

A COMPARISON OF THREE SELECTED STUDY STRATEGIES
ON THE DIMENSIONS OF EFFECTIVENESS AND EFFICIENCY

by

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(ABSTRACT)

Forty-five randomly selected and assigned college freshmen participated in this study designed to compare three text study strategies for their relative effectiveness (comprehension), efficiency (time), and level of awareness (confidence). The three study strategies of 1) Survey, Question, Read, Recite, Review (SQ3R), 2) Question, Read, Recite (QRR) with emphasis on text structure and main idea student-generated questions, and 3) Question, Read, Question - Product (QRQ-P), designed to develop greater metacognitive awareness of the user, were compared on three criterion measures of comprehension accuracy, time to study, and confidence in answering test questions. Using multivariate analysis of covariance with reading ability as the covariate, the results favored the metacognitive QRQ-P study strategy over the SQ3R in comprehension accuracy (effectiveness), but not over the QRR. Significant differences in time to study (efficiency) were revealed in favor of QRR and SQ3R over QRQ-P. No statistically significant differences were found in confidence (level of

awareness) among the three treatments. The QRQ-P was, therefore, the most effective, and QRR the most efficient; however, interpretation of the overall results favored QRR as both the most effective and efficient, since no significant differences existed between the QRR and the QRQ-P in effectiveness and since student response was more favorable toward the QRR.

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Chapter 1
INTRODUCTION

Background

The issue of how-to-study has been researched since the 1920's (Robinson, 1970). The emphases of study skills research have changed as the needs became evident. The most evident need today is for effective and efficient learning from text, which concomitantly carries with it the need to prepare the student for text learning. To help determine how students learn from text, recent research has focused on study strategies for learning from text.

One of these study strategies, taught widely and included almost exclusively in study skills texts, is known as SQ3R (Survey, Question, Read, Recite, Review) (Robinson, 1970). However, with regard to SQ3R and study strategies in general, certain issues still remain unsettled. For example: Is SQ3R the most effective (comprehension accuracy) and efficient (best use of time) strategy for students to use in their study? Would learning from text be more effectively and efficiently achieved with a simpler, less-involved, less time-consuming strategy? Would study/learning effectiveness and efficiency be improved by using more active during reading strategies (Baker, 1979) versus the before (survey) or after (review) study strategies of SQ3R?

These issues are important from both a student's and a teacher's perspective. If the study of text material can be simplified and still be as effective for comprehending the text information and also increase study efficiency, the student would have more time and energy available for study in general, and increase the chances of learning over the same period of time. Teachers of reading and study skills would also have a less formidable task of training students in study strategies which are more efficient and less involved. Of course, less time spent in teaching a study strategy allows the teacher more time for teaching other skills and thus would improve the student's chances of success in school. Finally, if a student's confidence in answering test questions can be increased from the use of a certain study strategy, grades may be affected significantly. These are only some of the more obvious benefits which could result from a more effective and efficient strategy for studying text material.

Purpose Of The Study

The purpose of this study was to compare three study strategies for their relative effectiveness and efficiency in comprehension of text and for level of awareness during study of the text. The popular SQ3R strategy (Robinson, 1941) was compared to two other study strategies, the QRR,

(Question, Read, Recite) and the QRQ-P, (Question, Read, Question - Product).

The QRR and the QRQ-P were researcher designed strategies. The QRR was designed as a simplification of the SQ3R, for testing the notion that comprehension of text could be achieved at least as effectively and more efficiently using fewer steps of SQ3R, and if more emphasis on reading for main ideas and on using the organization of the text were part of the study. The QRQ-P was designed to test the notion that a study strategy which requires the reader to be more cognitively active during the reading act could result in more effective comprehension of text. The concepts of "more active" and "during reading" study are derived from the literature on metacognition (Baker, 1979); therefore, the QRQ-P was designed with the intent of increasing the student's level of awareness in two ways. First, through the during reading question generating process, the student was expected to increase awareness of the comprehension of the text. Second, during the answering of the questions on the comprehension test, the student was expected to be more aware of whether he was guessing or not on each of the test items.

Study Strategies

The three study strategies compared in this study (SQ3R, QRR, and QRQ-P) have distinct features which were

important to this research. The SQ3R strategy is a 5-step strategy with major emphasis on the use of the structural features of text (headings, summaries, charts, graphs, etc.) during the study procedure. In addition, it has become the accepted study strategy for inclusion in a vast majority of college texts on study skills. The QRR strategy is distinctive for two reasons. First, it is much simpler and shorter, having only three steps. Second, it requires the student to generate main idea questions and continually relate the main ideas of the text throughout the study procedure. The QRQ-P strategy requires the student to be more cognitively active during the reading phase of the study strategy. The student is also taught the purpose of the strategy, and the need to monitor effectiveness in achieving that purpose, learning the text information. The student using the QRQ-P strategy is also trained to take necessary remedial action by rereading when comprehension is not occurring. This process is commonly referred to as comprehension monitoring (Alessi, Anderson, and Goetz, 1979). These distinctive features are classified as metacognitive skills and are intended to increase the student's level of awareness during study, above and beyond that achieved by either the SQ3R or QRR strategies.

The SQ3R study strategy. The SQ3R method of study was originally introduced by Francis Robinson (1941) and has been advocated for various purposes in three revisions of

the original text (1946, 1961, 1970). The steps of SQ3R are briefly summarized below (Robinson, 1961, pp. 32, 33):

Survey. Using the text features, the student becomes familiar with the reading for the purpose of mentally identifying the major ideas. The chapter title, headings, graphs etc., as well as the first sentences of paragraphs, may be surveyed.

Question. Using each of the headings, the student devises a question implied by the heading before reading the material under that heading. The question may be written over the heading or just mentally considered.

Read. The student reads to answer the self-generated question from the heading. The overall information of the chapter, derived from the survey should also be kept in mind during reading.

