INFORMATION TO USERS

This reproduction was made from a copy of a document sent to us for microfilming. While the most advanced technology has been used to photograph and reproduce this document, the quality of the reproduction is heavily dependent upon the quality of the material submitted.

The following explanation of techniques is provided to help clarify markings or notations which may appear on this reproduction.

1. The sign or "target" for pages apparently lacking from the document photographed is "Missing Page(s)". If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting through an image and duplicating adjacent pages to assure complete continuity.

2. When an image on the film is obliterated with a round black mark, it is an indication of either blurred copy because of movement during exposure, duplicate copy, or copyrighted materials that should not have been filmed. For blurred pages, a good image of the page can be found in the adjacent frame. If copyrighted materials were deleted, a target note will appear listing the pages in the adjacent frame.

3. When a map, drawing or chart, etc., is part of the material being photographed, a definite method of "sectioning" the material has been followed. It is customary to begin filming at the upper left hand corner of a large sheet and to continue from left to right in equal sections with small overlaps. If necessary, sectioning is continued again—beginning below the first row and continuing on until complete.

4. For illustrations that cannot be satisfactorily reproduced by xerographic means, photographic prints can be purchased at additional cost and inserted into your xerographic copy. These prints are available upon request from the Dissertations Customer Services Department.

5. Some pages in any document may have indistinct print. In all cases the best available copy has been filmed.
Pederson, Kathleen Marshall

THE EFFECTS OF PASSAGE AVAILABILITY DURING ADJUNCT QUESTIONING IN COMPUTER-ASSISTED READING PRACTICE ON RECALL MEASURES OF READING COMPREHENSION IN INTERMEDIATE COLLEGE FRENCH

The Ohio State University

University Microfilms International

Copyright 1985 by Pederson, Kathleen Marshall

All Rights Reserved
THE EFFECTS OF PASSAGE AVAILABILITY DURING ADJUNCT
QUESTIONING IN COMPUTER-ASSISTED READING PRACTICE ON
RECALL MEASURES OF READING COMPREHENSION
IN INTERMEDIATE COLLEGE FRENCH

DISSERTATION

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

By
Kathleen Marshall Pederson, B.S., M.A.

*****

The Ohio State University
1985

Reading Committee:
John C. Belland
Elizabeth B. Bernhardt
Marjorie A. Cambre
Gilbert A. Jarvis

Approved By
Gilbert A. Jarvis
Department of Educational
Theory and Practice
To Steve, my husband, whose love and encouragement and patience made this pursuit possible.
ACKNOWLEDGEMENTS

I would first like to thank the members of my reading committee. Each one has played an important role in my doctoral studies and in this project. I am grateful to Marjorie Cambre for her willingness to participate in the proposal stages of this project on very short notice. Her insight and comments throughout this process have been most useful. I wish to thank John Belland for having introduced me to Gavriel Salomon's work and for sharing his expertise with me on numerous occasions during the conceptualization stages of this study. His enthusiasm for this project were an enormous source of encouragement to me. I am indebted to Elizabeth Bernhardt for giving me a broader vision of the nature and complexity of the reading task. Throughout this project, her careful and thoughtful advice and comments were invaluable.

To my adviser, Gilbert Jarvis, I am deeply grateful. His vision for the quality of research that needs to be conducted in second-language education has had lasting
impact on my thinking. I especially appreciate his encouragement, his careful counsel, and his many kindnesses in helping to make working "long-distance" less treacherous.

I wish to thank my fellow doctoral students who so generously provided assistance throughout the research process. In particular, I wish to thank Ann Salomone and Pat Myhren for serving as raters and validators several times in the early stages of the research. I appreciate Patti Baker's patience and assistance in helping to work out some of the programming problems in the practice materials. I thank Shirley Brindle-Huelsman and Sue Bacon for serving as lab assistants. The care both of them took under rather hectic and tiring circumstances is much appreciated. Finally, I wish to make special mention of the impact Sue Bacon, my fellow doctoral candidate, has had on this study. From the start, Sue has shown genuine interest and has provided invaluable comments and suggestions.

I am appreciative for the cooperation of the French Section at The Ohio State University. I wish especially to thank Thérèse Bonin and Diane Birckbichler for making it possible for me to conduct this experiment with French 104 students. To all of the instructors of the eight class sections that agreed to participate and to their students, I am grateful.
I wish to thank my colleagues at Northwestern College who have been encouraging and understanding throughout the process. In particular I am grateful to Rob Robinson, for his assistance in statistical and computing matters; to Dick Beach, for helping me to learn to use SAS; and to both Dick Beach and Wayne Norman for their patience with my many questions and for their expertise in answering them during the final stages of this project. Cristy Sensanbaugh has been extremely helpful these last five months. I appreciate the efficiency and care with which she approached every task she has performed, from entering data into the computer program to proofreading.

Most importantly I wish to thank my family. I will never forget their understanding and patience during this rather intense period of my life. I thank my daughter, Kimberly, for her little love notes I would find on my computer monitor. I thank Kristin, my daughter, for surprise backrubs. Most of all I thank Steve, my husband and my friend. Steve's unselfishness and willingness to do far more than his share of our responsibilities during the past two years show in a very tangible and meaningful way his belief in the value of this pursuit. Unquestionably, without his love and support, this project would have been impossible.
VITA

October 13, 1950 .................. Born - Erie, Pennsylvania

1974 ............................. B.S., Northwestern College, Orange City, IA

1974-1975 ........................ Lecturer in English, Northwestern College, Orange City, IA

1976 ............................. M.A., University of Iowa, Iowa City, IA

1976-1983 ........................ Instructor of French, Northwestern College, Orange City, IA

1983-1984 ........................ University Fellow, The Ohio State University Columbus, OH

1984-1985 ........................ Assistant Professor of French, Northwestern College, Orange City, IA

FIELDS OF STUDY

Major Field: Foreign Language Education


Studies in Reading in a Second Language and Reading Theory. Professor Elizabeth R. Bernhardt.


vi
# TABLE OF CONTENTS

DEDICATION .................................................................................................................. ii

ACKNOWLEDGEMENTS .......................................................................................... iii

VITA .............................................................................................................................. vi

LIST OF TABLES ....................................................................................................... x

LIST OF FIGURES ...................................................................................................... xi

CHAPTER

I. THE PROBLEM

Introduction to the Problem .................................................................................. 1
Perspective on the Problem ................................................................................ 7
The Language Laboratory: A Technological Disaster ................................... 7
Computer-Assisted Instruction: History Revisited? .................................. 10
Purpose of the Study ............................................................................................ 14
Theoretical Basis for Design of the Study ...................................................... 18
Overview ................................................................................................................ 18
Symbol Systems and Their Coding Elements ............................................... 21
Task Requirements ............................................................................................... 23
Learner Aptitudes ................................................................................................. 25
Salomon's Model Applied to the Study ............................................................ 27
Definition of Terms ............................................................................................... 28
Overview of Procedures ...................................................................................... 31
Limitations and Assumptions ............................................................................ 32
Overview of the Dissertation ............................................................................. 33
II. REVIEW OF RELATED LITERATURE

Introduction ............................................. 34
Theoretical Framework for Variables Selection:
Levels of Processing........................................ 36
Introduction ........................................... 36
Rote-Meaningful Continuum............................... 37
Levels of Processing Continuum ......................... 41
Bottom-Up--Top-Down Processing Continuum .......... 46
Summary.................................................. 49

The Level of Task Independent Variable ............... 51
Creating Task-Induced Levels of Processing:
Second-Language Education Research.................... 51
Long-Term Studies on Meaningful Second-
Language Practice ....................................... 52
Short-Term Studies in Second-Language Educa-
tion on Task Orientation in Sentence-Level
Reading and Writing Practice......................... 54
Short-Term Studies on Task-Induced Processing
In Second-Language Reading Practice ................ 58

Creating Task-Induced Levels of Processing:
First-Language Reading Research on Adjunct
Questioning.............................................. 66
Introduction ........................................... 66
Question Placement ................................... 68
Level of Adjunct Question............................. 72
Interspersing: Task-Level Induction Resulting
from the Level of Interspersed Postquestions .... 76
Contiguity of Adjunct Questions........................ 83
Feedback during Adjunct Questioning ................. 84

The Passage-Availability Independent Variable .... 87
The Verbal-Ability Independent Variable .............. 95
Interactions of Verbal-Ability and Adjunct-
Questioning Treatments ................................ 95
The Measurement of Verbal Ability in Second-
Language Education Research......................... 100
The Recall Dependent Variable ......................... 102
Summary.................................................. 106

III. PROCEDURES

Population and Sample..................................... 109
Research Design......................................... 116
Variables and Instrumentation .......................... 119
Procedures and Data Collection........................ 132
Pilot Study............................................. 136
Data Analysis......................................... 138
Summary.................................................. 139
Summary of Null Hypotheses............................. 140
IV. RESULTS AND DISCUSSION

Introduction .......................................................... 141
Results ....................................................................... 144
Experimental Data on the Recall Dependent
Variable ..................................................................... 144
Additional Descriptive Data ........................................... 158
Data From Simultaneous Reading Practice
Measures ..................................................................... 158
Likert-Scale Measure on Subjects' Attitudes
Toward Their Computer-Assisted Reading
Practice .................................................................. 175

V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary of the Study .................................................... 181
Summary of Findings .................................................... 184
Limitations ............................................................... 201
Recommendations for Further Research ......................... 203

REFERENCES ................................................................. 207

APPENDICES .................................................................. 224

A. Instrument for Rating the Difficulty of
   Practice and Experimental Reading Texts .......... 225
B. Practice and Experimental Reading Texts ............. 226
C. Validation of Instrumentation of Level
   of Questions .......................................................... 229
D. Valid Propositions and their Mean Ratings
   of Importance ......................................................... 238
E. Printouts of Reading Practice Computer
   Programs ................................................................. 247
F. Attitude Questionnaire ............................................. 317
G. Recall Protocol Instruction Sheet ......................... 319
LIST OF TABLES

Table                                                                 Page
1. Means and Standard Deviations of Recall Scores as a Function of Passage Availability and Level of Question...............145
2. Means and Standard Deviations of Recall Scores as a Function of Level of Question and Verbal Ability.........................146
3. Means and Standard Deviations of Recall Scores as a Function of Passage Availability and Verbal Ability.........................147
4. Means and Standard Deviations of Recall Scores by Passage Availability, Level of Question, and Verbal Ability.........................148
5. Analysis of Variance of Recall Scores by Passage Availability (A), Level of Question (B), and Verbal Ability (C).........................150
6. All Pairwise Comparisons of Means (Tukey's Omega) to Determine the Nature of the Significant Interaction between Level of Question and Verbal-Ability Independent Variables.........................................................156
7. Mean Item Scores for Treatment Cells on Attitude Questionnaire.................................................................176
<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>118</td>
</tr>
<tr>
<td>2.</td>
<td>154</td>
</tr>
<tr>
<td>3.</td>
<td>161</td>
</tr>
<tr>
<td>4.</td>
<td>165</td>
</tr>
<tr>
<td>5.</td>
<td>169</td>
</tr>
<tr>
<td>6.</td>
<td>171</td>
</tr>
<tr>
<td>7.</td>
<td>179</td>
</tr>
</tbody>
</table>
CHAPTER I
THE PROBLEM

Introduction to the Problem

Practice is generally regarded as a key component of second-language curricula. Without many practice opportunities the learner is rarely able to develop proficiency, a primary goal of second-language learning in the 1980s. Since the demise of the audio-lingual method of the 1960s, and with the advent and refinement of more cognitively oriented approaches to teaching languages, it has become apparent that the most important characteristic of second-language practice is not quantity but quality. Mindless repetitions do little more than waste time as well as human and material resources (Ausubel, Novak, & Hanesian, 1978). Research has shown, however, that carefully graduated practice that emphasizes the meaningful use of language results both in better attitudes toward instruction (Omaggio, 1982) and in greater
achievement (Jarvis and Hatfield, 1971; Savignon, 1972; Joiner, 1974; Schaeffer, 1979).

Much attention has been given to providing meaningful practice opportunities in listening, speaking, and writing. Reading, however, has suffered from what Phillips (1974) calls "benign neglect." There are, no doubt, numerous reasons for this imbalance. Reading is covert and private by nature. Many second-language instructors find that intervening in the reading process to insure meaningful or higher-level processing is difficult and time-consuming.

Yet, with the opportunities that the computer provides for both private, individual practice and intervention (in the form of task orientation and encouragement of active processing), it is now possible for the second-language instructor to apply to reading practice much of what is known about the facilitative effects of higher-level processing during language practice. For example, learners can be asked higher-level adjunct questions to which they not only respond but for which they also receive assistance and diagnosis. In 1970 Jarvis advised instructors that in both listening and reading practice "students must be made explicitly aware of what is expected of them and what strategies should be employed" (p. 103). The use, for
example, of higher-level adjunct questions during reading practice may very well serve to inform students that they are expected to read texts for meaning (process on a higher level) rather than for discrete bits of information (process on a lower level). Rivers (1983) agrees with Jarvis and warns instructors that the types of questions they ask have a "shaping" effect. Furthermore, even during a highly limited individual reading-practice session in carefully controlled experimental conditions, the use of a given level of question in an interspersed manner, when the subject is not permitted to reinspect passages already read or passages to come, has repeatedly been shown to help induce the desired type of learning set in first-language reading.

Although in traditional reading instruction it is often difficult to penetrate the silent strategies employed by second-language readers even when adjunct questions are used, it may now be possible to orient the learner much more effectively toward the desired level of processing as a result of his or her interaction with well-designed computer-assisted reading practice software. The results that have been obtained in first-language reading under experimental conditions now have the potential to be applied to second-language reading practice because the computer is able to control for text "lookbacks" during questioning. The use of interaction, feedback, and
diagnosis may also all contribute to this end. Thus, the potential for providing in-class or out-of-class pedagogically sound second-language reading practice seems nearly limitless if computer-assisted practice is maximally utilized.

Problems arise quickly, however, for the instructional designer is faced with an array of coding options (ways in which the computer can deliver instruction) from which to choose. The designer, for example, must decide whether such options as color, sound, graphics, feedback, branching, and auto-control should be utilized, and if so, how. Unfortunately, there is little research on the effects of these coding elements upon learning during specific types of practice for specific types of learners to help the instructional designer make informed decisions about how best to use these options. Hence, most designs are based on intuition and extrapolation.

One such coding element that is of interest in second-language reading is passage availability during adjunct questioning (the answering of practice questions to enhance comprehension of the text). This coding element taps the computer's capability of removing a passage (the portion of the reading selection that is shown in one screen display) from the monitor when an adjunct question related to the passage is asked. In traditional reading practice such control of what the learner sees during
"test-like conditions" is at best impractical and usually impossible.

Passage availability is of interest not only because the computer makes this coding element possible but also because manipulation of passage availability during adjunct questioning may affect the learner's likelihood of processing meaningfully a given passage. Just as the level of adjunct question has been repeatedly shown to affect the level of processing of reading texts, so too it seems reasonable to hypothesize that if a student knows that the passage he or she is reading is going to be removed from the computer display during comprehension questioning, he or she will process the text differently than if the text will not be taken away. Because the ultimate goal of reading in any language is reading for meaning, information about how the level of processing is affected by knowledge of future passage availability during questioning should provide not only practical but also theoretical knowledge about how such changes in instructional design affect second-language reading.

As early as 1972, Rothkopf insisted that research on reading should emphasize comprehension and its most effective facilitation. He advised researchers that "the most important questions about learning from written discourse need . . . to bear on the control of processing activities" (p. 315). Since that time, much research on
the effects of manipulating adjunct questions has been conducted. In recent years the scope of research in this area has tended to be expanded to investigate aptitude-treatment interactions. From this large corpus of research and from Cronbach and Snow's (1977) analysis of related studies, it has become evident that manipulations of the level of adjunct questions often interact with learner differences, especially in verbal ability. Given the nature of passage availability it seems reasonable to expect that this variable not only may affect the level of processing but may interact with other levels-of-processing variables such as level of (or demands of) the reading task and verbal ability. There has been, however, little research on the effects of knowledge of future availability of information displayed on the computer monitor upon learning. In the absence of empirical results, software design is often creative and clever but, for lack of knowledge, fails to maximize learning.

The history of the use of technology in education in general, and second-language education specifically, further illustrates the need for careful and controlled research on the effects of machine-aided practice. In the past the profession has erred in favor of wholesale acceptance of technology-assisted second-language practice.
without research to substantiate such endorsement. The little research that has been conducted usually involved broad methodologies comparisons that yielded disappointing results.

**Perspective on the Problem**

**The Language Laboratory: A Technological Disappointment**

Research on educational technologies has been riddled with overstated predictions and malconceived designs. Salomon (1979) notes that past research has been "repeatedly criticized on the grounds that when **everything else** is held constant, sheer technological variations cannot have any meaningful effect aside from the self-evident and the trivial" (1979, p. 16).

The language laboratory of the late 1950s and the 1960s is viewed by many as an unfortunate venture that resulted in both loss of credibility for second-language education and loss of interest within the profession in using technology. Based upon the notion that "understanding and speaking are to a large extent matters of habit, rather than knowledge" (Hayes, 1963, p. 15), the language laboratory was designed to provide "repetition and overlearning of behavior patterns that [were] to become habitual" (Brooks, 1960, p. 147). Under Title VI of the 1958 National Defense Education Act (NDEA), massive monies
were allocated to institutions willing to spend matching funds for the installation of language laboratories. As early as 1965, over 6000 language laboratories had been installed in secondary schools alone (Hutchinson, 1961, p. 2); yet, Stern (1983) observes that "the introduction of the language laboratory was undertaken with virtually no systematic research except on its engineering aspects" (p. 64).

One needs only peruse language education journals from 1959-1962 to discern the range of reactions to this new technology. Language laboratories were viewed by some as potential "miracle workers" but by others as "foisted upon" the unwary (Smith, 1960, p. 75). Most language teachers, however, welcomed the type of pseudo-credibility this new technology afforded the profession and touted the language laboratory's value. It was heralded as a "taskmaster" (Siciliano, 1959, p. 224), a "private tutor" (Young, 1959, p. 221), a provider of a "fully automated language workout" (Mathieu, 1960, p. 352), the means by which the teacher could "enter into a much closer individual relationship with each of his students" (McGraw, 1959, p. 218), a resource that would "multiply the good teacher" (Hocking, 1959, p. 168), "the most important technological aid to language teaching" (Huebener, 1967, p. 109), and "the most important advance in language teaching efficiency" (Stack, 1971, p. x).
Such testimonials did not, however, go unrebuffed by others who were skeptical about the language laboratory's potential. Dostert (1960) warned that the profession should have been less enamored of sophisticated hardware and should have worked instead at creating flexible and appropriate materials. An anonymous language department chairperson responded to Mustard and Tudisco's (1959) questionnaire on language laboratories with the following: "The professional periodical literature has contained many glowing accounts of what has been accomplished with laboratories . . . . Don't believe everything you read. Don't expect miracles" (p. 338). Koekkoek (1959) provided a useful analysis of the division among second-language teachers concerning the language laboratory:

Some teachers view the language laboratory as opening a new millennium of language teaching; some are already becoming disillusioned. Some are eager for a chance to work with laboratory equipment; others are reluctant, but under pressure to do so. Many teachers are puzzled about the merits of various machines and set-ups. Not a few have more basic questions about results to be expected from the use of laboratory machines and the best methods of obtaining the results. (p. 5)

From its earliest use (1947 by Louisiana State University [Mathieu, 1962]) to its widespread dismantling in the late 1960s and early 1970s, the language laboratory has suffered from a number of inadequacies. Several observers have provided explanations concerning why this
technology failed so miserably: lack of adequate software (Davies, 1982), oversell (Holmes and Kidd, 1981-82; McCoy and Weible, 1983), inflexibility (Kelly, 1969), and negative reactions from students (Rivers, 1982). All of these explanations are undoubtedly partially accurate, but they fail to identify the source of the problem. It is Stern (1983) who succinctly analyzes the major inadequacy of the language laboratory movement: No research was conducted on how best to utilize the new hardware to enhance second-language learning. The limited comparative-evaluative research that was conducted (e.g., Keating, 1963) neither added to knowledge about the technology nor provided direction on how to manipulate specific potentials of the language laboratory. Because it paralleled short-sighted broad methodologies comparisons, The Keating Report failed to take the complexity of the technology's potentials, the learning tasks, and learner variables into account. Thus, largely as a result of its being inadequately researched, the language laboratory failed to deliver the kind of instruction that its enthusiasts had promised it would.

Computer-Assisted Instruction: History Revisited?

Stern (1983) observes that "language teaching theory has a short memory. Perhaps because of our involvement in current problems and polemics, we have tended to ignore the past or to distort its lessons, or to re-enact old battles
over and over again" (pp. 77-78). Several others have noted the parallels between the profession's anticipation of miraculous results from language laboratories and the impact presently expected of computer-assisted instruction (CAI) (Davies, 1982; McCoy and Weible, 1983). Davies (1982) explains that in spite of the fact that "the contribution [that the language lab] may reasonably be expected to make to language learning has become much more realistic" (p. 6), second-language CAI has been repeatedly heralded as "infinitely patient," "self-paced," "individualized," "private," "accessible," "interactive," and "stimulating." But research has not been conducted to date to investigate the pedagogical value of such CAI potentials in second-language learning.

Often today second-language education journals seem to fall into the same trap as they did in the late 1950s and early 1960s: Testimonials are consistently provided without the support of research results. Based solely on informal observations and on data from an attitude questionnaire given to first-year German students, Taylor (1979) explains that "we are convinced that both our educational goals and the needs of our students can be served more effectively by the great potential that computer-assisted instruction offers" (p. 291). Describing his experiences using the computer to assist in Latin instruction, Scanlan (1980) reports that "it is a very
sophisticated tool which can most effectively enhance and upgrade instruction" (p. 55). In an article describing the positive student reactions he has received using CAI in first-year French, Hope (1982) goes so far as to accuse those who call for research on computer-assisted second-language instruction as exaggerating the importance of this need. In light of the language laboratory fiasco, it is ironic indeed that he concludes his article, "all devices are effective to the extent to which they are used efficiently and enthusiastically" (p. 350). That testimonials abound is understandable; that very little research has been conducted on computer-assisted second-language instruction is unacceptable.

Second-language education is not alone in its failure to investigate theoretical issues in educational technological applications. Diamond (1980) has observed that

Throughout much of its history, instructional development has based its success on hunches, experiences, and the education (in a variety of disciplines) of its practitioners. It has not been and still isn't, for the most part, a well-defined field of study or discipline.

(p. 51)

Eisele (1984) explains that "scarcely anyone is now opposing the use of computers for learning; but, neither is anyone able to pronounce the real value of their use with any degree of confidence based on research" (p. 34).

Butler (1977) aptly describes the dilemma,
Most anyone engaged in the design, development and evaluation of instruction must have felt frustrated at times, as I have, by the lack of clear evidence, one way or the other, as to which instructional process would be best for a particular set of circumstances. (p. 5)

This frustration is clearly warranted. In spite of the numerous testimonials available from second-language instructors concerning the efficacy of CAI, other practitioners are far less enthusiastic about developments in second-language computer-assisted instruction to date. Leiblum (1982) asserts that within the profession there are serious "disappointments due partially to unfulfilled expectancies about the development of learning theories to support the medium" (p. 67). Post (1983) reflects the frustrations of many concerning the current state of the art in second-language CAI. She sees the greatest disadvantage of incorporating CAI into the curriculum as the dearth of good software.

Is it inevitable that "the bandwagon-to-pratfall history" (Arthurs, 1979, p. 38) of the language laboratory will be repeated, that language departments will abandon their current enthusiasm for incorporating CAI materials into their curricula? What can be done to provide instructional designers with the type of complex information that they need to make informed decisions about how to manipulate the many coding elements that CAI provides? What kind of empirical findings can best add to
the highly limited theoretical base that exists in second-language CAI?

Putnam (1983) provides timely advice concerning second-language CAI: "Computers will prove no more to be panaceas than did anything that earlier technological developments brought us, and we would be well to act cautiously and patiently" (p. 36). She adds that "if we try to utilize the latest technology without testing our pedagogical assumptions first, we are bound to end up with a mismatch of more-or-less serious proportions, to say nothing of misspent monies and time, and quite likely unreasonable [sic] raised expectations" (p. 36). She provides needed vision when she warns that "one as-yet largely-overlooked area of concern is figuring out the ways in which the processes of learning or teaching foreign languages make the use of computers peculiarly relevant" (p. 36).

Purpose of the Study

Of the four skills in second-language learning (listening, reading, speaking, and writing), reading seems best suited to initial theoretical study in computer-assisted practice. This is not only because of the degree of control that can be exerted over the variability in student responses (Multiple-choice questions are an
accepted means of practicing reading and listening comprehension, and such questions demand a single stroke response.); but also because practice in the other receptive skill, listening, requires the interface of peripherals (such as a tape player).

The purpose of this study is to investigate the effects of passage availability during computer-assisted reading comprehension question practice upon recall in second-language learners. Practice in second-language reading often involves the answering of postquestions of various types (from lower-level, discrete-point items to higher-level, integrative and interpretive questions). In computer-assisted first-language reading practice it is common to intersperse questions after a short amount of text (hereafter called "a passage") and to provide the learner with feedback concerning his or her performance. Passage unavailability has traditionally been utilized as a control in adjunct questioning research. Thus, some of the results obtained from studies on adjunct questioning in first-language reading may be attributable to the "passage-unavailable" control under which subjects performed. Given the fact that level of question and level of verbal ability have both repeatedly been shown to affect the level of processing under text-unavailable conditions, it seems reasonable to suggest that investigating the effects of passage availability vs. passage unavailability
during differing levels of adjunct questioning (lower-level vs. higher-level questions) for high- and low-verbal-ability learners will result in useful new information.

Furthermore, Salomon has illustrated that the use of a coding element (in this case, passage availability) in instructional materials can sometimes result in learners' developing the ability to "supplant" previously utilized learning strategies and thus can facilitate the mastery of certain mental skills in unskilled learners. For example, during second-language reading practice, the removal of the passage during adjunct questioning might direct the learner to develop metacognitive skills in organizing the passage, in self-interrogation prior to adjunct questioning, and in the adoption of the level of processing that matches the level of the adjunct question.

The primary focus of this study, therefore, was to investigate the following research question:

What is the effect in early intermediate French learners of passage availability vs. passage unavailability during computer-assisted reading practice adjunct questioning upon semi-delayed recall of a reading text?

In order to evaluate effectively the likely effects of the independent variable of primary interest, passage availability, the experiment took two other independent variables into account: level of task (determined by the level of adjunct question asked of subjects) and verbal
ability. The level of the question independent variable had two levels, "higher-level" and "lower-level." All subjects read the same texts, but those subjects assigned to the higher-level-question treatment responded to adjunct questions that required the integration of at least two separate propositions from two different clauses in the passage. The lower-level-question treatment responded to adjunct questions that simply asked the subject to identify which noun (substantive) among four native-language options was referred to in the preceding passage.

The following additional research questions emerged from the combination of the two treatment independent variables (passage-available vs. passage-unavailable and higher-level-question vs. lower-level-question) combined with the one classification variable (high- vs. low-verbal-ability):

- What is the effect of lower- vs. higher-level questioning upon semi-delayed recall of a reading text?
- What is the effect of low- vs. high-verbal ability upon semi-delayed recall of a reading text?
- What is the effect of passage availability vs. passage unavailability during lower-level questioning vs. during higher-level questioning upon semi-delayed recall of a reading text?
- What is the effect of passage availability vs. passage unavailability for high-verbal-ability subjects vs. low-verbal-ability subjects upon semi-delayed recall of a reading text?
What is the effect of lower-level vs. higher-level questioning for high-verbal-ability subjects vs. low-verbal-ability subjects upon semi-delayed recall of a reading text?

Are there any interactions among the three independent variables?

The combination of these three independent variables (passage availability, level of question, and verbal ability) was chosen to provide potentially useful information concerning the coding element's most essential effects. The design was based on Salomon's (1979) analysis of needed research in instructional design that calls for avoiding broad-based comparisons of various media and basing research upon coding elements and their relation to cognition.

Theoretical Basis for the 
Design of the Study

Overview

In the last decade many instructional designers and theorists in educational technologies have become aware of the need to move beyond evaluative research to more theoretical designs. Spitzer and Lielt (1977) have observed that "through the standard procedures of evaluative research we are rarely able to understand the complex nature of the effects of the educational technology
with which we are dealing" (p. 20). Thompson (1980) has asserted that the key to effective research in computer-assisted reading practice is not thinking about computers but thinking about instruction. Mitzel (1981) takes this point of view one step further and explains that cognitive elements in courseware must be based on instructional theory and not on folklore or even common sense.

Gagné (1980) asserts that it is now time for a new approach to the study of media that abandons the atheoretical bent of the past. He points to Salomon's (1979) *Interaction of Media, Cognition, and Learning* as providing a much-needed, convincing, and workable model for designing media research. Salomon's model takes into account the three most important variables in mediated instruction: the learner, the task, and the coding elements (means by which the instruction is delivered) of the medium.

There are five basic tenets of Salomon's theory that are of particular importance to the design of this study:

1. It is the ways a medium stores and delivers instruction (its coding elements) and not the medium itself that interact with individual learners in cognition.

2. These coding elements often mirror a cognitive subskill in human learners (e.g., focusing, zooming in, panning, etc.). The subskills in the learner that are mirrored are often the skills that are most affected by interaction with the coding
3 Different learners are affected in different ways by the use of any given coding element.

4 Different learners are affected in different ways by their perceptions of the task expectations related to their use of instruction that is transmitted via a given coding element.

5 A medium's coding elements often will interact with related learner differences and related learning tasks.

Salomon relies heavily upon Cronbach's Aptitude-Treatment Interaction (ATI) model and essentially adds a third variable to these two, the symbol systems (in the form of specific coding elements) of a medium. In researching media, the symbol systems of a medium and not the medium itself stand to make the greater difference in instruction. He aptly explains that "the alternative then, for research on media would be to try to understand and explain the relations between constructs, thus providing explanatory principles. More specifically, one would need to study the medium's most essential attributes and the psychological functions that they can be made to accomplish under different conditions and for different learners" (1979, p. 11). Cronbach (1975) explains that it is this type of research that will "develop explanatory concepts, concepts that will help people use their heads" (p. 126 in Salomon, p. 10).
Salomon defines media as "our cultural apparatus for selecting, gathering, storing, and conveying knowledge in representational form" (p. 3). Any medium, such as CAI, is made up of, among other components, many symbol systems. Symbol systems are of crucial importance to the instructional designer and researcher because they isolate particular ways in which a medium "relates cognition to learning" (p. 1). Rather than assuming, for example, that a medium as complex as CAI "can be shown to make a difference," Salomon emphasizes isolating a specific symbol system (an essential attribute of a medium that may affect learning) and examining it in relation to what is known about cognition. Hence, he insists both on establishing a strong theoretical base for variable choice and on studying learner differences, task, and symbol system in concert.

Furthermore, in spite of common misconceptions, Salomon asserts that the sub-categories of a medium's symbol systems, its "coding elements," are not invariant. Although Salomon does not discuss how the coding elements available in CAI relate to his theory and to other media, his theory is easily applied to the newer educational technologies. For example, a coding element such as "random access" can be utilized in such disparate media applications as a videodisc slide presentation (in which, for example, a computer can randomly access slides to
assist a French student in reviewing various architectural aspects of major monuments of Paris) to flash cards (in which, for example, a beginning Russian student can shuffle the cards to practice recognizing letters in the Cyrillic alphabet).

The same could be said of the coding element "passage availability," which may be viewed as a sub-category of the symbol system "display." If an instructor is using an overhead projector and chooses to cover a cue that the student has already seen, the symbol system potential "display," as coded in the coding element "passage (or cue) availability," is being utilized. Likewise, in CAI, display has a number of coding elements: rate, timing, passage availability, device, graphics, color, size, etc. Just as in the case of the use of the overhead projector, the computer may withdraw text upon cue (i.e., make the passage unavailable for reinspection by the learner during subsequent related activities, such as adjunct questioning).

In short, Salomon insists that no coding element can be attributed solely to one medium. Each medium, however, does "translate" coding elements in ways that will result in some differences from other media's utilization of them. Thus, "learning seems to be affected more by what is delivered than by delivery systems" (Schramm, 1977, p. 273 in Salomon, p. 6), but delivery systems can significantly
affect what is delivered.

Task Requirements

Research on use vs. non-use of coding elements alone cannot be expected to yield satisfactory results. The learner's task orientation will largely determine the effect of a medium's use of a given coding element such as passage availability. Salomon describes this interaction in terms of selective attention:

... when given a coded message, different coding elements are regarded as justifying one's attention (and hence, application of relevant skills), depending on the task to be performed. Task requirements, whether imposed or self-selected, determine what kinds of information are to be extracted, and this choice determines in turn what kinds of coding elements within the message are to be addressed. (p. 108)

It stands to reason, then, that a learner who views the task as lower-level processing of a reading passage may "utilize" passage availability (or lack thereof) during questioning differently than the learner who has been task-oriented toward a higher level of processing. The essential research design question in choosing the combination of coding element / task variables is whether the mental activities that the coding element activates are task-relevant. "To the extent that some [coding elements] are more task-relevant than others, one medium will yield better outcomes than another" (Salomon, 1979, p. 110).

Finally, Salomon has shown in research on film (1979) and on children's television (1979) that "increased
experience with coded messages improves one's skill in extracting information from such messages" (p. 113). Put simply, not only can the interaction of the coding element with the task "short-circuit" a skill (do extra processing that non-coding would normally require of the learner), but also coding elements can "activate" and "supplant" skills.

