups having a picture of some kind (Groups 2-6) and the mean for the group having no picture (Group 1) also proved to be significant at the .01 level. These results suggest that for subjects reading the story in French, having a picture of some kind provided an advantage in comprehending the passage for that facet of reading comprehension tested by the recognition measure. The greatest advantage occurred for the group having a picture depicting a context from the beginning of the story but peripheral to the central theme (Prethematic Context). This result is congruent with the hypothesis that the picture served as an advance organizer, giving the subject additional cues about the nature of the story beyond those provided by the text alone. When pairwise comparisons were made between the means of the group with no picture and each of the groups with either the Single Object, the Thematic Context, the Postthematic Context, or the Multiple Context, no significant advantage could be shown for the
Table 15. Mean Comparison Matrix for French Groups: Differences Between Cell Means on the 20-Item Recognition Measure.

<table>
<thead>
<tr>
<th></th>
<th>$\bar{X}_{.13}$</th>
<th>$\bar{X}_{.23}$</th>
<th>$\bar{X}_{.33}$</th>
<th>$\bar{X}_{.43}$</th>
<th>$\bar{X}_{.53}$</th>
<th>$\bar{X}_{.63}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(15.80)</td>
<td>(17.23)</td>
<td>(18.02)</td>
<td>(17.09)</td>
<td>(16.92)</td>
<td>(16.70)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.43</td>
<td>2.22**</td>
<td>1.29</td>
<td>1.12</td>
<td>0.90</td>
</tr>
<tr>
<td></td>
<td>0.79</td>
<td>0.14</td>
<td>0.31</td>
<td>0.53</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>0.93</td>
<td>1.10</td>
<td>1.32</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.17</td>
<td>0.39</td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>0.22</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* $p < .05$

** $p < .01$
groups with the pictures over the no-picture group. Perhaps these pictures were relatively ineffective in enhancing recognition scores for one or several of the following reasons: 1) they did not provide sufficient additional cues to the overall meaning of the story to affect reading comprehension as measured by the recognition test; 2) they provided cues to events occurring late in the story and might therefore have failed to suggest an effective organizational scheme to aid comprehension of the opening paragraphs; 3) they provided too many additional cues to the events of the story all at once, and for this reason may have been somewhat confusing. The Prethematic Context picture, which did show a significant advantage over the No-Picture condition ($p < .01$) may have been helpful for one or both of the following reasons: 1) the picture was informative enough to contribute additional cues to the overall meaning of the reading passage without being confusing; 2) the picture depicted events from the beginning of the story, thereby aiding the reader in organizing his existing store of knowledge prior to reading the opening paragraphs.

It is not likely that the advantage obtained from the Prethematic Context is attributable to the depiction of specific factual information in the picture. Examination of the scores obtained in the No-Text groups on the recognition measure reveals that even the highest mean score (8.94), which occurred in the group having three contextual pictures, was less than 1.5 points above that which would be expected by chance. This suggests that very little factual information about the story content as measured on the recognition test could be gleaned from any or all of the pictures in and of themselves.
The differences between the pairs of means in the English textual condition appear in the Mean Comparison Matrix presented in Table 16. None of these differences was statistically significant at the .05 level. These results suggest that when the story is in the native language, the pictures do not provide an advantage in comprehending the passage for that facet of reading comprehension measured by the recognition test. Perhaps the passage was sufficiently easy for a native speaker of English to comprehend, and no organizational aids beyond those provided by the framework of the story were needed.

The differences between all possible pairs of means in the No-Text condition appear in the Mean Comparison Matrix depicted in Table 17. None of these differences was statistically significant, suggesting that no one pictorial context in and of itself was more informative than the others. Table 18 depicts the differences between the means for each of the six pictorial contexts in the French and English groups. The mean score achieved by subjects reading the text in English without the aid of a picture (18.63) was substantially greater than that obtained by the subjects reading the text in French without a picture (15.80); this difference (2.83 points) was significant at the .05 level when the Scheffé correction factor was based on the large number of groups entering into the two-way analysis of variance (18). Although the task of comprehending the passage in the second language appeared to be substantially more difficult when no pictorial cues were provided than the task of reading and comprehending the same passage in the native language, the relative difficulty of the second-language comprehension task seemed to decrease with the addition of
Table 16. Mean Comparison Matrix for English Groups: Differences Between Cell Means on the 20-Item Recognition Measure.

<table>
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<tr>
<th></th>
<th>$\bar{X}_{.12}$</th>
<th>$\bar{X}_{.22}$</th>
<th>$\bar{X}_{.32}$</th>
<th>$\bar{X}_{.42}$</th>
<th>$\bar{X}_{.52}$</th>
<th>$\bar{X}_{.62}$</th>
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</thead>
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<tr>
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<td>(18.09)</td>
<td>(18.04)</td>
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<td></td>
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<td>0.26</td>
<td>$\bar{X}_{.22}$</td>
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<tr>
<td></td>
<td>0.60</td>
<td>0.76</td>
<td>0.81</td>
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<tr>
<td></td>
<td>0.16</td>
<td>0.21</td>
<td>$\bar{X}_{.42}$</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>0.05</td>
<td>$\bar{X}_{.52}$</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$\bar{X}_{.62}$</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 17. Mean Comparison Matrix for No-Text Groups: Differences Between Cell Means on the 20-Item Recognition Measure.

<table>
<thead>
<tr>
<th></th>
<th>X.11</th>
<th>X.21</th>
<th>X.31</th>
<th>X.41</th>
<th>X.51</th>
<th>X.61</th>
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</thead>
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<td>(8.51)</td>
<td>(7.86)</td>
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<tr>
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<tr>
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<td>0.43</td>
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<tr>
<td>$X_{22}$</td>
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<td>(17.23)</td>
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<td>$X_{32}$</td>
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<td>(18.02)</td>
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<td>(17.09)</td>
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<td>$X_{52}$</td>
<td>(18.09)</td>
<td>(16.92)</td>
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<td></td>
</tr>
<tr>
<td>$X_{62}$</td>
<td>(18.04)</td>
<td>(16.70)</td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* $p < .05$
some sort of visual aid. Mean achievement scores in the French groups approached those of the English groups when a pictorial context of some kind was provided; differences between the pairs of English and French means were not significant over levels 2-6 of the pictorial context variable. This finding suggest that although pictures have no differential effects on the comprehension of the passage in the native language, they do make a substantial contribution to the comprehension of the same passage in the second language. It seems reasonable to hypothesize that pictures serve as aids to comprehension only when the reading task is moderately difficult; in reading tasks where the structure of the passage is evident and simple or where there are no language decoding problems, pictures may be redundant and therefore unimportant in the comprehension process.

IV. Results for the Recall Measure

Table 2 contains main-effect means and standard deviations for the subscores on the recall measure: 1) tally of facts, 2) tally of inferences, and 3) tally of errors reported in the résumé. Treatment-group means and standard deviations for the tally of facts and inferences are reported in Table 6. Table 7 presents the means and standard deviations for the tally of facts, and Table 8 contains the means and standard deviations for the tally of inferences. The results of the error tally are discussed separately in Section V of this chapter.

Table 19 summarizes the two-factor analysis of variance for the composite recall measure. A one-factor analysis of variance for the composite recall scores among the six French groups is presented in Table 20.
Table 19. Summary of Analysis of Variance for the Recall Measure: Facts and Inferences.

<table>
<thead>
<tr>
<th>Source</th>
<th>Facts</th>
<th>Inferences</th>
<th>Total Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>df</td>
<td>ms</td>
<td>F</td>
</tr>
<tr>
<td>Main Effects</td>
<td>7</td>
<td>8865.38</td>
<td>115.28***</td>
</tr>
<tr>
<td>Pictorial Contexts</td>
<td>5</td>
<td>278.07</td>
<td>3.62**</td>
</tr>
<tr>
<td>Text</td>
<td>2</td>
<td>16890.40</td>
<td>219.63***</td>
</tr>
<tr>
<td>Pictures X Text</td>
<td>10</td>
<td>402.25</td>
<td>5.23***</td>
</tr>
<tr>
<td>Explained</td>
<td>17</td>
<td>11581.96</td>
<td>150.60***</td>
</tr>
<tr>
<td>Residual</td>
<td>646</td>
<td>76.90</td>
<td>1.31</td>
</tr>
</tbody>
</table>

* p < .05  
** p < .01  
*** p < .001
Table 20. Summary of One-Way Analysis of Variance for Recall Measure: French Groups.