Recite. After reading the first section, the student attempts to recite the answer to the question. This reciting may be done by developing an outline of cue phrases during the recitation process or by a totally mental method.

Review. After completing the four above steps, the student looks over the notes made and attempts to recite the main points. This review is usually performed at a later study time after completing the first four steps in the initial study session.

Theoretically the SQ3R study strategy should work, considering what is known about memory and learning.

Tadlock (1978, p. 111) argues for the use of SQ3R on the basis that it is consistent with an information processing theory of learning. She contends that each component of SQ3R is designed to enhance the processing of incoming information so that the learner can cope with more information and do so more effectively. For example, the survey component is supposed to give the student a general idea of the contents of the text information, thereby making the processing of the information of text during reading more a process of relating the main ideas from the survey to the details of the reading. This process of organizing and relating the information of text should aid both understanding and memory of the information.

The originator of SQ3R, Frances Robinson, also cited many research studies related to memory and learning in support of the use of the procedures involved in SQ3R, i.e. surveying, self-questioning, reciting, and reviewing. In fact, the study procedures of SQ3R can be traced as far back as the 1920's according to Robinson (1970), who did a limited sample study on the effectiveness of SQ3R. The fact that it has been used for so long attests to its pragmatic value to some degree. Yet, the fact that SQ3R has not been extensively validated through empirical research, leaves it open to question.

Despite these declarations in support of SQ3R, the research clearly suggests that without modification of some kind, SQ3R is less effective and efficient as a study strategy than such strategies as underlining or outlining, or reading only. A study by Willmore (1967) for example, comparing an unmodified SQ3R approach and other study strategies, did not show SQ3R to be the most effective or most efficient when compared with underlining, outlining, and reading only.

Kopfstein (1982) listed several other problems with SQ3R which other researchers have discussed. First, the students who know SQ3R do not apply it. Second, SQ3R is described by students who try to apply it as too artificial, too involved, and too time-consuming. Third, students do not believe SQ3R will work, thus hindering the effective use of the strategy. In summary, research indicates that SQ3R may have an input/output problem. That is, the student is required to expend excessive time and follow detailed procedures (input) without experiencing equal return of improved comprehension and/or learning of the text (output). Testing of this issue is one of the major concerns of this study. Can the strategy be changed and either maintain or increase the output from the study time and effort? The comparison of SQ3R with QRR was made to test this issue.

The QRR study strategy. The three components of the QRR strategy are Question, Read, and Recite (see Appendix

C, "QRR Study Strategy Guide"). The first component (Question) requires the student to generate main idea questions from the title and then the major heading. The second component (Read) requires the student to read in order to answer the main idea question generated from the heading. For the third step (Recite) the student recites to himself the answer to the main idea question.

The selection of the QRR (Question, Read, Recite) study strategy was influenced by two factors. The first factor was related to the inefficiency of the SQ3R strategy, that it is too time consuming and too involved. Reducing the number of separate components in the study strategy to question, read, and recite, may improve efficiency, but the question of effectiveness remained open to the results of this study. The rationale for selecting question and recite as the components of the reduced form of SQ3R is because both of these require less time to use than the other components of survey and review. Therefore, in the attempt to reduce the time demands, self-questioning and recite were selected. In addition, the research literature does not strongly support the use of survey (Williams, 1983) and the review procedure is usually performed as a follow-up step, carried out in a future study session following the original study. The recite step was therefore more easily applied in this study, which was designed to allow only one study session to apply the strategy on a text chapter. In fact,

one weakness of the use of the review step by the SQ3R treatment group of this study, was the awkwardness of performing the review step in this one-session study approach. The comparison between SQ3R and QRR was designed to reveal if a reduction of the steps of SQ3R decreased effectiveness for comprehension of text.

Since no research prior to this investigation had specifically reduced SQ3R to fewer of its components for comparison purposes, it was difficult to predict what the results would be. However, it was reasoned that if the student's attitude were improved with the QRR because it was less involved and more specific, and also less time-consuming, then the improved attitude alone might impact the student's comprehension of the text. Moreover, the probability would increase that the strategy would be incorporated into the student's study repertoire.

The second factor influencing the selection of the QRR components was the overwhelming favorable evidence from previous studies on self-generated questions during study. Research by Anderson and Biddle (1975), Andre and Anderson (1978), Duell (1977), Frase and Schwartz (1975), and Schmelzer (1975) and others have demonstrated favorable results for the use of self-questioning for effective study; thus, self-questioning was retained as part of an effective study strategy.

Reducing the SQ3R strategy to only self-questioning, reading, and recitation has potential disadvantages. The survey and/or review step(s) could be the greater catalysts to learning through SQ3R. Without the benefit of the survey which is designed to help the student identify the major ideas, and/or without the benefit of the review which gives the student a final opportunity to monitor his comprehension and recall of the text information, the student's comprehension and recall could be significantly reduced. If QRR were significantly less effective in comprehension of text than SQ3R when controlling for time, reading ability, and prior knowledge, it could be attributed to the effectiveness of the other components of survey and/or review as part of SQ3R or to the effectiveness of the SQ3R strategy as a total heuristic.

The QRO-P study strategy. The QRO-P (Question, Read, Question and Product) study strategy was a proposed new strategy based on more recent research related to metacognitive skills in reading/study (Armbruster, Echols, and Brown, 1983; Baker, 1979; Baker and Brown, 1984; Brown, 1980, 1981; Brown, Campione, and Day, 1981; Ganney and Winograd, 1979; Flavell and Wellman, 1977; Forrest and Waller, 1983; Smith, 1967; Spiro and Tirre, 1979; Tierney, 1983). This research reveals that students need to be more aware of their own cognitive processes, and to be aware of their own activities and their effectiveness while reading.