In the case of computer-assisted second-language reading practice, the coding element of lack of passage availability during adjunct questioning could serve to activate already possessed metacognitive strategies that would otherwise remain unutilized. The learner may, in essence, call up such active-reading strategies as self-interrogation, organization of the passage, and auto-measure of confidence in comprehension of the passage prior to proceeding as a result of this coding element. These are common strategies utilized, for example, in studying for tests. On the other hand, the unavailability of the passage during questioning may lead to what Salomon calls "supplantation," which involves internalizing the code itself. The learner in the computer-assisted reading practice example may learn to close his or her eyes or look away prior to viewing adjunct questions in order to rehearse the knowledge that he or she believes the task requires. In essence, the learner practices creating the coding element at will and learns to utilize it to enhance
future learning. It is not unlikely, for example, that extensive computer-assisted reading practice under passage unavailable conditions during adjunct questioning could lead to an enhanced metacognitive repertoire that would include auto-creation of simulated test-like conditions. Although such research problems are beyond the scope of this study, it is hoped that results from this project will provide useful information for the design of subsequent studies on the possible long-term effects of the interaction of this coding element and task orientation upon cognitive subskills.

**Learner Aptitudes**

Salomon relies heavily on Cronbach and Snow's analysis of the importance of individual learning differences both in his model and in his own research (1974a, 1974b, 1977, 1979). As a result, he totally rejects the notion that any medium's coding element can serve all learners equally well. Learner differences are complex and perplexing. The researcher needs to take such disparate contributing factors as cognitive development, learning preference, aptitude, and experience (available schemata) into account. Because learners vary in their ability to adapt to task and coding demands, one can expect (1) that a specific use of any coding element will not be best for all learners, and (2) that aptitude / task / coding-element interactions will emerge.
Therefore, in research design, just as with the coding-element / task variables selection, Salomon urges the choice of the coding element that seems to be in best "correspondence to--or in contiguity with--the mode of internal representation that an individual with a given cognitive make-up and task can best utilize" (p. 73). This is because in order to achieve "effective instructional communication, a match needs to be established between the cognitive demands of a learning task, the skills that are required by the codes of the message, and the learner's level of mastery of these skills" (p. 112).

Research that fails to take learner differences into account falls into a trap similar to evaluative research that seeks to prove that one medium communicates better than another. Tasks that are coded by a medium cannot be expected to require the same amount of translation or elaboration by all learners. Because the information is internally processed, the key learner variable(s) that are called into play must be considered as well as task(s) and coding element(s). Without such consideration for individual differences, media research design assumes that some tasks are always best coded in certain ways. Although such research moves a needed step beyond research that compares, for example, learning some given content in a traditional context vs. learning "the same" content via CAI, it still falls short of accurately accounting for the
likely causes of variance in learning outcomes.

Salomon's model for educational media research calls for basing design on a foundation that takes previous research on cognition concerning the skill in question (e.g., reading) into account. Furthermore, research on educational media should be holistic in the sense that it examine three crucial variables: coding element, task, and learner differences. It should be based firmly on the notion that "specific potential attributes of a medium may, under some circumstances, with some learners, matter in learning" (1979, p. 6).

Salomon's Model Applied to the Study

Because finding ways to induce higher levels of processing in second-language readers should be of primary concern in any use of computer-assisted reading practice, this study examined how learners who have been oriented toward a given level of processing are affected by the utilization of the computer's coding element, passage availability vs. passage unavailability, during interspersed comprehension questioning. Because all learners cannot be expected to react the same to these four treatments, the learner variable that bears most directly upon ability to process reading texts, verbal ability, was examined as well to determine if there were any main effects or interactions. The primary measure of the effectiveness of second-language reading practice is
retention; therefore, recall served as the dependent variable.

**Definition of Terms**

**adjunct question**: A higher-level or lower-level postquestion in English that is utilized after a brief passage in computer-assisted reading practice both to orient the subject toward the desired level of processing and to inform the subject of success in completing the task.

**CAI (computer assisted instruction)**: Instruction that uses a computer as instructional medium and that is interactive (i.e., the software provides instruction or stimulus, the subject responds, and the software provides feedback to the subject concerning his or her response).

**computer-assisted reading practice**: Reading a text divided into passages each of which is followed by a postquestion. It provides the student with the following feedback:
1. evaluation of right/wrong
2. explanation if wrong, why
3. a maximum of three trials
4. no information on how or where to find the correct answer.

Practice should be contrasted with "testing," which is usually not interactive (no feedback and no multiple trials).

**correct response**: Score awarded for correct response scaled by number of attempts needed to achieve correct response (3 = correct response on first trial; 2 = correct response on second trial; 1 = correct response on third trial; 0 = default value, only one response left).

**filler activity**: Response to a Likert-scale
questionnaire concerning the subject's reaction to the experimental practice experience. This activity serves both to provide additional data on subject processing and attitude, and to delay the recall measure long enough to insure the accessing of long-term rather than short-term memory during the recall protocol.

**free recall protocol:** Surprise postpractice and post-filler-activity measure of retention in which the subject is requested to write down in English as much as he or she can remember about the second text that was practiced.

**higher-level questions:** Postquestions that require the subject to demonstrate having meaningfully processed the passage by integrating at least two propositions found in two different clauses in the passage.

**initial passage processing time:** The amount of time between which the subject begins reading a passage and indicates completion of passage reading by pressing the carriage return for display of the adjunct postquestion.

**interspersed questions:** Postquestions that occur after a reading passage.

**levels of processing:** Processing that is either primarily lower-level (that focuses attention on discrete but semantic information in the text) or higher-level (that requires the integration of at least two propositions from within a passage).

**level of task independent variable:** Variable that is normally manipulated in reading practice to affect learning outcomes. In this case, level of adjunct question.

**lower-level questions:** Postquestions that require the subject to identify which substantive (among four native-language options) occurred in a passage. No integration of
constituent parts of the passage is required but understanding of the native-language equivalent of the target-language word is required.

**number of trials:** The number of response attempts measured both for each individual question and for the entire instructional sequence.

**passage:** A small amount of the whole text (usually one or two paragraphs) presented to the subject in its entirety in one screen display on the computer monitor prior to adjunct postquestioning treatment.

**passage availability:** A coding independent variable that controls whether the subject can reinspect the passage being questioned according to the following treatments:
- passage unavailability—subject cannot look back at the passage during questioning
- passage availability—subject has the passage available on the screen throughout questioning.

**postquestion:** A four-alternative, written, multiple-choice question in English designated as either lower- or higher-level and placed after the passage to which it refers.

**proposition:** A single idea that can be translated into a single simple sentence containing only those modifiers that are necessary for maintaining the original meaning of the text (Kintsch & Keenan, 1973).

**response latency:** The amount of time between the display of a question and the subject's choice of the response alternative.

**semantic processing:** Processing in which attention is given to meaning rather than to form. Ranges from lower-level processing to higher-level processing.
**semi-delayed recall:** Retention of the experimental text as measured by a weighted proposition count on a free recall protocol (Meyer, 1972) administered after a filler task.

**simultaneous measure:** A measure taken during reading practice (Chang, 1982-3). Specifically, initial passage processing time, response latencies, trials, and correct responses. In this study used for descriptive purposes only.

**successive measure:** A measure that is taken after reading practice (Chang, 1982-3), in this case a free recall protocol that is assigned a recall score. In this study the dependent variable.

**text:** A complete reading selection divided into passages.

---

**Overview of Procedures**

The subjects for both the pilot study and the actual experiment were drawn from French 104 students at The Ohio State University. Both the pilot study and the experiment were conducted near the end of the second week of the quarter. The study utilized a 2 x 2 x 2 factorial design. Experimental and descriptive data were gathered in three ways: from computer recording of simultaneous measures in an unobtrusive manner, from a Likert-scale on attitudes toward the practice experience, and from a surprise free recall protocol. The first reading text served both to avoid the confounding variable, the novelty effect, and to induce the appropriate treatment level of processing. The second reading text served as the experimental text. The
free recall protocol was utilized to score each subject on retention of the second text practiced. An appropriate ANOVA and post hoc test were utilized to interpret the experimental data. Descriptive data were analyzed by the experimenter for the purpose of hypothesis generation and elaboration of experimental results.

**Limitations and Assumptions**

The following assumptions were made in order to conduct the study:

1. It was assumed that second-language reading practice has as its primary purpose meaningful processing, and that meaningful processing of a reading text is best determined by evaluating comprehension.

2. It was assumed that semi-delayed recall is a valid measure of reading comprehension.

3. It was assumed that subjects would participate cooperatively and would provide recall protocols that best reflected what they had retained from their computer-assisted reading practice.

4. It was assumed that utilizing the subjects' grade point average and previous grades in French would provide adequate information for classifying high- vs. low-verbal-ability subjects.

The following limitations must be taken into account before any attempt to generalize from the results of the study:

1. This study provides results from a single experiment; therefore, these results can only serve as preliminary information in evaluating the role of passage availability in second-language reading.
Because of the short duration of the experiment, any effects of the two treatment variables can only be generalized as the effects of short-term practice under the treatments.

Any study on reading must take into account the key role played by the text chosen as an instrument. Because the study evaluated performance on a single text, generalizability should be ascribed to the results with caution. Furthermore, replication of the study using other materials is advisable.

Overview of the Dissertation

The balance of this study is presented in four subsequent chapters. Chapter II is comprised of an analysis of levels of cognitive processing that serves as the theoretical framework for the choice of the task, coding, and learner variables. The chapter then analyzes related studies on the three independent variables and the dependent variable. Chapter III describes the procedures for both the pilot study and the actual study and a description of the means by which data were analyzed. Chapter IV presents the results of the experiment, and Chapter V provides a discussion of the implications of the results, recommendations for further research, and a summary of the project.
CHAPTER II
REVIEW OF RELATED LITERATURE

Introduction

It was hypothesized that manipulation of the independent variable of primary interest, passage availability, would result in an adjustment in the subject's level of processing of the text. This hypothesis is supported indirectly by research on adjunct questioning, which has traditionally used a passage-unavailable treatment in order to control for text lookbacks. Furthermore, the two other independent variables, level of question and verbal ability, both have a rather extensive research base in first-language reading which indicates that differences in the level of these variables result in adjustments in the level of processing.

Three theories of levels of processing serve as the theoretical framework for the combining of coding variable (passage availability), task variable (level of question), and learner variable (verbal ability) for this
study. In particular, these theories' explanations on how to design instruction so that the learner adopts the desired level of processing, their descriptions of the multiplicity of features that are processed in reading, and their explanations of how task orientation affects retention will be considered. Because their varied descriptions of memory storage, retrieval, and loss are not pertinent to this study, they will not be discussed.

Research in second-language education provides strong evidence that in second-language learning meaningful is superior to rote learning, that learners can be oriented toward the desired level of processing by numerous prepractice and practice instructional manipulations, and that when learners experience difficulties or when the task orientation is not highly controlled, students will move to a level of processing that they perceive will allow the task to be most expeditiously accomplished. Most of these studies, however, do not examine prose reading practice; rather, they focus on productive skill practice (e.g., Jarvis, 1971), oral-aural or communicative skill practice (e.g., Joiner, 1974; Savignon, 1972), or the graphic modality combining sentence reading with written response practice (e.g., Birchbickler, 1975; Knorre, 1975; Schaeffer, 1979). Three notable exceptions are Bernhardt's
(1983b) study on silent vs. oral reading, and S. J. Adams (1983) and Hudson's (1982) studies on the facilitative effects of providing prereading schema inducers. In second-language research, there are neither applicable studies on task-level orientation through level of adjunct question nor studies on the effects of passage availability upon recall. Therefore, first-language research will serve as a primary basis both for predicting the likely effects of and also for controlling both the level of question independent variable and the passage-availability independent variable.

The learner independent variable, verbal ability, will be examined to determine how it has been shown to be significant both in research on second-language practice and in research on the use of adjunct questions in first-language reading. Finally, the measurement of reading comprehension in both first- and second-language research will be reviewed.

Theoretical Framework
For the Selection of Variables:
Theories of Levels of Processing

Introduction

"Levels of processing" has been the subject of considerable psychological and reading research. Most constructs of this phenomenon are based on a continuum, the nature of which is dependent upon a given theory's purpose
for elucidating the term.

The theories discussed below provide evidence not only of the enormous complexity of processing, but also of the general agreement among researchers concerning (1) the existence of levels of processing, (2) the superiority of higher-level over lower-level processing for retention, (3) the need for automaticity at lower levels in order to process at higher levels, and (4) the facilitative effect of providing task orientation in order to direct the learner toward the desired level of processing. In turn, these four principles will serve as a conceptual framework for the manipulation of the two treatment variables in the study, level of question and passage availability.

Rote-Meaningful Continuum

Ausubel's (1968, 1978) theory of meaningful verbal learning is a broad, comprehensive model that is based primarily upon a "types of learning" continuum that is labeled "rote-meaningful." Meaningful learning is a process whereby new learning is subsumed into the learner's cognitive structure in a hierarchical fashion by relating the new information to what is already known. Because meaningful learning requires that the learner actively extract meaning from the text or presentation and relate it to what he or she already knows, meaningful learning always results in greater retention than rote learning. Rote
learning occurs by default whenever the learner fails to relate meaningfully to the learning material.

The construct upon which Ausubel's continuum is built is this relatability of instruction to the learner's cognitive structure. The rote-meaningful continuum prescribes two prerequisites for meaningful learning:

1. The learning material must be logically or potentially meaningful.

2. The learner must access relevant anchoring ideas in order to relate the new material to prior knowledge.

In essence, rote processing is a type of default processing that occurs when either of the two above prerequisites for meaningful learning is not fulfilled. Absolute rote learning, however, probably never occurs (Novak, 1977). Even a task that requires the learner to memorize a social security number or recognize whether or not a given native-language lexical item occurs in a target-language reading passage is not totally devoid of meaning. In the latter, for example, in spite of the fact that the learner is not required to grasp any of the meaning of the connected discourse, he or she must still relate the meaning of the target language item to the meaning of that item in the native language (Phillips, 1974). But if this lower-level task is compared, for example, to a task that requires that the reader integrate two or more of the propositions presented in the same
reading passage, it then becomes clear that in this case, a more meaningful, or higher-level, learning task is involved. According to Ausubel, whether a learning task is classified as essentially rote or meaningful, then, is a function of the degree to which it must be meaningfully processed in order to be accomplished.

The first prerequisite for meaningful learning, potentially meaningful learning material, is not difficult to achieve in school learning material. Most subject matter is, by its very nature, logically meaningful. In second-language reading, for example, this would certainly hold for well-written (potentially meaningful), linguistically and culturally accessible (meaningful to the appropriate learner) prose. Learning tasks that distract the learner from the meaningfulness of the prose (for example, answering lower-level questions during the reading practice), however, can serve to override the potential meaningfulness of the material (1978, p. 43). The opposite is true as well. If the learning situation, as a result of its task expectations, requires the learner to impose meaning upon the to-be-learned material through organization and integration, the first prerequisite is not only fulfilled, it is enhanced. This could be achieved by taking already meaningful material (such as a prose selection) and requiring that the reader not only read it, but answer meaningful questions (questions that require

The second prerequisite, creating a meaningful learning set, is more difficult to achieve because the extent to which a learner will process meaningfully is partially under his or her own control and partially a function of his or her ability. Even potentially meaningful material can be inaccessible to many learners because they lack the will or know-how to access those broad, subsuming, anchoring ideas that serve as "cognitive bridges" to the assimilation of the new material. As a result, these potentially meaningful materials are processed on a rote level, wherein the learner attempts to assimilate material as discrete, arbitrary, verbatim bits of information. Previous related knowledge does not affect and is not affected by the process. A meaningful learning set, however, utilizes prior knowledge as anchoring ideas or ideational scaffolding for new learning. When the learner assimilates new knowledge, integrative reconciliation ensues: Not only is the learner better able to retain the new material, but also old material becomes more differentiated and reconciled to new learnings.

In order to facilitate meaningful learning set, Ausubel recommends the use of advance organizers (1962, 1978). An advance organizer is a preinstructional aid that furnishes anchoring ideas in a more abstract, general, and inclusive
manner than the learning materials which follow (1978, p. 171). Although there has been considerable debate concerning the efficacy of their use (Barnes & Clawson, 1975; Faw & Waller, 1976; Rickards, 1980), there appears to be relative unanimity concerning the fact that if the learner already has the relevant subsumers, an advance organizer can serve to facilitate learning by encouraging the association of the old learning to the new learning (Novak, 1977).

Levels of Processing Continuum

Unlike Ausubel's continuum, which is oriented toward classroom verbal learning and the creation of a meaningful learning set, several researchers in the area of memory have developed and are continually refining a continuum that is based upon a theory of memory-trace development, storage, and retrieval. Much of the research in this area relates to Craik and Lockhart's (1972) model of "depth of processing." Whereas Ausubel's model places rote learning on the lower end of the continuum, the Craik and Lockhart model is conceived such that superficial or rote processing is on the top end of the continuum and greater depth or penetration represents more meaningful processing. Their model delineates reading processing as a series of stages that begins on a superficial level (such as letter shape and letter cluster recognition) and ultimately stops at a
depth that will reflect the amount of additional processing
the reader engages in so as to elaborate or extract
meaning from the text. Depth of processing, then, reflects
the degree to which the reader has engaged in semantic or
cognitive analysis.

This model emerged from a series of experiments that
illustrate that retention is a function of depth of
processing. If a reader is provided with a task that
precludes deep processing (such as counting the number of
e's in a passage), the result will usually be weak memory
traces that will not be durable. When, however, the reader
is told to extract meaning actively from the text, the
result is stronger traces and more resilient retention.
Since 1972, there has been considerable research on and
refinement of not only this model's explanation of storage
and retrieval, but, more importantly for this study, on the
outward manipulation and effects of depth of processing.

Soon after the publishing of the original "depth of
processing" research, Craik (1973) acknowledged that the
depth of processing metaphor might more appropriately be
labeled "levels of processing" with lower levels being
symptomatic of superficial processing and higher levels
resulting from semantic encoding. Most research on this
construct since that time has utilized this revised
continuum and generally refers to it as "levels of
processing."
A particularly useful addition to this line of research was provided by LaBerge and Samuels (1974). Adding specificity to Miller's (1956) original hypothesis on the limits of the capacity in humans for simultaneous processing, these researchers demonstrated that the highest level of processing achieved is a result of conscious attention to that level and that all lower levels must be processed automatically (i.e., "while attention is directed elsewhere" [p. 295]).

Several additional studies concerning the cause of enhanced retention from (and in some cases, by implication, the facilitation of) higher-level processing have been conducted. In 1976, Lockhart, Craik, and Jacoby found that enhanced retention at the highest level of processing is due, at least in part, to the distinctiveness of the traces that receive increased attention during processing. Evidence of this "distinctiveness model" was found in later experiments by Jacoby and Craik (1979) and Eysenck (1979). Morris, Bransford, and Franks (1977) proposed a different explanation based on the data from a related experiment. Their results indicated that learners recall those items directly related to their prereading instructions or task orientation. This "transfer-appropriate processing" explanation is further supported by several replications (Bransford, Franks, Morris, & Stein, 1979; Duffelmeyer, 1980; and Tulving, 1979). Anderson and Reder proposed
their "elaboration processing" hypothesis in 1979, suggesting that because text is encoded in memory in the form of propositions, the more elaborate the encoding (the higher the level of processing), the more likely it is that the material will be retained. They further explain that the existence of memory traces with differing strengths illustrates that the learner is capable of multiple levels of retention. Elaboration (higher-level) processing can lead to enhanced retention in two ways: (1) network redundancy, which is the use, during testing, of alternate retrieval paths or traces created during reading, or (2) inferential redundancy, which is the elaboration of existent traces during testing (Reder, 1979). These findings have been replicated by Bradshaw and Anderson (1982).

Transfer-appropriate processing, distinctiveness processing, and elaboration processing each give related though relatively distinct explanations for enhanced retention from higher-level processing. None of the models purports to be definitive; however, each is highly supportive of Ausubel's model. Both the rote-meaningful continuum and the emerging levels of processing continuum acknowledge that (1) higher levels of processing lead to greater retention, and (2) effective task orientation can cause a subject to process primarily, but not totally, at a desired level of processing.
Ausubel's learning continuum provides an added dimension, however, not found in the levels of processing continuum: Emphasis upon adequate background knowledge for successful meaningful processing. Thus, if a higher level of task in second-language reading is desired, Ausubel's model points to the necessity of providing both advance organizers and any schemata that the learner might need to process meaningfully the text.

The levels of processing continuum addresses an important issue not adequately explained by Ausubel: "Level of processing" is best described as the level that is given the greatest amount of attention. Furthermore, memory research on levels of processing has illustrated the facilitative effect of the nature of the test expected by readers (Morris, Bransford, & Franks, 1977) and the facilitative effect over several practice sessions of the test experienced (Anderson & Reder, 1979) upon task induction of the desired level of processing of reading passages. Thus, the levels of processing model points to the value of utilizing task-level interspersed questions (in the case of a short experiment utilizing levels of reading tasks as a variable) in order to induce the desired level of processing.
Bottom-Up--Top-Down Processing Continuum

Whereas Ausubel's rote-meaningful continuum is primarily built on the prelearning conditions (potentially meaningful material and meaningful learning set), and the levels of processing continuum is concerned with postlearning evidence of levels of processing (memory traces or retention), the bottom-up--top-down processing continuum is based upon the strategies readers employ during the reading process. Although this study is not primarily concerned with how reading texts are processed but rather is concerned with orienting the level of processing and then examining the results of how reading texts are processed, this construct merits review because it illustrates both the degree to which the amount of relevant background knowledge is crucial to meaningful processing and also how one level of processing can be abandoned for another when comprehension problems are encountered.

The bottom-up and top-down distinction is commonly used in descriptions of reading research to describe how readers interact with texts. Top-down processing is synthetic or integrative. It starts from a global view of the text that is usually based on a schema or a set of subschemata that, throughout the process of "comprehension, are taken to be analogous to hypothesis testing, evaluation of goodness to fit, and parameter estimation" (Rumelhart,
In order for top-down processing to continue unhampered, the reader must have adequate schemata available to match to the story grammar. If this real world knowledge is not available to the reader or if the text presents novel or anti-hypothetical information, he or she may resort to bottom-up processing as a back-up strategy to compensate for the inability to process meaningfully (M. J. Adams, 1980).

Bottom-up processing can begin with such arbitrary tasks as letter shape recognition or morpheme recognition, and is usually associated with analysis and decoding. It is particularly evident in unskilled readers who either lack adequate background knowledge to rely on context for meaning or lack adequate knowledge of graphic language to proceed at a rate that encourages meaningful encoding. It is not entirely inevitable even in beginning second-language readers. S. Adams (1983) found that readers of beginning French were significantly aided in guessing the meaning of unknown vocabulary items in context (a top-down processing task) by being given short script activators that instantiated the type of schema needed to process meaningfully a reading passage. The opposite is true as well. Withholding necessary background information can lead to students' resorting to overreliance upon analysis of the text (Johnson, 1983). In second-language reading, this problem would emerge especially if the text
is a natural text (written in the target language by a member of the target culture), and if instructional materials did not provide any needed cultural schemata. Furthermore, this construct clearly points to the importance of carefully choosing the level of linguistic difficulty of a text, especially in an experiment that seeks to compare processing of high- and low-verbal-ability learners. If the text is too difficult, most learners will resort to bottom-up processing. If the text is too easy, the differences in retention that result from differences in verbal ability will not emerge.

In second-language text selection, therefore, a healthy tension should exist. No text should ever be totally processed in either a top-down or a bottom-up manner. The former would allow the reader to depend totally upon previous knowledge and to ignore any novel aspects of the text. The latter would result in attention only to structural aspects of the text without giving any attention to meaning (M. J. Adams, 1980). Both processes occur in nearly all reading (Chapman, 1974), but in skilled reading, top-down processing leads to greater efficiency and meaning, while bottom-up processing clears up comprehension problems where schema and hypothesis-testing fail to bring meaning to a text.
Summary

All three of these continua contribute to the theoretical framework for the combined study of passage availability, level of question, and verbal ability in useful ways. Ausubel's rote-meaningful continuum illustrates the requisite task and learner characteristics for meaningful processing and points to the necessity of providing advance organizers and choosing reading texts which are culturally accessible. The memory (levels of processing) continuum accounts for the likely recall of a multiplicity of information from a reading task, but with added recall of the material processed on a meaningful level. Furthermore, it illustrates that the level of processing can be oriented by the nature of the task (i.e., processing can be "task-induced" [Craik, 1979]). In reading, the nature of the task has been shown to involve not only the prereading instructions, but the type of activity (such as adjunct questioning) that the learner believes he or she will be expected to perform with the information retained. Finally, the bottom-up-top-down continuum serves to focus the framework on reading and to illustrate the necessity of providing appropriate schema builders (in the case of cultural information) and advance organizers (in the case of thematic information) to the second-language reader. It also serves to illustrate that if the linguistic difficulty of the text significantly
exceeds the linguistic competence of the reader, task orientation may be overridden by a compensatory shift in the level of processing.

What emerges from these three constructs are the following points of consensus:

1. All things being equal, higher-level processing will result in greater retention than lower-level processing.

2. Higher-level processing can be facilitated by providing necessary background knowledge in the form of advance organizers or schema inducers.

3. "Subjects automatically process on many levels, but may direct further controlled processing to elaborate on a particular attribute.

4. Manipulations of the orienting tasks [such as the type of test already experienced or expected] are effective because they direct further controlled processing to different levels." (Bradshaw & Anderson, 1982, p. 166)
The Level of Task Independent Variable

Creating Task-Induced Levels of Processing: Second-Language Education Research

There is a significant corpus of research in second-language education which indicates that second-language practice can be manipulated in such a way as to orient the learner toward either a lower or higher level of processing. The means used to achieve task orientation have been varied, including prepractice instructions and comprehension aids, type of practice required, and repetition. Furthermore, these studies illustrate the skill-specific nature of most second-language practice and the need for rather clear-cut task orientation and practice tasks in order to cause the student to adopt the desired level of processing. In order to increase the likelihood of observing the effects of passage availability during computer-assisted second-language reading practice, this study was designed based on the following results of inducing higher and lower levels of processing during second-language practice.
Jarvis (1971) utilized the type of practice required to orient two sets of learners toward the desired levels of processing. He based a semester-long experiment on the processing distinction between the generic or conceptual meanings of words and the processing involved when concepts are particularized by specific referents. Undergraduates were assigned as class groups to either a "drill" treatment, in which practice activities involved conceptual use of language, or to a "contextual" treatment, in which practice was designed to encourage use of particularized exemplars of concepts. Jarvis based his design upon the notion that in natural communication "one always finds particularized exemplars of concepts" (p. 403) and, that in use of a "drill" treatment, in which pattern practice is the primary mode, language is highly controlled, and, as a result, less natural and meaningful.

In the productive skills (speaking and writing), significant results in favor of the "contextual" group were found. But for the receptive skills (listening and reading), no significant differences in achievement measures resulted. He suggests that "perhaps the practice variable as here dichotomized did not carry sufficient weight among all factors involved to make a difference in receptive skills" (p. 409).
Savignon (1972) conducted a semester-long experiment that yielded similar results to Jarvis'. She, too, utilized level of task to orient the subjects toward the desired level of processing. Three groups of beginning French students received regular French instruction for the first four class periods of the week. During the fifth and last class period, the first group saw films and discussed French culture, the second group worked in the language laboratory, and the third group participated in communicative activities. Savignon found that the third group performed better on communicative tests, but that there were no differences in achievement among the three treatment groups on measures of linguistic competence.

That students who practiced oral communication would perform better on measures of oral communicative skills than those who did not practice oral communication is hardly surprising. Of particular interest is the fact that reading and writing skills were not improved due to 1/5 of the classroom time being devoted to meaningful practice activities in listening and speaking.

The results from Joiner's (1974) experiment in many ways support those of Jarvis and Savignon. She compared the effects of two levels of practice, "communicative" and "noncommunicative," on several measures of achievement and attitude in students of beginning college French. As expected, she found that students who engaged in oral
communication practice scored significantly higher on measures of listening and speaking, but that there were no differences on reading or writing measures.

All of these experiments illustrate that over time in the traditional classroom, tasks that induce meaningful language processing can result in higher achievement in tests measuring the specific skills that were utilized during the practice. Skills that are not subjected to task-induced processing are not affected by the level of tasks performed using the other skills.

Short-Term Studies in Second-Language Education on Task Orientation in Sentence-Level Reading and Writing Practice

In 1975 Birckbichler and Knorre conducted similar experiments in French and Spanish respectively. The effects of orienting tasks were measured over a much shorter amount of time than in the above studies. Birckbichler, in a set of two experiments with French 102 and 103 undergraduates, tested whether Craik and Lockhart's contention that learning is a function of levels of processing holds true for second-language writing practice. She randomly assigned students to one of four treatments that were designed to orient the practice task according to both level of processing (morphological-syntactic vs. semantic) and production (divergent vs. convergent). Her
purpose was to test the degree to which these two sets of variables affect short-term achievement and the degree to which they interact. Of interest here is the level of processing variable only.

Students assigned to the morphological-syntactic writing practice engaged in activities that did not require meaningful processing, such as sentence combinations, sentence completions based on models, dehydrated sentences, and fill-in-the blanks. The syntactic-semantic group engaged in activities that required meaningful processing such as single-sentence multiple-choice reading comprehension items, sentence reordering, matching of problems with solutions, and sentence completion based on mini-scenarios. In these one-hour experiments, the researcher found that of each of the three measures of learning utilized, only one measure (the vocabulary measure in the semantic treatment) was affected by level of processing, and that measure was only affected in the second experiment. The researcher notes in her conclusion that students may have been processing on a higher level than required in the morphological-syntactic tasks because of previous language learning habits and because of the option they were given to make up their own sentences. In addition, she postulates that "a longer treatment phase as well as a more sensitive criterion instrument might have yielded greater differences between these types of language
processing" (p. 72).

Knorre (1975) conducted concurrent research in Spanish 102 and 103 classes. She reports similar findings to Birckbichler's account. Lack of significant differences in depth of processing due to task orientation is attributed to the short duration of the experiment and the design of the semantic tasks. Both researchers suggest that extensive previous practice in short writing activities that were meaningful may have caused their attempts at task-induced processing to be overridden by the students' typical study habits.

The above studies seem to indicate that in traditional classroom practice when a substantial amount of the learner's practice can, over time, be oriented toward meaningful use of the language, significant improvement in the skills used in the practice can be achieved (Jarvis, 1971; Joiner, 1974; Savignon, 1972). But, very little effect is shown under experimental conditions where only limited specific skill practice is engaged in by students who have already developed learning set toward practicing that skill in a traditional classroom setting (Birckbichler, 1975; Knorre, 1975).

Research on the use of the computer for second-language practice has been extremely limited. One study that is
pertinent to this project, however, was conducted by Schaeffer in 1979. In a highly controlled experiment that lasted approximately one hour, undergraduate first-semester German students were placed in one of two treatments after having been instructed on the present perfect tense. The first group practiced "structural" interactive computer exercises that required them to attend to the form of the predicate only. The second group practiced "semantic" interactive computer exercises that required them to attend first and foremost to the meaning of the sentence and secondarily to form. Schaeffer based his prediction that students who practiced semantic exercises would score higher on the posttest measure on Hosenfeld's (1977) observation that when task orientations are provided for students, the beginning second-language student will usually exert the smallest amount of effort possible in order to accomplish the task.

On a criterion-referenced instrument that contained both syntactic and semantic items, the semantic group scored significantly higher on the semantic items. Although the difference in the syntactic scores was not significant, the semantic group scored higher on that measure as well. Schaeffer attributes the differences of the two measures on the practice-task variable and concludes that "while knowledge of the grammatical structure was the only requirement on the structural
subtest, the key to successful accomplishment of a semantic task [was] a deeper level of processing" (p. 70).

Contrary to Birckbichler and Knorre's experiments, Schaeffer's study demonstrates that clearly differentiated task demands can result in distinct levels of processing that produce statistically significant differences in learning even in short-term practice situations. Secondly, the use of the computer as the practice medium demonstrates the degree to which experimental conditions can be highly controlled in computer-assisted practice. The computer then becomes both research tool and practice medium. Finally, in spite of the fact that Schaeffer primarily measured writing ability, his semantic exercises did require reading comprehension in order to elicit meaningful responses. Although this limited comprehension of unconnected discourse hardly qualifies as "reading practice," per se, it does serve as a useful precursor of this study's investigation of the effects of level of question and passage availability in CAI reading of a longer, connected text.

Short-Term Studies on Task-Induced Processing in Second-Language Reading Practice

Recent literature on second-language reading has emphasized the key role that the reader's drawing on prior
knowledge of the world has upon second-language reading comprehension (Carrell, 1982; Crawford, 1983). Schema theory explains this phenomenon by describing "text processing [as] an interactive process between the text and the reader" (Carrell, 1983, p. 479). Two studies in particular (S. Adams, 1983; Hudson, 1982) have drawn heavily upon first-language schema theory to illustrate the facilitative effect of projecting appropriate schemata for the second-language reader prior to reading practice.

S. Adams investigated the effects of script activators upon the ability of upper-elementary French learners to guess the meaning of vocabulary in context. In this study, the script activator was a short sentence in the native language that indicated the activity or event that the text was about. As such, it served as a type of advance organizer designed to access anchoring ideas in the learners cognitive structure and thus to encourage meaningful processing and contextual guessing of unfamiliar vocabulary. She found that readers who were provided with script activators prior to the reading task were more able to guess unknown words from context than those learners who were not provided with the script activators. Her experiment illustrates the facilitative effects that meaningful learning set and pretask assistance can provide to the second-language reader and supports similar first-language reading research on the superiority of
explicit prereading assistance (Rothkopf & Kaplan, 1972) and on the overall facilitative effects of prereading cognitive organizers (Andrews, 1972-73). Furthermore, it demonstrates that two identical second-language reading texts may be processed on different levels depending upon the degree of potential meaningfulness of the entire set of learning materials.