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>ms</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pictorial</td>
<td>5</td>
<td>723.95</td>
<td>5.96***</td>
</tr>
<tr>
<td>Context</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>227</td>
<td>121.53</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>232</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** p < .001
Hypothesis I: There is no significant difference attributable to variation in the pictorial context variable on the following measures of reading comprehension: Tally of Facts, Tally of Inferences, and Composite Recall Measure. This hypothesis must be rejected for the Tally of Facts and for the Composite Recall Measure. The hypothesis remains tenable for the Tally of Inferences. Examination of the multivariate and univariate analyses of variance for the tally of facts and the composite recall measure reveals F-ratios significant at the .01 and .001 levels. When averaging scores across all levels of the textual variable, the highest means occurred in the groups with the Prethematic Pictorial Context (27.72 and 28.38 for the tally of facts and the composite recall score, respectively); the lowest means (22.63 and 23.49, respectively) occurred in the groups having no picture. This pattern is identical to the pattern of variation occurring in the Recognition Measures. An examination of Tables 6, 7, and 8 reveals, however, that when means are considered in terms of the textual variable, this pattern of high and low scores occurs only in the French groups. In the English groups the highest means occur in the No-Picture condition (37.47 and 39.81) and the lowest means in the Multiple-Context condition (34.07 and 35.18, respectively.) This pattern is the exact reverse of the pattern seen in the No-Text condition, where the highest means (6.46 and 6.74) occurred in the Multiple-Context group and the lowest (00.00 and 00.10) in the No-Picture group. For the No-Text groups, the résumés were based only on the pictures available to the subjects. It seems reasonable that three contextual pictures would provide more cues to the story content than would any one picture alone. For those
subjects with no text and no picture it is not surprising that the mean number of facts and inferences "recalled" from the story would be nearly zero. The mean number of facts gleaned from all three pictures was also quite low (6.74) relative to the average number reported by subjects with a text of some kind (approximately 37). This suggests that the pictures did not, in and of themselves, provide very much information about the story content. In view of the fact that the English and French patterns of means are qualitatively as well as quantitatively different, the main effect of the pictorial context variable must be interpreted with caution. Interaction effects between the pictorial context variable and the textual variable are discussed under Hypothesis III.

Hypothesis II: There is no significant difference attributable to variation in the textual materials variable on the following measures of reading comprehension: Tally of Facts, Tally of Inferences, and Composite Recall Measure. This hypothesis must be rejected. An examination of the analyses of variance (both multivariate and univariate) for all three tallies reveals F-ratios significant at the .001 level. When averaging means across all pictorial conditions, the highest scores occurred in the French groups for the tally of facts (39.28) and for the total recall score (39.95) and the lowest means (2.42 and 2.55, respectively) in the No-Text condition. The highest number of inferences occurred, however, in the English groups (1.65). The pattern of means for the tally of facts and the total recall tally varies only slightly when pictorial contexts are taken into consideration. The French
groups scored consistently higher than did the English groups on these tallies except in the condition where no picture was provided; the English group with no picture achieved a higher mean score on the recall measure (39.81) than the French group (36.24).

Post-hoc analyses of the differences between the means in the French and English groups are discussed under Hypothesis III. Because there are interaction effects present, the main effect of the textual materials variable must be interpreted with caution. However, there does seem to be a slight advantage for subjects reading the text in the second language with the aid of some kind of picture over subjects reading the text in their native language. It is possible that the greater processing demands of reading in the second language enhance recall of the information gleaned from the reading passage. Another plausible explanation of the enhanced recall scores among the French subjects is the fact that these subjects may have been motivated to read the passage more carefully than were the subjects reading in English. The French subjects were told that the passage was similar to one that they would encounter on their French 102 final exam, and this information may have had an effect on the amount of effort they expended in completing the résumé.

Hypothesis III: There is no significant interaction between levels of the pictorial context variable and the textual materials variable on the following measures of reading comprehension: Tally of Facts, Tally of Inferences, and Composite Recall Measure. This hypothesis is rejected for all three measures. An examination of the analyses of variance for these measures reveals F-ratios significant at the
.001 level. In order to interpret this interaction effect, post-hoc tests of significance were performed on the mean scores of the total recall tally (facts and inferences) and on the mean inference scores. Prior to submitting these data to post-hoc analysis, a separate one-way analysis of variance was performed on the total recall scores for the six French groups (see Table 20). The analysis yielded an F-ratio significant at the .001 level. The results of the analysis served as a basis for examining differences between the French treatment-group means. (The rationale for this approach is discussed under Hypothesis III in Section III of this chapter.) All other comparisons are based on the two-factor analysis of variance reported in Table 19.

Figures 5 and 6 depict treatment-group means for the recall tally in all three textual conditions and for all six pictorial contexts. The interaction between pictures and texts is disordinal, with the greatest variation in scores occurring in the French textual conditions. In order to ascertain whether these differences were statistically significant, a post-hoc analysis of all possible pairs of means among the French groups was performed using the Scheffé method of multiple comparisons. The differences between the pairs of means appear in the Mean Comparison Matrix presented in Table 21. The results of the analysis reveal that there are three significant pairwise differences among the French groups. The mean for the group with the Prethematic Context (46.43) was significantly higher (p < .01) than the mean for the group with no picture (36.24); the Prethematic Context mean was also significantly larger (p < .01) than the mean for the Thematic Context group (35.74) as well as the mean for the Postthematic Context
Figure 5. Treatment-Group Means for Recall Measure: Pictorial Contexts By Textual Materials.
Figure 6. Treatment-Group Means for Recall Measure: Textual Materials By Pictorial Contexts.
Table 21. Mean Comparison Matrix for French Groups: Differences Between Cell Means on the Composite Recall Measure (Facts + Inferences).

<table>
<thead>
<tr>
<th></th>
<th>( \bar{X}_{.13} )</th>
<th>( \bar{X}_{.23} )</th>
<th>( \bar{X}_{.33} )</th>
<th>( \bar{X}_{.43} )</th>
<th>( \bar{X}_{.53} )</th>
<th>( \bar{X}_{.63} )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(36.24)</td>
<td>(42.48)</td>
<td>(46.43)</td>
<td>(35.74)</td>
<td>(37.90)</td>
<td>(41.63)</td>
</tr>
<tr>
<td></td>
<td>6.24</td>
<td>10.19**</td>
<td>0.50</td>
<td>1.66</td>
<td>5.39</td>
<td>( \bar{X}_{.13} )</td>
</tr>
<tr>
<td></td>
<td>3.95</td>
<td>6.74</td>
<td>4.58</td>
<td>0.85</td>
<td>( \bar{X}_{.23} )</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.69**</td>
<td>8.53*</td>
<td>4.80</td>
<td>( \bar{X}_{.33} )</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.16</td>
<td>5.89</td>
<td>( \bar{X}_{.43} )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.73</td>
<td>( \bar{X}_{.53} )</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>( \bar{X}_{.63} )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* \( p < .05 \)
** \( p < .01 \)
group (37.90, p < .05). These results suggest that for subjects reading
the story in French, having a picture of some kind provided an advantage
in comprehending the passage for that facet of reading comprehension
tested by the recall measure; the best results were among the subjects
with a picture depicting a scene from the beginning of the story but
peripheral to the central theme (Prethematic Context). The advantage
of the picture from the beginning of the story may be due to the fact
that a prethematic visual context serves as an advance organizer, enabling
the subject to construct an organizational scheme for the facts and
events that will occur in the story before beginning to read. The
picture may also serve as a retrieval cue for the subject at the time
of recall. The fact that the single-object visual (the flashlight)
and the multiple context (three contextual pictures) yielded high
mean recall scores (42.48 and 41.63, respectively) might be explained
by one or several of the following reasons: 1) the flashlight visual
may have served as an advance organizer, replacing the story's original
title ("The Flashlight") with a pictured referent; 2) the multiple
context may have served as a retrieval cue at the time of recall,
depicting in pictorial form significant events from the beginning, middle,
and end of the story. It is interesting to note that the thematic
contextual picture did not yield recall scores above those occurring
in the group with no picture. The mean for the Thematic Context group
was actually lower (35.74), though not significantly lower, than the
mean for the group with no picture (36.24). The Postthematic picture
also seemed to be relatively ineffective by comparison with the Pre-
themetic picture, yielding a mean recall score of 37.90. Perhaps these
pictures were not particularly effective because they depicted specific events occurring rather late in the story. The Prethematic Context was more general in nature than the Thematic and Postthematic Contexts; it is possible that a general picture that gives an overall view of the nature of the story's content is most effective in helping the reader in his task of comprehending the prose passage in the second language. It is also possible that specific visuals serve to focus the reader's attention on the events of the story that they depict. At the time of retrieval, subjects may recall facts from that portion of the story that was pictured in the visual, forgetting or neglecting to report some of the other events in the passage as a result.