This research also states that metacognitive skills include the use of self-regulatory procedures or being a more active learner during the reading/study process. An active learner would not only be aware of comprehension occurring, but also, when it is not, the learner would be aware of what compensatory action might be taken to remediate lack of understanding (Baker and Brown, 1984). In short, the use of metacognitive skills requires readers to be more cognitively active during the study process (Anderson and Armbruster, 1980; Brown and Smiley, 1977).

The first component (Question) of QRQ-P requires the student to focus on the main idea of the paragraph(s) under each embedded heading. The student initiates the search for the main idea question by asking the question: "What main idea question(s) does this paragraph reading answer?" The second component (Read) requires the student to read to search for the main idea of the paragraph. After determining the main idea of the paragraph, the student formulates and writes the main idea question in the margin of the text beside the paragraph. The writing of the main idea question is the third component of QRQ-P or the 2nd "Q" (Question). Finally, the student underlines the key word(s), phrase(s), sentence(s) in the paragraph which answers the formulated main idea question. This underlining process comprises the final component of QRQ-P (Product). Before beginning the use of the QRQ-P on each heading, the

student is instructed to consider his own prior knowledge related to the information implied by the heading.

Based on the research literature on metacognition and reading, which emphasizes more active learning, it was expected that the QRQ-P strategy would 1) result in significantly more effective comprehension accuracy; 2) significantly increase the student's level of awareness as reflected in the confidence rating measure; but 3) would not be more efficient; that is, time to apply QRQ-P would be greater than either SQ3R or QRR.

A few disadvantages of QRQ-P also exists. First, because of the involved procedures, QRQ-P is no less demanding of the student than SQ3R, which could cause negative student reaction to the method. Second, it is potentially more time consuming than SQ3R. For the poorer reader this is potentially more exasperating to endure through the procedure, and could result in student modification of the strategy to reduce the time-consumption. Third, the student may lack the necessary skill to identify and formulate main idea questions after only three training sessions for learning to apply the QRQ-P strategy.

The Treatments Compared

Regarding the dependent measure of time, it was hypothesized that QRR would be more efficient; that is, it would take less time to use than SQ3R. Since reduction of

time is no guarantee for improved comprehension, effectiveness of the QRR over the SQ3R could not be determined from reduced time alone. However, because the QRR treatment included reading for main ideas and relating them to the self-generated questions of the chapter title and heading, it was reasoned that QRR might also be more effective (greater comprehension accuracy). This conclusion was based on the learning principle that we learn from the whole not from the parts (Pauk, 1984, pp. 82-113). The QRR strategy attempted to apply this principle by requiring understanding of the main (or whole) ideas and organizing the text into a meaningful set of main ideas (whole idea).

The most important difference in SQ3R, QRR and QRQ-P is that none of the components of SQ3R or QRR are applied as during reading strategies. Survey and self-questioning are before reading procedures and recitation and review are after reading procedures. The procedures of the QRQ-P strategy were especially designed to increase processing of the information during reading, therefore, all components of the QRQ-P are to be applied in the very act of reading. While during reading processing is certainly part of SQ3R and QRR, it is more a part of QRQ-P.

Finally, the training procedure of the QRQ-P was different in a major way (see Appendix C, Videotape Training Scripts). While the training procedure for SQ3R focused

primarily on following the sequential steps of the procedures with minimal emphasis on the dynamics of the procedures as a strategy, the QRQ-P training focused primarily on the purpose of the strategy, and the increase of the student's level of awareness. The training of the QRR also included instruction in the purposes and learning theory underlying the steps of QRR.

The three study strategies of this investigation also have common characteristics. The SQ3R and QRR strategies are not totally devoid of metacognitive qualities like those of QRQ-P. The survey component of SQ3R is specifically purpose-oriented and the review component is based on a comprehension monitoring strategy (Brown, Campione, and Day, 1981) if the student's recall proves to be deficient. Recitation in SQ3R and QRR also require an active mental processing of the information. Finally, the QRR treatment group was also taught the purposes and learning theory behind each step, thus possibly increasing the metacognitive component of the QRR training.

The comparison of these strategies on the dimensions of efficiency and effectiveness and awareness requires a multidimensional approach in the use of dependent measures. Thus time (efficiency) was used as one measure. The second was a measure of comprehension accuracy (effectiveness) on an objective test of multiple choice and short answer items.

The third was a confidence measure (awareness), number of guesses on the comprehension test questions.

The comprehension accuracy criterion measure was not only composed of a combination of multiple-choice and short answer questions, but also had the questions classified into the three groups of main idea, inference, and detail questions. These classifications were scored as a separate dependent measure and statistically analyzed to determine the effects of each of the study strategies (treatments) on the ability to answer different types of questions. While this was a fourth dependent measure, it was considered of secondary interest in the study.

Several measures of covariation were also needed to ensure that a meaningful comparison would be accomplished, given the interactive nature of learning from text. Each of the variables used as covariates in this study have been shown to affect reading performance, thus they needed to be controlled. The covariates of this study were time, the student's prior knowledge of the text of study, and the student's reading level grade equivalent score.

Questions

The comparison of the three study strategies focused on the following questions:

1. Does use of a study strategy (SQ3R, QRR, or QRQ-P) on text material affect comprehension accuracy, confidence in

answering the comprehension test questions, or the time required to study when controlling for reading level of the student?

2. Which of the dependent variables of comprehension accuracy, confidence, or time contributes most to study strategy group differences?

3. Does use of a study strategy (SQ3R, QRR, or QRQ-P) on text material affect ability to answer different question types of main idea, inference, or details when controlling for reading level of the student?

4. Does reading level affect comprehension accuracy, confidence in answering questions, or time to study?

5. Does prior knowledge of the text information affect comprehension accuracy, confidence in answering questions, or time to study?