Hudson (1982) investigated the effects of three types of intervention in the reading process of the same text: (1) reading, testing, rereading, (2) access to a vocabulary list prior to reading; and (3) schema instantiation through the use of pictures related to the text and guessing about passage content prior to reading. The results of this experiment indicate that schema familiarity, resulting from availability or induction prior to second-language reading, has similar facilitative effects to those that have been shown to exist in the first-language reading of natural, cultural texts (Freebody & Anderson, 1982-3; Lipson, 1982; Pearson, Jansen, & Gordon, 1979; Steffensen, Joag-Dev & Anderson, 1979). Of all of the manipulations, schema induction was the most facilitative, except in the case of advanced ESL (English as a Second Language) readers who comprehended the most from the first treatment (reading, testing, and rereading). Between beginning and intermediate ESL students, beginning ESL students benefitted more. These results are similar to those of G.
A. Mueller (1980) who based an experiment on the original Bransford and Johnson (1973) studies. He observed that providing prepractice contextualizing visuals improved listening comprehension scores more for low-proficiency beginning German students than for high-proficiency students.

Unlike the two above studies that discovered differences in levels of meaningful processing due to prereading treatments, Bernhardt (1983b) manipulated the reading task itself to induce different levels of processing in fourth-semester undergraduate students of German who all read the same texts. The subjects were required to read under three different conditions: silent, oral, and repeated readings (conducted in both the silent and oral modalities). She found that oral reading actually distracted the subjects from comprehending and thus oriented them toward a lower level of processing. Those who read silently tended to process on a much higher level as evidenced by their recall protocols. In addition, regardless of the text chosen, most subjects rated texts that they had read aloud as more difficult than those that they had read silently. She also found that she could enhance higher-level processing by allowing the subjects to reread the text (in whichever mode they had read it the first time), though subjects who read silently continued to
demonstrate superior recall to those who read orally.

Both S. Adams and Hudson's prereading schema induction studies and Bernhardt's oral/silent reading study provide useful direction for the design of second-language reading practice materials. Clearly, the provision of advance organizers (schema inducers) orients the reader to process more meaningfully. To withhold such assistance from learners, especially for texts that may be linguistically or culturally difficult for the readers, may very well be equivalent to inducing lower-level processing (Reynolds, Taylor, Steffensen, Shirey, & Anderson, 1982). Besides the obvious classroom implications of Bernhardt's study, her success at orienting students toward a higher or lower level of processing by simply manipulating the modality of the reading (silent/oral) illustrates the fact that even intermediate second-language readers can be distracted from or directed toward meaningful interaction with the text by differing the types of tasks they must perform on it.

Two studies have been conducted investigating the effects of the use of adjunct questions in second-language reading. Both of the studies, however, used questionable procedures that seriously diminish their generalizability. Evans (1979) compared differences in recall from reading practice that utilized prequestions, postquestions, and interspersed questions. The researcher utilized texts written for ESL students, which makes generalizing about
how such subjects might react to his treatments if the texts were natural ones inadvisable. A further problem results from his claim that he was measuring both incidental (unquestioned) and intentional (questioned) information in his recall measure, in spite of the fact that he told his subjects prior to their reading practice that they would be tested on the content of the readings. Finally, all three of the texts he utilized were about American cultural themes, "Patriotic Holidays," "Religion in American Life," and "Labor Day." By choosing such topics and by providing no prereading schema inducers or advance organizers the experimenter weighted the experiment against postquestions and in favor of prequestions, which Richards (1976a) has illustrated serve as schema activators in the absence of other relevant prereading orientation. This is confounded by the fact that such topics would probably not be equally familiar to all of the subjects in the experiment. Thus, much of what was probably tested was subjects' prior knowledge of American culture. Those who knew more about these topics before reading, would, most likely, perform better, than those who were less familiar with these topics. Finally, the experimenter discovered after the experiment that the texts he had chosen were far too easy for the population he had chosen. As a result, findings from this experiment cannot be ascribed with confidence to the treatment levels of the independent
variable.

In 1984, Manchester conducted an experiment on the conceptual level and placement of adjunct questions in beginning college French reading practice. In the introduction to her study, she states quite clearly that second-language reading cannot be equated with first-language reading for numerous linguistic and cultural reasons. She describes the complexity of second-language reading as follows:

Second-language readers' expectations of print often differ from those of native-language readers, thereby rendering second-language prediction systems inefficient. Second-language readers also have different cultural backgrounds and different world experiences; they may not, therefore, understand cultural implications in texts. (p. 3)

It is surprising indeed, therefore, that the researcher decided to utilize a highly unnatural English text (one that had been "constructed" for an early adjunct-questioning reading experiment conducted in 1972), which was then translated into French. Although she states in her list of assumptions that "it is assumed that there is a relationship between the manner in which subjects process the stimulus passage [text] used in the . . . study and the manner in which they process normal, unstructured reading passages" (p. 14), there is, however, no reason to believe that such an assumption is tenable. Clearly, generalizing about the process of second-language reading by observing
differences in subjects' ability to process the translation of a text that is highly unnatural in the original is unfeasible.

Second-language research provides a partial framework for the manipulation of levels of processing in reading. Results from experiments on schema inducers and levels of processing are particularly useful in providing direction for experimental materials design. There are, however, no pertinent studies in second-language reading on the effects of manipulation of adjunct questions. Additional necessary background, therefore, is provided by investigations concerning the use of adjunct questions in native-language reading practice.
Introduction

An adjunct question is defined as a practice question that is provided to the reader contiguous to the material to which it relates. If the text is longer than a few paragraphs, segments of a text (hereafter called "passages") are usually placed on separate pages with questions interspersed on additional separate pages either before or after the passages to which they relate (Andre, 1979; Rickards, 1977). Although some researchers fail to describe fully their procedures, it is generally accepted that in most experiments, the subject is not permitted to look at either previous or upcoming pages (as analyzed by Rickards, 1979; and also by Wiesdanger, Rirlem, & Wallenberg, 1982). In essence, most adjunct questioning research creates a "passage unavailable" condition as a control. This is in spite of the fact that in practical applications, until the use of CAI became available, controlling students from looking back or ahead during adjunct questioning was unfeasible.

Much of the early adjunct questioning research was behavioristic in nature and tended to investigate such
variables as question placement, response mode, contiguity, and feedback, using rote questions almost exclusively. Most researchers compared the amount of intentional (questioned) learning to the amount of incidental (unquestioned) learning that resulted from manipulation of the question variables, in order to discern how to maximize retention of the key concepts in programmed materials.

Since the advancement of cognitive learning theory beginning in the late 1960s, interest in adjunct questions has not waned, but a "paradigmatic shift" has occurred (Rickards & Denner, 1978). Research on how to use these questions to encourage the reader to become an active organizer of the text and to attach meaning to it has added impetus to adjunct question research and thus to the knowledge base concerning how these study aids can be used effectively to encourage higher-level processing of reading texts (Rickards & Denner, 1978). The interest in intentional vs. incidental learning, or "direct effect" vs. "indirect effect" as Anderson and Biddle (1975) labeled them, has continued, but with greater emphasis on discovering how to use adjunct questions "to modify further reading in precise ways" (Frase, 1969, p. 55). The cognitivists' research is characterized by investigation into the effects of all the previously studied variables, (question placement, feedback, response mode, and contiguity) factored with level of question and individual
learner variables, toward discerning which types of manipulations of adjunct questions lead to maximum learning.

The literature on adjunct questioning is both plentiful and complicated. The literature clearly indicates that creation of a higher- or lower-level-task orientation cannot be achieved solely by controlling the level of question asked. Question placement, contiguity, and feedback all play a major role in determining the effectiveness of the level of question in orienting the learner toward the desired level of processing. Only those studies will be discussed that provide information concerning manipulation of adjunct question variables which result in efficient induction of level of task or that provide bases for predicting the types of information that are usually recalled as a result of adjunct questioning manipulation.

Question Placement

Since Rothkopf's 1965 study on the subject, no aspect of comprehension questioning has received so much study as where to place reading comprehension questions relative to their references in the reading text (Rickard & Denner, 1978). As early as 1970, Frase observed that "a simple change in [question] position can radically transform
consequent reading behaviors" (p. 338). Although there are some conflicting results from research (e.g., Ladas, 1973; Rickards, 1976b), in the majority of studies that utilize question placement as the primary independent variable, the postquestion has emerged as the type of adjunct question that results in the most efficient task orientation and the greatest amount of question-level learning.

Several researchers have found that questions placed before passages improve retention for intentional learning but not for incidental learning (R. C. Anderson, 1971; Gustafson & Toole, 1970; Rothkopf, 1966; Wiesdanger et al., 1982). Other researchers have reported negligible recall effects of prequestions compared to no questions (Hayes-Roth, 1973; Peeck, 1970). Peeck (1970), for example, found that when the amount of time prequestion groups spent reading the questions was utilized by no-question groups for additional processing of the text, no differences in retention resulted. Still other researchers have found that when prequestioning is compared to no questioning, prequestions impede incidental learning (Dollerup, 1979-80; Gustafson & Toole, 1970; Rothkopf, 1966; Wilhite, 1982).

Berlyne (1965) has suggested a task-orientation explanation for the questionable merits of prequestions. She concludes that they are oftentimes deleterious because they direct students to pay too much attention to specific
textual features and thus to orient the task toward superficial reading and away from semantic encoding. A similar analysis is provided by Wiesdanger et al. (1982) who have proposed that prequestions may serve to lower motivation and thus reduce the energy directed toward meaningful processing. As a result, learners tend to read for bits of information without seeing the whole text as a unified, content-laden message.

Several studies have found superior facilitative effects in the case of postquestions. Rothkopf's (1965, 1966) original studies on adjunct questions investigated the effects of pre-, post-, and no questions on the recall of intentional and incidental information. Only verbatim (rote) questions were used in this study in which all subjects were undergraduates. Groups one and two received pre- and postquestions respectively, but were given no feedback on their responses. Groups three and four answered the questions before and after respectively and also were given the correct answers. Group five was given all of the questions and their answers before it started to read. Groups six and seven served as control groups who read without adjunct questions. Group six was told to read carefully and slowly because the passage contained a great deal of factual information, while group seven was simply asked to read the passage.

On a posttest the researcher measured both incidental
and intentional information recall. The results showed that students learned more incidental information with postquestions than with prequestions. On measures of intentional learning, all questioned groups performed better than either of the control groups. There was no significant effect on intentional information recalled due to question placement.

Several studies have replicated Rothkopf's original findings that postquestions result in recall of intentional learning that is at least equal to prequestions' and recall of incidental learning that is superior to prequestions' (Felker & Dapra, 1975; Frase, 1967, 1968a; Rickards, 1976c; Rothkopf & Bisbicos, 1967). In addition, Lamberg (1976) has replicated Rothkopf's findings that postquestions result in greater learning than when no questions are asked.

A minority of studies have found higher-level questions to facilitate more learning in the pre-position. After analyzing these studies, Rickards (1976b) has explained that those studies that demonstrated higher retention to result from conceptual (higher-level) prequestions than from the same questions in a postposition inadvertently weighted the experiment in favor of the prequestions, which served as surrogate advance organizers (schema activators) when no other prereading assistance was provided.
In 1975, Anderson and Biddle performed a meta-analysis of studies showing facilitation from adjunct-question placement. By a margin of two to one, postquestions were found to be most effective for intentional learning, and by a margin of eight to one, postquestioning was more effective than prequestioning for incidental learning. In short, in situations like that of this study, if both incidental and intentional learning is to be encouraged, if use of adjunct questions is intended not only to enhance learning but also to induce either lower-level or higher-level processing (depending on the treatment), and if prereading assistance (advance organizers or schema inducers) is provided, then the evidence demonstrates that postquestions are more effective than prequestions.

Level of Adjunct Question

Although placing questions in the postposition has been demonstrated to be effective in orienting the reader toward the desired level of processing, it is the level of interspersed questions that was manipulated in this study to create the two treatments of the level-of-task independent variable. The literature on level of adjunct questions, however, concerns itself with far more than just comprehension questions. Several other skills, such as scanning and vocalizing, have been examined by adjunct
questioning research (Johnson, 1983), but, because of the focus of this study, they will not be considered here.

Delineating the differences between the skill of comprehending and the many other skills studied in this literature is, at times, difficult. Furthermore, using first-language research on level of adjunct question for direction in the design of this study is especially problematic because "rote questions," requiring verbatim, meaningless parroting of information from the text, as utilized in this literature, cannot be equated with the type of word-recognition question used in this study for the lower-level-task treatment. As was stated earlier, roteness of task is really a matter of degree; no reading task is ever entirely rote. Questions that request the native-language reader to indicate whether or not a given substantive was mentioned in a passage would certainly be less meaningful if both the passage and the question were in the same language, and a simple one-to-one correspondence were involved. These questions could be equated to Andre's (1979) "factual," or lowest level of typical adjunct questions. They do not require comprehension, and thus do not require that even a minimally semantic level of processing take place. Questions that require the second-language reader to indicate in his or her native language whether a native-language lexical item has been used in the target
language in the passage is, however, a comparatively higher-level task, because meaning must be attached to the target-language word in order to perform the question task. This type of task is certainly short of the most meaningful tasks (integrative and inferential) that Andre describes, but it does require that the reader express what he or she reads "in alternate form" (Johnson, 1983, p. 7) and thus merits the first from the lowest classification by Andre, "paraphrase." Such a task, then, is clearly a lower-level task, but a step beyond the category of "rote" or "verbatim."

In addition, there is a particularly perplexing lack of agreement in adjunct-question research concerning how to label different levels of questions (noted by R. C. Anderson, 1972; Andre, 1979; Carrier & Fautsch-Patridge, 1981). To avoid unnecessary confusion, discussed here will be only those experiments that (1) utilize adjunct questions that require at least a minimum of comprehension (attaching of meaning to the text) even in the lower-level treatment (2) maximize the differences between lower- and higher-level questions (3) provide examples of the types of questions asked, rather than just simple labels, and (4) address the question of task-induction that results from level of question.

In 1974, Rickards and DiVesta compared the effects of "literal learning of ideas" questions (lower-level) with
meaningful-learning (higher-level) questions that required
the reader to identify main points from details. The
college-age subjects were grouped according to level of
question treatment, and were presented with short passages.
The lower-level-question group exceeded the control group
in recall of intentional material. The control group
outperformed the lower-level-question group in recall of
incidental material. The higher-level-question group
demonstrated the greatest amount of recall on measures of
both incidental and intentional learning. These results
illustrate the facilitative effect of level of question to
induce level of task.

Felker & Dapra (1975) conducted a study that compared
literal (lower-level) questions with application /
problem-solving questions in both pre- and postpositions.
All subjects took a criterion-referenced test that measured
incidental lower-level and higher-level learning. The
higher-level-postquestion group scored .59 of the possible
points and the remaining groups, whose scores were not
significantly different from one another, scored an average
of .46. The experiment indicates the facilitative effect
of the higher-level-postquestion treatment for both
incidental and intentional learning, and illustrates the
fact that neither pre- nor postquestioning serves to
enhance incidental learning in lower-level questioning.
These results have been replicated by Shavelson, Berliner,

**Interspersing: Task-Level Induction Resulting from the Level of Interspersed Postquestions**

There has been considerable debate on why postquestions would be more effective than prequestions in establishing efficient task orientation as determined by level of question. Rothkopf and Bisbicos (1967) suggest a mathemagenic, or "learning how to learn," hypothesis that explains that as the reader encounters questions he or she will begin to process a reading text in a manner so as to be able to succeed on upcoming trials. Their explanation is highly behavioristic in its positive-reinforcement orientation. The researchers explain:

The most plausible conception is a kind of adaptive evolution of mathemagenic behaviors, with questions providing selective contingencies. Mathemagenic behaviors, according to this view, are extinguished and dropped if they do not result in learning the skills necessary to answer the experimental questions. On the other hand, mathemagenic behaviors which preceded successful performance on experimental questions would be strengthened. (p. 60)

The researchers base this hypothesis on an experiment (1967) in which high school students read a text divided into three-page passages. Seven treatment groups were formed. One was a control group that answered no adjunct questions. All of the six other groups received either pre- or postquestions of varying types. The types of
questions were so similar (solicitation of names, dates, technical terms) that no effect for question-type was found. Question placement, however, did have a significant effect. Postquestioned subjects showed better recall on a criterion-referenced posttest. They also demonstrated "inspection behavior" or "mathemagenic behavior" as evidenced by the significantly larger number of recalled items occurring toward the end of the text compared to recalled items from the beginning of the text. Rothkopf (1970) interpreted these results as illustrative of the fact that "mathemagenic behaviors are adaptive ... [which] means that mathemagenic activities can be altered by their consequences" (p. 333).

Soon after the Rothkopf and Bisbicos experiment, Frase (1967, 1968c, 1968d) postulated that postquestions may serve to encourage the learner not only to engage in forward processing but also to review mentally the passage just read. But it was not until 1971 that Rothkopf and Bisbicos' forward-processing-orientation hypothesis was experimentally questioned by Watts and Anderson. One result of Watts and Anderson's study was to propose a backward-processing paradigm.

In their experiment, 300 high school seniors answered interspersed postquestions on five related passages each dealing with a psychological principle. The first group was asked verbatim questions about the name of the
psychologist who had been mentioned in the passage. The second group of subjects was asked a question in which the subjects simply needed to recognize the example for the principle that had been given in the passage. The third group was asked an application question in which the subjects had to use what they had learned in a novel situation. The third group performed better on the posttest than any of the other subjects. Not only did they outperform all other subjects (including a read-only control group) but also they performed better on questions that were either similar or identical to those that had been asked of both group one and two during their reading practice. Because all readers were not permitted to reinspect the text during practice questioning, the researchers surmised that both lower-level and higher-level postquestions cause the reader to go back mentally and review what was just read, with greater facilitation of recall resulting from higher-level questions.

These researchers support their argument both on the basis of the way subjects reacted to the reading practice and on the basis of the posttest results. First of all, if the mathemagenic hypothesis were able to provide the entire explanation for the superiority of postquestions, then it would be reasonable to assume that the first group of subjects, who repeatedly was requested simply to provide the name of the psychologist referred to in the passage,
would have become much more proficient at quickly finding the name they needed, turning the page, and answering the question. As concerns posttest evidence, they assert "if answering questions does affect study behavior on subsequent passages, then this effect should be more evident on posttest questions related to passages appearing near the end of the instructional sequence, when the type of question will be most predictable for the subjects" (p. 392). This, however, was not the case. Contrary to Rothkopf and Bisbicos' findings, the position of the information in the text had no effect on posttest scores.

Their explanation, unlike Rothkopf and Bisbicos', is more cognitively-based. They explain, "What is important is the character of the post-passage review and processing that a question induces" (p. 393).

One could easily question their interpretation of the experiment first because only five adjunct questions were provided and second because the learners knew that they were in an experimental situation. It is not unlikely that such an obvious attempt to encourage the subjects to process superficially as to ask the same, rather insignificant, question could have served as a type of signal to the subjects that this was not a genuine reading activity. In fact, some subjects may have suspected that they were being trapped into a task orientation that would backfire if the experimenter asked a higher-level question.
after such obvious, lower-level processing had been so consistently required. Watts and Anderson, however, are careful not to overstate their case. They conclude that it is likely that both backward and forward influence is exerted by postquestions, with meaningful processing being more effectively induced by higher-level questions.

McGaw and Grotelueschen (1972) have added credibility to the Watts and Anderson's indirect-review hypothesis with experimental evidence that postquestions are able to control both the level of attentiveness and the resultant level of processing. Undergraduates were requested to read single pages of text. The experimenters constructed three questions for each page of text. Two of the questions were mutually exclusive (i.e., knowledge of the answer to one did not guarantee ability to answer the other), highly related (i.e., dealing with the same set of propositions), and directly related to the content of the passage. These were called "matched questions." The third question was not related to the matched items, but was related to the passage and was of equal difficulty. After reading each passage, subjects were given one of the matched questions as a practice item. In a posttest the other two questions were used. It was found that subjects responded correctly to the second matched item much more often than to the unmatched question. Because during the reading stages of the experiment students had had equal access to the
information tested in all questions, the experimenters interpreted their results as illustrative of the backward, facilitative processing induced by adjunct postquestions.

Both the mathemagenic and the backward processing explanations for the facilitative effects of interspersed postquestions seem plausible. Until more information is available, Anderson and Biddle's (1975) advice seems reasonable: "To handle all the data, it would appear necessary to postulate at least two processes, a 'forward,' mathemagenic process and a 'backward,' review process" (p. 109). Richards (1979) agrees and adds that not only do postquestions exert directional processing (forward and backward), but also they have been demonstrated to produce a quality of processing that enhances direct and indirect learning.

Of greatest interest for this study is the fact that answering postquestions can serve not only to create and reinforce task orientation (be it higher- or lower-level processing) but also to induce backward processing on a level that reflects the level of question asked. Clearly, question placement can orient the reader to be more active in his or her own organization of the text. Furthermore, these results indicate the likely need for providing practice passages with postquestions to create task orientation prior to experimental reading practice if the desire is to measure the effects of such questions in a
Finally, the forward and the backward-processing models in many ways parallel Salomon's (1979) model of activation (forward processing) and supplantation (backward processing) in the interaction of media and cognition (see Chapter I). Such parallelism illustrates how interrelated coding elements, such as passage availability, and test-like events, such as adjunct questions, are. If these instructional-design characteristics are presented to the learner in such a way that he or she expects their use in an interspersed and predictable manner, then both may require the learner to make and to maintain processing adjustments, and thus they both may have the potential, if properly manipulated, to induce the desired level of processing.

Postquestions have been shown to be more effective than prequestions in establishing a higher-level of processing, and equally as good as prequestions in establishing a lower-level of processing. The explanations that have been forwarded point to the value of utilizing interspersed adjunct questions by dividing the text into practice passages followed by questions, rather than utilizing a text that is read in its entirety and is followed by just one questioning session. Such an approach allows for the level of processing to be more effectively
induced and maintained by the level of adjunct question.

Contiguity of Adjunct Questions

Several studies (Eischens, Gaite, & Kumar, 1972; Frase, 1967, 1968a) have found that as the amount of text between questions increases, the amount of intentional and incidental learning increases when prequestions are used, but decreases in postquestion treatments. Concerning question and text contiguity, Frase (1967, 1968b) found that the closer the postquestion is to the information it asks about, the more effective it is in encouraging postpractice recall. In 1972 McKenzie showed that high-frequency inferential (higher-level) questions led to recall that was superior to identical low-frequency questions. In the same year, M. L. Koran and J. J. Koran (1972) observed that the pacing of verbatim questions in both high- and low-verbal-ability subjects, however, had no significant effect on either incidental or intentional recall. Rickards and DiVesta (1974) suggest that this differential may be related to cognitive level of question. They too found no frequency effect for verbatim (lower-level) questions and significant effect for meaningful-learning (higher-level) postquestions. They reasoned that "placing meaningful-learning questions relatively far apart may have overtaxed the subjects'
processing capacity" (p. 361).

To induce a higher-level-task orientation, it would appear that in the case of higher-level questions the length of the passage should not exceed the amount of text needed to answer the contiguous question(s). Reading texts demonstrate a great deal of variety in such characteristics as cohesiveness, density, and redundancy, thus researchers have not been able to pinpoint the optimal length of a passage. Nonetheless, Rickards and Denner (1978) interpret contiguity results to "mean that postquestions 'shape' or 'elicit' mathemagenic activity more effectively when such questions occur frequently" (p. 324). As concerns computer-assisted instruction (CAI) and the optimal use of single screen displays, Wise (1982) cautions that "a good programmer always remembers not to overwhelm the user with too much information" (p. 27). Thus, level of task can be more efficiently induced and maintained when the appropriate task-level adjunct questions are placed after relatively short rather than long passages.

Feedback during Adjunct Questioning

Feedback provides knowledge of results. In CAI this involves either the provision of the correct answer after the question has been answered for the first time or giving the learner multiple opportunities to choose the correct
answer with the final step involving either correct choice by the learner or indication of the correct answer to the learner. Adjunct-questioning research usually involves only the former.

Although cognitivists and behaviorists disagree on the causes for the facilitative effects of immediate feedback, they both agree on its results. Most instructional designers agree with Kulhavy's (1977) analysis: "There is little doubt that feedback works to increase what a person learns from an instructional unit" (p. 229). Johnson (1983) contends that the major effect of feedback is to allow the reader to engage in "repair strategies," mathemagenic strategies that will lead to better success on future trials. Not only, then, would question placement help to orient level of processing, but also, when adjunct questions are answered incorrectly, knowledge of results should lead to an adjustment in processing to insure greater success on subsequent trials.

When intentional recall (recall of the questioned material) is the desired outcome, feedback markedly enhances performance (Bruning, 1968; Frase, 1967; Throop, 1971 in Anderson & Biddle, 1975). However, in lower-level questioning intentional recall has been shown to be only slightly enhanced by immediate feedback compared to no feedback (Frase, 1967). One could infer that inducing a lower-level of processing is enhanced by providing
immediate knowledge of results, although the effects are minimal. Carnine, Stevens, Clements, and Kameenui (1982) discovered that in middle school children the higher-level processing required to answer inferential questions on character motives was more efficiently induced by providing immediate feedback rather than delayed feedback. This supports Frase's (1968c) earlier finding on the benefits of feedback during interspersed higher-level postquestions. Hence, both lower and higher levels of processing have been shown to be more readily induced by the use of feedback compared to no feedback, with superior recall resulting from immediate feedback.

Although many other manipulations of adjunct questioning, such as response mode and effects over time, have been studied, it appears that placement, level, contiguity, and feedback are the variables that have the most potential for enhancing task orientation. The results indicate that when both lower and higher levels of processing are to be induced in different learners, then utilizing the appropriate level of question in a frequently interspersed postposition with immediate feedback is most effective. This treatment, however, is only most effective if the reader has been provided with appropriate prereading assistance (instructions, advance organizers, or schema inducers) (Rickards, 1976a).
The Passage-Availability Independent Variable

A control that is often used in adjunct questioning research is passage unavailability. Rothkopf (1966) explains that such a control of passage reinspection is necessary in experimental conditions because it enables as clear as possible an analysis of adjunct questioning without allowing confounding learner behaviors to invalidate the study. The above research results apply to situations in which learners were not allowed to view the passage during questioning. Although a small corpus of research on adjunct questions has used passage availability (freedom to reinspect the passage during questioning) in its designs, these studies are clearly in the minority (see Andre, 1979, p. 301 for an analysis). Furthermore, their uses of passage availability are so varied and their descriptions are so sketchy that generalizing from them is unfeasible (Andre, 1979). None of these studies that utilizes the typical adjunct-questioning paradigm compares the effects of passage availability vs. passage unavailability.

Rickards and Denner (1978) fault the general approach that has been used in adjunct questioning research because the procedures involved are not "ecologically valid" (p.
342), i.e., they are not applicable to the typical classroom. Other researchers agree and note that instructional designers have not been able to put the vast results from adjunct questioning research to practical use with confidence because students in traditional study situations can normally neither be stopped from reinspecting the passage during questioning nor deterred from looking ahead at postquestions (Anderson & Biddle, 1975; Hiller & Denzel, 1973). CAI now provides, however, a modality that can easily control both when the learner in an instructional setting first sees an adjunct question and whether he or she has the option of reinspecting the passage during questioning. Both Rickards and Denner (1978) and Andre (1979) call for research on this variable that has kept the vast amount of information available about adjunct questioning inapplicable to the typical learning situation.

Andre (1979) also notes that because the traditional adjunct questioning paradigm (the cycle of providing a passage and asking questions without text lookbacks) has become so generally accepted, many research reports are failing to indicate exactly which type of procedures were used during questioning. His analysis of research reports finds that "many studies did not make clear if subjects were permitted to reread the passage after reading the instructional question . . . . [which] may be related to
differences in the results of various studies" (p. 300). Although he fails to provide "many" examples, he does illustrate the fact that using passage unavailability as a control in adjunct-questioning research has become so expected, that it is taken for granted. The opposite could be said for classroom practice. Traditional reading practice has nearly always taken for granted that text lookbacks were not only inevitable but necessary. In addition, most standardized tests of verbal ability, such as the ACT and the SAT, also allow passage reinspection. The distinction is an important one. Does allowing text lookbacks and hence reducing the test-like atmosphere of adjunct questioning increase retention? Or is it possible that removing the text during questioning causes the learner to process more carefully and, as a result, at a higher level? Unfortunately, very little research has been conducted on this question. It is known that good comprehenders tend to engage in more spontaneous and useful text lookbacks than poor comprehenders (Garner & Alexander, 1981; Garner, Wagoner, & Smith, 1983). It is also generally accepted that answering questions with the passage unavailable is more difficult than with the passage available (Boyd, 1970; Johnson, 1983), though there is no empirical evidence to support this belief. Carroll (1971) has indirectly supported the notion of greater recall from passage-unavailable conditions. He surmises that
"questions are most effective when they not only cause memory search but also cause some sort of re-organization of memory traces and associations" (p. 164). Again, he cites no passage-availability research to support this claim.

There has been considerable research on the effects of removing memory support (passage-unavailable condition) on anxiety level in a variety of learning situations, but these studies, at least in their present design, do not address the question of retention. There have been a few studies on the effects of passage availability upon learning. Those studies that do use passage availability as an independent variable usually do not involve reading comprehension of prose, rather they involve the removal of tables, graphs, instructions, and lists during questioning. Dennis (1979), for example, measured the effects of memory support upon numerous simultaneous measures (correct responses, trials, total instructional time, and response latencies) in an experiment on CAI problem solving. He found that allowing learners "to retrieve and reread previously printed material is more effective" (p. 53). He did not, however, utilize a dependent measure of learning or recall, hence his results are of limited value to this study.

Only three other studies in reading, to the writer's knowledge, have utilized passage availability during adjunct questioning as an independent variable. Two have
found superior results for passage availability, and one has found superior results for passage unavailability. All three studies, however, have serious flaws that make generalizing from them problematic.

Kender and Rubenstein (1977) and Mooney (1982) conducted similar experiments, both at Lehigh University. The former used fourth-grade students as subjects, and the latter used seventh-grade students. All other procedures were the same. The subjects were placed in one of two groups. The first group was told to read a passage and to respond to postquestions solely on the basis of recall (passage-unavailable treatment). The second group was told to read the passage and was permitted to reinspect the passage after the question was asked (passage-available treatment). Both studies found that reinspection results in higher comprehension as measured by better responses to the oral questions. That those students who were permitted to look at the passage during questioning could answer the questions better is certainly not surprising. Also, only two series of treatments were undertaken for each subject. Thus, any facilitative effects that might be expected because of task orientation would not, most likely, have developed (Kaplan, 1976). Furthermore, both studies fail to measure the amount of information read that was retained. Therefore, they are inadequate measures of the effects of passage availability upon recall.
T. H. Anderson, R. C. Anderson, Dalgaard, Paden, Biddle, Surber, and Alessi (1975) utilized passage unavailability in the design of an experiment comparing computer-managed study vs. traditional study in an introductory economics course. The sample consisted of 228 college-age students who were randomly assigned to either the experimental or the traditional group. The experimental group was required to complete a series of study-management quizzes that were given on the computer at the student's convenience before each reading assignment's due date for the class. None of the questions on the quizzes was included on the final examination. The subjects assigned to the experimental group were not permitted to take the final examination without having first completed all of the quizzes. The procedure for taking a quiz involved coming to the computer center, reading a few pages of the textbook, moving to a computer terminal without the textbook, and answering questions on the reading. This cycle was continued until the entire reading assignment was completed. The traditional group simply studied using their own resources.

On all dependent measures (attitude, achievement, and attrition) the experimental group scored significantly higher. The researchers attribute their results to the higher level of processing they were able to induce in the experimental group through the use of test-like practice.
Just as in the cases of broad methodologies comparisons (see Chapter I), the results of this study are difficult, if not impossible, to evaluate. They may be due to the increased attention given to these students, to the fact that their study was managed (organized) for them, to the fact that they answered adjunct questions, or to the fact that they answered questions that were "test-like" (in passage-unavailable conditions) prior to taking the exams. Thus generalizing from these results is inadvisable.

It is, perhaps, understandable that in the past little research has been conducted on the effects of passage availability vs. passage unavailability upon retention of a reading text, given the impracticality of utilizing any results that might have emerged and given the perceived need to control for reinspection in adjunct-questioning research. With the passage-availability-coding capabilities of the computer, however, and with the possibility that this coding element will interact with other processing variables such as level of question and level of verbal ability, it seems appropriate to pursue such research in 1984. In their recommendations for future prose-learning research, Faw and Waller (1976) suggest that "except in studies where the purpose of answering theoretical questions requires otherwise, every effort should be made to keep materials, instructions, and
experimental conditions as realistic as possible" (p. 715). In nearly 60 years of adjunct-questioning research, except for the above three examples, little effort has been expended to assure that the research results from adjunct-questioning studies would be applicable in the typical learning situation (Andre, 1979). Much is known about the effects of passage-unavailable treatments (given the large corpus of adjunct-questioning research that has used it as a control). Little is known about the passage-available treatment (though this is what most students experience when they use practice questions to study). This study was designed to build on what is known, and to add to it by utilizing both levels of the variable in a factorial design that would provide a needed beginning in rethinking the nature and the purpose of practice comprehension questions in second-language reading.
The Verbal-Ability Independent Variable

Interactions of Verbal Ability and Adjunct-Questioning Treatments

If research on how to manipulate adjunct questions is complex, the research results from the analysis of interactions of verbal ability with type of question have been rather definitive. In their analysis of results to date Fisher and Peters (1981) conclude that adjunct questions of both lower and higher levels seems to be unnecessary for the skilled reader. For the unskilled reader they are helpful in either form. When, however, the text, for whatever reason, is partially inaccessible to the reader, higher-level questions enhance the comprehension for both the skilled reader and the unskilled reader.