The differences between the pairs of means in the English textual condition appear in the Mean Comparison Matrix presented in Table 22. None of these differences was statistically significant. This suggests that for subjects reading a relatively easy text in their native language, pictorial aids may be superfluous and therefore ineffective in enhancing recall scores. It is interesting to note that the No-Picture group achieved the highest mean score (39.81) in the English textual condition and that the lowest score occurred in the Multiple Context group (35.18). This might be a spurious result, however, in view of the fact that the difference is not statistically significant.

The differences between the pairs of means in the No-Text groups are presented in the Mean Comparison Matrix in Table 23. An examination of the tabled values reveals that subjects with no text
Table 22. Mean Comparison Matrix for English Groups: Differences Between Cell Means for the Composite Recall Measure (Facts + Inferences).

<table>
<thead>
<tr>
<th></th>
<th>X.12</th>
<th>X.22</th>
<th>X.32</th>
<th>X.42</th>
<th>X.52</th>
<th>X.62</th>
</tr>
</thead>
<tbody>
<tr>
<td>(39.81)</td>
<td>(38.17)</td>
<td>(38.18)</td>
<td>(36.09)</td>
<td>(35.77)</td>
<td>(35.18)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.64</td>
<td>1.63</td>
<td>3.72</td>
<td>4.04</td>
<td>4.63</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.01</td>
<td>2.08</td>
<td>2.40</td>
<td>2.99</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.09</td>
<td>2.41</td>
<td>3.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.32</td>
<td>0.91</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.59</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 23. Mean Comparison Matrix for No-Text Groups: Differences Between Cell Means on Composite Recall Measure (Facts + Inferences).

<table>
<thead>
<tr>
<th></th>
<th>$\bar{X}_{.11}$</th>
<th>$\bar{X}_{.21}$</th>
<th>$\bar{X}_{.31}$</th>
<th>$\bar{X}_{.41}$</th>
<th>$\bar{X}_{.51}$</th>
<th>$\bar{X}_{.61}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(0.10)</td>
<td>(0.23)</td>
<td>(0.85)</td>
<td>(5.29)</td>
<td>(2.57)</td>
<td>(6.74)</td>
</tr>
<tr>
<td></td>
<td>0.13</td>
<td>0.75</td>
<td>5.19</td>
<td>2.47</td>
<td>6.64</td>
<td>$\bar{X}_{.11}$</td>
</tr>
<tr>
<td></td>
<td>0.62</td>
<td>5.06</td>
<td>2.34</td>
<td>6.51</td>
<td>$\bar{X}_{.21}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.44</td>
<td>1.72</td>
<td>5.89</td>
<td>$\bar{X}_{.31}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.72</td>
<td>1.45</td>
<td>$\bar{X}_{.41}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.17</td>
<td></td>
<td>$\bar{X}_{.51}$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$\bar{X}_{.61}$</td>
</tr>
</tbody>
</table>
to read got the most factual information about the story content from the Thematic and Multiple-Context visual conditions. Differences between these two pictorial conditions and the No-Picture, Single-Object, and Prethematic picture conditions were not statistically significant, however. It is interesting to note that although the Thematic and Multiple-Context visuals seemed to be the most informative, the picture that enhanced both the recognition and recall scores for the French students was the Prethematic Context; this latter visual aid provided an average of less than one piece of information about the actual content of the passage in the No-Text condition ($\bar{X} = 0.85$). This fact lends further support to the hypothesis that the Prethematic visual was acting as a general advance organizer for the second-language reader; it does not seem likely that the picture provided clues to specific events occurring in the story.

The differences between pairs of means in each of the pictorial contexts for the French and English groups are presented in Tables 24 and 25. No significant differences appeared in the post-hoc analysis of either the total recall scores or the inference scores.

V. Results for the Error Tally

Table 9 contains treatment-group means and standard deviations for the tally of errors reported in the résumé. Main-effect means and standard deviations are listed in Table 2. Table 26 summarizes the analysis of variance for the error tally in the two-way analysis, and the one-way analysis for the French groups is presented in Table 27.
Table 24. Mean Comparison Matrix for French and English Groups: Differences Between Cell Means on the Composite Recall Measure (Facts + Inferences).

<table>
<thead>
<tr>
<th></th>
<th>English</th>
<th>French</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\bar{X}_{.12}$</td>
<td>(39.81)</td>
<td>$\bar{X}_{.13}$ (36.24)</td>
</tr>
<tr>
<td>$\bar{X}_{.22}$</td>
<td>(38.17)</td>
<td>$\bar{X}_{.23}$ (42.48)</td>
</tr>
<tr>
<td>$\bar{X}_{.32}$</td>
<td>(38.18)</td>
<td>$\bar{X}_{.33}$ (46.43)</td>
</tr>
<tr>
<td>$\bar{X}_{.42}$</td>
<td>(36.09)</td>
<td>$\bar{X}_{.43}$ (35.74)</td>
</tr>
<tr>
<td>$\bar{X}_{.52}$</td>
<td>(35.77)</td>
<td>$\bar{X}_{.53}$ (37.90)</td>
</tr>
<tr>
<td>$\bar{X}_{.62}$</td>
<td>(35.18)</td>
<td>$\bar{X}_{.63}$ (41.63)</td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.25</td>
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<tr>
<td>2.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.45</td>
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</tr>
</tbody>
</table>
Table 25. Mean Comparison Matrix for French and English Groups: Differences Between Cell Means on Recall Measure (Inferences).

<table>
<thead>
<tr>
<th></th>
<th>English</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\bar{X}_{.12}$</td>
<td>$\bar{X}_{.22}$</td>
<td>$\bar{X}_{.32}$</td>
<td>$\bar{X}_{.42}$</td>
<td>$\bar{X}_{.52}$</td>
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<td>(2.34)</td>
<td>(2.50)</td>
<td>(1.44)</td>
<td>(1.44)</td>
<td>(1.12)</td>
</tr>
<tr>
<td>French</td>
<td>$\bar{X}_{.13}$</td>
<td>$\bar{X}_{.23}$</td>
<td>$\bar{X}_{.33}$</td>
<td>$\bar{X}_{.43}$</td>
<td>$\bar{X}_{.53}$</td>
</tr>
<tr>
<td></td>
<td>(0.50)</td>
<td>(0.58)</td>
<td>(0.55)</td>
<td>(0.50)</td>
<td>(0.85)</td>
</tr>
<tr>
<td></td>
<td>1.84</td>
<td>1.92</td>
<td>0.89</td>
<td>0.94</td>
<td>0.27</td>
</tr>
<tr>
<td></td>
<td>0.02</td>
<td>0.63 (1.13)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 26. Summary of Analysis of Variance for Recall Measure: Error Tally.

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>ms</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td>6</td>
<td>11.50</td>
<td>9.72***</td>
</tr>
<tr>
<td>Pictures</td>
<td>5</td>
<td>5.31</td>
<td>4.49***</td>
</tr>
<tr>
<td>Texts</td>
<td>1</td>
<td>45.00</td>
<td>38.03***</td>
</tr>
<tr>
<td>Pictures X Texts</td>
<td>5</td>
<td>4.93</td>
<td>4.17***</td>
</tr>
<tr>
<td>Explained</td>
<td>11</td>
<td>8.51</td>
<td>7.20***</td>
</tr>
<tr>
<td>Residual</td>
<td>411</td>
<td>1.18</td>
<td></td>
</tr>
</tbody>
</table>

* p < .05  
** p < .01  
*** p < .001
Table 27. Summary of One-Way Analysis of Variance for Recall Measure: Error Tally for French Groups.