6. Does time to study text material affect comprehension accuracy, or confidence in answering test questions?

Chapter 2

REVIEW OF RELEVANT LITERATURE

Chapter 2 presents a review of the relevant literature on studies of the SQ3R method of study, the use of student-generated questions, and literature on the effects of prior knowledge and metacognition on comprehension.

SQ3R Study Strategy

In a review of literature, Entwisle (1960) reports the need for more research on what specific techniques of study should be included in a study skills course. Willmore (1967) reports in her review of literature that SQ3R, or some variation of it, pervades the field of study methods literature; however, she further states that only one study was available at the time of her research (1967) which studied SQ3R as a total method, and the author of that research (Wooster, 1953) admitted that many subjects did not actually apply the SQ3R method.

More recently Adams, Carnine, and Gerston (1982) state that SQ3R is widely reported in textbook and teacher training courses as being empirically based, though in fact the research literature does not support this claim (Lawrence, 1978; Spenser, 1978, Weiner, 1977; Crewe and Hultgren, 1969). Kopfstein (1982) states that "conclusive proof that SQ3R, or other effective study strategies,

actually benefit the student is a researcher's chimera" (p. 2). Finally, Johns and McNamara (1980) claim that research still needs to be done to prove whether or not SQ3R is a superior study technique.

From the introduction of the SQ3R study method by Robinson (1941) until a study by Wooster (1953), no research was available testing SQ3R as a total approach to study. The Wooster study had design flaws and also failed to substantiate the SQ3R method as a superior method; in fact, the results can only be interpreted as negative. No further studies using SQ3R were conducted until Willmore (1967) tested SQ3R against three other popular study methods of underlining, outlining, and reading. Again SQ3R was not more effective in improvement of comprehension as measured by a multiple-choice test.

Following the Willmore study, six additional studies were conducted using SQ3R (Adams, et al. 1982; Stoodt and Balbo, 1979; Welch, 1978; Diggs, 1975; Harris and Trujillo, 1975; Donald, 1967). In the review of the literature of the Adams, et al. (1982, p. 31) study, regarding all prior studies on SQ3R, she states, "A critical reading of these studies reveals serious design flaws in all but the study by Willmore (1967)".

The review of the literature on SQ3R in this study focuses on the studies by Willmore (1967) and Adams, et al. (1982). In addition, the means by which Robinson created

the SQ3R approach and the evidence used by Robinson to substantiate the effectiveness of the SQ3R method are presented to strengthen the need for further investigations of SQ3R and the claims of the author. This section closes with comments from other contemporary researchers regarding the status of SQ3R as an empirically researched study method.

Using college students Willmore (1967) trained her subjects in four study methods: SQ3R, Underlining, Outlining and Reading. Time was not controlled, but the time for each person to complete the study method was measured and analyzed as a covariate. In addition, the students were asked to evaluate the four above methods they had been trained to use. The results showed that students scored higher on the average on Underlining than on Reading, Outlining or SQ3R; they scored higher on the average on SQ3R than Outlining and about the same on Reading and Outlining and on Reading and SQ3R. There were also significant group differences in time to complete the study methods. Predictably, Reading took less time than the other methods, and Underlining took less time than Outlining or SQ3R.

The results of the student evaluations are particularly interesting in view of the present-day emphasis on the importance of metacognitive factors related to effective study methods. The student evaluations ranked Underlining and Reading as the most popular methods, both in terms of

past and future use of the four methods, with Underlining ranking first for future use, though Reading had been ranked first for past use before the training in these methods. Outlining and SQ3R ranked 3rd and 4th respectively in both past and future use, though SQ3R did make some 11% gain from past use to future use in the response category of "Almost Always" predicted use. In the "Often" predicted use response, SQ3R gained from 5% in past use to 32% for future predicted use. Fifty-five percent said that they would either "Seldom" or "Almost Never" use the SQ3R approach in the future, but eighty-seven percent said they would "Almost Always" or "Often" use Underlining. Perhaps not coincidentally, this ranking is the same as the results of the two methods in terms of effectiveness for improving comprehension. More importantly these student ratings were taken before the students knew the results of Underlining as a more effective method than SQ3R.

More significant is the fact that the students ranked SQ3R and Outlining much higher than Underlining or Reading in the characteristics of "Helping concentration" and "Making material easier to remember after completion", but ranked SQ3R and Outlining much lower than Underlining or Reading in the characteristics of "Easy to use", "Takes right amount of study time", and "Enjoy using the method". In other words SQ3R and Outlining were perceived as more effective learning methods than Underlining or Reading;

however, in the important areas of time to use, ease of use, and enjoyment, Underlining and Reading were more acceptable. Again, the students made these rankings without knowledge of which method was indeed more effective according to the comprehension measure.

In a more recent study, Adams (1980) used a modified SQ3R approach on 5th grade subjects to determine the effectiveness of training intermediate level students in study skills. The modified SQ3R approach was compared to the two treatments of 1) independent seatwork on the same materials with feedback from the teacher, and 2) no instruction. A factual short answer test and a retell procedure were used as the dependent measures in a repeated measures design with two weeks between the two measures. Results indicated students receiving the systematic study skills instruction with the modified SQ3R performed significantly higher on the factual short answer test on both measures ($p < .001$), but no significant differences were found on the retell measures.

While the Adams study is not particularly relevant in terms of the subjects (5th graders) since the present study used college freshman, it is different than all other past studies of the SQ3R method because of the additional elements incorporated into the study other than just specific training in how to use the modified SQ3R method.

Other than the training to use the method, the subjects were taught the reasons for using the method and procedures for monitoring independent use of the strategy. Those additional elements were included in the Adams study because of research on metacognition and on increasing acquisition of information by focusing on factual or instructional variables that maintain students' attention to the material being read.