These researchers explain:

The most consistent finding across all research variables is that skilled comprehenders, regardless of age, use strategies that are best adapted to extracting meaning from a text in the most economical fashion . . . . poor comprehenders may be characterized by their lack of appropriate reading strategies and their inability to alter their reading style to suit the purpose for which they are reading . . . . the poor reader . . . . approaches the task as if reading a series of unconnected words, much like a grocery list. (pp. 124-125)

The results from a study conducted by Gambrell and Heathington (1981) support this analysis. They compared the metacognitive awareness of task strategies of 28 good and 28 poor comprehenders. That found that "in general,
adult poor readers are not aware of strategy variables or their role in facilitating comprehension" (p. 215). It stands to reason then that poor comprehenders would benefit most from prereading assistance and from higher-level questions. The questions, for example, may serve to override the low-verbal-ability learners' tendency to approach all reading tasks with bottom-up strategies (Fisher & Peters, 1981, p. 126). This analysis is supported by results from research.

Wilhite (1982) found that low-verbal-ability students benefit most from higher-level questions. High-verbal-ability students who were asked higher-level questions, however, recalled no more on a free recall protocol than other high-verbal-ability students who were asked no questions. Surprisingly, lower-level questions were beneficial for both high- and low-verbal-ability subjects, though they resulted in considerably more recall of subordinate propositions. Wilhite surmised that "this interaction is consistent with the view that high-ability and low-ability people differ in their tendency to use the superordinate organizational structure of the passage and thus in their tendency to benefit from processing aids such as adjunct questions" (p. 1). He further explains that high-verbal-ability subjects would not have paid as much attention to detail (because they tend to read for major ideas) unless lower-level questions directed them to do so.
Using a New Developmental Reading Test index to identify good and poor comprehenders, Rickards and Hatcher (1978) showed that poor comprehenders benefit more from meaningful-learning (higher-level) postquestions than from rote postquestions. The poor comprehenders given the higher-level questions did not perform significantly differently than the good comprehenders regardless of the treatment received. They attribute these gains to the level of processing induced for poor comprehenders by repeated experience with higher-level questions.

Rickards and DiVesta (1974) found that

For good readers, meaningful learning postquestions, rote learning postquestions and no questions (control group) all yielded the same degree of recall of subordinate passage information. Importantly, however, for poor readers, meaningful learning post-questions produced significantly more total passage recall than rote learning postquestions or no adjunct questions of any kind". (in Rickards, 1976b, p. 16)

Shavelson, Berliner, Ravitch, and Loeding (1974) found similar aptitude-treatment interactions. In their experiment, they used a vocabulary test that measured verbal comprehension. For junior college students, they found that

The insertion of HA [higher-order] questions appears to aid subjects with low Advanced Vocabulary scores. Questions of this type and in this position may act in a compensatory manner when the ability to interrelate concepts and ideas in the prose materials is deficient. (p. 47)

Hypothesizing about why such an interaction would occur,
they surmise that the superior recall that resulted from higher-order questions may be due to their "ability to promote review in subjects who ordinarily do not engage in such activities" (p. 47). Their results show that the low-verbal-ability students benefitted most from higher-order questions and also showed some benefit from lower-order questions, but that the high-verbal-ability students do not need adjunct questions and may even be distracted by them.

When average and below-average readers were compared by Wilson (1979), it was found that in answering factual questions, the two groups did equally well, with the average readers scoring slightly higher. On inferential questions, however, the average readers performed significantly higher than the below-average readers.

All of these results point to the value of higher-level adjunct questions, especially for low-verbal-ability learners. But these results are from first-language reading experiments, in which the processing of the text is probably not problematic for high-verbal-ability subjects. The same cannot be surmised concerning second-language reading, especially for college-age early-intermediate readers who have had little experience and no training in second-language reading, as is the case for the population investigated in this study. Even in readers with high-verbal ability, the reading of a
second-language text cannot be expected to be approached the same way a native-language text would. Clearly, even high-verbal-ability intermediate college second-language readers cannot be classified as "skilled" readers in Fisher and Peters' sense above. They are still in a stage of rapid development of second-language reading skills. Therefore, the above results, though useful in predicting possible outcomes, should be utilized cautiously.

There is some evidence from second-language research, however, that does support the notion that the more proficient second-language learner derives little benefit from higher-level task orientation if the task is not sufficiently challenging. Hudson (1982), for example, found that in ESL learners, externally-induced schemata prior to reading was more facilitative for subjects with lower levels of proficiency than for higher levels of proficiency.

Likewise, Mueller (1980) found that no differences in recall resulted between experienced (more proficient) students who were provided with prelistening assistance (in the form of contextualizing visuals) and equivalently experienced students who received no such assistance. He did find, however, that such task orientation toward higher-level processing resulted in significantly superior recall in inexperienced Beginning German students.

These results may illustrate the crucial role
materials selection plays in experiments that attempt to investigate how processing variables may interact in second-language learners. If the text is not sufficiently difficult to challenge even the high-verbal-ability learners then the likely effects of different levels of these variables will probably not emerge.

The Measurement of Verbal Ability in Second-Language Education Research

Second-language education researchers have long sought an instrument that would reliably identify those learners who demonstrate high vs. low aptitude for second-language study. There is little unanimity within the profession concerning the best method for classifying subjects in experiments, probably because the construct is so difficult to define and identify. Many researchers use the Modern Language Aptitude Battery (MLAT) (Carroll & Sapon, 1959) to evaluate aptitude. The use of any such instrument, however, was prohibited by the constraints of the experimental conditions of this study (see Chapter III).

Others have utilized indicators of general intelligence to classify according to aptitude. Chastain (1975) found, however, that the SAT correlated poorly (r = .17) with second-language achievement compared to other measures. Pimsleur (1968) recommends the use of
either grade point average ($r = .62$) or previous grade in the same second-language ($r = .62$) when it is not possible to use a language aptitude instrument. He further explains that general measures of verbal ability (such as grade point average) tend to correlate well with second-language achievement for reasons that remain unknown. In spite of the traditional tendency of counselors to use grades in English as a predictor, Pimsleur (1968) found a relatively weaker correlation of $r = .57$ between marks in English and language marks.

Given the nature of the task in this study (adjusting to a new type of learning task, and retaining information that is read), it seemed likely that grade point average combined with previous final grade in French would serve as the most valid and practical predictor of verbal ability.
The Recall Dependent Variable

Burton, Niles, and Waldman (1981) explain that recall is a valid measure of reading comprehension because "under normal conditions reading is considered a semantic processing task" (p. 158). This is certainly in keeping with a cognitive approach to learning where memorization and imitation are seen as less indicative of learning than description, explanation, understanding, and elaboration. The review of pertinent literature on both the levels of processing continua, and on the level of question and verbal-ability independent variables illustrates the general concensus that lower-level processing results in less recall than higher-level processing and that high-verbal-ability learners tend to process on a higher level than low-verbal-ability learners.

Several methods for measuring reading comprehension in second-language contexts have been proposed by a number of sources. Henning (1975) provides evidence that among cloze recognition, synonym-antonym selection, short-answer, grammaticality of response, and multiple-choice sentence-selection measures, synonym-antonym selection and the multiple-choice measures showed the highest correlations with the criterion. The construct of reading comprehension as here delineated, however, does not really
reflect the current awareness of the key role memory plays in any measure of comprehension. As a result, no type of testing which required global recall was investigated in this study.

In experimental settings in first-language research, manipulations of type of recall measure utilized have shown that free recall not only provides more valid information than any type of structured questioning but also is "the most straightforward assessment" (Johnson, 1983). Even a questioning procedure as apparently unobtrusive as cueing, for example, has been shown to act as a facilitator of short-term memory (Turner, 1979). In essence, cueing increases recall, but it also serves as a postreading recall aid, which helps the reader reconstruct the text. Till, Cormak, and Prince (1977) found that cues serve to "activate" knowledge about the world that may enhance comprehension of the text. Though such a use may be facilitative in the teaching-learning situation, in an experimental setting, it may serve as a threat to the validity of a recall measure which seeks to evaluate the retention resulting solely from practice treatments and verbal ability.

Pellegrino and Hubert (1982) observe that "a survey of the human learning and memory literature from the past 20 years would show free-recall as the primary paradigm and method for studying recall" (p. 129). Meyer (1973) agrees
points to the introduction of the notion of "the importance of individual propositions" by Johnson (1970) as a major turning point in the way recall has been evaluated. The results from this work, which have been elaborated upon and refined by several researchers, clearly indicate that recall measures which fail to take the differential semantic importance of recalled ideas or propositions into account do not really measure both the quantity and the quality of retention (Kintsch and van Dijk, 1978). Because all evidence points to the primary value of retaining higher-level propositions and to the decreasing importance of retaining other propositions as they become less and less crucial to the overall meaning of the text, propositional weighting such as that delineated by Meyer (1973) has become a generally accepted approach to evaluating recall.

The means for creating a text-based instrument for evaluating recall are varied and complicated. Logical structure of the text, idea units (propositions), order of presentation, and cohesion have all been utilized in a variety of studies. For an analysis of general recall that does not attempt to analyze the effects of discourse properties (redundancy, anaphora, cohesion, etc.), the most common means of creating an instrument for evaluating a free recall protocol is to weight all the possible propositions in a text according to their importance (how
crucial each one is for conveying the main points of the text) on a scale. This weighting usually reflects the mean of the ratings given to each proposition by proficient readers. Meyer (1973) recommends a scale of from one to seven. Individual protocols are searched for each proposition and awarded points commensurate with the weights of any valid propositions that are found.

Recent research in second-language reading (Bernhardt, 1984, 1985) indicates that the free recall protocol better reflects the subject's retention of the text than the information gained from structured questioning. When subjects were asked straight-forward syntactic and semantic questions about the text (e.g., "What is the tense of this verb?" or "What is the meaning of this sentence?") they were often able to answer correctly. The same subjects, however, showed difficulty in reconstructing from memory the meaning of the text. Bernhardt concludes that text-based questions are not best suited for measuring global comprehension and text encoding, rather they tend to measure grammatical and decoding skills.

The advantages of the free recall protocol in a second-language experimental setting are many. Bernhardt (1983a) observes that "a recall test, unlike a traditional test, in no way influences the students' understanding of the text" (p. 32). Therefore, what is being tested is what
was learned during reading, and not how well the subject can use cues from the test to comprehend the text. Second, they provide considerable descriptive data about the way the subject has processed and stored the text in memory, which experimenter-directed tests rarely expose. Finally, they do not require that the subject engage in further reading in order to be complete the test task. Jones (1977) warns language teachers that the fact "that a test must be read does not qualify it as a measure of reading ability" (p. 250). The same could be said of measures of recall. Even if the test is constructed in the native language, there is no way of knowing if having to read the test will cause the subject to provide a recall score which does not really reflect so much what is remembered from the text, but rather how proficient the subject is at taking traditional, teacher-constructed reading tests.

**Summary**

This review has analyzed theoretical literature on the facilitative effects of prereading assistance, top-down (rather than bottom-up) processing, and higher-level tasks during the reading process. Ausubel's theory of meaningful verbal learning illustrates the need for materials appropriate to the level of the learner. It further indicates the need for providing advance organizers in
order to enhance higher-level processing. The levels of processing continuum shows the value of providing clear task orientation and knowledge of the type of postreading task to expect. It further illustrates that higher-level processing leads to greater retention than lower-level processing for several related, but distinct reasons. The top-down--bottom-up processing continuum demonstrates the fact that most readers process on a number of levels, but that greatest retention will result from information learned on the highest level of processing achieved. It also illustrates the key role text selection has in any experiment on levels of processing.

Research indicates that when comparisons between higher- and lower-level processing are desired, the frequently interspersed postquestion is most facilitative of inducing task-level processing. Immediate feedback also enhances task orientation.

Passage availability has traditionally been utilized as a control in adjunct-questioning research. The few experiments which use it as part of the procedures for all subjects, use text lookbacks in such disparate, and undelineated manners that generalizing from their results would be questionable at best.

In general, high-verbal-ability subjects score higher than low-verbal-ability learners in tests of recall. Adjunct questions, however, have been shown to lessen the
gap between these two groups, especially when the questions are higher- rather than lower-level.

The free recall protocol has several advantages over other more obtrusive measures of recall. First, it accurately reflects only what the learner has retained, thus testing threats to validity are avoided. Second, it provides useful descriptive data concerning the way the subject has reconstructed the text. Finally, it forces the student to engage in self-interrogation concerning what was read, and thus is influenced by intrinsically-generated rather than extrinsically-motivated metacognitive strategies.
Population and Sample

The population from which this sample was drawn are classroom-track French 104 students at The Ohio State University. Due to scheduling problems, the 20 students who were enrolled in the individualized track for French 104 were not included in the population or the sample. French 104 is the fourth in a series of four five-quarter-hour courses that serve both as an introduction to French and as fulfillment of the foreign-language requirement for majors in the Colleges of Arts and Sciences. It is the approximate equivalent of the beginning of college intermediate-level study (second-year, first-semester).

The majority of the population is college-age, with most students in French 104 either sophomores or juniors. 93% (127 of the 136) of the sample had taken the 103 course.
at The Ohio State University. Only two of the subjects who participated were not pursuing an undergraduate degree. Both had already received a degree at another institution and were not enrolled in any other course. In addition, all of the subjects were native speakers of English.

All sections of the first three courses in the 101-104 classroom-track sequence that led up to the fall, 1984 quarter 104 course utilized the same syllabus sequence; the same textbook, Invitation (Jarvis, Bonin, Corbin, & Birckbichler, 1979); and the same set of tests. The first three courses in the individualized program that preceded the fall, 1984 104 course used the same textbook and curricular goals as those of the classroom track but utilized their own study packets and tests. Both the classroom track and the individualized sequence cover the entire textbook in the first three courses. Both tracks tend to place heavy emphasis upon grammar and communicative activities, which leaves comparatively little time for reading-practice activities. Neither track normally provides systematic instruction in reading until the 104 course in which a considerable amount of time is devoted to developing reading proficiency. The fourth course in the classroom track, which is open to students who either have completed 103 in the individualized or the classroom track
or who place in 104 as a result of a placement test, included four options during the fall quarter, 1984:

104.01—Basic (literary readings)
104.02—Conversation (discussion of readings of interest to the class)
104.03—French Now (contemporary cultural readings)
104.04—Civilization (historical cultural readings)

The Ohio State University was chosen as the experimental site for several reasons. First, the fall offerings in French 104 provided an adequate number of subjects to conduct the experiment over the span of a single quarter.

Second, students in French 104 have had significant training in grammar, and thus are, for the most part, able to comprehend the basic structures of the language. This allowed the experimental text to be a natural one (written in the target language by native speakers for native-language speakers) without risking subject abandonment of desired task orientation due to linguistic difficulty of the text. As a result, significant differences and interactions between experimental treatments reflected the reading of authentic target language rather than language that had been adjusted in ways that would make generalizing from the study less feasible.

Third, the difficulty experienced in the past by some experimenters in quickly orienting second-language learners
to the desired level of processing (Birckbichler, 1975; Knorre, 1975) did not emerge in this experiment. This was probably due to the fact that the subjects had had little experience and no formal instruction in either the skill of second-language reading or in computer-assisted-language practice (only three of the 136 subjects indicated that they had ever used the computer before to learn or practice a second language). This permitted the experiment to be of short duration (one class period).

Fourth, The Ohio State University makes provision for doctoral candidates to rent computer laboratories for dissertation research. Thus, the experiment could be conducted with intact classes, a minimum of disruption, few problems in obtaining subjects, and no knowledge on the parts of the subjects that they were participating in an experiment until after the experiment was completed.

Fifth, the French Section traditionally requests students to fill out a "Class Registration Form" on one of the first few days of class. This ensures the Section that all students have either taken the prerequisite course or have taken a placement examination. Permission was granted to the experimenter to make minor changes in the form to gain the information needed (grade point average and last final grade in French) to preplace subjects in treatment cells according to verbal ability. That the form is a normal procedure in the section and that it was distributed...
and collected by the classroom instructor helped to protect against the Hawthorne Effect.

Of the total fall quarter, 1984 classroom-track French 104 (hereafter, 104) population of approximately 267 students in 13 sections, 136 subjects from eight sections served as the subjects. The computer laboratory that was used had only 21 computers. Of the eight sections of 104 that participated, only two had more than 21 students enrolled. In both of these cases, however, the number of eligible subjects (as a result of the verbal-ability classification) was 21 or less. Thus, all eligible subjects who attended class on the day of the experiment participated in the experiment. In order that the sample would reflect the population as accurately as possible within the restrictions of the experimental procedures, four of the six 104.01 sections, two of the four 104.02 sections, and two of the three 104.03 sections were selected to participate. The single 104.04 section was not included. An additional restriction on section selection was the availability of the computer laboratory and class meeting times. All of the 104 instructors who were asked to permit their classes to participate agreed to do so.

It is contrary to policy of the Department of Romance Languages to allot classroom time for non-instructional
activities like, for example, the administration of the Modern Language Aptitude Test (MLAT); therefore, other data were utilized to classify subjects according to high- and low-verbal ability. At The Ohio State University, ACT and SAT scores are difficult to access. Even if they had been provided, it is likely that several subjects would have had to be eliminated for one of several reasons. First, in any given year, only approximately 85% of the students enrolled in undergraduate courses have taken the ACT or the SAT. Second, because the tests are normally taken at different stages in students' careers (e.g., junior year of high school vs. senior year of high school), scores cannot be expected to reflect accurate comparisons of even past verbal ability. Also, because the lapse between the time of the taking of the ACT and the experiment can span anywhere from six months to several years for a given subject, using this data to classify according to present verbal ability risks being inaccurate. Furthermore, at least one researcher (Chastain, 1975) has found SAT verbal scores to have only a mild correlation with language achievement ($r = .17$).

To avoid the many problems involved in the use of aptitude tests and achievement tests to place students, two other measures that have been shown to correlate relatively strongly with second language achievement were utilized: grade point average and last final grade in French. The
correlation between grade point average and aptitude has been found to be $r = .62$ (Pimsleur, 1968). Furthermore, the correlation between previous second-language final grade and aptitude has been shown to be $r = .62$ (Pimsleur, 1966).

Subjects were placed in high- or low-verbal-ability classifications according to median splits of ranked grade point average and ranked most recent final grade in French using the following procedure. First, the subjects were ranked for each of these two measures. For grade point average, the split occurred between 2.77 and 2.76; for last final grade in French, the split occurred between B and B-. Any student who crossed over from one classification to the other as a result of the rankings (i.e., who failed to be classified twice as either high- or low-verbal-ability) was not eligible to be a subject. This procedure resulted in 147 of the 168 students enrolled in the participating sections being eligible to serve as subjects. Of the 147, 144 attended class on the day of the experiment. Following Kerlinger's paradigm (1973, p. 268), all of the 144 subjects were assigned to experimental cells, and when the experiment was completed, a total of eight subjects were eliminated from experimental cells to equalize the cells to the number of subjects in the smallest cell. This procedure was conducted at random on a cell-by-cell basis and resulted in a total of 136 subjects with 17 in each of
the eight experimental cells.

**Research Design**

Based upon Salomon's (1979) suggestion for incorporating learner, task, and coding element independent variables in single experiments on the interaction of media with cognition, this study utilized a $2 \times 2 \times 2$ factorial design. This type of design controls for history, maturation, and testing threats to validity. In addition, variables which cannot be manipulated can be controlled (Kerlinger, 1973, p. 257). Its drawback is that repeated measures cannot be used, thus many subjects must participate.

Because the independent variable of primary interest was the coding element, passage availability, and because its second treatment, passage unavailability, also served as a control for a no-treatment effect, no control group was utilized in this experiment. Furthermore, no provision was made for classroom effect because this experiment was conducted during the second week of class and because the class groups were moved to a new locale for the experiment. Also, different subjects from the same class received different treatments, and all subjects in the same cell received identical practice treatments because they were provided by identical computer software.

After assignment to either the high- or
low-verbal-ability classification, subjects were randomly assigned to one of four treatments based on the combination of the task and the coding-element independent variables:

1. lower-level questions
   passage available during postquestioning
2. lower-level questions
   passage unavailable during postquestioning
3. higher-level questions
   passage available during postquestioning
4. higher-level questions
   passage unavailable during postquestioning.

This design, which is illustrated in Figure 1, not only had the advantage of determining the main effects of the three independent variables, verbal ability, level of question, and passage availability, but also had the potential of identifying any significant interactions between levels of any one independent variable and levels of any other independent variable.
Figure 1.

*2 x 2 x 2 factorial design*

<table>
<thead>
<tr>
<th></th>
<th>passage available (A₁)</th>
<th>passage unavailable (A₂)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lower-level questions</td>
<td>higher-level questions</td>
</tr>
<tr>
<td>(B₁)</td>
<td>(A₁B₁C₁)</td>
<td>(A₁B₂C₁)</td>
</tr>
<tr>
<td></td>
<td>lower-level questions</td>
<td>higher-level questions</td>
</tr>
<tr>
<td>(B₁)</td>
<td>(A₂B₁C₁)</td>
<td>(A₂B₂C₁)</td>
</tr>
</tbody>
</table>

- **Low-verbal ability (C₁)**
  - (A₁B₁C₁)
  - (A₁B₂C₁)
  - (A₂B₁C₁)
  - (A₂B₂C₁)

- **High-verbal ability (C₂)**
  - (A₁B₁C₂)
  - (A₁B₂C₂)
  - (A₂B₁C₂)
  - (A₂B₂C₂)
Variables and Instrumentation

The first independent variable was the coding element, passage availability. It was a fixed, active (treatment) variable and had two levels:

1 passage available--during questioning the passage remained on the computer display. In case of a wrong response, feedback concerning why the answer was incorrect was provided and up to two additional tries were allowed while the passage remained available.

2 passage unavailable--the passage was removed from the computer display when the subject was asked a postquestion. During diagnosis and further feedback, the passage remained unavailable.

The second independent variable was the level of task variable, level of comprehension questions. The comprehension questions were interspersed after reading passages, and were designed as part of the experimental reading practice. Level of questions was a fixed, active variable that had two levels, lower-level questions and higher-level questions. All questions were provided in English, in a four-alternative multiple-choice format. The level of the question (task) reflected the level of processing required to respond successfully to a given set of adjunct postquestions. Lower-level questions were defined as questions that require the reader to indicate if a given native language substantive was used in the reading
passage in the target language. Understanding of individual words was a requirement of the task; however, meaningful, integrative reading was not required. Higher-level questions asked about a major point of the passage. They could not be answered correctly (except by chance) without the reader's having integrated the ideas in at least two separate clauses or propositions in the passage.

This instrumentation for these two levels of questions was validated using the following procedures. To ensure that the texts were appropriate to the reading level of French 104 students in their second week of class, five teaching assistants who were teaching or had recently taught French 104 at The Ohio State University were asked to rate five reading texts on their difficulty for 104 students. The one practice and one experimental text that were chosen were both rated by all five raters either four or five on a seven point scale of difficulty (one on the scale was "far too easy" and seven was "far too difficult") (see Appendix A). The mean rating for the practice text, "Ma femme, ma télé et moi" was 4.2. The mean difficulty rating for the experimental text, "Les enfants, la famille et l'argent" was 4.4.

The texts that were chosen were natural texts from recent French periodicals, reprinted and shortened for the cultural reader Réalités Françaises (J. A. Murphy,
1984) (see Appendix B). Permission to use the two selections for experimental purposes was granted by the publisher. The two texts dealt with issues that reflect problems in twentieth-century living shared to a great degree by both French and American culture. The practice text was about the way television has had a detrimental effect upon interpersonal relationships. The experimental text discussed alternative ways of dealing with the family budget and teaching children about money. It was surmised that nearly any student would have adequate schemata to relate meaningfully to these topics, and that few, if any, subjects would have an unfair advantage because of expertise in the content areas.

The content of the passages was not judged to be overly predictable. For example, new words are coined, arguments and counter-arguments are presented, and creative solutions are presented. Thus, comprehension of the texts was a prerequisite for recall with little advantage provided for cultural or world knowledge. The prose structure, however, was typically French, including dialectical examples, the use of ellipses to underline irony, and the references to literary examples for evidence of everyday occurrences. As a result, subjects with skills in reading natural French did have an advantage in comprehending and subsequently recalling the texts. The above criteria for text selection were based on the fact
that the dependent measure in this study was recall based on comprehension. The purpose of choosing texts that used natural French prose but that were, at the same time, culturally accessible to non-French readers was to protect, as well as possible within the confines of the experimental design, against text-based threats to validity.

Next, two native-speaker French teaching assistants at The Ohio State University were asked to read the two texts and identify any obscure or unnatural uses of language and to evaluate the overall naturalness of the texts. Both raters indicated that they did not understand one expression, "le chapeau rond noir" as it was used in the experimental text. They both agreed that the text was clear without this reference, thus it was decided to strike the expression from the practice materials. Otherwise, both rated the texts as authentic and natural.

The texts were then read again by three of the five original evaluators to determine if any cultural explanations should be provided prior to reading in order to facilitate comprehension. It was decided that in spite of the fact that "tante Agathe" (France's somewhat obscure equivalent to "Emily Post") was quoted in the experimental text, failure to appreciate her rather limited cultural identity in France would not detract seriously from comprehension of the selection. This carefully considered decision was based on three criteria. First, the recall
proposition that related to the fact that tante Agathe expressed opinions concerning children and their financial education within the family only received a 2.3 rating of importance (out of seven possible points) to the overall meaning of the text (see pp. 127-8 for a description of this measure). Second, only one of the three native speakers who read the text knew of her identity. Third, a short explanation concerning tante Agathe was provided in the pilot study prereading instructions. Based on the overemphasis placed on tante Agathe in recall protocols from the pilot study (due, it seemed, to the subjects' having just read an explanation of her identity prior to their reading), it was judged that explaining the identity of tante Agathe placed too much emphasis upon what was judged to be a relatively inconsequential aspect of the text, and that such a prereading explanation might, in this case, even serve as a threat to validity. All three evaluators judged that the experimental materials contained no cultural references or suppositions that, if not understood by the subjects, would impede comprehension.

Prior to beginning the reading practice, the title of the selection and the general topic of the entire text was provided to all treatments. These schema inducers were utilized to control for the confounding effects of not providing adequate prereading or orienting assistance, an especially pertinent precaution in the case of computer-
assisted reading practice in which subjects both cannot control the program to return to previously read passages and are required to answer postquestions. (See Appendix E for a printout of the computer programs for each treatment.)

After the texts were chosen, lower-level questions were written. Each of these questions began "Which French equivalent of one of these words appears in this passage?"; then, four alternatives were provided in English. All English choices were checked against the glossary in the back of the textbook used in 101, 102, and 103 to assure that students would be potentially familiar with all four alternatives in French. Of the 13 words questioned, five were taken from the first third of the passage, five were taken from the second third, and the three were taken from the last third of the passage.

Higher-level questions were based upon a major point of each passage. Three French-language teaching assistants were asked to read each passage and write one sentence in English that described the main point. These analyses were used to select the content of the questions. Each question required the reader to integrate the meaning of at least two propositions from the passage in order to answer correctly.

In all, two questions of each type were prepared for each passage. To protect against passage independency (the
provision of clues in the question so that reading the passage is not a prerequisite for correct answering)

Pyrczak's (1972) method of determining the degree of passage independency of each question was utilized:

Where

\[ p_m = \text{the proportion of validation examinees who mark the correct alternative without having read the passage} \]

\[ p_e = \text{the proportion of items that would be expected to be marked correctly by chance alone} \]

\[ I = \text{the index of passage independency (the extent to which subjects can answer an item correctly without having read the passage)} \]

\[ I = p_m - p_e \]

The closer the index number is to .00 the more passage-dependent the question is. A negative index indicates that fewer than the number of subjects expected to choose the item on the basis of chance alone did choose the item. A positive index indicates that more subjects chose the correct alternative than would be expected on the basis of chance alone. As Pyrczak (1972) recommends, passage dependency was evaluated on the basis of the correct alternative alone. Because all questions had four alternatives, each alternative had a \( p_e = +.25 \) and a maximum range of from -.25 to +.75 for \( I \). Because Pyrczak's research indicates that achieving near zero passage dependency for higher-level questions is much more difficult than for lower-level questions, it was determined
that any lower-level question with a passage independency index of between -.07 and +.15 would be acceptable. For higher-level questions, only those items that received a score of between -.10 and +.20 were considered to be adequately passage-dependent. These criteria are well within generally accepted ranges (Pyrczak, 1974).

Twenty-five graduate students in second-language education participated in the passage-dependency validation. They attempted to answer both the higher- and lower-level questions correctly without having read their appropriate passages. Eight items failed to meet the criterion level, but for each passage and each level of question, at least one question demonstrated adequate passage dependency. This procedure succeeded in identifying enough items that were passage-dependent for the creation of both the practice and experimental reading practice materials, because only one question followed each passage.

In order to validate the questions as either higher- or lower-level, five college-level French-language instructors were provided with the operational definitions of both lower- and higher-level questions. They were asked to evaluate each of the questions as "lower-level," "higher-level," or "neither" (see Appendix C). Prior to this procedure, it was determined that two discrepancies from experimenter-assigned classification would be
considered an invalidation of the item. The first time the instrument was distributed, two validators indicated that the instructions provided were not clear enough. Two adjustments were made, and on the second try, all raters validated all of the items as they had been designed.

The third independent variable was the learner variable, verbal ability. It was a fixed, classification variable that was determined as described above (see Population and Sample).

The dependent variable, recall, was measured by requesting the subjects to provide a free recall protocol of the experimental text only. Subjects were instructed to write down everything they could remember about the experimental text entitled "Les enfants, la famille et l'argent" (see Appendix G). These protocols were scored using a weighted propositional count (Meyer, 1973). To create this instrument, the researcher developed a listing of all possible idea units or propositions presented in the experimental text. One college-level French instructor matched the list to the text and made several suggestions for additions and changes in wording. Then, three college-level French instructors were requested to evaluate the list and suggest additions or (in the case of repetitions or inaccuracies) deletions. Then, using the
experimental text as their guide, they were asked to assign each proposition a rating on a seven-point scale (1 = of negligible importance to the meaning of the text, 7 = extremely important to the meaning of the text) (see Appendix D). Following Meyer's approach, the mean rating of each item became its assigned value (see ratings listed in Appendix D). All of the original 160 propositions provided to the raters were designated as accurate by each rater, and none was added. The sum of the mean ratings for all of the propositions resulted in the possible number of recall points totaling 540.1.

When the experiment was completed, the researcher analyzed the recall protocols and scored them checking each protocol for each of the possible propositions. The sum of the weighted values of all of the propositions that were included in the protocol comprised the recall score. Following Murphy and Puff's (1982) recommendations, incorrect or inaccurate information did not count against the score. Furthermore, neither the identity nor the experimental treatment of the protocol's author was available to the rater.

In order to insure rater reliability, the experimenter spent two hours training a college-level intermediate French instructor on how to use the propositional rating scale and on how to score a protocol. In addition, the
instructor was told to read the experimental text several times to become thoroughly familiar with it. Next, ten protocols were randomly selected from the pilot study. Both the experimenter and the French instructor scored separate photocopies of the ten protocols. Rater reliability established after this procedure was $r = .74$. In an attempt to raise the level of inter-rater reliability to $r = .90$, the French instructor and the experimenter spent an additional four hours discussing the discrepancies between the propositions identified for each of the ten protocols scored. Ten additional recall protocols from the pilot study were randomly selected and scored by both raters. From this process, an inter-rater reliability coefficient of .91 was established.

Although not an experimental variable, the Likert-scale, used both as a filler task between the reading practice and the writing of the recall protocol and as a means of providing descriptive data about the subjects' attitude toward the type of reading practice in which they engaged, was subjected to the following procedures. First, prior to being utilized in the pilot study each item was examined for the informal criteria required of Likert-style items as outlined by Edwards (1957, p. 34-35). These criteria include avoiding the use of the following: past tense, universals (such as "only,"
"just," etc.), esoteric terms, complex statements, factual statements, double negatives, statements that are generally held as true by the public at large, and ambiguities. In order to control against an acquiescence response set (Triandis, 1972), approximately one half of the items (five of the eight) were reversed from positive to negative wording.

Second, Likert's (1932) method of using summated ratings through item analysis was conducted on the pilot study data to determine if each item discriminated adequately between overall favorable and overall unfavorable reactions. Following Likert's design, the means of the individual items' responses from the top 25% of the subjects (most favorable) were compared to those from the bottom 25% (least favorable). It was determined that on a five-point scale an item with a discrimination index of 1.3 or above would qualify for inclusion in this descriptive instrument. All item analyses resulted in positive indices, which indicated correct directional interpretation of item wording. Of the twelve items tested, eight met the criterion level. The item that was retained which produced the lowest discrimination index (1.3) was worded, "The questions in this reading practice are too difficult." The item that was retained which produced the highest discrimination index (2.4) was worded, "I think I remember less from this type of reading practice
than I do when I read French from a book." Appendix F provides a copy of the entire instrument.

To assure that the 1.3 - 2.4 discrimination-index range would yield adequately reliable results, Likert's method of split-half correlation of each subject's responses to attitude items was used. Using the pilot study data, each subject's responses to the eight attitude items were correlated on an even-odd item basis. This resulted in an overall reliability co-efficient of .87.