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>ms</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pictorial</td>
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<td>9.82</td>
<td>5.39***</td>
</tr>
<tr>
<td>Context</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>227</td>
<td>1.82</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>232</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < .05
** p < .01
*** p < .001
Hypothesis I: There is no significant difference attributable to variation in the pictorial context variable on the following measures of reading comprehension: Tally of Errors reported in the recall résumé. This hypothesis must be rejected. Examination of the analysis of variance for the error tally reveals an F-ratio significant at the .001 level. When averaging scores across all levels of the textual variable, the highest mean occurred in the groups with no picture (1.08) and the lowest mean in the group with the multiple-context picture (0.41). An examination of Table 9 shows, however, that this pattern does not hold true when mean number of errors is considered in terms of the textual variable. In the English groups, the greatest number of errors were made among subjects in the Thematic Picture condition (0.47) and the fewest number by subjects in the Multiple-Context condition (0.11). In the French groups, a different pattern of high and low scores emerged: the highest mean number of errors (1.82) occurred in the group with no picture; the lowest number of errors was observed in subjects with the Prethematic Context (0.52). This pattern of errors is consistent with the pattern of recognition and recall scores on the comprehension tests. The visual condition that produced the highest scores and the lowest error rate was the Prethematic Context. A discussion of the post-hoc analysis of differences between means on the error tally appears under Hypothesis III.

Hypothesis II: There is no significant difference attributable to variation in the textual materials variable on the following measures of reading comprehension: Tally of Errors for the recall résumé.
This hypothesis must be rejected. The analysis of variance for the error tally reveals an $F$-ratio significant at the .001 level. When averaging scores across all pictorial conditions, the highest mean error rate occurred in the French groups (0.95) and the lowest in the English groups (0.32). No error tally was taken on the résumés for the No-Text groups. Because these résumés were not based on the text, nearly all statements reported by subjects were fabrications. Subjects could not be expected to understand or misunderstand a text they have never read.

When pictorial contexts are taken into consideration, the pattern of high and low scores remains consistent in all six pictorial conditions. Highest scores on the error tally occurred in the French groups. This suggests that there is a greater likelihood of misunderstanding the text when reading in the second language than when reading in one's native language, especially when the text is not difficult for a native speaker of English. Post-hoc analysis of the mean differences between the French and English groups will be discussed under Hypothesis III.

Hypothesis III: There is no significant interaction between levels of the pictorial context variable and the textual variable on the following measures of reading comprehension: Error Tally in the recall résumé. This hypothesis is rejected. The analysis of variance for the error tally reveals an $F$-ratio significant at the .001 level. In order to interpret this interaction effect, post-hoc tests of significance were performed on the mean scores of the error tally. Prior to submitting these data to follow-up testing procedures, a separate one-way analysis
of variance was performed on the recall error tally for the six French groups (see Table 27). The analysis yielded an F-ratio significant at the .001 level. The results of this analysis served as a basis for examining differences between the French treatment-group means. Comparisons between the French and English groups were based on the results of the two-way analysis of variance reported in Table 26.

Figure 7 depicts treatment-group means for the error tally in all textual conditions and for all pictorial contexts. The interaction between texts and pictures is ordinal, but a marked departure from parallelism occurs in the no-picture and single-object picture conditions. In order to ascertain whether these differences were statistically significant, a post-hoc analysis of all possible pairs of means among the French groups was performed using the Scheffe method of multiple comparisons. The differences between the pairs of means appear in the Mean Comparison Matrix presented in Table 28. The results of the analysis reveal that there are four significant pairwise differences among the French groups. The mean for the group with no picture (1.82 errors) was significantly higher than the mean for the groups with a Prethematic Context (0.52, p < .01), a Thematic Context (0.67, p < .05), and Postthematic Context (0.81, p < .05), or a Multiple Context (0.70, p < .05). These results suggest that for subjects reading the story in French, greater misunderstanding of the facts of the story may occur when there is no additional contextual support provided in the form of pictures. Perhaps other organizational aids (such as outlines, key words, summaries, or short résumés given in English) would also be effective in reducing
Figure 7. Treatment-Group Error Scores on Recall Measure: Textual Materials (French and English) By Pictorial Contexts.
Table 28. Mean Comparison Matrix for French Groups: Differences Between Cell Means on Error Tally.

<table>
<thead>
<tr>
<th></th>
<th>X.13</th>
<th>X.23</th>
<th>X.33</th>
<th>X.43</th>
<th>X.53</th>
<th>X.63</th>
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<tr>
<td></td>
<td>(1.82)</td>
<td>(1.48)</td>
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<td>(0.67)</td>
<td>(0.81)</td>
<td>(0.70)</td>
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<td>1.15*</td>
<td>1.01*</td>
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</tbody>
</table>

* p < .05
** p < .01
misunderstanding of the passage. To date, no studies have addressed this question. It would be interesting to explore the effects of other types of organizational aids on reading comprehension in the second language.

None of the differences between the pairs of means in the English groups was significant (see Table 29). This fact lends support to the hypothesis that pictorial aids may be superfluous in reading tasks in the native language, especially when the passage presents no structural or linguistic difficulties to the native speaker. Perhaps the effects of pictorial contexts would be different with more difficult or ambiguous passages.

The differences between pairs of means in each of the pictorial contexts for the English and French groups are presented in Table 30. The post-hoc tests of significance showed that for the No-Picture condition, subjects in the French group reported significantly more errors \( (p < .001) \) than did subjects with no picture reading the text in English. The difference between the French and English means in the Single-Object condition was also fairly large (1.11 points), but this difference was not significant at the .05 level. These results suggest that when subjects in the French groups have no picture to aid in comprehending the passage, they are more likely to misunderstand certain events in the story than are subjects having a picture and reading in French or than subjects reading the text in their native language. A list of errors and misunderstandings reported in the French résumés can be found in Appendix B. An examination of this list reveals that
Table 29. Mean Comparison Matrix for English Groups: Differences Between Cell Means on Error Tally.

\[
\begin{array}{cccccc}
X.12 & X.22 & X.32 & X.42 & X.52 & X.62 \\
(0.28) & (0.37) & (0.32) & (0.47) & (0.32) & (0.11) \\
\hline
--- & 0.09 & 0.04 & 0.19 & 0.04 & 0.17 & X.12 \\
--- & 0.05 & 0.10 & 0.05 & 0.26 & X.22 \\
--- & 0.15 & 0.00 & 0.21 & X.32 \\
--- & 0.15 & 0.36 & X.42 \\
--- & 0.21 & X.52 \\
--- & X.62 \\
\end{array}
\]
Table 30. Mean Comparison Matrix for French and English Groups: Differences Between Cell Means on Error Tally.

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<thead>
<tr>
<th>English</th>
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<th></th>
<th></th>
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<th></th>
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<th>French</th>
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<td>$\bar{X}_{.32}$</td>
<td>$\bar{X}_{.42}$</td>
<td>$\bar{X}_{.52}$</td>
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<tr>
<td>(0.28)</td>
<td>(0.37)</td>
<td>(0.32)</td>
<td>(0.47)</td>
<td>(0.32)</td>
<td>(0.11)</td>
<td></td>
<td></td>
</tr>
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<tr>
<td>0.59</td>
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<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

* $p < .05$
** $p < .01$
*** $p < .001$
students misunderstand aspects of the story for several reasons:  
1) they misunderstand a single lexical item, which leads to further misunderstandings as they continue to read and can lead to confusion when they are unable to associate these past false cues to the cues they pick up further along in the passage; 2) they misunderstand a grammatical structure, causing them to make false assumptions about the events of the story; this occurred when subjects failed to notice the conditional tense of the verbs in that portion of the story where the small boy wishes something \textit{would happen} so that he \textit{would be able} to use his flashlight. Some students thought the events actually did occur when they did not. 3) A third reason for misunderstanding occurring among the French students was due to a cultural phenomenon; in one part of the story, the small boy does an arithmetic problem and obtains the answer 33.33. In French, however, commas are used instead of periods to indicate a decimal point, and many students reported the number as 33,330; 33,300; 33,000; or 300,000. This type of error could be very serious in a reading task where the actual figure was of substantial importance in the comprehension of the text. Such comprehension errors can be avoided when cultural notes accompany a reading in the second language.
CHAPTER V
SUMMARY, CONCLUSIONS, AND IMPLICATIONS

Overview

This study was designed to examine the effects of selected pictorial contexts on reading comprehension measures in beginning college French. The effects of two independent variables were studied. The Pictorial Context variable consisted of six levels: (a) no picture, (b) a picture of a single object related to the theme of the story, (c) a prethematic contextual picture, (d) a thematic contextual picture, (e) a postthematic contextual picture, and (f) a series of three pictures consisting of c, d, and e above. The Textual Materials variable consisted of three levels: (a) no text, (b) a text in English, and (c) an identical text in French.