The result in the Adams (1980) study, which favored the modified SQ3R study skills experimental group over the usual independent seatwork method with teacher feedback and a no instruction group, is the first evidence of the efficiency of a total study approach similar to SQ3R for improving comprehension of text material. However, this implication drawn from the study may be more closely related to the attention focusing strategy and the metacognitive skills of rehearsal taught to the subjects of the experimental group. Rather than validating SQ3R, this study may confirm the contentions of Kopfstein (1982) and others (Johns and McNamara, 1980; Tryon and Sy, 1977), that "...study skills alone, (such as SQ3R) apparently do not improve academic performance; psychological factors must be taken into account..."

The review of literature on the SQ3R approach would not be complete without reference to the evidence cited by Robinson (1970) in support of the SQ3R study method.

Robinson says that several studies show evidence of the success of SQ3R. Parsimonious results are given for two studies but no references are offered. One of these studies may have been the study by McCormick (1943) performed at Ohio State University where Robinson has conducted his SQ3R study skills program. The McCormick study did not, however, employ the entire SQ3R system but did emphasize the question - answer - recitation technique in a study designed to test the effect of the question approach on reading comprehension and accuracy. The question - answer - recitation group was compared to a group reading and rereading with the result of no significant differences.

Aside from the studies cited above purported to substantiate SQ3R, Robinson claims the most convincing evidence for effectiveness are the comments of students who have tried it and found that it worked. Unfortunately, such testimony apparently is not empirically verified by Robinson. In fact, taken as a whole the empirical evidence to date does not support the effectiveness and/or efficiency of the SQ3R method of study in unmodified form.

The above critique is not meant to categorically and finally dismiss the SQ3R method as ineffective, since it has not been thoroughly and fairly tested. Even in the Willmore (1967) study the author admitted that evidence indicated that the students did not confine their study solely to SQ3R as they were instructed to do. The subjects may have

adapted the SQ3R to their own strategies and hence failed to truly test the SQ3R approach.

Upon what basis was the SQ3R system of study created? Paradoxically, the separate components of the SQ3R approach have been researched and for the most part the empirical evidence favors the use of each of the steps as separate strategies. In the 4th edition of Robinson's (1970) Effective Study, he cites research supporting the use of a quick overview (McClusky, 1934), use of questions (Miles, Kibler, and Pettigrew, 1957; Weaver and Bickley, 1967; Holmes, 1931; Frase, 1967; McKeachie and Jiler, 1954; Rothkopf, 1966; Rothkopf and Bisbicos, 1967), use of recitation (Wark, 1968; Otto, 1966; Arnold, 1942; Spitzer, 1939) and application of distributed learning (review) (English, Wellborn, and Killian, 1934; McGeoch, 1934; McAustin, 1921). From these studies, as well as many others, Robinson draws this conclusion:

For years this writer has had students try out various methods that such experiments have suggested; such trials have led to further refinements and suggestions. One method has finally been devised that fits the criteria above. Further research may show other possible refinements, but it is felt that this now represents a higher level skill of great effectiveness for school work (1970, p. 32).

Of course, what Robinson was referring to was the SQ3R method of study which he presents in specific detail following the above statement.

Work recently completed by other researchers on the SQ3R strategy do not share Robinson's optimism. Spenser (1978) concurred with an assertion by Albert Harris that SQ3R seems to be well grounded in the experimental psychology of learning but has not been subjected to vigorous experimentation. Johns and McNamara (1980) contended that SQ3R is a "forgotten research target" which is extensively used, but its popularity does not stem from carefully controlled research studies, but rather from endorsements from well-known reading educators such as Burmeister, Courtney, and Spache. Finally, Kopfstein (1982) candidly cited numerous researchers (Bahe, 1969; Katz and Wright, 1977; Lazarus, 1979; Robyak, 1977, 1978; Tryon and Sy, 1977) who point out several problems which prevent SQ3R from being an effective practical study tool, though it is based on sound theory. The problems he cited are

- 1) students may know how to use the technique but they do not apply it (Robyak, 1977, 1978; and Tadlock, 1978),
- 2) students who do apply SQ3R find it artificial, too involved, and so time-consuming that it actually interfered with comprehension (Lazarus, 1979), and
- 3) students do not believe SQ3R will work, thus hindering its successful application (Tadlock, 1978).

Student-Generated Questions

In general, the use of adjunct questions has proven to be an effective means of improving comprehension of text. Anderson and Biddle (1975) reviewed the literature on adjunct questions and concluded that their use generally has a positive effect on learning from prose. An important finding about adjunct questions with implications for student-generated questions is that the closer the questions are physically located to the information to which they refer, the higher the performance when those questions are repeated later.

Research results from investigations on student-formulated questions by Andre' and Anderson (1978), Duell (1977), Frase and Schwartz (1975), and Schmelzer (1975), showed that formulating questions during study by writing them down or verbalizing the questions and related text information to someone, resulted in significantly higher post-test scores than students not using the self-questioning technique. Other studies using the student-generated questions treatment resulted in a no difference effect (Owens, 1977; Pederson, 1976; Morse, 1976; Bernstein, 1973).

Anderson and Armbruster (1980, p. 26) stated "...that, when student questioning is effective, it is so because students are forced to encode the information more than they might if they simply read it." In recent studies

(Raphael, 1984; Raphael and McKinney, 1983; Raphael, Wonnacott and Pearson, 1983; 1980) on children's question-answering behavior, the importance of the question and answer relationships are emphasized. One of these studies (Raphael and McKinney, 1983, p .84) stated that it is obvious "...that the availability of information determines in great part the ability ...to answer ... questions...", but what is less obvious "...is the importance... to accurately access the appropriate sources of information in their question-answering activities." Studies such as this and others (e.g. Canney and Winograd, 1979; Markman, 1981; Paris and Myers, 1981) demonstrate the importance of the metacomprehension skill of a knowledge of the relationship between questions and the sources of information for answering them. In relation to this present research, these studies confirm the necessity of maintaining a close relationship between self-questioning procedures and procedures of relating answers (recitation, underlining, etc.) in order to make the self-questioning an effective study method.