Finally, two items were designed to provide information concerning any correlation between the subjects' past experience with computer-assisted instruction and their attitude toward the experimental practice. Because the purpose of these two items was to sub-classify subjects rather than to discern attitudes, they were not subjected to an item analysis. The first item read, "Before today, I have already had the opportunity to use the computer for practice or instruction for another course besides foreign language." The second item stated, "Before today, I have already used the computer to practice or learn a foreign language." The only purpose of these items was to correlate attitude toward the type of practice experienced in the experiment with degree of previous experience with CAI.
Procedures and Data Collection

This experiment was conducted during eight classroom periods on September 27 and September 28, 1984 at The Ohio State University. Participants in the experiment were told by their classroom teachers the day before the experiment that during the next class meeting they would practice reading French using the computer. They were informed that the French Section would like their reactions to the materials in order to make decisions about how to implement computer-assisted reading practice for 104 students in the future. The instructors told their classes to meet for their regular class period in the computer lab in Cockins Hall on The Ohio State University campus.

Prior to the arrival of the participants, individual computers were assigned to subjects based first on their verbal-ability classification and then on random placement in one of the four remaining treatments cells. A running tally was kept of absences in order to reassign subjects to cells that began to fall below the average number of participants. This insured that the last sections to participate were not disproportionately reassigned to one or two treatments that may have needed additional subjects. As participants arrived at the computer lab, they were taken to the appropriate computer by a laboratory assistant and told to sit down. Those students who did not participate in the experiment because they were not placed
in the high- or low-verbal-ability classifications and because there was an inadequate number of computers were given the practice and experimental texts to read from photocopies. When a computer became available, they were given the opportunity to practice on the computer and provide their evaluations. In addition, several class members who were not eligible to be subjects because of inability to classify them according to verbal ability were assigned computers upon their arrival at the experimental site if the class size was small enough that there were more computers than needed by the subjects. Any data that was generated by these two groups of non-participants was not included in the data analysis.

When all of the subjects were seated, they were informed that they should reserve judgment on the materials until they had completed the practice, and that they should attempt to do their best at reading and answering the questions. No mention of the variety of treatments was made. Each treatment began with the reading of and answering questions on a three-passage practice text on the influence of television on relationships. This text served to orient the subject to the combination of level of question and passage-available / passage-unavailable treatment to expect. The experimental text followed and consisted of a ten-passage text on children, the family, and money. After each passage, the subject responded to a
treatment-specific comprehension question. If the subject answered incorrectly, the program indicated why the answer was unacceptable and gave as many as two more opportunities with feedback to answer correctly. If the subject failed to answer correctly after three tries, the program proceeded without providing the correct answer. Feedback was based on the answer chosen, and did not make reference to how to discern the correct answer. Thus, in neither group did feedback directly lead the student to the correct answer. This precaution served to control against feedback operating as a threat to validity. (See Appendix E for printouts of the programs.) Furthermore, this approach insured that subjects who were not participating cooperatively would not be rewarded for their lack of effort with the provision of the correct answer. Recalled information, as a result, could be attributed to level of processing and participation in the reading practice task.

During both the practice and the experimental treatments, unobtrusive, simultaneous measures were taken by the computer on passage processing time, response latencies, trials, and correct responses. Although within this design these measures were not conceived as experimental dependent variables, they were utilized for descriptive purposes. Additional descriptive data was provided by a Likert-scale questionnaire completed by participants subsequent to the reading practice (see
The subjects were provided with the questionnaire and the instructions for writing the recall protocol as follows. When each subject reached the end of his or her computer reading practice, the following was displayed on the subject's monitor, "Now the French Department would like to have your reaction to this type of practice. Please raise your hand and a lab assistant will give you a form to fill out." As subjects raised their hands, lab assistants gave them a two-page form and said the following: "Please fill out page one, then, when you are done with page one, turn to page two and follow the instructions given." At the top of page one, subjects were assured that any information they provided would remain confidential. This page contained the Likert-scale instrument, which was designed to determine the subjects' reactions to the combination of treatments under which they practiced. More importantly, the responding to this scale served as a filler task to delay the recall measure in order to assure that subjects were accessing long-term rather than short-term memory during the writing of the recall protocol. (See Appendix F for a copy of this sheet.) On page two they were told to spend a few moments attempting to recall everything they could from the experimental text, and then to write down in English as much as they could remember from the experimental text.
(See Appendix G for a copy of this sheet.) Students were asked to remain until the end of the class period in order to encourage all participants to give maximum effort to this task. At the end of the class period, participants were permitted to leave.

The day following the experiment a letter was written to the instructors of each section that participated requesting that they read an attached explanation to their students concerning the nature of their participation. The explanation included the information that the students had participated in an experiment, that simultaneous measures had been taken on their reading practice, that they had practiced under different treatments, and that any student had the option of erasing the data and revoking their recall protocol if they did not wish to be included in the data analysis. Furthermore, an explanation was provided about why reading for meaning rather than reading by decoding is much more effective for long-term retention.

**Pilot Study**

A pilot study comprised of subjects from two sections of French 104 was conducted at the Ohio State University on June 22 and June 27, 1984. The purpose of the pilot study was to verify the feasibility of the proposed procedures and to determine the number of subjects that would be required for the actual experiment.
On the first day of the pilot study the orienting text was comprised of eight passages and comprehension questions. The experimental passage was comprised of ten passages and questions. The first group of subjects in the study did not have enough time to complete the entire experimental process: reading practice, completion of the Likert-scale questionnaire, and writing of the recall protocol. For the second group of subjects, the practice text was shortened to only three passages, and the experimental text was not altered. All participants in this group had enough time to complete the recall protocol.

There were six subjects assigned to each treatment in this study. When the recall protocols were analyzed, it became apparent that there was considerable variability in the levels of recall within cells. In order to achieve adequate power to discern differences, it was decided that, within the confines of scheduling problems, as large a sample as possible would be drawn.

In addition, results from the pilot study were utilized in establishing reliability and validity. The responses from the Likert-scale questionnaire were subjected to an item analysis to establish their ability to discriminate between positive and negative reactions to the reading practice. Also, the recall protocols generated in the pilot study were used to establish rater reliability (see Variables and Instrumentation).
Data Analysis

The recall scores obtained from the students' protocols were subjected to a three-way factorial analysis of variance (ANOVA) to test the null hypotheses of no differences between groups and no interactions between levels of different independent variables. The SAS (Statistical Analysis System) package was utilized on an Amdahl V-7B computer at The Ohio State University. For the one significant first-order interaction that resulted, a Tukey's Omega post hoc test of pairwise comparisons of means was conducted.

The simultaneous measures (passage processing time, response latencies, trials, and correct responses) and the questionnaire results served as additional descriptive data. For both the individual simultaneous measures and individual questions from the questionnaire, means and standard deviations were computed for each of the eight research design cells as well as for subjects across gross treatments (passage availability vs. passage unavailability; lower-level vs. higher-level questions and for high- vs. low-verbal ability). In addition, several correlations were computed for data that were particularly pertinent to the major thrust of the experiment. In Chapter IV, only those descriptive results that bear on the experimental results or that are of particular interest for
further related research are reported.

Summary

This study investigated the effects of passage availability vs. passage unavailability during interspersed adjunct postquestioning in computer-assisted French reading practice upon recall of the text read. In order to appreciate more fully and determine the context of any effects, two additional independent variables were considered, level of comprehension questions (higher-level vs. lower-level) and level of verbal ability of the subjects (high vs. low). This 2 x 2 x 2 factorial design utilized a recall score assigned to a free recall protocol as the dependent measure.

It was hypothesized that passage availability is a levels of processing variable, i.e., different treatment levels of passage availability would affect and be affected by other known levels of processing variables, specifically level of comprehension question and verbal ability. The use of a factorial design allowed this hypothesis to be tested in an efficient and thorough manner.

Furthermore, several simultaneous measures and an attitude questionnaire were utilized to provide useful descriptive data from the study. These results were not considered part of the experimental design, but served as descriptive information that may be useful for the
generation of hypotheses for future studies in this area.

**Summary of Null Hypotheses**

H$_0$ 1: There will be no significant difference attributable to passage availability during adjunct questioning on the recall measure of reading comprehension.

H$_0$ 2: There will be no significant difference attributable to the level of comprehension question on the recall measure of reading comprehension.

H$_0$ 3: There will be no significant difference attributable to level of verbal ability on the recall measure of reading comprehension.

H$_0$ 4: There will be no significant interaction between the passage-availability variable and the level of comprehension question variable.

H$_0$ 5: There will be no significant interaction between the passage-availability variable and the level of verbal ability variable.

H$_0$ 6: There will be no significant interaction between the level of comprehension question variable and the level of verbal ability variable.

H$_0$ 7: There will be no significant interaction among the passage-availability variable, the level of comprehension question variable, and the level of verbal ability variable.
CHAPTER IV
RESULTS AND DISCUSSION

Introduction

This study investigated the effects of passage availability during interspersed comprehension postquestioning on semi-delayed recall in early-intermediate college-level French students. All practice was conducted using microcomputers with the software providing feedback based on the response chosen by the subject. A maximum of three trials per question was allowed. Two additional independent variables were also investigated in this study, the effects of the conceptual level of comprehension questions and the effects of the learner variable, verbal ability.

A 2 x 2 x 2 factorial design was chosen for the study because of its potential for examining not only the main effects of the three independent variables but also any interactions that might occur. The passage-availability variable consisted of two levels, available or unavailable. Subjects for whom the passage was available had the passage displayed on their monitors throughout the questioning / feedback portion of the practice. Subjects in the
passage-unavailable treatment did not have the passage available for reinspection during questioning / feedback.

The level of question variable was based on the conceptual level of the interspersed reading practice questions. There were two conditions for this variable, lower-level questions and higher-level questions. Lower-level questions simply asked the subject to indicate which French equivalent among four English nouns had appeared in the passage. Higher-level questions required the subject to integrate at least two propositions that appeared in separate clauses in the passage in order to answer correctly. All questions were asked in English. A practice text comprised of three passages was utilized to orient each subject to his or her assigned treatment without making direct reference to the fact that different subjects were practicing under different treatments. This allowed the subject to become aware, prior to reading the experimental text, both of whether or not the passage would be available during postquestioning and of the type of question to expect after reading each passage.

The learner independent variable, verbal ability, was comprised of two categories, high- and low-verbal ability. Each subject was rated either high- or low-verbal-ability according to both of two criteria, last final grade in
French and grade point average. A median split was used in both cases to determine the two placements. Those subjects who placed in either the high- or the low-verbal-ability group twice as a result of the two criteria participated in the experiment. Because this experiment involved the use of intact classes, subjects who crossed over from one group to another as a result of these two placements participated in the reading comprehension practice, but were not included in the data analysis.

After reading the practice text, which consisted of three passages and treatment-specific questioning, the subjects read the ten-passage experimental text and answered interspersed postquestions. Throughout the practice, several simultaneous measures were stored by the computer. These measures, which included initial passage processing time, response latencies, trials, and correct responses, were designed as descriptive measures and were not considered part of the experimental design per se. After the practice, subjects were asked to fill out a ten-question Likert-scale questionnaire on both their past experience with computer-assisted instruction and their attitudes toward this type of practice. This measure was designed primarily to delay the surprise recall protocol in order to assure that subjects would be accessing long-term rather than short-term memory. In addition, the
questionnaire was devised to provide additional, descriptive data. Finally, the subjects were asked to write a free recall protocol on the experimental text. The dependent variable for this design, semi-delayed recall, was the score assigned to this protocol.

The dependent measure was computed as follows. Each proposition in the text was given a weighted score (from one to seven points) according to its importance to the overall meaning of the text (see Chapter III and Appendix D). Recall protocols were examined for accurate provision of each valid proposition. The sum of the weights of the valid propositions provided in a given recall protocol determined its score.

An analysis of variance appropriate to a three-way factorial design was computed using the SAS (Statistical Analysis System) at The Ohio State University on an Amdahl V-7B computer, which uses an IBM MVS operating system. In order to determine the nature of the single interaction that emerged, a Tukey's Omega post hoc test was conducted.

Results

Experimental Data on the Recall Dependent Variable

Table 1 provides the means and standard deviations for two of the three independent variables, passage
availability and level of question. Examination of the table points to strong main effects for both of these independent variables. Subjects who did not have the passage available to them for reinspection during comprehension questioning scored higher on the recall measure than those subjects for whom the passage remained available on the computer monitor. In addition, those subjects who answered higher-level questions scored higher on their recall protocols than subjects who answered lower-level questions.

Table 1. Means and Standard Deviations of Recall Scores as a Function of Passage Availability and Level of Question

<table>
<thead>
<tr>
<th></th>
<th>lower-level questions</th>
<th>higher-level questions</th>
<th>OVERALL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean</td>
<td>S.D.</td>
<td>mean</td>
</tr>
<tr>
<td>passage available</td>
<td>31.44 14.93</td>
<td>77.88 36.34</td>
<td>54.65</td>
</tr>
<tr>
<td>passage unavailable</td>
<td>38.34 20.14</td>
<td>89.93 46.18</td>
<td>64.14</td>
</tr>
<tr>
<td>OVERALL</td>
<td>34.89 17.94</td>
<td>83.90 41.69</td>
<td>59.39</td>
</tr>
</tbody>
</table>
Table 2 presents a comparison of the level of question variable and the verbal-ability variable. Low-verbal-ability subjects scored lower on the recall measure than high-verbal-ability subjects for both levels of questions answered during the reading practice. In addition, the table demonstrates that across levels of verbal ability, subjects who answered higher-level questions consistently achieved higher recall scores than subjects who answered lower-level questions.

<table>
<thead>
<tr>
<th>Table 2.</th>
<th>Means and Standard Deviations of Recall Scores as a Function of Level of Question and Verbal Ability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>low-verbal ability</td>
</tr>
<tr>
<td></td>
<td>mean</td>
</tr>
<tr>
<td>lower-level questions</td>
<td>28.69</td>
</tr>
<tr>
<td>higher-level questions</td>
<td>61.37</td>
</tr>
<tr>
<td>OVERALL</td>
<td>45.03</td>
</tr>
</tbody>
</table>
This consistent pattern of the higher recall scores being achieved by passage-unavailable, higher-level-questions, and high-verbal-ability conditions is demonstrated by the mean scores of all possible combinations of pairs of independent variables in Tables 1, 2, and 3; and by Table 4, which provides the means and standard deviations of recall scores for all eight experimental cells.

<table>
<thead>
<tr>
<th>Table 3. Means and Standard Deviations of Recall Scores as a Function of Passage Availability and Verbal Ability</th>
</tr>
</thead>
<tbody>
<tr>
<td>low-verbal ability</td>
</tr>
<tr>
<td>mean</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>passage available</td>
</tr>
<tr>
<td>passage unavailable</td>
</tr>
<tr>
<td>OVERALL</td>
</tr>
</tbody>
</table>
Table 4. Means and Standard Deviations of Recall Scores by Passage Availability, Level of Question, and Verbal Ability

<table>
<thead>
<tr>
<th>Passage Availability</th>
<th>Low-Verbal Ability</th>
<th>High-Verbal Ability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td>Available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower-level questions</td>
<td>26.18</td>
<td>10.15</td>
</tr>
<tr>
<td>Higher-level questions</td>
<td>59.13</td>
<td>23.64</td>
</tr>
<tr>
<td>Unavailable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower-level questions</td>
<td>31.20</td>
<td>18.64</td>
</tr>
<tr>
<td>Higher-level questions</td>
<td>63.62</td>
<td>24.12</td>
</tr>
</tbody>
</table>
The results of a factorial analysis of variance for a three-factor design are summarized in Table 5. The main effects of all three independent variables proved to be significant. The test of difference between the passage-available treatment and the passage-unavailable treatment was statistically significant at the \( p < .05 \) level (\( F(1, 128) = 4.05 \)). Both the level of question treatment (\( F(1, 128) = 108.26 \)) and the verbal-ability classification (\( F(1, 128) = 37.18 \)) were significant at the \( p < .001 \) level. Thus, the apparent differences in Tables 1, 2, and 3 of higher recall scores for the passage-unavailable, higher-level-questions, and high-verbal-ability conditions were confirmed by the analysis of variance. In addition, the ANOVA indicated only one first-order interaction and no second-order interaction. Although the passage-availability variable did not interact with any other variable, the level of question variable and the verbal-ability variable did significantly interact (\( F(1, 128) = 12.02, p < .001 \)). Means and standard deviations for these two variables are provided in Table 2.
Table 5. Analysis of Variance of Recall Scores by Passage Availability (A), Level of Question (B), and Verbal Ability (C)

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>DF</th>
<th>SUM OF SQUARES</th>
<th>MEAN SQUARE</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (passage availability)</td>
<td>1</td>
<td>3055.21</td>
<td>3055.21</td>
<td>4.05*</td>
</tr>
<tr>
<td>B (level of question)</td>
<td>1</td>
<td>81673.20</td>
<td>81673.20</td>
<td>108.26***</td>
</tr>
<tr>
<td>C (verbal ability)</td>
<td>1</td>
<td>28051.40</td>
<td>28051.40</td>
<td>37.18***</td>
</tr>
<tr>
<td>A x B</td>
<td>1</td>
<td>224.67</td>
<td>224.67</td>
<td>.30</td>
</tr>
<tr>
<td>B x C</td>
<td>1</td>
<td>9069.36</td>
<td>9069.36</td>
<td>12.02***</td>
</tr>
<tr>
<td>A x C</td>
<td>1</td>
<td>758.60</td>
<td>758.60</td>
<td>1.01</td>
</tr>
<tr>
<td>A x B x C</td>
<td>1</td>
<td>273.89</td>
<td>273.89</td>
<td>.36</td>
</tr>
<tr>
<td>Within Groups</td>
<td>128</td>
<td>96568.52</td>
<td>754.44</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>135</td>
<td>219674.86</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05

***p < .001
Following are the specific results for each null hypothesis tested in this experiment:

\( H_0^1 \): There will be no significant difference attributable to passage availability during adjunct questioning on the recall measure of reading comprehension. This hypothesis must be rejected on the basis of the data. The \( F \)-ratio produced for this variable was significant at the \( p < .05 \) level. In fact, Table 4 illustrates that passage-unavailable groups consistently outperformed their passage-available counterparts, though the differences are never as great as the differences that emerged for both the level of question variable and the verbal-ability variable.

\( H_0^2 \): There will be no significant difference attributable to level of the comprehension question on the recall measure of reading comprehension. On the basis of the data from this study, this hypothesis must also be rejected. The analysis of variance yielded a significant \( F \)-ratio (\( F(1, 128) = 108.26, p < .001 \)). Table 4 shows that all cells that practiced lower-level comprehension questions scored lower than their counterpart cells that answered higher-level questions. The practicing of higher-level comprehension questions yielded recall scores for treatment cells that ranged from a mean of 59.13 (S.D. = 23.64) to 116.24 (S.D. = 48.44), while lower-level questions yielded cell means ranging from 26.18.
(S.D. = 10.15) to 45.48 (S.D. = 19.52).

$H_0^3$: There will be no significant difference attributable to the level of verbal ability on the recall measure of reading comprehension. On the basis of the analysis of variance this hypothesis must be rejected as well. An $F$-ratio that was significant at the $p<.001$ resulted from the comparison of the cell means based on this variable. High-verbal-ability subjects consistently outperformed low-verbal-ability subjects. Although the mean difference between cell means for lower-level questions ($M = 12.40$) is not as great as the mean difference between cell means for higher-level questions ($M = 45.05$), the general pattern of higher scores being achieved by the high-verbal-ability cells remained consistent throughout.

$H_0^4$: There will be no significant interaction between the passage-availability variable and the level of comprehension question variable. On the basis of the analysis of variance, this hypothesis cannot be rejected. The higher recall scores of passage-unavailable groups remained stable across level of question cell means comparisons.

$H_0^5$: There will be no significant interaction between the passage-availability variable and the level of verbal-ability variable. The analysis of variance indicated a non-significant $F$-ratio for such an
interaction. The lack of this Aptitude-Treatment Interaction (ATI) showed that passage unavailability benefitted both low- and high-verbal-ability learners with neither group benefitting significantly more than the other. Thus, the null hypothesis remained tenable.

$H_6$: There will be no significant interaction between the level of comprehension question variable and the level of verbal ability variable. The analysis of variance indicated that these two variables combined to create an Aptitude-Treatment Interaction that was statistically significant at the $p<.001$ level. A comparison of pairwise means (Figure 2) indicates that though high-verbal-ability subjects recalled more than low-verbal-ability subjects when both groups practiced lower-level questions, the tendency toward this effect is even stronger in the higher-level-question treatment where high-verbal-ability subjects showed even greater recall gains than low-verbal-ability subjects.
Figure 2. Interaction Plot of Recall Scores for Level of Question and Verbal Ability

- O = low-verbal ability
- • = high-verbal ability

Recall Score

Level of Question

lower-level
higher-level

B₁C₂
B₂C₁
B₂C₂
In order to determine the nature of this first-order interaction, a Tukey's Omega pairwise comparison of means was conducted. This post hoc test makes use of the studentized range and uses a single computed value for judging the comparison of all differences (Steele and Torrie, 1980). The results of this test, which are provided in Table 6, indicated that three pairs of combinations of level of question (B) and level of verbal ability (C) had significant effects upon recall.

In all three cases, the higher-level-questions / high-verbal-ability category \((B_2C_2)\) participated in the interaction. Furthermore, all possible comparisons with the higher-level-questions / high-verbal-ability groupings \((B_2C_2)\) were statistically significant. The higher-level-questions / high-verbal-ability combination \((B_2C_2)\) was statistically different from both the lower-level-questions / high-verbal-ability condition \((B_1C_2)\) and lower-level-questions / low-verbal-ability condition \((B_1C_1)\) at the \(p < .01\) level.

A comparison of the higher-level-questions / high-verbal-ability treatment \((B_2C_2)\) and the higher-level-questions / low-verbal-ability treatment \((B_2C_1)\), however, resulted in significantly different recall scores at the \(p < .05\) level.
Table 6. All Pairwise Comparisons of Means (Tukey's Omega) to Determine the Nature of the Significant Interaction between Level of Question and Verbal-Ability Independent Variables

<table>
<thead>
<tr>
<th>B x C Pairs</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1C1 x B2C1</td>
<td>32.66</td>
</tr>
<tr>
<td>B1C1 x B1C2</td>
<td>12.39</td>
</tr>
<tr>
<td>B1C1 x B2C2</td>
<td>77.74**</td>
</tr>
<tr>
<td>B2C1 x B1C2</td>
<td>20.29</td>
</tr>
<tr>
<td>B2C1 x B2C2</td>
<td>45.05*</td>
</tr>
<tr>
<td>B1C2 x B2C2</td>
<td>65.34**</td>
</tr>
</tbody>
</table>

*p<.05
**p<.01

B1=lower-level questions
B2=higher-level questions
C1=low-verbal ability
C2=high-verbal ability

In spite of the strong main effects for both level of question (B) and verbal ability (C), this interaction illustrates that when these two variables are considered in concert, only and always was the higher-level-questions/high-verbal-ability combination (B2C2) significantly different from other combinations of the two variables. When this consistent and exclusive interaction is combined with the superior recall scores achieved by this grouping, compelling evidence in favor of this combination over all other possibilities emerges.

The Tukey's Omega (Table 6) also indicated that, in spite of the apparent difference illustrated in Figure 2
between the lower-level-questions / low-verbal-ability combination \((B_1C_1)\) and the lower-level-questions / high-verbal-ability groupings \((B_1C_2)\), this difference was not statistically significant. The strong main effect for verbal ability revealed by the ANOVA (Table 5) was not maintained when the effects of high- or low-verbal ability on recall were examined only for the subjects who practiced lower-level questions \((B_1)\). When only those subjects who practiced higher-level questions \((B_2)\), however, were compared on the basis of the verbal-ability variable, a statistically significant difference in recall \((p<.05)\) in favor of the high-verbal-ability grouping \((C_2)\) resulted.

Similarly, for low-verbal-ability subjects \((C_1)\) the difference in recall resulting from lower-level questions \((B_1)\) compared to higher-level questions \((B_2)\) was not statistically significant. However, for high-verbal-ability subjects \((C_2)\), the difference in recall attributable to level of question was statistically significant \((p<.01)\).

\(H_07: \text{There will be no significant interaction among the passage-availability variable, the level of comprehension question variable, and the level of verbal-ability variable.}\) The data from the analysis of variance indicate that this hypothesis must be retained. The second-order interaction was not statistically significant.
Additional Descriptive Data

The experimental findings of this study are summarized above. Two additional types of data collection were also conducted during the course of the study. These measures included simultaneous reading practice measures (including initial passage processing time, response latencies, correct responses, and number of trials) and the results of a Likert-scale questionnaire on attitudes toward the reading practice experience. They were conceived as additional, descriptive data that may prove useful in the design of further research in this area. In addition, they provide useful information concerning possible causes for the above experimental results. They should not be construed as experimental results, nor can they legitimately be utilized to predict results in replications using other experimental texts.

Data from Simultaneous Reading Practice Measures

In all, eight bits of data were collected by the computer program for each passage read by each subject, totalling 14,144 bits in all. This data collection was unobtrusive and simultaneous with the reading practice. These eight measures included:


1. **initial passage processing time** (the amount of time the subject spent reading the passage prior to pressing the carriage return to request to see the related comprehension question)

2. **last answer response latency** (the amount of time spent processing the question and choosing among the four multiple-choice alternatives for the last time the subject responded to the question. This response was either the correct response on the first, second, or third try; or it was the incorrect response on the third try.)

3. **last answer** (the alternative chosen on the last response)

4. **score for the last answer** (the answer was scored as right or wrong because it was possible to answer incorrectly on the last try if it were a third try)

5. **first to the last answer response latency**

6. **first to the last answer**

7. **second to the last answer response latency**

8. **second to the last answer**

Of the many possible analyses of the above data that are possible, only those descriptions that appear to bear most directly on the experimental thrust of this study or related research will be provided. Analysis of the descriptive data indicated that the following trends occurred in this experiment:

**In all cases, cells in the passage-available condition spent less initial passage processing time than their counterpart passage-unavailable cells.**
Given the option, low-verbal-ability subjects in the higher-level-question treatment chose to view the question earlier than their high-verbal-ability counterparts.

Because there were no interactions between passage availability and either of the two other variables, level of question and verbal ability, it was of interest to compare the strategies used by subjects in the passage-available treatments with those of subjects in the passage-unavailable treatments as evidenced, at least in part, by total experimental (for the ten passages in the experimental text only) initial passage processing times (IPPT) and total experimental first response latencies (FRL) in concert. This was of interest because such information illustrated the fact that knowledge of future passage availability during postquestioning resulted in different strategies (in this case, the choice of when during the passage processing to press the carriage return to view the question) for different treatment cells. Figure 3 illustrates the cell means of IPPT.
Figure 3.

Cell Means of Initial Passage Processing Time (IPPT)

![Bar chart showing cell means of IPPT for lower-level and higher-level questions for low-verbal and high-verbal ability.]

**Lower-Level Questions**
- Low-Verbal Ability
- High-Verbal Ability

**Higher-Level Questions**
- Low-Verbal Ability
- High-Verbal Ability

Legend:
- □ = Passage Available
- ■ = Passage Unavailable

Note: All scores reflect the mean in seconds of the total IPPT for the ten passages in the experimental text.
These results appear to indicate that all treatment cells, regardless of verbal ability or level of question, were adequately oriented to their passage-available / passage-unavailable condition. As would logically be expected, in all cases, subjects who knew that the passage would not be available for reinspection during questioning spent more time reading the passages before pressing the carriage return to view the question (IPPT) than did subjects in their counterpart passage-available condition who knew that even after they pushed the carriage return to view the question, the passage would remain available for reinspection.

When lower-level questions were practiced in the passage-available treatment, comparisons of IPPT between high-verbal-ability (M = 666 seconds) and low-verbal-ability (M = 659 seconds) groups showed negligible differences. There was no difference in IPPT for groups practicing lower-level questions in the passage-unavailable groups (M = 959 seconds for both the low- and high-verbal-ability groups).

The comparison of differences in IPPT for higher-level-question treatments revealed a more striking pattern. In the passage-available condition, low-verbal-ability subjects took a shorter amount of time to process initially the passages (M = 827 seconds) than their high-verbal-ability counterparts (M = 876 seconds). In the
passage-unavailable condition, however, low-verbal-ability subjects' IPPT was longer (\(M = 1041\) seconds) than that of high-verbal-ability subjects (\(M = 918\) seconds). This pattern seems to reveal a type of cooperation and auto-organizing of the text being exhibited by high-verbal-ability learners in the passage-available treatment who, though they had the option of pressing the carriage return to see the higher-level questions before they attempted to comprehend the passage fully, waited longer to press the return than low-verbal-ability subjects who may have used the question to help themselves organize the text.

In all cases passage-available cells used more time for first response latencies (FRL) than their passage-unavailable-cell counterparts.

In the case of lower-level questions, passage-available cells used less time to process up to the first response (PFR), but in the case of higher-level questions, passage-unavailable groups used less PFR time than their passage-available counterparts.

Perhaps even more telling of the strategies employed by subjects who had the option of viewing the question at any time during the reading process (passage-available treatment) compared to the strategies employed by learners
who were required to do all of their visual passage processing prior to viewing the question (passage-unavailable treatment) is a comparison of the combination of IPPT and first response latencies (FRL). Figure 4 illustrates that there was very little difference in processing time from the moment the passage was displayed up to the end of the first response latency (hereafter, "PFR," which equals IPPT + FRL) for lower-level questions.

When comparisons are made on the basis of verbal ability, low-verbal-ability subjects in the passage-available condition utilized about the same PFR time (M = 969 seconds) as did their counterpart high-verbal-ability subjects (M = 981 seconds). In the passage-unavailable condition a slightly larger difference emerged (M = 1073 seconds for low-verbal-ability subjects vs. M = 1047 seconds for high-verbal-ability subjects).
Figure 4.

Cell Means of Reading Practice Time From Display of Reading Passage Up To the First Response (PFR)

---

Note: All scores reflect the mean in seconds of the total PFR time for the ten passages in the experimental text.
When passage availability and level of question are considered in concert, PFR times demonstrate an interaction. In the lower-level-question condition, passage-available treatments consistently used less time on PFR ($M = 969$ seconds for low-verbal-ability subjects and $M = 981$ seconds for high-verbal-ability subjects) than did passage-unavailable subjects ($M = 1073$ seconds for low-verbal-ability subjects and $M = 1047$ seconds for high-verbal-ability subjects). For higher-level questions, however, PFRs did not follow the pattern of cells in the lower-level-question treatment. Passage-unavailable treatments in the higher-level-question condition took less PFR time than passage-available treatments. Whereas IPPTs for all passage-unavailable treatments were consistently higher than their passage-available counterparts, in the case of higher-level-question treatments FRLs were lower for passage-unavailable treatments ($M = 139$ seconds for low-verbal-ability subjects and $M = 151$ seconds for high-verbal-ability subjects) than for passage-available treatments ($M = 411$ seconds for low-verbal-ability subjects and $M = 299$ seconds for high-verbal-ability subjects).

This pattern provides additional evidence that passage availability in this experiment was a levels of processing variable. Clearly, those who practiced under the
passage-available condition processed on a lower level as evidenced by recall scores. That FRLs were consistently much longer under the passage-available condition illustrates that these subjects probably utilized the question to help organize the text and find the answer. Subjects in the passage-unavailable condition, however, were aware that they had to read carefully before viewing the question because they could not return to the passage for help in answering the question. Consistently they used more IPPT than their counterpart treatments, but they also consistently used less time for FRLs.

That subjects in the higher-level-question treatments used more PFR time under the passage-available condition than subjects in the passage-unavailable condition illustrates that answering the higher-level questions in this experiment required top-down processing (higher-level processing) compared to lower-level questions which required decoding skills. Therefore, finding the answer to higher-level questions by reviewing the passage took more time than did accessing one's memory for the answer.

Only low-verbal-ability subjects who practiced lower-level questions took longer to complete the reading practice in the passage-unavailable condition than did their passage-available counterpart group. All other passage-unavailable groups completed the practice in equal
or less time than did their passage-available counterparts.

Total practice time (TPT) only resulted in a mild correlation with subsequent recall scores.

Correct answer (CA) scores only showed a moderate correlation for one grouping, and a negligible correlation for all other groups with subsequent semi-delayed recall scores.

The total reading practice time (TPT) resulted from summing the IPPT, the FRL, and any additional response latencies. (It should be noted that the TPT does not include the program run time for the provision of instructions or for feedback. Because processing probably did occur while the subject was receiving feedback, this less-than-ideal means of determining time on task should be taken into consideration in drawing conclusions.) Figure 5 illustrates that for lower-level questions, low-verbal-ability subjects spent more TPT in the passage-unavailable condition ($M = 1152$ seconds) than did their counterparts in the passage-available condition ($M = 1027$ seconds). For low-verbal-ability subjects, it may have taken less time and may have been less difficult to scan the text for the French equivalent of English nouns than to access this same information from memory or to resort to guessing.
Figure 5.

Cell Means of Total Practice Time (TPT)

Note: All scores reflect the mean in seconds of the TPT for the ten passages in the experimental text.
A comparison of the mean correct answer (CA) scores (illustrated in Figure 6) supports this interpretation. (The correct answer score was computed for each subject for each question then summed for each subject. Three points were awarded for answering correctly on the first try; two for answering correctly on the second try; one for answering correctly on the third try, and 0 for failing to answer correctly in three tries.) A comparison of CA scores for lower-level-question groups indicates that in both the low-verbal-ability and high-verbal-ability conditions, the passage-unavailable treatment resulted in more response trials, and thus lower CA scores than in the passage-available treatments.

For low-verbal-ability subjects in the lower-level-question treatments, passage-available groups not only completed the practice more quickly (M = 1027 seconds for passage-available vs. M = 1152 seconds for passage-unavailable cells) but also received higher CA scores (M = 28.66 for passage-available vs. M = 24.17 for passage-unavailable cells). In spite of these apparently superior results in favor of the passage-available condition, it should be reiterated that under the passage-available condition, significantly less was recalled about the text as evidenced by the recall measure than under the passage-unavailable condition.
Figure 6.