A 6 X 3 factorial design was used in the study. Students participating in the one-day experiments were enrolled in Psychology 100 (for textual conditions a and b) and in French 102 (for textual condition c) at The Ohio State University. There were 18 treatment conditions in the experiment. In 12 of these conditions, subjects were asked to read a text in English or French accompanied by one of the pictorial contexts (10 groups) or by no picture (2 groups). In the other six treatment conditions, students were given no text, but were asked to look at one of the pictorial contexts (5 groups); in one group (the zero-information control group) subjects were given
no text and no picture. After the subjects had been given 15 minutes to examine the materials, their comprehension of the reading passage was tested by means of two measures of reading comprehension: (a) a recognition test consisting of 20 multiple-choice and true-false items and (b) a recall test in which subjects were asked to write a résumé of the story. These two measures constituted the two dependent variables in the study.

Summary of Findings

A review of the findings reveals significant differences between treatment-group means beyond the .05 level. Many of the differences proved to be significant beyond the .01 and .001 levels as well. A summary of the findings with respect to the three research questions investigated follows.

Question I: What are the effects of various types of pictorial contexts used as advance organizers on measures of reading comprehension in beginning college French? This was the research question of greatest interest in the study. The data suggest that for both the recognition and recall measures a picture of some kind had a significant positive effect on comprehension of the text in the second language. The picture that was most helpful seemed to be the Prethematic Context visual, which depicted a scene from the beginning of the story but peripheral to the central theme. This picture produced the highest mean recognition and recall scores among the French students and also significantly reduced the number of errors reported in the résumés. It is possible that the Prethematic
Context picture was the most helpful for one or more of the following reasons: 1) the picture was informative enough to contribute additional cues to the overall, general meaning of the reading passage without being confusing; 2) the picture depicted events from the beginning of the story, thereby aiding the reader in organizing his existing store of knowledge prior to reading the opening paragraphs; 3) the provision of a general context to the story helped students avoid making wrong or uncertain hypotheses about the events occurring in the passage; that is, the picture may have helped students guess the meaning of words and structures in the passage with which they were unfamiliar.

The data also reveal that all pictures were not equally effective in enhancing comprehension scores. The Thematic, Postthematic, and Multiple Context pictures as well as the Single-Object picture were not, in and of themselves, effective in enhancing recognition scores; the Thematic and Postthematic Contexts did not contribute much to the comprehension of the story as measured by the recall test. Perhaps these pictures were relatively ineffective for one or more of the following reasons: 1) they provided cues to events occurring late in the story and might therefore have failed to suggest an effective organizational scheme to aid comprehension of the opening paragraphs; 2) they provided too many additional cues to the events of the story all at once and may have been confusing; 3) the single-object picture may have contained too little contextual information to help the subjects to a significant degree.

The multiple-context picture had differential effects on recognition and recall scores within the French groups. Although
this visual condition did not show a significant advantage over the no-picture condition in the recognition test, it seemed to be fairly effective in promoting a greater mean number of facts and inferences reported in the recall test. Perhaps this series of three contextual pictures served as an effective retrieval cue, helping students remember more details from the story at the time of retrieval than did students in the no-picture condition. It still was not as effective as the Prethematic Context picture, however. It seems reasonable to hypothesize that the best visual context to choose in illustrating a story in the second language is a general context providing cues to the nature of the story as a whole, preferably from the beginning paragraphs of the reading passage.

Question II: What are the effects of these same pictorial contexts on identical measures of reading comprehension for the same text in the native language?

No significant differences were revealed in post-hoc comparisons of the means among the six English treatment groups for any of the comprehension measures. This suggests that for subjects reading a relatively easy text in their native language, pictorial aids may be superfluous and therefore ineffective in enhancing recognition and recall scores. Perhaps if the text were structurally or conceptually difficult for a native speaker of English pictorial aids might have a positive effect on comprehension. This question was not addressed in this study, but it would be interesting to explore the effects of pictorial aids on the comprehension of more complex native-language reading tasks.
Question III: What information relevant to the comprehension measures can be obtained from the pictorial contexts alone, without reference to any textual material?

This question is an important one when considering the effects of pictorial aids on second-language comprehension because it is possible that subjects merely "read the picture" instead of reading the foreign language text in order to comprehend. The data reveal, however, that in this study, subjects were apparently not able to read the picture with enough success to score above the chance level on the recognition test. The group having all three contextual pictures to look at still was unable to produce more than an average of six or seven facts about the story content on their résumés. Those subjects having the Prethematic Context picture produced an average of less than one piece of information on the recall test when they had no text to read. These data suggest that the pictures, in and of themselves, are not laden with actual factual information from the story. The advantages accrued from the pictorial contexts in the French groups seem to be due to the fact they serve as advance organizers of a general nature.

In summary, the study reveals that the choice of pictorial context is important when illustrating a second-language text; certain contexts appear to be more effective than others. Some contexts, especially those depicting events occurring late in the story, appear to have no effect on reading comprehension scores for subjects in French. Further, it seems that none of the pictorial contexts used in this
study was effective in enhancing comprehension scores among subjects reading the text in their native language. The positive effects of pictorial aids are obtained only when the reading task is somewhat difficult without such pictorial support. When the reading task is relatively easy, the visual support seems to be superfluous. The results of this study indicate that the choice of visual aid is important; the best visual context among those presented to the subjects was the Prethematic Context, a picture which was general in nature and which provided information that could be utilized in the comprehension of the beginning paragraphs. It seems that if subjects are given an effective advance organizer in the form of a picture, comprehension of the second-language text becomes less difficult.

Limitations of the Study

The following limitations of the study should be pointed out when considering the results:

1. Reading Passage: The study is based on one reading passage in French. Because reading selections differ in difficulty and content, the findings should be generalized only to reading passages of a similar nature and difficulty level.

2. Selection of Pictorial Contexts: Only four separate pictures were used in the study. Pictures differ widely in quality and content, and it is difficult to generalize the results of this particular study to other kinds of visual aids. These results might serve to stimulate interest in other research efforts related
to the role of visual aids in second-language reading comprehension. There are many other dimensions of visual aids that need to be explored before one can make a categorical statement about their benefits to the second-language learner.

3. **Instruments**: "Comprehension" was measured in this study by a recognition test and a recall test; as in any study, a limiting factor is the extent to which these criterion instruments are valid and reliable measures of student knowledge. It is possible that in this study the 20-item recognition measure was not sensitive enough to detect differences between scores in the English textual condition. Scores in this textual condition were close to ceiling (20 points); however, there was no ceiling effect for the recall measure in any of the textual conditions, so it is unlikely that the effects observed in the English condition were only due to the criterion instrument.

Because comprehension remains an elusive construct in psychological and educational research, the extent to which the instruments actually measured facets of reading comprehension depends in part upon how the term is defined.
Recommendations for Further Research

This study examines one of many possible questions about the role of visual aids in second-language learning. Other studies are needed to examine questions such as the effects of visual aids on listening comprehension in the second language; the role of size and color in visual materials; the differential effects of photographs, cartoons, and stick figures on second-language reading and listening comprehension; the effects of sequencing and integration of visuals within textual materials; the effects of illustrations on the comprehension of other types of reading passages; the effects of visual aids on attitudes toward the second-language learning task; and the like. Studies relating to the role of visual aids in reading comprehension in languages other than French and English are also needed. This study is only one of many that can be designed to elucidate the effects of pictorial aids on language acquisition. It is hoped that other studies relating to these questions will be undertaken in future research efforts.
Appendix A. Pilot Study

1. Pictorial Contexts
2. Text in French
3. Criterion Instruments
4. Design of the Study
5. Results of the Analysis
Figure 8. Level 2: Pictorial Context Variable, Pilot Study.
Figure 9. Level 3: Pictorial Context Variable, Pilot Study.
Comme j'ai reçu une bonne note en orthographe,
Papa m'a donné de l'argent pour m'acheter ce que je voudrais,
et j'ai acheté une lampe de poche.