Empirical evidence for the efficacy of student-generated questions as a study method has been steadily gaining impetus in research since the mid sixties (Marston and Marston 1965) reaching its most active stage at the conclusion of the seventies (Andre' and Anderson, 1978; Anderson, 1978; Duell, 1977; Owens, 1977; Helfeldt and

Lalik, 1976; Manzo, 1976; Schmelzer, 1975; Frase and Schwartz, 1975). More recently, studies on self-questioning have been linked to other areas of contemporary research such as metacognition (Brown, 1981) and schema theory (Singer and Donlan, 1982). In general, the results indicate that student-generated questions during reading of prose improves comprehension; however, the research is not unanimously favorable (Owens, 1977; Pederson, 1976; Morse, 1976; Bertstein, 1973).

Excellent reviews of the literature on self-questioning research are available (Cohen, 1983; Anderson, 1978). While there are other implications which may be drawn from these reviews, the one clear fact upon which they all agree is that student-generation of questions improves comprehension. However, since this present study is concerned with the comparison of the SQ3R study method with the simplified approach of using only self-questioning, reading, and recitation (Q/R/R), the review of the literature on student-generated questions attempts to compare the Robinson questioning technique to the student-generated techniques of the studies cited above.

According to Robinson's (1970) description of the SQ3R questioning technique, a question is generated from the heading(s) of the text material to be studied. In Robinson's words, "Turning a heading into a question can be

done at the instant of reading the heading but it demands a conscious effort" (p. 23). The student is then directed to read to answer the question generated from the heading.

Just how then does the use of student-generated questioning techniques of recent research studies compare with the SQ3R questioning technique?

Supporting studies. In a study by Smith (1972), 7th grade subjects were trained to ask questions from headings and illustrations after previewing a chapter. The purpose of this study was to focus exclusively on the success of training students to ask their own questions prior to reading. Six weeks of training were given to the subjects on how to develop questions as a prereading activity. The dependent measure was the number of acceptable questions generated by the students. The study showed that these 7th grade subjects did improve in their ability to devise questions in comparison to a control group. No comprehension measure was used to determine if the improved skill in generating questions resulted in significant increases in comprehension ability.

What the Smith study (1972) contributes to the present research is that training in question-generating can result in improved ability to ask text related questions. If the assumption that self-questioning improves comprehension can be accepted, it should follow that improved ability to ask

good questions would result in even more improved comprehension.

In a study by Frase and Schwartz (1975), that is often cited in the literature, the questioning procedure in two separate experiments was quite different from that used in SQ3R. In Experiment 1 high school subjects cooperated in a tutorial situation in which a subject either asked questions, answered questions, or merely studied. In Experiment 2 college students constructed 5 or 10 multiple-choice questions from prose material. In both studies, the questioning activities produced higher overall recall than just studying when confined to content that was directly related to subjects' questions.

The questioning technique of the two Frase and Schwartz (1975) experiments differ dramatically from that in SQ3R. The students in these experiments were asking questions from material within the text that they considered important enough to ask questions. The determination of the questions to ask were not based on the heading(s) within the text, but rather on the student's own judgments of what part of the reading warranted the need for a question. This question-generating technique is clearly more purpose-oriented than the algorithmic process of SQ3R which requires the student to generate a question from a heading regardless of the relative importance of the material under the heading to the student's own purposes for

reading/studying. The Frase and Schwartz experiments do not therefore support the use of the SQ3R self-questioning technique, but they do support the notion that any questioning technique requires metacognitive components to make the technique effective.

This conclusion is substantiated by the additional finding of these experiments that recall for incidental information not directly related to the questions generated by the subjects was neither depressed nor facilitated by questioning activities. Apparently, only information that the student perceived as important enough from which to generate a question was recalled more effectively, not information in general. The question therefore remains: Was it the questioning activity per se or the student's judgment about which material to use to generate a question that caused the increase in recall?

Duell (1977) performed a study in which college subjects were required to generate multiple-choice test items from instructional objectives related to reading passages. This question-generating group was compared to a group which only studied the reading passages with a list of behavioral objectives. Post-test data revealed a significant advantage for the question-generating group. Again, this technique for generating questions differs from the SQ3R questioning technique. The Duell study, therefore, further confirms the Frase and Schwartz (1975) results, that

questions generated which are targeted to the test measure, result in greater recall for those items.

Andre and Anderson (1978) reported two studies in which student-generated questioning was used. In both studies with high school participants one group was trained to generate questions about the main points in paragraphs. The control group simply studied the prose passages (two passages of 450 words each). The control subjects were allowed to read and reread as often as they wished, while the questioning group read and generated questions. In the second of the two studies, a third group not trained to ask questions was added.

In both studies the question-generating groups scored significantly higher than the control groups; however, those trained to generate questions scored higher than those not trained. In addition, the results showed an ability x treatment interaction, favoring those low ability students who were trained to use the questioning technique. High ability subjects trained to ask questions improved only 2 percent over the read, reread control, while the middle-ability group improved 14 percent and the low-ability group improved 164 percent.

The Andre and Anderson (1978) study also differs greatly in the student generated questioning technique from that used in SQ3R. First, the students were guided by a

content-oriented purpose for their question generating, that is, the main idea of paragraphs. Second, the questions were post-reading generated, therefore, directly related to the answer from which the question was generated. Furthermore, the study provides data to support the conclusion that question generating per se did not result in improved comprehension. If so, the high ability students should have also increased in their comprehension over comparable ability students in the control group. The greater increase for middle and lower ability students may be related to the failure of low ability students to study with a purpose, perhaps even causing their "low ability" ranking. Giving the low ability student a specific purpose for his reading/study; that is, in this case, to determine the main idea of a paragraph and write a question about it or in the case of the no training questioning group, the purpose of simply writing a question about some of the material read, guides the student in the application of more effective study. High ability students are guided by purpose, hence they achieve higher through their metacognition related to study. The fact that higher ability students have higher metacognitive skill was also found in studies by Raphael and McKinney (1983, p. 74); they state that, "...students of high ability are likely to differ in their metacognitive knowledge from those of average or low ability and students

of average ability are likely to differ in their metacognitive knowledge from those of low ability".