Cell Means of Correct Answer Scores (CA)

<table>
<thead>
<tr>
<th>Lower-Level Questions</th>
<th>Higher-Level Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-Verbal Ability</td>
<td>High-Verbal Ability</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- = Passage Available
- = Passage Unavailable
When the TPT (Figure 5) of high-verbal-ability subjects who answered lower-level questions is compared on the basis of passage availability, the data show a nearly identical amount of TPT used by the passage-unavailable group (M = 1051 seconds) compared to the passage-available group (M = 1050 seconds). When the CA scores and the PFR times for these two treatments are taken into account, however, it becomes clear that these two groups of subjects spent their time employing different strategies. The passage-available group spent less IPPT (M = 666 seconds) and more time looking for the correct answer (M = 315 seconds). This group was also more successful in finding the correct answer (CA M = 27.09) than the passage-unavailable group, which spent more time initially reading the text (M = 959 seconds) and, though they spent less time in total response latencies (M = 91 seconds), had more difficulty choosing the correct answer (CA M = 25.23).

This pattern would seem to indicate that under the lower-level-question treatments, passage-available groups relied heavily upon the printed passage to search for the answer to the postquestion, and that they were less prepared to answer after they had pressed the carriage return to view the question than were the passage-unavailable groups. Although the passage-unavailable groups made more errors in their initial answer choices, it
appears that they were also more ready to enter a second choice than the passage-available groups, who, most likely, spent additional time reinspecting the text to discern the best subsequent choice.

Unlike the lower-level-question / low-verbal-ability treatment, in which the passage-unavailable condition resulted in more time on task, in the higher-level-question treatments, less time was used by passage-unavailable conditions for both low-verbal-ability ($M = 1452$ seconds for passage-available cell vs. $M = 1305$ seconds for passage-unavailable cell) and high-verbal-ability subjects ($M = 1276$ seconds for passage-available cell vs. $M = 1150$ seconds for passage-unavailable cell). Such a reversal of the lower-level-question group's pattern would tend to support the notion that in higher-level questioning, passage-unavailable conditions resulted in the use of a single strategy across high- and low-verbal-ability classifications. The CA scores for these two groups, however, indicate another interpretation. For low-verbal-ability subjects, the answering of higher-level questions in the passage-unavailable treatment resulted in more response trials ($CA_M = 21.70$) than either their passage-available counterparts ($CA_M = 23.23$) or their high-verbal-ability counterparts ($CA_M = 26.23$).

These results indicate that the number of trials as
evidenced in the CA score (Figure 6), though useful for discerning the types of strategies employed by subjects, does not serve to predict how much will ultimately be retained from the reading practice. Whereas CA scores usually favored passage availability, lower-level questions, and low-verbal ability, recall scores consistently were higher for passage unavailability, higher-level questions, and high-verbal ability. Thus, in this experiment, success in answering practice comprehension questions did not predict the ability to recall the content of the text. This disparity was illustrated even more directly by correlating each subject's recall score with his or her CA score. The comparison of these two scores resulted in only a moderate correlation in one case (r = .49 for the passage-unavailable, higher-level questions, high-verbal-ability grouping), and with correlations ranging from r = -.16 to .23 for the seven other treatment cells.

Likewise, though useful in the analyses of likely strategies employed by different treatment cells, the TPT measure had only moderate power to predict recall scores in this experiment. When all subjects were pooled, the correlation between recall and total practice time was r = .35. This data must be interpreted with caution, however, because, as was stated earlier, TPT did not include any program run time used for providing feedback.
Likert-Scale Measures on Subjects' Attitudes Toward Their Computer-Assisted Reading Practice

The filler task between the reading practice and the surprise recall protocol was the completion of a Likert-type scale evaluation of the reading materials the subject had just used. Although there were eight treatments, each subject used the same questionnaire (see Appendix F). Furthermore, it was assumed that subjects were unaware that they had practiced under a variety of treatments, hence, Likert-scale items were written in a manner so as not to divulge the fact that the subjects were participating in an experiment.

The primary purpose for this instrument was to delay the recall activity so that long-term rather than short-term memory would be accessed during the writing of the protocol. Students were told before the practice that they would be asked to evaluate the materials, thus, they were expecting to receive an evaluation form when they completed the practice.

Only those results that seem to bear most directly on the thrust of this study will be discussed, though the mean response scores of all of the items are provided in Table 7. The major results of interest are summarized below:
Table 7. Mean Item Scores for Treatment Cells on Attitude Questionnaire

<table>
<thead>
<tr>
<th>TREATMENT</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>TOTAL 3-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>passage available</td>
<td>2.5</td>
<td>1.0</td>
<td>2.6</td>
<td>3.0</td>
<td>2.9</td>
<td>3.2</td>
<td>3.8</td>
<td>3.8</td>
<td>4.4</td>
<td>4.2</td>
<td>27.65</td>
</tr>
<tr>
<td>lower-level questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>low-verbal-ability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>passage available</td>
<td>2.7</td>
<td>1.0</td>
<td>3.9</td>
<td>4.0</td>
<td>4.1</td>
<td>4.0</td>
<td>4.3</td>
<td>3.8</td>
<td>4.1</td>
<td>4.1</td>
<td>32.35</td>
</tr>
<tr>
<td>higher-level questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>low-verbal-ability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>passage available</td>
<td>2.6</td>
<td>1.0</td>
<td>3.2</td>
<td>2.7</td>
<td>3.0</td>
<td>2.3</td>
<td>3.6</td>
<td>2.8</td>
<td>4.3</td>
<td>4.3</td>
<td>26.35</td>
</tr>
<tr>
<td>lower-level questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>high-verbal-ability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>passage available</td>
<td>2.8</td>
<td>1.0</td>
<td>4.0</td>
<td>3.2</td>
<td>3.9</td>
<td>3.7</td>
<td>4.2</td>
<td>3.4</td>
<td>3.9</td>
<td>4.2</td>
<td>30.53</td>
</tr>
<tr>
<td>higher-level questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>high-verbal-ability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>passage unavailable</td>
<td>2.5</td>
<td>1.0</td>
<td>3.4</td>
<td>3.3</td>
<td>3.4</td>
<td>3.4</td>
<td>4.2</td>
<td>3.3</td>
<td>4.2</td>
<td>4.2</td>
<td>29.41</td>
</tr>
<tr>
<td>lower-level questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>low-verbal-ability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>passage unavailable</td>
<td>2.8</td>
<td>1.0</td>
<td>4.1</td>
<td>3.1</td>
<td>3.8</td>
<td>4.1</td>
<td>4.2</td>
<td>3.6</td>
<td>3.9</td>
<td>3.9</td>
<td>30.59</td>
</tr>
<tr>
<td>higher-level questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>low-verbal-ability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>passage unavailable</td>
<td>2.6</td>
<td>1.6</td>
<td>3.6</td>
<td>2.9</td>
<td>3.2</td>
<td>2.2</td>
<td>3.3</td>
<td>2.6</td>
<td>4.1</td>
<td>3.8</td>
<td>25.70</td>
</tr>
<tr>
<td>lower-level questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>high-verbal-ability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>passage unavailable</td>
<td>2.0</td>
<td>1.0</td>
<td>4.1</td>
<td>3.2</td>
<td>3.8</td>
<td>4.0</td>
<td>4.4</td>
<td>3.4</td>
<td>4.2</td>
<td>4.0</td>
<td>31.24</td>
</tr>
<tr>
<td>higher-level questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>low-verbal-ability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

OVERALL MEANS 2.57 1.09 3.62 3.18 3.52 3.38 3.99 3.29 4.15 4.09 29.23
Overall, the subjects demonstrated a moderately positive attitude toward their computer reading practice experience. The mean of the entire sample on the eight items that tapped attitudes toward the practice materials (items numbered 3 through 10) was 3.66 out of a range of 1.0 - 5.0.

The correlation between previous experience with computer-assisted instruction and attitude toward the experimental reading practice was negligible. The first item in the questionnaire asked, "Before today, I have already had the opportunity to use the computer for practice or instruction for another course besides foreign language." The correlation between paired responses to this item and the sum of the responses to attitude items 3 through 10 resulted in a correlation of .06.

The second item in the questionnaire was designed to discern if previous experience with second-language computing would be related to overall attitude toward the type of practice in the experiment. Item two read, "Before today, I have already used the computer to practice or learn a foreign language." The mean response to this item was only 1.09. A comparison of subjects' responses on this measure and the measure of overall attitude (sum of items 3-10) resulted in a correlation of -.08.
Of all of the three conditions (passage availability, level of question, and verbal ability), it was the level of question practiced that most clearly distinguished between the highest and the lowest cell ratings of the instructional materials. Table 7 provides the means for the responses to each question for each of the eight practice treatments. In addition the sums of the attitude items (numbers 3-10) are also provided. Figure 7 illustrates a comparison of cell means by groupings. The lowest ratings were given by subjects in cells that had practiced lower-level questions (range of 25.70 - 29.41), but consistently higher ratings were given by subjects in cells that practiced higher-level questions (range of 30.53 - 32.35).

A comparison of attitude ratings on the basis of verbal ability shows higher ratings were given by low-verbal-ability subjects than by high-verbal-ability subjects in three out of four instances. Only in the case of the passage-unavailable / higher-level-question treatment did high-verbal-ability subjects rate the materials higher than did low-verbal-ability subjects. This passage-unavailable / higher-level questions / higher-verbal-ability treatment was the same group that scored the highest on the recall measure.
Figure 7.

Cell Means of Likert-Scale Ratings of Practice Materials

<table>
<thead>
<tr>
<th></th>
<th>Low-Verbal Ability</th>
<th>High-Verbal Ability</th>
<th>Low-Verbal Ability</th>
<th>High-Verbal Ability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower-Level Questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher-Level Questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- □ = Passage Available
- ■ = Passage Unavailable
Furthermore, a comparison of attitude ratings on the basis of passage availability indicates that low-verbal-ability subjects who practiced lower-level questions under the passage-unavailable condition gave higher ratings to the practice materials (M = 29.41) than those who practiced under the lower-level-questions / passage-available condition (M = 27.65). But low-verbal-ability subjects tended to give higher ratings when they practiced higher-level questions under the passage-available condition (M = 32.35) than did low-verbal-ability subjects who practiced under the passage-unavailable condition (M = 30.59).

Just the opposite was true of high-verbal-ability subjects, who gave higher ratings both to the materials under the lower-level questions / passage-available treatment (M = 26.35) than the lower-level questions / passage-unavailable treatment (M = 25.70) and to the higher-level questions / passage-unavailable treatment (M = 31.24) than higher-level questions / passage-available treatment (M = 30.53).
CHAPTER V
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary of the Study
The primary purpose of this study was to investigate the effects of passage availability during comprehension postquestioning in computer-assisted reading practice for early-intermediate, college-level students of French. Passage availability refers to whether or not the subject is permitted to reinspect a passage after the comprehension question has been displayed on the computer monitor. In addition to passage availability, the independent variable of primary interest, two other independent variables were also investigated: the learner variable, verbal ability, and the treatment variable, level of comprehension question. Salomon's (1979) analysis of the interaction of media and cognition served as the theoretical basis for the choice of the types of independent and dependent variables for the study. As he suggests, this study investigated not only a coding element (passage availability), but also examined a learner difference (verbal ability) and the learning task (level of comprehension question) to
determine how the three work together to affect some aspect of cognition, which in this experiment was the dependent variable, recall. To demonstrate any main effects or interactions, these three variables were utilized in a $2 \times 2 \times 2$ factorial design.

Within the confines of the Salomon model, the levels of processing continua (found in memory research, cognitive psychology, and recent research on reading) served as the theoretical base for manipulation of all three independent variables. A considerable research base on how verbal ability and level of question have been shown to affect level of processing was presented. This research was utilized to design the practice materials and to avoid problems experienced in the past by researchers who unsuccessfully attempted to orient subjects to a given level of processing in a short period of time. Because of passage availability's extremely limited research base, the hypothesis that passage availability was a levels of processing variable was based on the levels of processing theoretical literature. The primary purpose of reading is comprehension; therefore, recall was chosen as the dependent variable.

The following procedures were followed. Subjects ($N = 136$) read one orienting text and answered three treatment-specific interspersed postquestions under
treatment-specific passage-availability conditions. Then, they practiced a ten-passage selection that served as the experimental text, filled out a Likert-scale evaluation on their reading practice experience, and finally completed a surprise free recall protocol. On the recall protocol, they were requested to write down everything they could remember from the experimental text. Protocols were scored using a list of propositions in which each proposition had been weighted according to its overall importance to the meaning of the text. The subject's recall score reflected the sum of the values of all valid propositions provided in the recall protocol.

An appropriate ANOVA and post hoc test were conducted for the above experimental data. Additional data were provided by the Likert-scale evaluation of the practice materials and by simultaneous measures taken by the computer during practice. These measures included initial passage processing time, response latencies, correct responses, and trials (see Chapter I, Definition of Terms). These additional data were utilized as descriptive data that were used to elaborate on this experiment's results and that may provide useful direction for future related research in this area.
Analysis of the experimental data revealed statistically significant main effects for all three independent variables. The passage-availability variable, the independent variable of primary interest, resulted in a difference in recall beyond the .05 level. Subjects in the passage-unavailable condition scored higher on the recall measure ($M = 64.14$) than subjects in the passage-available condition ($M = 54.65$). The two remaining independent variables, level of question and verbal ability, both demonstrated main effects that were statistically significant beyond the .001 level. Subjects practicing higher-level questions scored much higher ($M = 83.90$) than subjects who practiced lower-level questions ($M = 34.89$). Likewise, high-verbal-ability subjects scored much higher ($M = 73.76$) on the recall measure than low-verbal-ability subjects ($M = 45.03$).

One first-order interaction, the level of question / verbal-ability interaction, was significant beyond the .001 level. A post hoc analysis of this interaction demonstrated that the higher-level questions / high-verbal-ability combination was always significantly different from all other combinations, and that all significant sets of combinations included the higher-level of questions / high-verbal-ability combination.
Below is a summary of the experimental and descriptive findings of this study as they relate to each of the research questions posed in Chapter I. Data that are statistically significant are designated as such. Data that are provided without reference to statistical significance emerged from the additional, descriptive measures (the Likert-scale on attitudes toward instruction and the simultaneous measures taken by the computer during the reading practice). In essence, they describe the attitudes and strategies used by subjects in this experiment only. Both sets of data are provided together in this summary because, in spite of the fact that generalizability can only be ascribed to the experimental data, the descriptive data do provide useful information for both interpretation of the experimental data and for possible future avenues of research in this area. As each research question is discussed, the experimental findings are presented first, with related descriptive data provided second.

**Question I:** What is the effect in early-intermediate French learners of passage availability vs. passage unavailability during computer-assisted reading practice adjunct questioning upon semi-delayed recall of a reading text?

This research question was the primary focus of the study. The data from the experiment indicate that,
compared to the passage-available treatment, the passage-unavailable condition resulted in higher recall scores ($F(1, 128) = 4.05, p<.05$). Based on the levels of processing theoretical literature, these experimental results lead to the conclusion that passage unavailability induces a higher level of processing than passage availability.

The nature of the passage availability construct in this experiment placed rather distinct task demands on the two treatment levels of this variable. The simultaneous measures taken during the reading practice provide interesting preliminary data concerning the likely strategies induced by these two treatments.

In the passage-available condition, subjects had the option of pressing the carriage return and reading the question at any time during their processing of the passage. The consistently shorter initial passage processing times (IPPT) of the passage-available groups compared to those of the passage-unavailable groups (see Figure 3, Chapter IV) indicate that, in this experiment, passage-available subjects probably chose to use postquestions to help them discern how to process each passage. Given the consistently longer first response latencies (FRL) of the passage-available treatments compared to passage-unavailable treatments (see Figure 4, Chapter IV), it appears that these subjects were induced to
process the text on a lower level than their passage-unavailable counterparts. As a result, they read not so much for overall meaning but for the answer to the postquestion.

The overall longer TPT of this treatment further supports this analysis of the lower-level processing strategies of passage-available subjects. The fact that passage-available treatments spent more overall time-on-task would seem to imply that the subjects in this experiment did not subsume the reading material as meaningfully as their passage-unavailable counterparts and, as a result, were less able to access readily the needed information from the passage in order to answer the postquestion. That subjects in the passage-available treatment were, overall, more able to find the correct answer (CA $M = 25.94$) than those in the passage-unavailable groups (CA $M = 24.33$) further indicates that subjects in the passage-available treatments probably engaged in considerable text reinspection in order to discern the correct answer before they made an answer choice.

The restrictions placed on subjects in the passage-unavailable treatment resulted in what appears to be quite distinct strategies from those of the subjects in the passage-available condition. In the passage-unavailable treatment, subjects realized that they had to do all of
their visual passage processing prior to viewing the question. They were, however, aware of the type of question (either a lower-level vocabulary item or a higher-level integrative question) that they would be asked. As a result, these subjects were induced to retain as much of the upcoming question-level information as possible. The experimental results, which indicate that passage-unavailability led to higher recall scores, clearly illustrate that this treatment resulted in more top-down processing (higher-level processing) than occurred under the passage-available condition.

An analysis of the descriptive data also illustrates how subjects in the passage-unavailable condition probably read more for overall meaning than did passage-available subjects. First, passage-unavailable subjects consistently processed the passage longer without having seen the question (IPPT), probably because they were not afforded the luxury of viewing the question and passage simultaneously. As a result, their processing was not constrained by searching for question-specific information in the passage. Second, they consistently provided their first responses more quickly, and, overall, they spent less TPT. The tendency to respond more quickly in the passage-unavailable condition may be a result of the fact that these subjects had already processed the reading passage on a higher level than their passage-available
counterparts. They were, therefore, more ready to access the information needed to answer the postquestion when it was displayed. It should be noted, however, that the shorter FRLs and TPTs may, at least in part, be a result of the fact that these subjects did not have the passage available to reinspect. Finally, passage-unavailable subjects produced an overall slightly lower correct answer score than that of the passage-available subjects. When the passage-available treatment's higher overall CA score is considered in concert with its lower semi-delayed recall scores, added credence is given to the notion that passage-available subjects were utilizing comparatively lower-level processing strategies (ie., processing for question-specific discrete bits of information) than subjects in the passage-unavailable treatment who were engaged in comparatively higher-level processing strategies.

In short, the statistically-significant difference in favor of the passage-unavailable condition for higher recall points, on a theoretical basis, to the following interpretation: For the early-intermediate second-language reader, having the option of reinspecting passages for question-specific information leads to lower retention of the overall content of a reading text compared to the higher retention that results from the subject's knowing
that passages will be removed during upcoming questioning. The additional descriptive data from this experiment, including correct answer scores, initial passage-processing times, response latencies, and total practice time, provide preliminary indications that subjects in the passage-available treatment engaged in lower-level processing strategies, which included using the postquestion to facilitate passage processing and reinspecting the passage. Subjects in the passage-unavailable treatment, however, appear to have been induced to engage in comparatively higher-level processing strategies including reading the whole passage for question-level information and processing the text more thoroughly prior to viewing the question.

**Question II:** What is the effect of lower-vs. higher-level reading comprehension questions upon semi-delayed recall of a reading text?

The results of the experiment support the considerable research base in first-language reading education which indicates that a higher level of processing is induced by higher-level questions. As expected, subjects who practiced higher-level questions consistently recalled more from the experimental reading text than subjects who practiced lower-level questions ($F(1, 128)=108.26$, $p<.001$).

These results also support the previous research base in second-language education which indicates that inducing
different levels of processing in second-language learners in a short experiment is usually best achieved by having the subjects engage in practice activities that are at least relatively new to them. The subjects in this experiment had limited experience with reading practice and nearly no experience with second-language CAI. Therefore, it was possible to orient them to a lower or a higher level of processing quite easily with the use of just a three-passage practice text.

The descriptive data from this study provide interesting information concerning this variable as well. Of all of the bases for determining which groupings showed the greatest differential in their evaluations of their practice experiences, the Likert-scale data showed that it was the level of question that most clearly separated those who reacted the most favorably from those who reacted the least favorably to their practice experience. Subjects who practiced higher-level questions gave the highest group ratings to the materials ($M = 31.18$) and subjects who practiced lower-level questions gave the lowest group ratings ($M = 28.45$).

One possible reason why level of question would emerge as the differentiating factor in the evaluation of the materials is because three of the questions in the attitude questionnaire referred to the types of questions asked in
the CAI reading materials. Therefore, the instrument might have been slightly weighted in favor of showing differences in attitude toward the level of question variable rather than toward the practice materials as a whole. The pilot study data did show, however, a .87 split-half reliability coefficient for the attitude items overall. There is, as a result, reasonable assurity that no single item was tapping overall attitude in an unreliable fashion.

It is also possible that subjects rated the materials based on how much they believed they recalled from their reading practice. The ANOVA of recall scores resulted in a significant $F$-score for all three of the independent variables. But the level of question main effect ($F(1, 128) = 108.26$) reached a significance level considerably beyond that of either of the other two variables (passage availability, $F(1, 128) = 4.05$, and verbal ability, $F(1, 128) = 37.18$). If the subjects were able to discern how much they recalled, and if they based their ratings of the reading materials on that perception, it seems possible that the favorable attitudes expressed by subjects who had practiced higher-level questions may simply reflect the fact that the level of question variable resulted in far greater disparity in recall than did the other two independent variables, passage availability and verbal ability. Unfortunately, however, the above possibilities can only be viewed as speculation, because
the data simply do not provide adequate information for interpretation.

Finally, these results may indicate that, in this experiment, subjects simply reacted positively to the higher-level-question treatment and considerably less positively to the lower-level-question treatment. Furthermore, the level of question treatment, as dichotomized in this study, may have been so extreme that other differences that may otherwise have emerged were overshadowed.

**Question III:** What is the effect of low- vs. high-verbal ability upon semi-delayed recall of a reading text?

The data from this experiment support the considerable research base on the effects of verbal ability on recall. High-verbal-ability subjects consistently outperformed low-verbal-ability subjects on the recall measure ($F,(1,128)=37.18, \ p<.001$). Furthermore, these results indicate that the use of grade point average and last grade in French were effective in identifying low- and high-verbal-ability subjects for this study.

These results also illustrate the fact that the text-validation procedure utilized in this study was successful at identifying a text that was neither too easy nor too difficult for the population. This consideration was an important one, because previous research in
first-language reading has indicated that high-verbal-ability learners do not need adjunct questions (and in fact, may be distracted by them), if the text they must read is not adequately challenging.

Among the many differences in apparent strategies that emerged from an analysis of the descriptive data for these two groups, perhaps the most telling involved the pattern evident during the practicing of higher-level questions in the passage-available condition. Low-verbal-ability subjects tended to press the carriage return to have the question and the passage simultaneously displayed sooner (M = 827 seconds) than did high-verbal-ability subjects (M = 876 seconds). When this data is considered in combination with the fact that these low-verbal-ability subjects had much longer first response latencies (M = 411 seconds) than did high-verbal-ability subjects (M = 299 seconds), it appears that the low-verbal-ability subjects relied more heavily upon the question to organize the text and to complete the reading task, and that higher-verbal-ability subjects relied more heavily upon auto-organization of the text, and thus were more prepared to answer the question when it was first displayed. In fact, for the higher-level-questions / passage-available condition, in spite of the fact that high-verbal-ability subjects took longer to process initially the text, they used considerably less TPT (M = 1276 seconds) than
their low-verbal-ability counterparts (M = 1452 seconds).

This interpretation of the study's descriptive data seems particularly tenable when the research base concerning the reading strategies of high- and low-verbal-ability learners in first-language reading is considered. Fisher and Peters (1981) analyzed a large body of research on the verbal-ability variable and found that "skilled comprehenders...use strategies that are best adapted to extracting meaning from the text in the most economical fashion...[whereas] poor comprehenders may be characterized by their lack of appropriate reading strategies" (p. 124). The descriptive data from this study provide limited evidence that these differences were paralleled in the second-language early-intermediate readers who participated in this study.

**Question IV:** What is the effect of passage availability vs. passage unavailability during higher-level comprehension questioning vs. lower-level comprehension questioning upon semi-delayed recall of a reading text?

The data indicated that there was not a significant first-order interaction between these two variables. It must be concluded, as a result, that the main effects of level of question (as instrumentalized in this study) are not affected by the passage-availability variable. No combination of these two variables demonstrated tendencies
in recall scores that deviated from the main effects of the two variables. Passage-unavailable subjects consistently outperformed passage-available subjects, and subjects who practiced higher-level questions consistently outperformed subjects who practiced lower-level questions with no groups benefitting significantly more as a result of any combination of these two variables.

**Question V:** What is the effect of passage availability vs. passage unavailability for low-verbal-ability vs. high-verbal-ability subjects upon semi-delayed recall of a reading text?

The data indicated no first-order interaction for the combination of these two variables. As a result it must be concluded that high-verbal-ability subjects consistently outperformed low-verbal-ability subjects, and that passage-unavailable-treatment cells consistently outperformed passage-available-treatment cells, and that no statistically significant difference in recall scores resulted from any combination of these two variables.

**Question VI:** What is the effect of lower-level comprehension questioning vs. higher-level comprehension questioning for low-verbal-ability vs. high-verbal-ability subjects upon semi-delayed recall of a reading text?

The data indicated an interaction significant at the .001 level for these two variables. A Tukey's Omega post hoc test of pairwise means illustrated that of all of the
possible combinations of these two variables, always and only, the higher-level-question / high-verbal-ability pair participated. Although neither of these variables was a primary focus of this study, this interaction does indicate that, in spite of the strong main effect shown for the level of question variable, low-verbal-ability subjects did not benefit significantly more from the practice of higher-level questions compared to lower-level questions. Furthermore, it indicates that in spite of the strong main effect shown for verbal ability, high-verbal-ability subjects did not retain significantly more from the practice of lower-level questions than did low-verbal-ability subjects.

This interaction may provide further evidence that the level of question, as dichotomized in this study, was more extreme than it needed to be. These results seem to indicate that the lower-level-question operationalization was too low to demonstrate effectively differential levels of processing between the high-verbal-ability / lower-level-questions combination and the low-verbal-ability / lower-level-questions combination. In fact, it is entirely possible, that for early-intermediate high-verbal-ability French readers, the type of lower-level question used in this study was not a semantic (or even minimally meaningful) question. Likewise, the fact that
low-verbal-ability subjects did not show statistically significant differences in recall due to level of question may indicate that the higher-level-question treatment was too extreme (difficult) to induce a significantly higher level of processing in these subjects.

**Question VII:** Are there any interactions among the three independent variables?

The ANOVA indicated that there was no second-order interaction. It is entirely possible, however, that if another population of second-language learners were used as subjects in a similar experiment, a second-order interaction might emerge.

In this experiment, passage availability did not interact with any other variable. Therefore, the results of this study indicate that both low- and high-verbal-ability early-intermediate French learners can be expected to benefit from the use of passage-unavailability during reading-practice postquestioning. Given the nature of the task and strategies required of students in the passage-unavailable condition, it is possible that elementary French students would react differently to the use of this coding element. For example, it may be more crucial for low-verbal-ability elementary French students to engage in text lookbacks during questioning in order to organize and process a text meaningfully. Furthermore, high-verbal-ability elementary learners may benefit from the demands of
the passage-unavailable treatment. Many other possibilities could be cited. The main point is, however, that Salomon's (1979) view that no coding element can be expected to be best for all learners in all situations is in no way called into question by the fact that no second-order interaction resulted from this experiment. Rather, these results point to the need to continue to investigate this coding element in a variety of contexts, for a variety of learners.

In summary, the results from the experimental data indicate that passage availability is a levels of processing variable in the case where it is applied to interspersed postquestioning on a French reading text for early-intermediate French learners. The evidence indicates that, compared to passage availability, passage unavailability during comprehension questioning results in a higher level of processing, and, as a result, more recall of the text. When the level of question and verbal-ability independent variables were examined in a factorial design with the passage availability variable, no significant interactions between passage availability and either of the other two variables emerged. Thus, passage unavailability resulted in consistently higher recall scores regardless of the levels of these two variables. Furthermore, the results concerning both the level of question and the
verbal-ability independent variable support previous related research. Higher-level questioning consistently resulted in higher recall than did lower-level questioning. High-verbal-ability subjects consistently recalled more from the experimental reading text than did their low-verbal-ability counterparts.

The results from the descriptive data both support the above conclusions and provide useful clues concerning the strategies employed by subjects in the various treatments in this experiment. Evidences of distinct levels of processing in counterpart treatments emerge from a variety of sources: the longer response latencies of passage-available groups, the longer initial passage processing of passage-unavailable groups, and the greater differentiation that emerged between high- and low-verbal-ability subjects who practiced higher-level questions compared to the differences that emerged for these two groups when they practiced lower-level questions.
Limitations

The Reading Text

The experimental text that was chosen for this experiment was judged to be both a natural French text (written in natural French for French speakers) and culturally accessible to the subjects. Every effort was made to find a text that would not provide unfair advantages to a portion of the population because of non-verbal-ability factors (such as world knowledge or available cultural schemata). The recall protocols written by the subjects in this study indicated that the material in the text was indeed adequately accessible to them. One problem that was unforeseen, however, is the fact that some subjects tended to impose American cultural schemata on propositions in the text that needed simply to be read at face value. For example, the text indicates that French adults are free to teach children about sex. No mention is made of French schools anywhere in the text. Fifteen subjects wrote in their recall protocols, however, that French schools openly teach sex education.

Although there is no way to be certain, it appears that these subjects projected their own American sex-education schema upon this text, and, as a result, assumed that any reference to open sex education automatically involved schools. Therefore, in experimental text selection, it appears that the neutrality of the text
itself should be considered as well as any related cultural issues in the subjects' native culture that may lead to the projection of inappropriate schemata on the text. In this study, any misinformation provided in a given recall protocol was not counted against the subject's recall score. One can only speculate, however, about the degree to which this type of cognitive "derailing" might have led to lower recall than would otherwise have resulted. Fortunately, misprojection of cultural schemata appeared to occur only rarely in the recall protocols.

Furthermore, the experiment used only one reading text. Unquestionably, no two texts can be equated. Therefore, as is advisable for all research that uses reading texts, this study should be replicated using other texts.

The Recall Measure

The free recall protocol used in this experiment was chosen because it was subject-generated (i.e., it reflected the subject's own memory search for information from the text). In spite of the advantages of using a non-directive measure of recall, there is a built-in limitation in the use of such an instrument. In a free recall protocol, subjects are required to write down everything they can recall. In a sense, the recall protocol in this experiment measured, at least to a degree, not only what the subjects
recalled from the experimental text, but also how capable they were of writing down what they recalled from the text.

The **Total Practice Time Calculation**

The descriptive measure, total practice time (TPT), was calculated by summing the initial passage processing time (IPPT) and all response latencies. The program run time for feedback and for instructions was not included in this measure. A more accurate measure of TPT that includes program run time for instructions and feedback should be used in any replications of this study.

**Recommendations for Further Research**

Further research on the coding element passage availability should attempt to determine whether passage availability is always best for all second-language learners. Such research could investigate, for example, how elementary language learners at different levels respond to this coding element. Furthermore, this study could be conducted again using a new learner variable other than verbal ability. One possibility is locus of control. Given the fact that passage availability can be designed to be either a program-controlled (as in this experiment) or a student-controlled option, such study may provide useful information concerning how this learning style and this
related coding option interact.

Another avenue of research that may be useful is treating passage length as a variable. In this study, the length of the passage was based on the maximum number of words that could be printed on the screen of an Apple IIe computer using the Super Pilot programming language. A text was chosen that could be divided into cohesive passages that were short enough to fit on the screen and still leave enough room for the adjunct postquestion below. This display constraint is rapidly diminishing with upgraded monitors and programming capabilities. It would be of interest to determine the point at which a passage becomes too long to allow the benefits of passage unavailability to continue to have an impact upon recall.

The long-term effects of practice under passage-available vs. passage-unavailable treatments also merit investigation. Subjects participated in this experiment for less than 50 minutes. They did, however, illustrate that what Salomon (1979) calls "activation" can occur in a very short amount of time. Subjects were clearly oriented to their passage-available / passage-unavailable condition after practicing the short, three-passage text that they read prior to reading the experimental text. Because the data showed a statistically significant difference for the passage-availability variable, it seems reasonable to
suggest that subjects were induced to activate already possessed metacognitive strategies in order to adjust to their treatments and succeed on the practice questions. Research that would test this hypothesis and that would investigate the long-term effects of participating in reading practice in the passage-unavailable condition may provide useful information concerning the nature of this construct, and, more importantly, its affects upon the learner's subsequent metacognitive repertoire.

Finally, this study limited itself to the skill of reading and passage availability. Most CAI software presently used in second-language education utilizes, however, short written prompts and short typed answers (written drills). A needed avenue of research that would follow well on this study might be an investigation into the effects of cue availability in CAI second-language drill and practice. Presently, most software leaves the written cue on the screen. There are many options, however, that this coding element affords that research should explore. Research is needed to determine the effects of the following: removing the cue, allowing the students to choose to have the cue removed, removing the cue after a given number of correct answers are provided, removing the cue on subsequent items if the subject answers correctly within a given amount of time, removing the cue and allowing the subject to request to see the cue at any
time, removing the cue and giving the option of seeing the
cue but providing incentive to the subject not to ask to
see the cue, removing the cue and allowing the subject to
see it if he or she wishes but only flashing the cue for a
given amount of time when it is requested. New knowledge
about any of these uses of this coding element would
provide useful information concerning both the nature of
passage availability and how best to code practice learning
materials for second-language learners.