--Mais qu'est-ce que tu vas en faire, de ta lampe de poche? m'a demandé Alceste.

--Bien, j'ai répondu, ça sera très bien pour jouer aux détectives. Les détectives ont toujours une lampe de poche pour chercher les traces des bandits.

--Oui, a dit Alceste, mais moi, j'aurais préféré de la pâtisserie.

--Tu nous la donneras quelquefois, ta lampe? m'a demandé Rufus.

--Non, j'ai dit. C'est ma lampe. Et nous nous sommes quittés fâchés.

A la maison, quand j'ai montré ma lampe à Maman, elle a dit:
--Comme c'est bizarre, cette idée d'acheter une lampe de poche! Au moins ça ne fait pas beaucoup de bruit. Monte, fais tes devoirs.

Je suis monté dans ma chambre, j'ai fermé les fenêtres et la chambre est devenue bien noire. Je me suis amusé à envoyer le rond de lumière sur les murs, sous les meubles, et sous mon lit, où j'ai trouvé une bille* que je cherchais depuis longtemps.

J'étais sous le lit quand Maman est entrée et a allumé la lumière.

--Nicolas, où es-tu? elle a crié.
Quand elle m'a vu sous le lit elle s'est fâchée.
--Veux-tu faire tes devoirs tout de suite, tu joueras après!

Maman est sortie, j'ai éteint la lumière* et j'ai *turned out
le début a travailler. C'est très amusant de faire les
devoirs avec une lampe de poche, même si c'est de l'arithmétique!
Et puis Maman est revenue dans la chambre, et elle a rallumé la lumière.
Elle n'était pas contente du tout!

--Tu fais les devoirs dans le noir avec cette petite lampe
ridicule? Tu vas te faire mal aux yeux!

Et elle a pris la lampe. --Finis tes devoirs et puis
descends retrouver ta lampe.

Et puis Papa est arrivé et je lui ai montré ma lampe de poche.
Il a dit que c'était une idée très bizarre, mais qu'au moins avec ça
je ne casserais* les oreilles de personne. Et il a commencé *break
t'à lire le journal.

Je suis monté dans ma chambre et j'ai commencé à jouer devant
la glace.* J'ai mis la lampe sous ma figure et j'avais *mirror
l'air de phantôme. Puis dans ma bouche et on a les joues toutes
rouges! Et j'ai mis la lampe dans ma poche et on voit la lumière
à travers le pantalon. Maman m'a appelé pour le dîner.

A table, comme personne n'avait l'air content, je ne jouais
pas avec la lampe, mais j'espérais que les plombs sauteraient* *fuses
parce que tout le monde aurait été content* de l'avoir,
là lampe; et puis, après dîner, je serais descendu avec
Papa à la cave pour arranger les plombs. Mais c'est dommage, il
ne s'est rien passé.
Je me suis couché et dans mon lit j'ai lu un livre avec ma lampe de poche. Maman voulait la prendre, mais Papa a dit que je pouvais la garder. Je me suis mis sous la couverture, et c'était amusant avec la lampe; et puis je me suis endormi.

Le matin, la lampe était éteinte, et elle ne voulait pas se rallumer.

--Bien sûr, a dit Maman. La pile* est usée. *battery

Papa a dit qu'il voulait beaucoup m'apprendre une leçon; il faut être raisonnable. Je dois utiliser mon argent pour des choses pratiques.

Eh bien, ce soir Maman et Papa vont être contents de voir comme j'ai été raisonnable. Parce qu'à l'école, j'ai échangé ma lampe qui ne marche plus contre le sifflet à roulette* de Rufus *police whistle qui marche très bien!
(Recognition Test, Pilot Study)

Directions: Circle the best answer for each of the following items, based on the reading.

1. Where did Nicolas get the flashlight?
   a. He found it.
   b. He bought it.
   c. He got it for his birthday.
   d. He borrowed it from his friend Alceste.

2. Nicolas wanted the flashlight so he could....
   a. search for monsters
   b. hide and scare his brother
   c. look for clues
   d. send code messages

3. Alceste said he would rather have....
   a. a soccer ball
   b. a frog
   c. a gun
   d. something good to eat

4. Nicolas's friends were angry when he....
   a. wouldn't let them play with the flashlight
   b. shone the flashlight in their eyes
   c. bragged too much about his flashlight
   d. charged them money to use the flashlight

5. Nicolas's mother thought the flashlight was....
   a. a strange toy
   b. of good quality
   c. easily broken
   d. very powerful

6. Nicolas's mother was angry with him because he....
   a. wanted to play with the flashlight at the dinner table
   b. turned the lights out in his room
   c. wasn't doing his chores
   d. was bothering his father

7. Nicolas's father was pleased that the flashlight....
   a. didn't cost him anything
   b. kept Nicolas occupied after dinner
   c. was a practical toy
   d. didn't make noise

8. One thing Nicolas did to amuse himself was to....
   a. try using the flashlight under water
   b. look for cats at night in the bushes
   c. search for ghosts in the cellar
   d. put the flashlight in his mouth
9. In this story, Nicolas's father was most anxious for him to be...
   a. happy
   b. sensible
   c. studious
   d. clever

10. Nicolas decided to get rid of the flashlight the next day because....
    a. the batteries were dead
    b. the switch was broken
    c. his parents wouldn't let him have any fun with it
    d. he got tired of it

DIRECTIONS: Circle T if the statement is true and F if it is false, 
basing your answers on the story.

1. T F Nicolas always got poor grades in school.
2. T F Nicolas found some money under his bed when he used the flash­light.
3. T F Nicolas did his homework by the light of his flashlight.
4. T F Nicolas's mother took the flashlight away before he went to
   bed.
5. T F When Nicolas's father came home, he sat down and read the
   paper before dinner.
6. T F Nicolas's father thought the flashlight was a good idea.
7. T F Nicolas was happy when the fuse blew at dinner.
8. T F Nicolas read a book before he went to sleep.
9. T F Nicolas asked his father if he could play in the cellar.
10. T F Nicolas's parents would probably like the trade he made for
    the flashlight better.
Figure 10. Experimental Design, Pilot Study.
Table 31. Summary of Analyses of Variance for Recognition and Recall Scores: Pilot Study.

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<th>Univariate F-ratios</th>
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Univariate F-ratios

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* p < .05
** p < .01
*** p < .001
Appendix B. Main Study

1. Pictorial Contexts
2. Text in English
3. Text in French
4. Criterion Instruments
5. Instruction Sheet for French

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Figure 11. Level 2: Pictorial Context Variable, Main Study.
Figure 12. Level 3: Pictorial Context Variable, Main Study.
Figure 13. Level 4: Pictorial Context Variable, Main Study.
Figure 14. Level 5: Pictorial Context Variable, Main Study.
Because I got a good grade in spelling, Dad gave me some money to buy myself whatever I wanted. My friends went with me to the store and I bought a flashlight.

"What are you going to do with a flashlight?" Alceste asked me.

"Well," I answered, "it'll be really good for playing detectives. Detectives always have flashlights so they can look for clues that the crooks leave behind."

"Yes," said Alceste, "but I would have bought some doughnuts, myself."

"Will you let us use your flashlight sometimes?" Rufus asked me.

"No," I said. "It's my flashlight. If you want one, study like I did."

We were all mad at each other when we went home.

At home, when I showed my flashlight to Mom, she said, "What a strange idea to buy a flashlight! Well, at least it won't make a lot of noise. Go upstairs and do your homework."

I went up to my room, I closed the windows, and the room was really dark. I had fun shining the little circle of light all around—on the walls, under the furniture, and under the bed, where I found a marble I had been looking for for a long time. I was under the bed when Mom came in and turned on the lights.