The key variable in these studies seems to be the establishment of a purpose set by the question generating, rather than the use of question generating as a study technique. It is just this feature of specific purpose setting which the SQ3R questioning technique lacks. Requiring students to write a question from a heading as SQ3R does, may not permit activation of true cognitive interaction during the reading/study process between the student and text material relative to the important ideas as determined by the student. Generating questions from headings reduces the need to require any decision making on the student's part related to the purpose for reading it.

Nonsupportive studies. Two studies which resulted in no significant difference in the student-generated questioning technique and a control group are the Morse (1976) and Owens (1977) studies. These studies are included in this review to discuss possible reasons for the failure to show that self-questioning was an effective technique.

The study by Owens (1977) required college students to read/study a 1200 word passage (Kohlberg's hierarchical stages) in one of three ways (3 groups). One group read and constructed at least one multiple-choice question about each of Kohlberg's six stages. A second group answered six

multiple choice questions about the six stages without help from the passage and then checked their answers (feedback) against the information in the passage, and a third group read and reread the passage until they understood the content. Time to apply the technique was also a measured variable of this study, although the time allotted was set at 20 minutes for all three groups.

The results of no significant differences in these three techniques may possibly be explained by the following considerations:

1. The time limit of 20 minutes did not allow the question-generating group adequate time to complete their more difficult task. As a result the latter portions of the reading (stages 5 and 6 of Kohlberg's six stages) had fewer questions generated than the earlier sections. Analysis of the results showed a significant interaction between the conditions (group tasks) and content. Clearly this failure to adequately apply the self-questioning equally throughout the passage depressed the scores of the self-questioning group on the dependent comprehension measure.

2. The self-questioning group was only told to write multiple-choice questions for each of the stages without being told to focus on any specific content in the reading. Thus, the exercise of writing questions became the "purpose" of the reading, not the acquisition of any specific information from the passage. The techniques tended to be

text-oriented: write questions about each part of the text (the six stages).

3. The students of the self-questioning group received no training in writing multiple-choice questions. This appears to be the greatest weakness because of the specific skill required to write multiple-choice questions. Without training, the subjects may have struggled with the question-generating task more than they focused on the meaning of the passage, resulting in negative effects on the dependent measure.

The Morse (1976) study used college undergraduate subjects in a three group design, using experimenter generated questions. A seven minute time limit was placed on all these groups to complete the reading/study procedure on a 600 word passage.

The problems with the Morse study are numerous:

1) No training was provided for the question generating group, hence problems of lack of skill in generating questions may have depressed the scores on the post test measure for this group. 2) The dependent measure suffered from a ceiling effect causing an inappropriate spread in scores. 3) The passages were too short. Unlike normal study material requiring lengthier reading/study these 600 word passages could be mastered by simple reading as easily as by some study technique. 4) All groups were allowed to review the passages. Combining review with such a short

passage would result in near mastery by any procedure. This was not a study on the effects of review, yet no controls were entered into the study for this procedure. 5) The 600 word passages were highly structured. Added to the brevity of the passage, this structured characteristic was another variable not controlled. 6) The experimenter generated questions were admittedly (by the researcher) more facilitative because they were reiterative, acting as ongoing review, therefore giving added advantage to the group using these questions.

In general, the studies not favoring the student-generated question approach have design flaws. These flaws exclude them from serious use in analyzing research on the effects of student-generated questioning on mathamagenic behavior (Rothkopf, 1971), or those behaviors which give birth to learning.

Reader Variables

Prior knowledge. One of the most important variables affecting recall and comprehension of text is prior knowledge. Generally, investigations of prior knowledge appear to show that prior knowledge regularly and significantly influences comprehension and recall of text in reading. A review of the prior knowledge literature by Williams (1983) through 1981 indicated that prior knowledge is indeed an influential factor in reading comprehension

with high school and college subjects (Anderson and Ortony, 1975; Anderson, Reynolds, Schallert and Goetz, 1977; Anderson, Spiro and Anderson, 1978; Christopherson, Schultz and Waern, 1981; Langer and Nicholich, 1981; Stevens, 1980;). Spiro (1975) cites research which shows that the extent of an individual's prior knowledge influences the inferences made by readers in the process of comprehending text. Tierney and Pearson (1981, p. 11) state conclusively that a reader's prior knowledge has a pervasive influence upon understanding and that this is an empirically validated conclusion. Recent research has also confirmed the overriding effects of prior knowledge on reading comprehension (Johnston, 1984; Langer, 1984;). Because prior knowledge has been so conclusively established as a major factor affecting comprehension and recall of text discourse, it was decided that this study would control for the effects of prior knowledge on the dependent comprehension measure through quantitative measurement.

Control by quantitative measurement of the subjects' prior knowledge of the text content was chosen as opposed to use of a commonly "unfamiliar/familiar" text selection. It was decided that quantitative measurement of prior knowledge would allow for greater precision in determination of the effects of prior knowledge because such measurement would permit use of statistical analysis and thus reveal the actual variance in the dependent measure accounted for by

the individual subject's prior knowledge. With prior knowledge control, the effects of the study method/strategy could be more accurately determined.

Two studies related to measurement of prior knowledge are particularly useful. Langer (1984) used a measure of text specific background knowledge to measure prior knowledge. This measure has been analyzed for validation since Langer (1980) developed a system for categorizing the quality of knowledge that a reader possesses about key concepts in a text (Langer, 1980, 1984; Langer and Nicholich, 1981). Findings from the research on the text specific knowledge measure indicate that the measure is highly related to passage comprehension and is a reliable predictor of comprehension and recall as well.