The results from this study indicate that the use of
passage availability vs. passage unavailability during
second-language practice merits further analysis. Given
the fact that this study has demonstrated that passage
availability can affect levels of processing, and given the
strong research base already found in second-language
education that indicates that higher-level processing
facilitates effective language practice, further research
on the relationship of passage availability, different
second-language tasks, and various learner characteristics
seems clearly in order.
REFERENCES


APPENDICES
Appendix A

Instrument for Rating the Difficulty of Practice and Experimental Reading Texts

The attached reading selections are being considered for use in a reading experiment with French 104 students in the second week of class. Please rank each of the selections' difficulty level for the average 104 student by assigning it a score based on the scale below. Any comments you might have about why a given text might be difficult or easy would be greatly appreciated.

Rating scale:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>far too</td>
<td>too easy</td>
<td>just different</td>
<td>too far too easy</td>
<td>easy</td>
<td>right</td>
<td>difficult</td>
</tr>
</tbody>
</table>

Text #1: rating____
comments: __________________________________________

Text #2: rating____
comments: __________________________________________

Text #3: rating____
comments: __________________________________________

Text #4: rating____
comments: __________________________________________

Text #5: rating____
comments: __________________________________________

Please return these ratings in the enclosed self-addressed stamped envelope. And thank you for sharing your time and expertise.
Appendix B

Practice and Experimental Reading Texts

These texts are copied by permission of Heinle & Heinle Publishers, Inc.

Practice text: "Ma femme, ma télé et moi," reprinted from La Vie in Réalités Françaises (Murphy, 1984).

The following excerpts were used:

Ma Femme, ma télé et moi

Le journal Télé 7 jours a mené une enquête* il y a quelques années pour mesurer l'influence de la télévision dans la vie des couples. Cette enquête confirme l'attachement des maris à leurs récepteurs: ce sont eux qui sont les premiers devant le poste après le repas du soir, trois fois plus souvent que les femmes, occupées alors aux tâches ménagères.* Du moins dans les familles qui ne dînent pas devant la télévision, seulement 48%. En effet, 39% allument leur poste pendant le repas de 4 à 7 soirs par semaine et 13% de 1 à 3 soirs. «Qu'est-ce qu'il y a à la télé?» a remplacé «Qu'est-ce qu'il y a à manger?»

Un psychologue français, Gilbert Rapaille, a inventé un mot pour désigner l'intrusion de la télévision dans les ménages: un trouple. «Un trouple, c'est un monsieur, une dame et un poste de télévision. Ils vivent ensemble une relation où la télé est le partenaire dominant. Les deux autres se taisent* quand elle parle, respectent ses horaires,* et toute leur vie est conditionnée par elle. Le trouple n'est pas arrivé par hasard. Une autre épidémie l'a précédé, et a créé le terrain: l'épidémie de couple.

«Télémama», comme l'appelle Rapaille berce ses enfants et leur raconte des histoires avant de les envoyer au lit. Ils sont contents. 72% des «trouplistes» français ont bien dû reconnaître que la télévision empêche les conversations mais 60% ont immédiatement ajouté: «Quand on est devant son poste, on n'a pas besoin de se parler pour être bien ensemble!»
Les Enfants, la famille et l'argent


Deux conceptions de l'éducation—veut-on protéger les jeunes ou les préparer aux réalités de l'existence? La réponse dépend... des ressources de la famille, de son apparence sociale, des aléas de l'existence, mais surtout des normes éducatives.

«L'enfant et l'argent?» a dit tante Agathe, choquée, «drole d'idée, drôle de rapprochement, les enfants c'est l'innocence, la pureté, la candeur. Qu'ont-ils à voir avec l'argent? Quand ils comprennent ce que c'est l'argent, ils cessent d'être des enfants... On n'en parle pas, les enfants pourraient entendre.»

Dans les «bonnes familles» à haute préventions éducatives, on n'en parle pas à table mais on y pense... et on agit en fonction—c'est pourquoi nos grands-parents ont été taxés d'hypocrisie. Il est admis de faire l'éducation sexuelle des enfants, mais, pour l'argent, le tabou subsiste, latent mais insidieux.

Dans la famille rurale et patriarcale, chacun devait contribuer soit par un travail effectif à la maison ou aux champs, soit en évitant de dépenser. Les enfants, dès leur jeune âge, avaient des tâches à remplir. Cette main d'œuvre gratuite augmentait la capacité de production de la famille. Pas question de distraire un sous du patrimoine pour ses plaisirs et son usage personnel. L'argent, rare, appartenait au groupe familial comme les autres biens.

Aujourd'hui, dans certaines familles, cette vieille tendance continue. On essaie d'élever l'enfant dans la pureté, la fraîcheur de son âme. Donc, il ne faut jamais dire le prix des choses: ce qui compte dans le noyau familial ce sont les relations d'amour, de tendresse désintéressée. Les enfants doivent être soigneusement tenus à l'écart des préoccupations matérielles, ne pas savoir combien leurs parents gagnent, ou paient d'impôt: «Ils le sauront assez tôt. Inutile de les rendre adultes avant l'heure,» affirme F., qui a deux enfants.

Gageons que cette volonté d'isoler l'enfant de l'argent est un luxe de classes aisées. Dans Émile et les détectives d'Erich Kastner, Émile demandait à son copain: «On parle souvent d'argent chez toi?—Non, jamais.—C'est que tu en es plein, rétorque Émile, chez moi on en parle tout le temps parce qu'on n'en a pas.»

Pour sûr, le discours autour de l'argent est plus fréquent quand on en manque pour le quotidien. Les enfants du milieu modeste ont souvent plutôt la notion du prix des choses, le sentiment que «tout n'est pas possible.» Bruno, huit ans, fils d'un mécanicien auto et d'une femme de ménage, regrette: «J'aimerais bien monter sur les poneys, moi aussi, le mercredi, mais maman dit que c'est trop cher. C'est pas pour nous. Il coûte ce que maman gagne en une semaine.»
Ce qui contribue avant tout à former le rapport de l'enfant à l'argent, c'est l'attitude des parents, plus que leur moyens, que l'argent de poche dont il peut disposer. Plus que les discours aussi: c'est l'exemple qui compte. Une mère ne peut pas affirmer que l'argent ne fait pas le bonheur, si elle annonce tous les soirs à table le prix du bifteck, le coût des vêtements, des sorties ou des vacances.

Cependant, de nombreux éducateurs déplorent cette attitude «infantilisante», car l'enfant qui doit demander l'argent à ses parents pour satisfaire le moindre désir n'a aucune marge de manœuvre, aucune possibilité de choix. Jean Ormezzano, psychologue, s'élève même contre l'expression, «argent de poche.» «L'argent de poche, c'est littéralement celui qui traîne au fond des poches, celui qui n'est pas comptabilisé, qui n'est pas valorisé. Donner l'argent sans savoir combien, c'est anti-éducatif.»

Pour faire une véritable «éducation à l'argent», Jean Ormezzano préconise un système de «décision collective.» Il souhaite que les enfants sachent exactement les revenus des parents, qu'on établisse en famille un budget, leur montrant les frais incompressibles, les impôts, le loyer, les vacances: «Une fois qu'on a retiré tout cela, il reste, disons, 1 500 francs. Papa a besoin de cigarettes, de son journal, de temps en temps il déjeune au restaurant. Il lui faut donc 500 francs. Maman a sa coiffeur, ses produits de maquillage, ses journaux, il lui faut tant. Toi, tu as ton cinéma, tes vignettes de football, tes timbres, qu'en penses-tu de cette somme?»

Ce n'est pas de l'argent de poche, c'est une somme allouée à chaque membre de la famille pour ses dépenses personnelles et ses propres plaisirs. Moyennant quoi, la somme régulièrement versée peut être utilisée pour autre chose; il est possible de remplacer le cinéma par un match de football, les timbres par un journal ou une pile de crêpes. Ainsi, l'enfant dispose d'une somme qu'il gère à sa guise, dont il est responsable, et qu'on n'augmente pas à volonté.
Appendix C

Validation of Instrumentation of Level of Questions

Thank you for agreeing to help evaluate the materials I plan to use for my dissertation research.

The following are questions that will be used with French 104 students at The Ohio State University in an experiment on computer-assisted reading practice in French. Please read the definitions of both "lower-level questions" and "higher-level questions" very carefully. Then read each short passage and indicate your judgment concerning how the questions following it should be classified according to the definitions given: "higher-level," "lower-level," or "neither." If you have any comments on your choice, please write them in the space provided after each question.

Thank you very much for sharing your expertise in helping to develop these materials. When you have completed this form, please send it back to me in the enclosed self-addressed envelope.

Sincerely,

Kathleen M. Pederson

lower-level question: a postquestion that requires the student to identify which substantive (noun) among four native-language options occurred in French in the preceding passage.

higher-level question: a postquestion that requires the student to integrate or combine the information from at least two clauses in the preceding passage in order to answer correctly. In other words, it would be impossible to simply read a single clause in the preceding passage (without having read and understood at least one other clause) and have all of the information needed to answer the question correctly.

neither: a question that fits neither of the above two categories.
Passage #1: Ma Femme, ma télé et moi

Le journal *Télé 7 jours* a mené une enquête il y a quelques années pour mesurer l'influence de la télévision dans la vie des couples. Cette enquête confirme l'attachement des maris à leurs récepteurs: ce sont eux qui sont les premiers devant le poste après le repas du soir, trois fois plus souvent que les femmes, occupées aux tâches ménagères.* Du moins dans les familles qui ne dinent pas devant la télévision, seulement 48%. En effet, 39% allument leur poste pendant le repas de 4 à 7 soirs par semaine et 13% de 1 à 3 soirs. «Qu'est-ce qu'il y a à la télé?» a remplacé «Qu'est-ce qu'il y a à manger?»

1a. Which French equivalent of one of these words appears in the passage?
   a. work
   b. loss
   c. life
   d. destiny

rating_____________ comments__________________________

1b. The major point of this passage is that concerning TV in France....
   a. men watch more than women
   b. quality is still quite low
   c. it is affecting couples' lives
   d. many now watch it during meals

rating_____________ comments__________________________

Passage #2: Un psychologue français, Gilbert Rapaille, a inventé un mot pour désigner l'intrusion de la télévision dans les ménages: un trouple. «Un trouple, c'est un monsieur, une dame et un poste de télévision. Ils vivent ensemble une relation où la télé est le partenaire dominant. Les deux autres se taisent quand elle parle, respectent ses horaires,* et toute leur vie est conditionnée par elle. Le trouple n'est pas arrivé par hasard. Une autre épidémie l'a précédé, et a créé le terrain: l'épidémie de couple.

2a. Which French equivalent of one of these words appears in the passage?
   a. families
   b. relatives
   c. neighborhoods
   d. households

rating_____________ comments__________________________
2b. Gilbert Rapaille views TV as an intrusion into the couple because it....
   a. now has status equal to the mate's
   b. divides the couple
   c. keeps them from meeting others
   d. controls the relationship

rating________________ comments______________________________

Passage #3: «Télémama», comme l'appelle Rapaille berce ses enfants et leur raconte des histoires avant de les envoyer au lit. Ils sont contents. 72% des «touplistes» français ont bien dû reconnaître que la télévision empêche les conversations mais 60% ont immédiatement ajouté: «Quand on est devant son poste, on n'a pas besoin de se parler pour être bien ensemble.»

3a. The main point of this passage is that TV is....
   a. becoming a substitute parent
   b. substituted for personal interaction
   c. keeps children from going to bed
   d. enjoyed by young and old alike

rating________________ comments______________________________

3b. Which French equivalent of one of these words appears in the passage?
   a. festivities
   b. methods
   c. punishments
   d. stories

rating________________ comments______________________________

Passage #4: Les Enfants, la famille et l'argent


Deux conceptions de l'éducation—veut-on protéger les jeunes ou les préparer aux réalités de l'existence? La réponse dépend... des ressources de la famille, de son appartenance sociale, des aléas de l'existence, mais surtout des normes éducatives.

4a. Which French equivalent of one of these words appears in the passage?
   a. society
   b. life
   c. existence
   d. humanity

rating________________ comments______________________________
4b. This selection is about money and French opinions concerning how....
   a. to spend it wisely
   b. to invest it
   c. to teach children about it
   d. children view it

   rating_______________ comments____________________________

Passage #5: «L'enfant et l'argent? a dit tante Agathe, choquée, «drôle d'idée, drôle de rapprochement, les enfants c'est l'innocence, la pureté, la candeur. Qu'ont-ils à voir avec l'argent? Quand ils comprennent ce que c'est l'argent, ils cessent d'être des enfants... On n'en parle pas, les enfants pourraient entendre.» Dans les «bonnes familles» à haute prétentions éducatives, on n'en parle pas à table mais on y pense... et on agit en fonction—c'est pourquoi nos grand-parents ont été taxés d'hypocrisie. Il est admis de faire l'éducation sexuelle des enfants, mais, pour l'argent, le tabou subsiste, latent mais insidieux.

5a. Tante Agathe believes that teaching kids about money is like....
   a. robbing them of their purity
   b. robbing them of their childhood
   c. robbing them of their innocence
   d. teaching them about sex

   rating_______________ comments____________________________

5b. Which French equivalent of one of these words appears in the passage?
   a. babies
   b. children
   c. adolescents
   d. adults

   rating_______________ comments____________________________

Passage #6: Dans la famille rurale et patriarcale, chacun devait contribuer soit par un travail effectif à la maison ou aux champs, soit en évitant de dépenser. Les enfants, dès leur jeune âge, avaient des tâches à remplir. Cette main d'œuvre gratuite augmentait la capacité de production de la famille. Pas question de distraire un sous du patrimoine pour ses plaisirs et son usage personnel. L'argent, rare, appartenait au groupe familial comme les autres biens.
6a. Rural families in the past viewed providing for the needs of the family as....
a. each member's concern  
b. the father's jurisdiction  
c. the father's responsibility  
d. important as relationships

rating________________ comments_____________________________________

6b. Which French equivalent of one of these words appears in the passage?
a. work  
b. contribution  
c. need  
d. treasure

rating________________ comments_____________________________________

**Passage #7:** Aujourd'hui, dans certaines familles, cette vieille tendance continue. On essaie d'élever l'enfant dans la pureté, la fraîcheur de son âme. Donc, il ne faut jamais dire le prix des choses: ce qui compte dans le noyau familial ce sont les relations d'amour, de tendresse désintéressée. Les enfants doivent être soigneusement tenus à l'écart des préoccupations matérielles, ne pas savoir combien leurs parents gagnent, ou paient d'impôt: «Ils le sauront assez tôt. Inutile de les rendre adultes avant l'heure,» affirme F., qui a deux enfants.

7a. Today many parents don't discuss money with their children so as to....
a. teach them about good taste  
b. maintain their own privacy  
c. let them enjoy childhood  
d. not confuse them

rating________________ comments_____________________________________

7b. Which French equivalent of one of these words appears in the passage?
a. kindness  
b. generosity  
c. tenderness  
d. patience

rating________________ comments_____________________________________
Passage #8: Gageons que cette volonté d'isoler l'enfant de l'argent est un luxe de classes aisées. Dans Émile et les détectives d'Erich Kastner, Émile demandait à son copain: «On parle souvent d'argent chez toi?—Non, jamais.—C'est que tu en as plein, rétorque Émile, chez moi on en parle tout le temps parce qu'on n'en a pas.»

8a. Which French equivalent of one of these words appears in the passage?
   a. pal
   b. circumstance
   c. line
   d. remedy

rating comments

8b. Émile thinks that families that talk about money are....
   a. poor
   b. tasteless
   c. poorly-educated
   d. close-knit

rating comments

Passage #9: Pour sûr, le discours autour de l'argent est plus fréquent quand on en manque pour le quotidien. Les enfants du milieu modeste ont souvent plutôt la notion du prix des choses, le sentiment que «tout n'est pas possible.» Bruno, huit ans, fils d'un mécanicien auto et d'une femme de ménage, regrette: «J'aimerais bien monter sur les poneys, moi aussi, le mercredi, mais maman dit que c'est trop cher. C'est pas pour nous. Il coûte ce que maman gagne en une semaine.»

9a. Bruno, like many poor children, tends to....
   a. hope for a better future
   b. be jealous of richer children
   c. be frustrated at being poor
   d. be realistic about money

rating comments

9b. Which French equivalent of one of these words appears in the passage?
   a. people
   b. places
   c. animals
   d. things

rating comments
Passage #10: Ce qui contribue avant tout à former le rapport de l'enfant à l'argent, c'est l'attitude des parents, plus que leur moyens, que l'argent de poche dont il peut disposer. Plus que les discours aussi: c'est l'exemple qui compte. Une mère ne peut pas affirmer que l'argent ne fait pas le bonheur, si elle annonce tous les soirs à table le prix du bifteck, le coût des vêtements, des sorties ou des vacances.

10a. Which French equivalent of one of these words appears in the passage?
   a. food
   b. clothing
   c. rent
   d. insurance

10b. A child's views on money reflect the parents'....
   a. attitude or their example
   b. attitude and example
   c. example
   d. attitude

Passage #11: Cependant, de nombreux éducateurs déplorent cette attitude «infantilisante», car l'enfant qui doit demander l'argent à ses parents pour satisfaire le moindre désir n'a aucune marge de manœuvre, aucune possibilité de choix. Jean Ormezzano, psychologue, s'élève même contre l'expression, «argent de poche.» «L'argent de poche, c'est littéralement celui qui traîne au fond des poches, celui qui n'est pas comptabilisé, qui n'est pas valorisé. Donner l'argent sans savoir combien, c'est anti-éducatif.»

11a. Several educators think that having children ask for money when they need it....
   a. is good for small children
   b. is insulting and counterproductive
   c. develops a responsible attitude
   d. undermines parent-child trust

11b. Which French equivalent of one of these words appears in the passage?
   a. senator
   b. psychologist
   c. lawyer
   d. professor

rating___________ comments____________________________
Passage #12: Pour faire une véritable «éducation à l'argent», Jean Ormezzano préconise un système de «décision collective». Il souhaite que les enfants sachent exactement les revenus des parents, qu'on établisse en famille un budget, leur montrant les frais incompressibles, les impôts, le loyer, les vacances: «Une fois qu'on a retiré tout cela, il reste, disons, 1 500 francs. Papa a besoin de cigarettes, de son journal, de temps en temps il déjeune au restaurant. Il lui faut donc 500 francs. Maman a sa coiffeur, ses produits de maquillage, ses journaux, il lui faut tant. Toi, tu as ton cinéma, tes vignettes de football, tes timbres, qu'en penses-tu de cette somme?»

12a. Ormezzano thinks that parents should give their children...
   a. the opportunity to earn money
   b. family budget figures and a vote
   c. freedom from worries about finances
   d. more money as they get older

   rating____________________ comments______________________________

12b. Which French equivalent of one of these words appears in the passage?
   a. inventory
   b. products
   c. toys
   d. perfume

   rating____________________ comments______________________________

Passage #13: Ce n'est pas de l'argent de poche, c'est une somme allouée à chaque membre de la famille pour ses dépenses personnelles et ses propres plaisirs. Moyennant quoi, la somme régulièrement versée peut être utilisée pour autre chose; il est possible de remplacer le cinéma par un match de football, les timbres par un journal ou une pile de crêpes. Ainsi, l'enfant dispose d'une somme qu'il gère à sa guise, dont il est responsable, et qu'on n'augmente pas à volonté.

13a. Which French equivalent of one of these words appears in the passage?
   a. books
   b. telegram
   c. stamps
   d. trip

   rating____________________ comments______________________________
13b. Ormezzano believes that children who receive an allowance should....
   a. save some of it
   b. budget it carefully
   c. spend it as they wish
   d. spend as they promised

rating________________ comments__________________________
Appendix D

Valid Propositions and their Mean Ratings of Importance

(The score listed after each proposition below reflects the mean of the ratings of importance given to the proposition by the three evaluators. The original evaluators received this instrument with a blank line after each proposition.)

STEP #1: Please read the attached selection, "Les enfants, la famille et l'argent," and judge whether or not the following propositions (simple sentences or dependent clauses) are all valid thoughts presented in the text. If for any reason you judge that a given proposition inaccurately reflects the content of the selection or fully duplicates the information presented in another proposition, please indicate this by writing "no" in the blank following the item.

Note: When a part of a proposition is underlined, the underlined portion is the only portion that is being evaluated. The rest of the sentence is provided in order to make the new information clear. Information in parentheses provides another possible wording of immediately preceding information. Information in brackets is optional.

STEP #2: Next, using the blank lines at the end of the listing, please list any additional propositions that are presented in the selection but that are not included on the list.

STEP #3: Finally, using the scale below, please rate each proposition that was not marked "no" in step #1 above according to your estimate of its relative importance to the overall meaning of the text:

7 = extremely important
6 = of great importance
5 = quite important
4 = of average importance
3 = of below-average importance
2 = only slightly important
1 = of negligible importance
1. What does money represent for (mean to) children? 4.3
2. How much money do they have? 1.7
3. What do they do with (their) money? 2.3
4. What do their parents say about money? 5.7
5. Here are some questions. 1.3
6. Here are some questions within this framework. 1.3
7. There are two conceptions (viewpoints) on education [in general]. 4.0
8. Do we (does one) want to protect youngsters? 6.3
9. Do we (does one) want to prepare youngsters? 6.3
10. The realities of existence create such a choice. 3.3
11. The answer depends on several circumstances (factors). 4.3
12. The family's resources play a role (are an important issue). 3.7
13. One's social standing plays a role. 3.0
14. The hazards (risks) of daily life play a role. 2.7
15. Educational (socialization) norms play a role. 3.7
16. Educational norms play the most important role. 3.3
17. Tante Agathe is shocked. 1.7
18. Children and money do not go (belong) together. 6.3
19. Putting the two together is funny (odd, strange). 3.0
20. Childhood is innocence. 4.3
21. Childhood is purity. 4.3
22. Childhood is guilelessness (naivete). 4.3
23. [When] children come to understand what money is. 3.7
24. [Then] they cease to be children. 4.3

25. Understanding what money is spoils childhood. 6.3

26. [Some French believe that] adults should not talk about it to children. 5.7

27. The children could hear [such conversations]. 4.0

28. Tante Agathe presented this point of view. (Items #18-27) 2.3

29. Good families do not talk about it. 4.3

30. One does not talk about it at the table. 2.3

31. These "good families" have high educational ambitions for their members. 3.0

32. But one, nonetheless, thinks about it (making money). 3.3

33. One fulfills one's duty ("does" rather than "says" what one has to do to make money). 2.0

34. Our grandparents have been accused of being hypocritical. 2.0

35. This double-standard (thinking about money but not talking about it) is the cause of this accusation. 4.0

36. Children's sexual education is allowed. 3.0

37. Children's financial education is taboo. 5.3

38. This taboo remains. 3.0

39. This taboo is hidden. 2.0

40. This taboo is harmful (insidious). 3.7

41. Some families used to require that each member make a contribution. 5.3

42. These families were rural. 3.0

43. These families were patriarchal. 1.0

44. This contribution could involve working at home. 2.7
45. This contribution could involve working in the fields.  
46. This contribution could involve avoiding spending [money].

47. Children had tasks to complete.  
48. This began at an early age.

49. This labor added to the family's productivity.  
50. This labor was free.

51. No one even thought of using the family's money for himself or herself.

52. [No one even thought of using the family's money] for his or her own wants.

53. [No one even thought of using the family's money] for his or her own needs.

54. Money was scarce.  
55. All belongings were family-owned.

56. Money belonged to the whole family.

57. Today this tendency (community ownership) continues [in some families].

58. This tendency is old.  
59. Some try to raise children in purity.

60. Some try to raise children in the innocence of youth.

61. [Some families believe that] one must never say how much things cost.

62. The family circle is the place for more important concerns.

63. A loving atmosphere is more important than finances.

64. Unconditional love (tenderness) is more important than finances.
65. Children must be protected from material preoccupations.

66. This protection should be scrupulous (careful).

67. Children must not know (find out) about family finances.

68. Children must not know (find out about) how much their parents earn.

69. Children must not know (find out) how much their parents pay in taxes.

70. They will learn about finances (money) soon enough.

71. It is useless to make them adults (grow up) too soon.

72. F. expressed these views. (Items #70-71)

73. F. has two children.

74. There is a desire to isolate the child [from knowledge about money].

75. This desire to isolate the child is a luxury of some classes.

76. Emile et les detectives is by Erich Kastner.

77. Emile asks his friend a question.

78. Emile asks if his friend's family talks about money [often].

79. His friends says no (never).

80. Emile says that's because his friend's family has so much [money].

81. At Emile's house they often talk about money.

82. [This is because] they do not have much money.

83. [Certainly] discussion concerning money occurs more often when one lacks it.
84. [When] one lacks it for everyday needs. 

85. Children from families of modest means often have a clearer understanding of the cost of things.

86. Children of modest means sense that "everything is not possible" (are realistic about money).

87. Bruno is eight years old.

88. Bruno's father is an auto mechanic.

89. Bruno's mother is a housekeeper (maid).

90. Bruno wishes to go on pony rides.

91. Other children are allowed to go on pony rides.

92. Children ride ponys on Wednesday.

93. It costs too much (for Bruno to ride).

94. His mother says that it costs too much.

95. Riding ponies is just not possible for Bruno['s family].

96. A pony ride costs as much as Bruno's mother makes in one week.

97. Parents' attitudes contribute to the child's conception (notion of, understanding of) money.

98. Parents' attitudes are the most important influence on the child's understanding of money.

99. Parents' attitudes are more important than their means.

100. Parents' attitudes are more important than the pocket money at their child's disposal.

101. Example counts more than what is said.

102. Example is second most important.

103. [If she acts otherwise], a mother cannot claim that money doesn't make a person happy.

104. [If] she brings up how much everything costs.
105. [If] she brings up the cost of the steak (meat). 1.3
106. [If] she brings up the cost of the steak (meat) at the table. 1.3
107. [If] she brings up the cost of steak (meat) every night. 1.3
108. [If] she brings up how much clothes cost. 1.3
109. [If] she brings up how much it costs to go out. 1.3
110. [If] she brings up how much going on vacation costs. 1.3
111. Some children must ask for money for every little desire (want). 4.7
112. Many detest this infantile attitude. 4.0
113. Many educators hate this infantile attitude. 4.0
114. Children [who must ask for money for every desire] do not have even limited freedom. 5.3
115. Children [who must ask for money for every little desire] do not even have the chance to make choices. 5.3
116. Jean Ormezzano is a psychologist. 2.7
117. He is against the expression "pocket money." 3.7
118. Pocket money is simply money that ends up in the bottom of one's pockets. 3.0
119. Pocket money is something "not counted." 3.3
120. Pocket money is not [really] valued [money]. 4.3
121. To give children this "uncounted money" is anti-educational. 5.0
122. Families should utilize [a system of] collective decisions [about money]. 7.0
123. Collective decisions result in a real education about money. 6.0
124. Children should know all the details 6.0
of the family's financial situation.

125. Children should know the exact income of their parents. 4.7

126. A family budget should be established. 5.3

127. Children should be told about fixed expenses. 4.0

128. Children should know how much taxes their parents pay. 2.3

129. Children should know how much rent their parents pay. 2.3

130. Children should know how much vacations cost. 2.3

131. Once expenses are deducted, a sum (e.g., 1500 francs) is left. 2.0

132. Each family member receives enough to meet his or her own personal expenses. 4.7

133. Father needs several items. 3.0

134. Father needs cigarettes. 1.0

135. Father needs his newspaper. 1.0

136. [Sometimes] he eats out. 1.0

137. Father needs 500 francs. 1.0

138. Mother needs to spend her money (allocation) on several expenses. 3.0

139. She has the expense of getting her hair done. 1.0

140. She has [the expense of] her make-up. 1.0

141. She has [the expense of] her newspapers. 1.0

142. She needs enough to meet her personal expenses. 1.3

143. The child has several items he or she wants to buy. 3.0

144. He or she has [the expense of] soccer cards (pictures). 1.0

145. He or she has [the expense of going to] the
movies.

146. He or she has [the expense of] stamps. 1.0
147. He or she is asked what he or she thinks of of a given amount [of allowance]. 2.3
148. Jean Ormezzano expresses these opinions. (Items #144-148) 2.0
149. This is not pocket money. 2.3
150. It is an allowance. 4.3
151. Each family member gets an allowance. 5.7
152. The allowance is for personal expenses. 3.7
153. The allowance is for one's own pleasures. 2.7
154. The money can be used for other things. 4.3
155. Movies can be replaced by a soccer game. 1.0
156. Stamps can be replaced by a newspaper. 1.0
157. Stamps can be replaced by a stack of crepes. 1.0
158. The child spends (controls) his or her money on his or her own. 6.7
159. The child is responsible for his or her money. 7.0
160. The child cannot ask for additional money. 4.7
161. ____________________________________________________________________________
162. ____________________________________________________________________________
163. ____________________________________________________________________________
Appendix E

Printouts of Reading Practice Computer Programs

Following are the practice reading programs for the level of question treatment groups. They are written in the SuperPilot course authoring language. The only difference between the passage-available and the passage-unavailable programs for each level of questions was the programming in subroutine #1 (sub1). At the end of the printouts of the passage-available / lower level questions and the passage-available / higher-level questions treatments, this subroutine is listed separately.
#1 Passage-Available / Lower-Level Questions Reading
Practice Computer Program

pr:lg
d:a$(1)
d:b(18)
d:f(10)
d:g(10)
d:h(10)
d:n$(30)
d:r(1)
d:z$(20)

c:f=0
c:g=0
c:h=0

r:********p$ = student's name********
r:*******r = random praise**********
r:*******z$ = answer choice in French*
r:****The following strokes will *****
r:****print the corresponding French***
r:****characters:
r:@ = "a" accent grave
r:& = "a" accent circonflexe
r:t = "e" accent grave
r:s = "e" accent aigu
r:+ = "E" accent aigu
r:" = "e" accent circonflexe
r:$ = "i" accent circonflexe
r:o = "o" accent circonflexe
r:¶ = "u" accent grave
r:© = "u" accent circonflexe
r:® = "c" cedille
r:[ = guillemets (left side)
r:] = guillemets (right side)
r:* = l.
r:***They are in character set********
r:***named ASCIIFR***************
tx:asciifr
k:s,PA-LL

*name
r:***experimentor uses following*****
r:***to set up learning stations*****
r:***prior to experiment***********
Bonjour, $n$ !

This computer is for you.

Sit down and relax, but please don't touch me until you receive instructions from the lab director.

Mille mercis!

WAIT WAIT WAIT WAIT WAIT WAIT

FOR FOR FOR FOR FOR FOR

INSTRUCTIONS!!!

***subject interaction from this****

***point on**************************

You will read part of a text about TV in France. The text will be shown to you in short passages, a little at a time.

After you read a passage you will be asked a question on the passage you've just read.

Press RETURN key to continue.

You will be given more than one try to get the answer right.
For maximum points,
DO YOUR BEST TO ANSWER CORRECTLY ON THE FIRST TRY.

Both this text and one you will read a little later are written for French people by French authors.

It's only natural that you won't understand everything.

What's important is to understand as much as you can and learn all you can by doing your best.

First of all, you will read a selection entitled...

"Ma femme, ma t§l§ et moi"

an article from La Vie

by Claude Perrier

Press RETURN to begin.

Le journal T§l§ 7 jours
a men§ une enqu"te il y a quelques ann§es pour mesurer l'influence de la t§l§vision dans la vie des couples. Cette enqu"te confirme l'attachement des maris et leurs r§cepteurs: ce sont eux qui sont les premiers devant le poste apr§s le repas du soir, trois fois plus souvent que les femmes, occup§es alors aux taches m§nag§res. Du moins dans les familles qui ne d§nent pas devant la t§l§vision, seulement 48%. En effet, 39% allument leur poste pendant le repas de 4 @ 7 soirs par semaine et 13% de 1 @ 3 soirs. [Qu'est-ce qu'il y a @ la t§l§vision?]

a remplac§ [Qu'est-ce qu'il y a @ manger?]

Which French equivalent of one of these words appears in this passage?
a. work
b. loss
c. life
d. destiny
Un psychologue français, Gilbert Rapaille, a inventé un mot pour désigner l'intrusion de la télévision dans les ménages: un trouple. [Un trouple, c'est un monsieur, une dame]
et un poste de télévision. Ils vivent ensemble une relation où la télé est le partenaire dominant. Les deux autres se taisent quand elle parle, respectent ses horaires, et toute leur vie est conditionnée par elle. Le trouple n'est pas arrivé par hasard. Une autre épidémie l'a précédée, et a créé le terrain : l'épidémie de couple.

Which French equivalent of one of these words appears in this passage?

a. families
b. relatives
c. neighborhoods
d. households

"les familles"
"les parents"
"les voisins"
"les ménages"
That’s right.
The answer is: d. households (les ménages)

Which French equivalent of one of these words appears in this passage?

a. festivities
b. methods
t:  c. punishments
th:  d. stories
j3: go3

mj:%a%
c:z$="[les festivités]"
k:3,a ;#(%a) /#(tim(0))
u:sub4
jy:quesa3

mj:%b%
c:z$="[les méthodes]"
k:3,b ;#(%a) /#(tim(0))
u:sub4
jy:quesa3

mj:%c%
c:z$="[les punitions]"
k:3,c ;#(%a) /#(tim(0))
u:sub4
jy:quesa3

m:%d%
c:z$="[les histoires]"
jn:wrong3
u:sub0
k:3,d* ;#(%a) /#(tim(0))
g:es
t:Correct.
w:3
ts:x20
g:es
jy:2hello

*first3
u:sub5
jy:2hello

*wrong3
u:sub7
j:quesa3

*go3
r:***these responses are counted*****
k:#b , $a$ ;#(%a) /#(tim(0))
t(a$="d"): That's right.
The answer is: d. stories (les histoires)

You got 1 question correct on the first try.
You got 1 question correct on the second try.
Altogether, you answered out of 3 correctly on the first two tries.

Press RETURN to continue.
The noun, $z$, does not appear in this passage.

Here's the question. Try again.