"Nicolas, where are you?" she cried.

When she saw me under the bed, she got mad. "What are you up to?
You're all dirty! Get your homework done this minute! You can play later."

Mom went out. I turned off the lights and I started my work. It's really fun to do your homework with a flashlight, even if it's arithmetic. I did my problem really fast. Luckily, it was an easy problem, and I figured out right away that the chicken laid 33.33 eggs per day.

Then Mom came back into the room, and she turned the lights back on. She was not at all happy with me.

"You're doing your homework in the dark with a silly little flashlight! You're going to hurt your eyes!" Then she took the flashlight. "Finish your homework, and then come downstairs and get your flashlight back."

Then Dad came home and I showed him my flashlight. He said it was a really strange idea, but at least I wouldn't break anyone's eardrums with it. And he started to read his paper, as usual. He didn't want to play with my flashlight.

I went back up to my room and I started to play in front of the mirror. I put the flashlight under my face and I looked like a ghost! Then I put it in my mouth and my cheeks turned all red! And then I put the flashlight in my pocket and you could see the light through my pants. Finally, Mom called me to dinner.

At the table, since nobody looked too happy, I didn't play with my flashlight, but I wished the fuses would blow because everybody would be happy that I had my flashlight; and then, after dinner, I would have gone downstairs with Dad to the cellar to fix the fuses.
But unfortunately, nothing happened.

I went to bed and in bed I read a book with my flashlight. Mom wanted to take it away, but Dad said I could keep it. I got under the covers and had fun with the flashlight. Then I fell asleep.

The next morning the flashlight was out, and I couldn't make it go on.

"Of course," said Mom. "The battery's dead."

Dad told me he hoped that I'd learned a lesson: I have to be sensible. I have to use my money for practical things instead of throwing it away.

Well, tonight Mom and Dad are going to be happy to see how sensible I've been. Because at school, I traded my flashlight, which doesn't work, for Rufus's police whistle, which works really well!
Comme j'ai reçu une bonne note en orthographe* spelling
Papa m'a donné de l'argent pour m'acheter ce que je voudrais.
Mes copains m'ont accompagné au magasin où j'ai acheté une lampe de poche.

--Mais qu'est-ce que tu vas en faire, de ta lampe de poche?
m'a demandé Alceste.

--Bien, j'ai répondu, ça sera très bien pour jouer aux détectives.
Les détectives ont toujours une lampe de poche pour chercher les traces des bandits.

--Oui, a dit Alceste, mais moi, j'aurais préféré de la pâtisserie.
--Tu nous la donneras quelquefois, ta lampe? m'a demandé Rufus.

--Non, j'ai dit. C'est ma lampe. Si vous voulez une lampe, étudiez comme moi!

Et nous nous sommes quittés fâchés.* angry

A la maison, quand j'ai montré ma lampe à Maman, elle a dit:

--Comme c'est bizarre, cette idée d'acheter une lampe de poche!
Au moins* ça ne fait pas beaucoup de bruit. Monte, fais tes devoirs.

Je suis monté dans ma chambre, j'ai fermé les fenêtres *at least et la chambre est devenue bien noire. Je me suis amusé à envoyer le rond de lumière partout--sur les murs, sous les meubles, et sous mon lit, où j'ai trouvé une bille* que je cherchais depuis *marble longtemps. J'étais sous le lit quand Maman est entrée et a allumé la lumière.
Nicolas, où es-tu? a-t-elle crié.
Quand elle m'a vu sous le lit elle s'est fâchée. --Quelle idée!
Tu es tout sale! Veux-tu faire tes devoirs tout de suite, tu joueras après.
Maman est sortie, j'ai éteint la lumière* et j'ai *turned out the lights commencé à travailler. C'est très amusant de faire les devoirs avec une lampe de poche, même si c'est de l'arithmétique. J'ai fait n. problême le plus vite possible. Heureusement, c'était un problème facile et j'ai trouvé tout de suite que la poule pondait* *laid 33,33 œufs par jour. Et puis Maman est revenue dans la chambre et a rallumé la lumière. Elle n'était pas contente du tout!
--Tu fais les devoirs dans le noir avec cette petite lampe ridicule? Tu vas te faire mal aux yeux. Et elle a pris la lampe.
--Finis tes devoirs et puis descends retrouver ta lampe.
Et puis Papa est arrivé et je lui ai montré ma lampe de poche. Il a dit que c'était une idée très bizarre, mais qu'au moins avec ça je ne casserai* les oreilles de personne. Et il a commencé *break à lire le journal, comme d'habitude. Il ne voulait pas jouer avec ma lampe de poche.
Je suis monté dans ma chambre, et j'ai commencé à jouer devant la glace.* J'ai mis la lampe sous ma figure et j'avais *mirror l'air de phantôme. Puis dans ma bouche et on a les joues toutes rouges! Et j'ai mis la lampe dans ma poche et on voit la lumière à travers le pantalon. Enfin Maman m'a appelé pour le dîner.
A table, comme personne n'avait l'air content, je ne jouais pas avec ma lampe, mais j'espérais que les plombs sauteraient* *fuses would blow
parce que tout le monde aurait été* content de l'avoir, *would have been ma lampe; et puis, après dîner, je serais descendu avec Papa à la cave pour arranger les plombs. Mais c'est dommage, il ne s'est rien passé.

Je me suis couché et dans mon lit j'ai lu un livre avec ma lampe de poche. Maman voulait la prendre, mais Papa a dit que je pouvais la garder. Je me suis mis sous la couverture, et c'était amusant avec la lampe; et puis je me suis endormi.

Le matin, la lampe était éteinte, et elle ne voulait pas se rallumer.

--Bien sûr, a dit Maman, la pile* est usée. *battery Papa m'a dit qu'il voulait beaucoup m'apprendre une leçon: il faut être raisonnable. Je dois utiliser mon argent pour les choses plus pratiques. Il m'a dit que je jette l'argent par les fenêtres.

Eh bien, ce soir Maman et Papa vont être très contents de voir comme j'ai été raisonnable. Parce qu'à l'école, j'ai échangé ma lampe qui ne marche plus contre le sifflet à roulette* *police whistle de Rufus, qui marche très bien!
The boy's name was Nicolas.
The boy got a grade.
The grade was good.
The grade was in spelling.
The boy got money.
The money was for the grade.
His father gave him the money.
He could buy what he wanted.
He went to the store.
His friends went with him.
He bought a flashlight.
He showed the flashlight to his friends.
His friend asked him why he wanted it.
His friend's name was Rufus.
His friend's name was Alceste.
He wanted to play.
He wanted to play detectives.
Detectives use flashlights.
Detectives look for clues.
Detectives look for criminals.
Criminals leave clues.
His friend (Alceste) would have bought pastry (doughnuts).
His friend (Rufus) asked if they could use the flashlight.
The boy said no.
He told them to study (work for it).
He refused to give his friends the flashlight.

They all went home.

They parted angrily.

He went home.

He showed the flashlight to his mother.

His mother said it was a strange idea (purchase).

The flashlight didn't make noise.

His mother told him to go upstairs.

His mother told him to do his homework.

He went upstairs.

He went to his room.

He closed the windows (curtains, drapes).

The room became dark.

He had fun.

He shone the light on the walls.

He shone the light under the furniture.

He shone the light under the bed.

He had been looking for a marble.

He found a marble.

The marble was under the bed.

He had been looking for it for a long time.

He was under the bed.

His mother came in.

His mother turned on the lights.

His mother asked where he was.

His mother cried out.

His mother saw him.
She saw him under the bed.
She got angry.
She said he was dirty.
She told him to do his homework.
She said to do it right away.
She said he could play later.
His mother left.
He turned out the lights.
He started to work.
He like to do homework with a flashlight.
Even arithmetic could be fun.
He did his problem.
He did it fast.
The problem was easy.
The problem was about a chicken.
The chicken laid eggs.
The chicken laid 33.33 eggs per day.
His mother came back.
She turned on the lights.
She was unhappy.
She said the flashlight was silly.
She took the flashlight.
She said he would hurt his eyes.
She told him to finish his homework.
She told him to come downstairs when he was finished.
He could have the flashlight back when he finished.
He could play later.
His father came home.
He showed the flashlight to his father.
His father thought it was a strange idea.
It wouldn't break anybody's eardrums.
His father read the paper.
He usually read the paper.
He didn't want to play with the flashlight.
Nicolas went upstairs.
He went to his room.
He played.
He played in front of the mirror.
He shone the light on his face.
He looked like a ghost.
He put the flashlight in his mouth.
His cheeks got all red.
He put the flashlight in his pants pocket.
He saw the light through his pants.
His mother called him.
She called him for dinner.
He didn't play with the flashlight at dinner.
Nobody seemed happy.
He hoped the fuses would blow.
Everyone would have appreciated the flashlight.
After dinner he could go to the cellar.
He would go to the cellar with his father.
He would fix the fuses.
Nothing happened at dinner.
He thought that was unfortunate.
He went to bed.
He read a book.
He read it in bed.
He read it with his flashlight.
His mother wanted to take the flashlight.
His father let him keep the flashlight.
He got under the covers.
He had fun.
He fell asleep.
He woke the next morning.
The flashlight was out.
The flashlight wouldn't work.
The battery was dead.
His mother said the battery was dead.
His father wanted him to learn a lesson.
He must be sensible.
He must use his money for practical things.
He shouldn't throw money away (out the window).
Nicolas went to school.
He traded the flashlight.
He traded it for a whistle.
It was a police whistle.
It was Rufus's whistle.
He thought his mother and father would be happy.

He thought he was sensible.

The whistle worked.

The whistle worked well.
The story is about a little girl.
The boy's name is Monty.
The boy's name is John.
The boy's name is Alsace.
The boy's name is Alistair.
The girl's name is Alice.
She won the flashlight at a spelling contest.
His father gave him money to buy spelling books.
He got money from his mother.
His mother went to the store and bought him a flashlight.
He got a good grade in math.
Nicolas got money to buy something at the magazine store.
Nicolas bought a flashlight from a friend who had done well in spelling.
Nicolas wanted to buy pastries.
He wanted his parents to buy him a reading light.
His parents sent him to the store to buy books.
Nicolas bought a lamp.
He bought a magnifying glass.
He bought a "buit."
His magnifying glass had a light on it.
His friends wanted him to buy them things.
The family went with Nicolas to the store.
The storekeeper thought the flashlight was a strange purchase.
Nicolas's mother thought he was wise to buy something useful.
His parents gave him a pouch.
His father told him he made a wise purchase.

His father thought at least he wouldn't break his things.

At least he wouldn't break any bones.

His mother said at least the flashlight wasn't too much money.

His parents said he used his money well.

His father was very upset about the flashlight.

He was afraid his son might whack someone on the head with it.

He told his son not to hit anyone on the ears with it.

Nicolas's brother came into the room.

He compares his flashlight to the moon.

His homework problem was about 33,000 eyes.

The problem was about a man who laid 3300 bricks.

He got only 1/3 of his math problem.

The chicken laid 33.33 eggs a week.

The chicken laid 33.33 eggs a year.

The chicken laid 33,000 eggs.

The chicken laid 33,330 eggs.

The chicken laid 33,333 eggs.

The chicken laid 300,000 eggs.

His father came into the bedroom to scold him.

His mother turned off the light when she left the bedroom.

His mother found him on the bed.

Nick was looking for a pair of pants in the dark.

Nick's teacher said his eyes would go bad.

His father told him he'd ruin his eyes.

He found a marble in his bed.
Someone asked him if he had bad eyes.
His mother told him he'd have to return the flashlight.
He played behind the mirror.
His father read the paper at dinner.
His mother threw his light away.
He threw a marble on the floor.
Nicolas got sick of the glass.
Nicolas was worried that a fuse would blow.
They used his flashlight to fix the fuses.
A fuse blew at dinner.
He went with his father to the cave.
He wanted to see caves after dinner.
He'd need the flashlight to arrange the "plumage."
His father thanked him for buying such a sensible object.
The flashlight didn't have any batteries.
He went back to the store.
He bought a police whistle.
He took some remaining money to buy a police whistle.
He marched around very well with it.
Nicolas gave his friend some money for the whistle.
His parents were glad to see Nicolas finally realized his bad choice of toy.
(Criterion Instrument: Recognition Test)

Name

Directions: Circle the letter next to the best answer for each of the following items, based on the reading.

1. Where did Nicolas get the flashlight?
   a. He found it.
   b. He bought it.
   c. He got it at school.
   d. He borrowed it from Alceste.

2. Nicolas wanted the flashlight so he could....
   a. search for monsters
   b. hide and scare his brother
   c. look for clues
   d. send code messages

3. Alceste said he would rather have....
   a. a soccer ball
   b. a frog
   c. a whistle
   d. something good to eat

4. Nicolas's friends were mad when he....
   a. refused to let them play with the flashlight
   b. shone the flashlight in their eyes
   c. bragged too much about the flashlight
   d. charged them money to use the flashlight

5. Nicolas's mother thought the flashlight was....
   a. a strange toy
   b. of good quality
   c. easily broken
   d. useful

6. Nicolas's mother was angry with him because he....
   a. wanted to play with the flashlight at the dinner table
   b. turned the lights out in his room
   c. wasn't doing his chores after dinner
   d. was bothering his father

7. Nicolas's father was pleased that the flashlight....
   a. didn't cost him anything
   b. kept Nicolas occupied after dinner
   c. was a practical toy
   d. didn't make noise

8. One thing Nicolas did to amuse himself was to....
   a. try using the flashlight under water
   b. look for ghosts at night
   c. look for monsters in the cellar
   d. put the flashlight in his mouth
9. In this story Nicolas's father was most anxious for him to be....
   a. happy
   b. sensible
   c. studious
   d. clever

10. Nicolas decided to get rid of the flashlight the next day because....
    a. the batteries were dead
    b. the switch was broken
    c. his parents wouldn't let him have any fun with it
    d. he got tired of it

True-False: Circle T if the statement is true and F if it is false, basing your answers on the information in the story.

1. T F Nicolas was happy when he got his spelling test back.
2. T F Nicolas found something under his bed when he used the flashlight.
3. T F Nicolas would enjoy doing his homework if he could use his flashlight.
4. T F Nicolas's mother took the flashlight away before he went to bed.
5. T F Nicolas's father didn't want to admit it, but he enjoyed playing with the flashlight.
6. T F Nicolas's father thought the flashlight was a good idea.
7. T F Nicolas was happy when the fuse blew at dinner.
8. T F Nicolas liked to play all by himself.
9. T F Nicolas asked his father if he could play in the cellar.
10. T F Nicolas's parents would probably like the trade he made for the flashlight better.
TO: All TAs French 102
FROM: Alice Omaggio
SUBJECT: French Experiment: Special Reading

Please follow the directions below for conducting the reading experiment as closely as possible.

Introduction to the students: Please tell your students that you are giving them a reading passage as an exercise to prepare them better for the final exam. Tell them to read the passage carefully and that you will be giving them some questions on an informal quiz after they read. Point out to them that it's to their benefit to read the passage as carefully as time allows because it will help indicate to them how they can expect to do on the reading section of the final exam. (You might tell them that this passage may be somewhat longer than the one on the final). If your group has any visuals, tell them that it might be a good idea to look first at the picture for a second before starting to read.

Time Schedule for the Experiment:

1. Give out the reading passage. Give students only 15 minutes to read the passage.

2. Collect the passage. Give them paper or ask them to take out a sheet of paper and instruct them to write IN ENGLISH a résumé of the story, writing down as many details as they can remember. Give them 10 minutes to do this. Make sure they have put their names on the papers and collect them.

3. Give out the multiple-choice true-false quiz. Give them 10 minutes maximum to finish this. Please make sure they have put their names on these and then collect them.

Feedback to the Students:

If you choose to do so, you can explain that the passage was not only in preparation for the final exam, but also part of an experiment to determine whether the pictures would help them in their reading. Tell them that they will get the MC/TF test back as soon as it is graded. You may want to quickly give them the right answers from the key I have enclosed in these materials.

Please return the passages and tests in this envelope to Thérèse Bonin as soon as you can. Thank you all for your cooperation in this research. Your help is very much appreciated.
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