---

The noun, $z$, does not appear in this passage.

Here's the question. Try again.

---

C'est *a!
t(r=3): Bravo!
t(r=4): Excellent!
t(r=5): Voilà!
t(r=6): Bien!
w:2
t: The noun, $z$, is indeed in the
: passage.
th: Press RETURN to read more of the text.
a:
g:x20
g:ies

e:

*sub6
r: ***feedback for correct ans 2nd try**
r: ***full viewport/screen erased*******
w:2
t: The noun, $z$, does appear in the passage.
th: Press RETURN to read more of the text.
a:
g:x20
g:ies

*sub7
r: ***When a, b, c, or d is not chosen*****
k: #b, #a$ ;#(a) /#/tim(0))
t: Please type a single letter (a, b, c, or d) for your answer.
w:3
t: Here's the question. Try again.
w:5
g:ies
e:

*sub8
r: ***After three tries************
th: Let's go on.
w:3
g:x20
g:ies
e:
Now you will read a selection from the weekly French newspaper, Le monde de l'éducation by Liliane Delwasse entitled 

[Les enfants, la famille et l'argent]...

Most cultures that utilize money have some rather unique and sometimes varied views about how it should be valued and utilized. French culture is no exception.

The selection you will now read is longer than the one on TV. You will be asked the same kind of questions as in the first selection. This is READING PRACTICE not READING TESTING! The computer will, however, keep a record of how well you do—so do your best!

L'argent, que représente-t-il pour
les enfants? Combien en ont-ils? 
Qu'en font-ils? Et qu'en disent leurs parents? Voilà les questions de ce cadre.

Deux conceptions de l'éducation -- veuille protéger les jeunes ou les préparer aux réalités de l'existence?
La réponse dépend... des ressources de la famille, de son appartenance sociale, des aléas de l'existence,
mais surtout des normes éducatives.

Which French equivalent of one of these words appears in this passage?

a. society  
b. life  
c. existence  
d. humanity

---

les enfants? Combien en ont-ils?
Qu'en font-ils? Et qu'en disent leurs parents? Voilà les questions de ce cadre.

Deux conceptions de l'éducation -- veuille protéger les jeunes ou les préparer aux réalités de l'existence?
La réponse dépend... des ressources de la famille, de son appartenance sociale, des aléas de l'existence,
mais surtout des normes éducatives.

Which French equivalent of one of these words appears in this passage?

a. society  
b. life  
c. existence  
d. humanity
That's right.

The answer is:

c. existence (l'existence)

IL'enfant et l'argent? a dit tante Agathe, choquée, drôle d'idée, drôle de rapprochement, les enfants c'est l'innocence, la pureté, la candeur. Qu'ont-ils à voir avec l'argent? Quand ils comprennent ce que c'est l'argent, ils cessent d'être des enfants... On n'en parle pas, les enfants pourraient entendre.] Dans les [bonnes familles] à haute prétentions éducatives, on n'en parle pas à table mais on y pense...et onagit en fonction --c'est pourquoi nos grands-parents ont été taxés d'hypocrisie. Il est admis de faire l'éducation sexuelle des enfants,
mais, pour l'argent, le tabou subsiste, latent mais insidieux.

Which French equivalent of one of these words appears in this passage?

a. babies
b. children
c. adolescents
d. adults

[les enfants]
[les adolescents]
[les adultes]
Which French equivalent of one of these words appears in this passage?

a. work
b. contribution
c. need
d. treasure
These responses are counted

That's right.

The answer is:

a. work (le travail)
Aujourd'hui, dans certaines familles, cette vieille tendance continue. On essaie d'élèver l'enfant dans la pureté, la fraîcheur de son âme. Donc, il ne faut jamais dire le prix des choses; ce qui compte dans le noyau familial ce sont les relations d'amour, de tendresse désintéressée. Les enfants doivent être soigneusement tenus à l'abri des préoccupations matérielles, ne pas savoir combien leurs parents gagnent, ou paient d'impôts: [Ils le sauront assez tard. Inutile de les rendre adultes avant l'heure,) affirme F., qui a deux enfants.

Which French equivalent of one of these words appears in this passage?

a. kindness
b. generosity
c. tenderness
d. patience
*go12
t:**these responses are counted*****
k:#b, $a$ ;#(a) /#(tim(0))
t(a$="c") : That's right.
t:
t(a$="c") : The answer is:
t(a$="c") : c. tenderness (la tendresse)
t:
u:sub8

*pas13
k:if*
k:
kis,pas13
t: Gageons que cette volonté d'isoler
l'enfant de l'argent est un luxe de
classes aisées. Dans *mile et les
détectives
ts:g22,2
t:--------------------- d'Enrich
Kastner, *mile demandait à son copain:
t:
t:--On parle souvent d'argent chez toi?
t:—Non, jamais.
t:—C'est que tu en as plein, rétorque Emile, chez moi on en parle tout le temps parce qu'on n'en a pas.
tsm1
u:sub1
k:63,T,<CR>/#{tim(0)}
k:f*

*ques13
k:
k:s,ques13
t:Which French equivalent of one of these words appears in this passage?
t: a. pal
t: b. circumstance
t: c. line
th: d. remedy
u:sub2
as:$a$
c:b=13
u:sub3
j3:go13

mj:%b%
c:z$="la circonstance"
k:13,b ;#{a) /#{tim(0)}
u:sub4
jy:ques13

mj:%c%
c:z$="la ligne"
k:13,c ;#{a) /#{tim(0)}
u:sub4
jy:ques13

mj:%d%
c:z$="le remède"
k:13,d ;#{a) /#{tim(0)}
u:sub4
jy:ques13

m:%a%
c:z$="le copain"
jn:wr0n13
u:sub0
k:13,a* ;#{a) /#{tim(0)}
jy1:firs13
u:sub6
These responses are counted.

The answer is:

a. pal (le copain)

You answered correctly in one try!

You answered correctly in two tries.

c(%a=1): f=f+1
c(%a=2): g=g+1

t:-----------------------------
ts:v0,39,18,23

t:When done reading press RETURN.

a:
g:es

---

These responses are counted.

t:********
k:b, $a$ ;$(@a) /$(tim(0))
t(a$="a"): That's right.
t:
t(a$="a"): The answer is:
t(a$="a"): a. pal (le copain)
t:

You answered correctly in one try!
The noun, $z$, does not appear in this passage.

Here's the question. Try again.

The noun, $z$, is indeed in the passage.

Press RETURN to read more of the text.

The noun, $z$, does appear in the passage.

Press RETURN to read more of the text.

Please type a single letter (a, b, c, or d) for your answer.
Pour s°r, le discours autour de l'argent est plus fr§quent quand on en manque pour le quotidien. Les enfants du milieu modeste ont souvent plut°t la notion du prix des choses, le sentiment que [tout n'est pas possible.] Bruno, huit ans, fils d'un mécanicien auto et d'une femme de ménage, regrette: [J'aimerais bien monter sur les poneys, moi aussi, le mercredi, mais maman dit que c'est trop cher. C'est pas pour nous...il co°te ce que maman gagne en une semaine.]
That's right, the answer is: d. things (les choses)
Ce qui contribue avant tout à former le rapport de l'enfant est l'argent, c'est l'attitude des parents, plus que leur moyens, que l'argent de poche dont il peut disposer. Plus que les discours aussi, c'est l'exemple qui compte. Une mère ne peut pas affirmer que l'argent ne fait pas le bonheur, si elle annonce tous les soirs à table le prix du bifteck, le coût des vêtements, des sorties ou des vacances.
That's right.
The answer is: b. clothes (les vêtements)

Cependant, de nombreux éducateurs déplorent cette attitude [infantilisation] car l'enfant qui doit demander l'argent à ses parents pour satisfaire le moindre désir n'a aucune marge de manœuvre, aucune possibilité de choix. Jean Ormezzano, psychologue, s'oppose même contre l'expression, [argent de poche.] [L'argent de poche, c'est littéralement celui que traîne au fond des poches, celui qui n'est pas compatible, qui n'est pas valorisé.

Donner l'argent sans savoir
Which French equivalent of one of these words appears in this passage?

a. senator  
b. psychologist  
c. lawyer  
d. professor
*wron16
ut:sub7
j:ques16

*go16
r:**these responses are counted******
k:#b , $#a$ ;#$(&a) /#/((tim(0)))
t(a$="b"):That's right.
t:
t(a$="b"):The answer is:
t(a$="b"): b. psychologue (psychologist)
t:
usub8

*pas17
kif*
k:
k:s,pas17
t: Pour faire une véritable [éducation
:à l'argent,] J.Ormezzano prôconise un
:systeme de [décision collective.] Il sou-
t:haite que les enfants sachent
:exactement les revenus des parents,
:qu'on établisse
:ten familles un budget, leur montrant
:les frais incompressibles, les impôts,
:le loyer, les vacances:
:[Une fois qu'on a retiré tout cela, il
:reste, disons, 1500 francs. Papa a
:besoin de cigarettes, de son journal*
:de temps en temps il déjeune
:tau
:restaurant. Il lui faut donc 500
t:francs. Maman a sa coiffeur, ses
:produits de maquillage, ses journaux,
:il lui faut tant. Toi, tu as ton
:cinéma, tes vignettes de football, tes
:timbres, qu'en penses-tu de cette
:somme?] 
usub1
k:67,T,<CR>//#((tim(0)))
kif*

*ques17
k:
k:s,ques17
t:Which French equivalent of one of
these words appears in this passage?

- a. inventory
- b. products
- c. toys
- d. perfumes

These responses are counted*****

That's right.
Ce n'est pas de l'argent de poche, c'est une somme allouée à chaque membre de la famille pour ses dépenses personnelles et ses propres plaisirs. Moyennant quoi, la somme régulièrement versée peut être utilisée pour autre chose; il est possible de remplacer le cinéma par un match de football, les timbres par un journal ou une pile de crêpes. Ainsi, l'enfant dispose d'une somme qu'il peut être à sa guise, dont il est responsable, et qu'on n'augmente pas à volonté.

Which French equivalent of one of these words appears in this passage?

a. books
b. telegram
c. stamps
d. trip
Press RETURN to continue.

That's right. The answer is: c. stamps (les timbres)

You got 1 question correct on the first try.
You got #f questions correct on the first try.
t:

t(g=1): You got 1 question correct on the second try.
t(g>1): You got #g questions correct on the second try.
c:h=(f+g)

t:

Altogether, you answered #h out of 10 correctly on the first two tries.

th: Press RETURN to continue.

a:

ts:x20
g:es

*end1

Now the French Department would like to have your reaction to this type of reading practice in French.

Please raise your hand and the lab assistant will give you one final form to fill out.

DO NOT TOUCH THE COMPUTER FROM THIS POINT ON.

Please do not touch the computer anymore.

RAISE YOUR HAND AND THE LAB ASSISTANT WILL GIVE YOU A FORM. THANK YOU.

w:10
g:es

jnt: end1
e:

*sub0

ty1: You answered correctly in one try!
ty2: You answered correctly in two tries.
ty2:
c(%a=1): f=f+1
When done reading press RETURN.

The noun, $z$, does not appear in this passage.

Press RETURN to read more of the text.
The noun, \( z \), does appear in the passage.

Press RETURN to read more of the text.

Please type a single letter (a, b, c, or d) for your answer.

Here's the question. Try again.

Let's go on.
#2 Passage-Available / Higher-Level Questions Reading Practice Computer Program

pr:lg
d:a$(1)
d:b(18)
d:f(10)
d:g(10)
d:h(10)
d:n$(30)
d:r(1)
d:z$(20)
c:f=0
c:g=0
c:h=0

r:********n$ = student's name**********
r:*******r = random praise***********
r:******z$ = answer choice in French*

r:**The following strokes will *****
r:**print the corresponding French***
r:**characters:********
r:@ m' accent grave
r:& = "a" accent circonflexe
r:t = "e" accent grave
r:$ = "e" accent aigu
r+: = "E" accent aigu
r:"m = "e" accent circonclexe
r:$ = "i" accent circonclexe
r:$ = "o" accent circonclexe
r:¶ = "u" accent grave
r:° = "u" accent circonclexe
r:® = "c" cedille
r:[ = guillemets (left side)
r:] = guillemets (ride side)
r:* = l.
r:**They are in character set********
r:**named ASCIIFR************
tx:asciifr
k:s,TA-HL

*name
r:**experimentor uses following*****
r:**to set up learning stations*****
r:**prior to experiment**************
Bonjour, $n$ !

This computer is for you.

Sit down and relax, but please don't touch me until you receive instructions from the lab director.

Mille merci!

WAIT WAIT WAIT WAIT WAIT WAIT FOR FOR FOR FOR FOR FOR INSTRUCTIONS!!

***subject interaction from this****
***point on***********************

You will read part of a text about TV in France. The text will be shown to you in short passages, a little at a time.

After you read a passage you will be asked a question on the passage you've just read.

Press RETURN key to continue.
You will be given more than one try to get the question right.

For maximum points, DO YOUR BEST TO ANSWER CORRECTLY ON THE FIRST TRY.

Press RETURN to continue.

Both this text and one you will read a little later are written by French authors for French people.

It's only natural that you won't understand everything. What's important is to understand as much as you can, and to learn all you can by doing your best.

Press RETURN to continue.

First of all, you will read a selection entitled... "Ma femme, ma $51$ et moi" an article from La Vie by Claude Perrier..............

Press RETURN to begin.
*pasa1
k:s,pasa1
t: Le journal T§1§ 7 jours
r:**text mode #2 for underlining**
ts:m2
r:**moves cursor to underline pos**
ts:g13,0
t:________________ a men§ une enqu"te il y :
a quelques ann§es pour mesurer :
l'influence de la t§l§vision dans la :
vie des couples. Cette enqu"te :
:confirme l'attachement des maris @
ts:m1
t:leurs r§cepteurs: ce sont eux qui sont :
:les premiers devant le poste apr§s le :
:repas du soir, trois fois plus souvent :
:que les femmes, occup§es alors aux
t:tt&ches m§nagtres. Du moins dans les :
familles qui ne d§nent pas devant la :
t§l§vision, seulement 48%. En effet,
:39% allument leur poste pendant le :
:repas de 4 @ 7 soirs par semaine et :
:13% de 1 @ 3 soirs. [Qu'est-ce qu'il :
y a @ la t§l§?]
t:a remplac§ [Qu'est-ce :
:qu'il y a @ manger?]
u:sub1
k:51,T,<CR>/#(tim(0))
k:f*

*quesa1
k:s,quesa1
t:The major point of this passage is :
:that concerning TV in France,....
t: a. men watch more than women
t: b. quality is still quite low
t: c. it is affecting couples' lives
t: d. many now watch it during meals
u:sub2
as:$a$
u:sub3
c:b=1
j3:go1
mj:%a%
k:1,a ;#(%a) /#(tim(0))
u:sub4
jy:quesa1
mj:%b%
Un psychologue français, Gilbert Rapaille, a inventé un mot pour désigner l'intrusion de la télévision dans les ménages: un trouple. [Un trouple, c'est un monsieur, une dame et un poste de télévision. Ils vivent ensemble une relation où la télé est le partenaire dominant. Les deux autres se taissent quand elle parle, respectent ses horaires, et toute leur vie est conditionnée par elle. Le trouple...]

***these responses are counted********

That's right.
The answer is:
c. it is affecting couples' lives
n'est pas arrivé par hasard. Une autre épidémie l'a précédée, et a créé le terrain: l'épidémie de couple.

Gilbert Rapaille views TV as an intrusion into the couple because it...

- a. now has status equal to the mate's
- b. divides the couple
- c. keeps them from meeting others
- d. controls the relationship

TV's status is not described as "equal."

TV's status is not described as "equal."
*first2
u:sub5
jy:pasa3

*wrong2
u:sub7
j:quesa2

*go2
r:***these responses are counted******
x:k:#b , $a$ ;#(%a) /#(tim(0))
t(a$="d"): That's right.
t(a$="d"): The answer is:
t(a$="d"): d. controls the relationship

*pasa3
k:f*
k:s,pasa3
t: [T§l§mama], comme l'appelle
:Rapaille berce ses enfants et leur :
:raconte des histoires avant de les :
envoyer au lit. Ils sont contents. :
:72% des [trouplistes] fran§ais ont :
:bien d° reconna$tre que la t§l§vision :
:emp°che les conversations mais 60% ont :
t:imm§diatement ajout§: [Quand on est :
devant son poste, on n'a pas besoin de :
:se parler pour ùtre bien ensemble!]
u:sub1
k:53,T,<CR>/#(tim(0))
k:f*

*quesa3
k:s,quesa3
t:The main point of the passage is that :
:TV is....
t: a. becoming a substitute parent
: b. substituted for personal :
:interaction
: c. keeps children from going to bed
: th: d. enjoyed by young and old alike
u:sub2
as:$a$
u:sub3
c:b=3
j3:go3
That's right.

The answer is:

b. substituted for personal interaction

You got 1 question correct on the first try.

You got #f questions correct on the first try.
t:
t(g=1): You got 1 question correct on the second try.
t(g>1): You got \#g questions correct on the second try.
c: h=(f+g)
t:
t: Altogether, you answered \#h out of 3 correctly on the first two tries.
ts: g7,23
t: Press RETURN to continue.
a:
ts: x20
g: es

l: 2hello

*sub0
r: ***feedback for first or second*****
r: ***try -- \%a counts successes*****
ty1: You answered correctly in one try!
ty1:
ty2: You answered correctly in two tries.
ty2:
c(\%a=1): f=f+1
c(\%a=2): g=g+1
e:

*sub1
r: ***line separates passage from <CR>**
r: ***Inverse <CR> instructions********
r: ***5-line viewport for question******
r: ***cursor to to top-left viewport*****
r: ***text available during questioning*
ts: v0,39,17,18
.ts: m2
ts: g0,17
t: ------------------------------------------------
ts: v0,39,18,23
t: When done reading press RETURN.
a:
g: es
e:

*sub2
r: ***keeps cursor on line 23**********
This point is mentioned in the passage, but it is not the main point.

Here's the question. Try again.

Press RETURN to read more of the text.
Press RETURN to read more of the text.

Please type a single letter (a, b, c, or d) for your answer.

Here’s the question. Try again.

Let’s go on.

No. This point was not made in the passage.

Here’s the question. Try again.
Here's the question. Try again.

Most cultures which utilize money have some rather unique and sometimes varied views about how it should be valued and utilized. French culture is no exception.
This is READING PRACTICE not READING TESTING! The computer will, however, keep a record of how well you did—so do your best!

Press RETURN when ready.

This selection is about money and French opinions concerning how....

a. to spend it wisely
b. to invest it
c. to teach children about it
d. children view it
That's right.
The answer is:
c. to teach children about it

[L'enfant et l'argent?] a dit tante
Agathe, choquée, drôle d'idée, drôle
de rapprochement, les enfants c'est
l'innocence, la pureté, la candeur.
Qu'ont-ils à voir avec l'argent?
Quand ils comprennent ce que c'est
l'argent,
t'ils cessent d'être des
enfants... On n'en parle pas, les
enfants pourraient entendre.] Dans
:les [bonnes familles] @ haute
:pr$entions §ducatives, on n'en parle
:pas @ table mais on y pense...et on
:agit en fonction --c'est pourquoi nos
:grands-parents ont §tax§s
:d'hypocrisie. Il est admis de faire
:l'éducation sexuelle des enfants,
:mais, pour l'argent, le tabou
:subsiste, latent mais insidieux.

*ques10
k:60,T,<CR>/#(tim(0))
k:f*

*ques10
k:s,ques10

Some French people believe that
:teaching kids about money is like....
 t: a. robbing them of their purity
 t: b. robbing them of their childhood
 t: c. robbing them of their innocence
 th: d. teaching them about sex

Just the opposite is true. Sex is
:openly discussed.

Just the opposite is true. Sex is
:openly discussed.

:les [bonnes familles] @ haute
:pr$entions §ducatives, on n'en parle
:pas @ table mais on y pense...et on
:agit en fonction --c'est pourquoi nos
:grands-parents ont §tax§s
:d'hypocrisie. Il est admis de faire
:l'éducation sexuelle des enfants,
:mais, pour l'argent, le tabou
:subsiste, latent mais insidieux.

*ques10
k:60,T,<CR>/#(tim(0))
k:f*

*ques10
k:s,ques10

Some French people believe that
:teaching kids about money is like....
 t: a. robbing them of their purity
 t: b. robbing them of their childhood
 t: c. robbing them of their innocence
 th: d. teaching them about sex

Just the opposite is true. Sex is
:openly discussed.

Just the opposite is true. Sex is
:openly discussed.
That's right.

The answer is:

b. robbing them of their childhood

In the past, the family viewed providing for the needs of the family as....

a. each member's concern
b. the father's jurisdiction
c. the father's responsibility
d. important as relationships
The family is called patriarchal, but there is a better answer.

- The answer is: a. each member's concern

* these responses are counted
Aujourd'hui, dans certaines familles, cette vieille tendance continue. On essaie d'élever l'enfant dans la pureté, la fraîcheur de son âme. Donc, il ne faut jamais dire le prix des choses : ce qui compte dans le noyau familial ce sont les relations d'amour, de tendresse désintéressée. Les enfants doivent être soigneusement tenus à l'écart des préoccupations matérielles, ne pas savoir combien leurs parents gagnent, ou paient d'impôts : [Ils le sauront assez tôt.

Inutile de les rendre adultes avant l'heure,] affirme F., qui a deux enfants.

Today many parents don't discuss money with their children so as to:

a. teach them about good taste
b. maintain their own privacy
c. let them enjoy childhood
d. not confuse them

This was mentioned earlier, but not in this passage.
That's right.
The answer is: c. let them enjoy childhood

Gageons que cette volonté d'isoler l'enfant de l'argent est un luxe de classes aisées. Dans +mile et les détectives

Kastner, +mile demandait à son copain:

On parle souvent d'argent chez toi?
Non, jamais.
C'est que tu en as plein, rétorque Emile, chez moi on en parle tout le temps parce qu'on n'en a pas.
t: mile thinks families that talk about money are....

t: a. poor
t: b. tasteless
t: c. poorly-educated
th: d. close-knit

as: $a$
usub2
c:b=13
j3: go13

mj:%b%
k:13,b ;#(%a) /#(tim(0))
usub9
jy:ques13

mj:%c%
k:13,c ;#(%a) /#(tim(0))
usub9
jy:ques13

mj:%d%
k:13,d ;#(%a) /#(tim(0))
usub9
jy:ques13

m:%a%
jn:wron13
usub0
k:13,a* ;#(%a) /#(tim(0))
jy1:firs13
usub6
jy:3hello
*firs13
usub5
jy:3hello

*wron13
usub7
j:ques13
*gol3
r:***these responses are counted********
k:#b, $#(a) /#(tim(0))
t(a$="a"): That's right.
t(a$="a"): 
t(a$="a"): The answer is: 
t(a$="a"): a. poor

*3hello
1:3hello

*sub0
ty1: You answered correctly in one try!
ty1:
ty2: You answered correctly in two tries.
ty2:
c(%a=1):f=f+1
c(%a=2):g=g+1
e:

*sub1
ts:v0,39,17,18
ts:m2
ts:g0,17
t:------------------------------------------
ts:v0,39,18,23
t:When done reading press RETURN.
a:
g:es
e:

*sub2
ts:g35,23
ti:=>
e:

*sub3
ts:v0,39,18,23
ts:x12
ts:x25
e:

*sub4
t:This point is mentioned in the passage, but it is
not the main point.

Here's the question. Try again.

Please type a single letter (a, b, c, or d) for your answer.

Here's the question. Try again.

Let's go on.
No. This point was not made in the passage.

Here's the question. Try again.

Here's the question. Try again.

Pour sœr, le discours autour de l'argent est plus fréquent quand on en manque pour le quotidien. Les enfants du milieu modeste ont souvent plutôt la notion du prix des choses, le sentiment que [tout n'est pas possible.] Bruno, huit ans, fils d'un mécanicien auto et d'une femme de ménage, regrette: [J'aimerais bien monter sur les poneys, moi aussi, le mercredi, mais maman dit que c'est trop cher. C'est pas pour nous...il coûte ce que maman gagne en une semaine.]
Bruno, like many poor children, tends
to:
  a. hope for a better future
  b. be jealous of richer children
  c. be frustrated at being poor
  d. be realistic about money

Although this may be true, the passage does not say so.

Although he may be jealous, the passage simply says what he would like.

There is no evidence of frustration in what Bruno says.
A child's views on money reflect the parents'....

1. a. attitude or their example
2. b. attitude and example
3. c. example
4. d. attitude

The answer is:

1. a. be realistic about money
No, this is not what the author said about attitudes and example.

The author also talked about attitudes.

The author also talked about example.

These responses are counted:

That's right.

The answer is: b. attitude and example

Cependant, de nombreux éducateurs déplorent cette attitude [infantilisme]
car l'enfant qui doit demander l'argent à ses parents pour satisfaire le moindre désir n'a aucune marge de manœuvre, aucune possibilité de choix. Jean Ormezzano, psychologue, s'ultime même contre l'expression, [L'argent de poche.] [L'argent de poche, c'est littéralement celui que traîne au fond des poches, celui qui n'est pas compatibilis, qui n'est pas valorisé.

Donner l'argent sans savoir combien, c'est anti-éducatif.]

Some think that having children ask for money when they need it....

a. is good for small children
b. is insulting and counterproductive
c. develops a responsible attitude
d. undermines parent-child trust
That's right.

The answer is: b. is insulting and counterproductive.

Pour faire une véritable éducation à l'argent, J. Ormezzano préconise un système de décision collective. Il souhaite que les enfants sachent exactement les revenus des parents, qu'on établisse en famille un budget, leur montrant les frais incompressibles, les impôts, le loyer, les vacances: [Une fois qu'on a retiré tout cela, il reste, disons, 1 500 francs. Papa a besoin de cigarettes, de son journal*; de temps en temps il déjeune au restaurant. Il lui faut donc 500 francs. Maman a sa coiffeur, ses produits de maquillage, ses journaux; il lui fait tant. Toi, tu as ton cinéma, tes vignettes de football, tes
timbres, qu'en penses-tu de cette somme?

Ormezzano thinks that parents should give their children:

a. the opportunity to earn money
b. family budget figures and a vote
c. freedom from worries about finances
d. more money as they get older

mj: qa

mj: qa

mj: qa

mj: qa

mj: qa

mj: qa

mj: qa

mj: qa

mj: qa

mj: qa
*wron17
u:sub7
j:ques17

*go17
r:***these responses are counted*****
k:#b , $a$ ;#(%a) /#(tim(0))
t(a"="b"):(That's right.
t(a"="b"):
t(a"="b") :The answer is:
t(a"="b") : b. full information and a budget
:vote
t:
:u:sub8

*pas18
k:**
k:s,pas18
: t: Ce n'est pas de l'argent de poche,
s'est une somme allouée à chaque
: membre de la famille pour ses dépenses
: personnelles et ses propres plaisirs.
: Moyennant quoi, la somme régulièrement
 :t
: versée peut être utilisée pour
: autre chose; il est possible de
: remplacer le cinéma par un match de
: football, les timbres par un journal
: ou une pile de crêpes. Ainsi,
: l'enfant dispose d'une
: somme qu'il
: gère à sa guise, dont il est
: responsable, et qu'on n'augmente pas à
: volonté.
:u:sub1
k:68,T,<CR>/#(tim(0))
:k:**

*ques18
k:s,ques18
: t: Ormezzano believes that children who
: receive an allowance should....
: t: a. save some of it
: t: b. budget it carefully
: t: c. spend it as they wish
: th: d. spend it as they promised
:u:sub2
as:$a$
:u:sub3
c:b=18
tiOrmezzano does not reflect this point of view.

t: Good.

t: Press RETURN to continue.

*a: end

*r: ***these responses are counted******

t(a$="c"): That's right.

t(a$="c"): The answer is:

t(a$="c"): c. spend it as they wish

t: *end

*k:f*

t:f=1): You got 1 question correct on
the first try.
t(f > 1): You got \( #f \) questions correct on
the first try.
t:
t(g = 1): You got 1 question correct on
the second try.
t(g > 1): You got \( #g \) questions correct on
the second try.
c:h = (f + g)
t:
t: Altogether, you answered \( #h \) out of
10 correctly on the first two tries.
ts: g7,23
th: Press RETURN to continue.
a:
ts: x20
g:es

*end1

t: Now the French Department would like
to have your reaction to this type of
reading practice in French.
t:
t: Please raise your hand and the lab
assistant will give you a questionnai
re to fill out.
t:
t: Thank you for your assistance.
t:
t: PLEASE DO NOT TOUCH THE KEYBOARD OF
THE COMPUTER ANY MORE.
a:
m: %fin%
g:es
tn:
tn: PLEASE DO NOT TOUCH THE COMPUTER.
tn: RAISE YOUR HAND AND THE LAB
ASSISTANT WILL GIVE YOU A QUESTIONNAIR
E. THANK YOU.
w: 3
g:es
jn: end1
e:

*subO
ty1: You answered correctly in one try!
ty1:
ty2: You answered correctly in two
tries.
ty2:
c(%a=1): f=f+1
c(%a=2): g=g+1
e:

*sub1
ts:v0,39,17,18
ts:m2
ts:g0,17
t:-----------------------------------------
ts:v0,39,18,23
t:When done reading press RETURN.
a:
g:es
e:

*sub2
ts:g35,23
th:==>
e:

*sub3
ts:v0,39,18,23
ts:x12
ts:x25
e:

*sub4
t:This point is mentioned in the
:passage, but it is
:not the main point.
w:2
t:
t:
t:Here's the question. Try again.
w:3
ts:x12
e:

*sub5
ts:x25
g:es
c:r=rnd(6)
t(r=1): Exactement!
t(r=2): C'est eal!
t(r=3): Bravo!
t(r=4): Excellent!
t(r=5): Voila!
t(r=6): Bien!
w:2
Press RETURN to read more of the text.

Please type a single letter (a, b, c, or d) for your answer.

Here's the question. Try again.

Let's go on.

No. This point was not made in the passage.

Here's the question. Try again.
#3 and #4 Passage-Unavailable Coding for both Lower-Level and Higher-Level Questions

The following subroutine #1 was substituted in the above programs to code for passage unavailability:

*sub1
r:***line separates passage from <CR>**
r:***Inverse <CR> instructions**********
r:***5-line viewport for question******
r:***cursor to top-left viewport****
r:***text unavailable during *******

  ts:v0,39,17,18
  ts:m2
  ts:g0,17
  t:-----------------------------------------
  ts:v0,39,18,23
  t:When done reading press RETURN.
  a:
  g:es
  ts:v0,39,0,16
  g:es
  ts:v0,39,18,23
  e:
Appendix F

Attitude Questionnaire

All information that you provide in this questionnaire will remain confidential.

1. Before today, I have already had the opportunity to use the computer for practice or instruction for another course besides foreign language.

<table>
<thead>
<tr>
<th></th>
<th>never</th>
<th>less than</th>
<th>for about</th>
<th>for about</th>
<th>for more</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 hours</td>
<td></td>
<td>10 hours</td>
<td>20 hours</td>
<td>than 20</td>
<td></td>
</tr>
<tr>
<td>hrs.</td>
<td></td>
<td></td>
<td></td>
<td>hrs.</td>
<td></td>
</tr>
</tbody>
</table>

2. Before today, I have already used the computer to practice or learn a foreign language.

<table>
<thead>
<tr>
<th></th>
<th>never</th>
<th>less than</th>
<th>for about</th>
<th>for about</th>
<th>for more</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 hours</td>
<td></td>
<td>10 hours</td>
<td>20 hours</td>
<td>than 20</td>
<td></td>
</tr>
<tr>
<td>hrs.</td>
<td></td>
<td></td>
<td></td>
<td>hrs.</td>
<td></td>
</tr>
</tbody>
</table>

3. In this type of reading practice you don't have to pay attention to the meaning of the passage.

<table>
<thead>
<tr>
<th></th>
<th>never</th>
<th>rarely</th>
<th>sometimes</th>
<th>often</th>
<th>always</th>
</tr>
</thead>
</table>

4. This type of practice makes me read more closely than I would if I were simply reading the text from a book or paper.

<table>
<thead>
<tr>
<th></th>
<th>strongly disagree</th>
<th>no opinion</th>
<th>agree</th>
<th>strongly disagree</th>
<th>agree</th>
</tr>
</thead>
</table>

5. I think I remember less from this type of reading practice than I do when I read French from a book.

<table>
<thead>
<tr>
<th></th>
<th>strongly disagree</th>
<th>no opinion</th>
<th>agree</th>
<th>strongly disagree</th>
<th>agree</th>
</tr>
</thead>
</table>
6. The type of question in this type of reading practice seems useful for helping me to remember the text.

| strongly disagree | disagree | no opinion | agree | strongly agree |

7. Generally, I find doing this type of practice interesting.

| strongly disagree | disagree | no opinion | agree | strongly agree |

8. Even if I were more familiar with this type of practice, if I had my choice on how to do my reading assignments, I would choose to read the texts from books rather than do computer-assisted reading practice.

| strongly disagree | disagree | no opinion | agree | strongly agree |

9. The types of questions asked in this reading practice are too difficult.

| strongly disagree | disagree | no opinion | agree | strongly agree |

10. This type of computer-assisted reading instruction is frustrating to me.

| strongly disagree | disagree | no opinion | agree | strongly agree |

When you have completed the above questionnaire, please turn the page and follow the directions provided.
Appendix G

Recall Protocol Instruction Sheet

Name__________________________

The information you provide will be used by the laboratory assistant. The French department will be provided with the general results of the whole class, but will not read this paper or receive specific results for specific students.

Please spend a few moments recalling the second selection that you read today entitled "Les enfants, la famille et l'argent." Write down on this sheet everything you can remember from that selection. Please write in English, unless you wish to write a phrase or two in French.