A second measure of prior knowledge was developed by Johnston (1984). This measure was developed to demonstrate that standardized comprehension tests are biased at the individual level by prior knowledge. Johnston used the Pearson and Johnston (1978) taxonomy of question types and Schank's (1975) central questions to examine possible differential biasing effects of prior knowledge on different types of questions. Johnston's prior knowledge measure is known as a content specific vocabulary test. Quantitative and qualitative effects of prior knowledge on reading comprehension were demonstrated through an examination of performance on different question types. This study used a

modified version of the Johnston content specific vocabulary test.

Metacognition. Research related to the effects of metacognition on reading proficiency has generally resulted in positive effects; that is, metacognition is a statistically significant factor in measures of reading for meaning (comprehension) or reading for remembering (studying) (Baker and Brown, 1984).

Brown (1977) makes the point that metacognition is only a new term for "study skills", or the activities usually associated with effective study. Therefore, any research on study skills is by definition related to metacognition. However, in this review of metacognitive literature, only studies which specifically study "metacognitive" variables were included for discussion and only studies which relate metacognition to reading to learn (or remembering) were relevant to this study.

Several researchers (Brown, Campione, and Day, 1981; Flavell and Wellman, 1977) point out that metacognition in reading to learn involves the knowledge of four variables and their interaction. The four variables are text, task, strategies, and learner characteristics. Metacognition also involves the active monitoring or self regulation of the interaction of these variables. This regulatory action has become known as comprehension monitoring, which consists of the two steps of recognition of comprehension failure and

then taking the necessary action to remediate the comprehension failure (Baker, 1979).

This review of literature on metacognition focuses on the studies which relate to adult learners and which shed light on study strategies which incorporate metacognitive behavior and their relationship to reading to learn (or remember).

Studies which incorporate text variables and their relationship to comprehension monitoring behavior in adult readers have resulted in the following conclusions:

1. The ability to distinguish relative importance of idea units to the theme of the passage may be related to age. That is, older students reliably discriminate the relative importance of ideas while younger 8 year old students do not (Brown and Smiley, 1977).

2. Knowledge of text structure is critical for efficient use of study time. Older students tend to improve their recall of important text elements when given extra study time, but younger students do not (Brown and Smiley, 1977).

3. Older students tend to spontaneously underline or take notes of important information while younger students do not know what is important and hence, do not use effective strategies to learn it (Brown and Smiley, 1977).

4. Knowledge of the effect of text structure on learning is prerequisite to conscious control of strategies

that accommodate this feature (Owings, Petersen, Bransford, Morris, and Stein, 1980).

5. Mature readers can be trained to identify and use the inherent structure of text as an aid to learning through such techniques as advance organization, or instruction in the purpose and use of embedded headings of text (Dansereau, 1983).

In addition to the studies using text variables, some research has studied metacognition in relation to task variables. The studies have attempted to answer the questions: 1) Does effective performance on any task depend on the learner's awareness of the processing and retrieval demands of the tasks? 2) Does effective performance on any task depend on the student's ability to adapt reading and studying to meet the processing and retrieval demands of the tasks? In studies related to task variables these conclusions are noteworthy for this research:

1. Older and better readers are more aware that reading/studying must result in the acquisition of meaning (Canney and Winograd, 1979).

2. The ability to adjust reading strategy according to the tasks involved in the reading/study improves with age and general reading ability (Smith, 1967).

3. The learner's estimation of his/her degrees of learning related to the demands of the task is a particularly late-developing metacognitive skill (Brown and

Campione, 1979; Brown, Smiley, Lawton, 1978). These studies focused on retrieval cues and the researchers conclude that the ability to select suitable retrieval cues is late in developing since it requires a finer degree of sensitivity to the demands of studying.

4. Success in the learner's ability to predict performance on a task increases with both grade and reading ability (Forrest and Waller, 1983). This conclusion was particularly important for this present research since this study required the students of each treatment group to predict the correctness of their responses to the comprehension test questions.

Students who are weak in their knowledge of what to do to remedy comprehension failures, though they may know they do not comprehend what they read/study, do not have a full scope of metacognitive knowledge. This knowledge of knowing what to do when comprehension failure occurs is metacognition about strategies. The research literature has divided these strategies into two types. One type is used during reading when the student's level of awareness reveals that comprehension failure has occurred. These are referred to as "fix-up" strategies (Alessi, et al., 1979). Fix-up strategies include rereading, looking ahead in the reading, referring to another source for clarification, or even asking oneself a question in hopes that further reading will clear-up the confusion.

The second type of remedial metacognitive strategy is study strategies intended to assist the learner in more effective long term memory storage and retrieval (learning). Those study strategies are learned behaviors that the student uses as an adopted procedure for more effective learning even in the absence of comprehension failure. In fact, these study strategies could be conceived of as strategies intended to prevent comprehension failure.

The one common element which surfaced in these studies is that they all included training which was intended to increase the level of metacognitive awareness. Brown (1977) defines metacognitive awareness as knowing when, where, and how to use a strategy; hence these studies trained students in the when, where, and how related to the studying situation. These successful training studies are

- 1) training learning-impaired college students to use a semantic mapping method (Long, Hein, Coggiola, 1978),
- 2) teaching self-questioning skills to high school students (Andre' and Anderson, 1978),
- 3) training college students in the use of semantic mapping (Dansereau, 1979), and
- 4) training average and remedial junior college students in summarization skills (Day, 1980).

The one result from all these studies which is significant for this study was that training in the level of awareness resulted in the successful use of the study strategy. Those not trained to

increase their level of awareness were not as successful on the criterion measure.

Not many studies have been performed which sought to measure the effects of metacognition of the learner's characteristics, such as vocabulary deficiency, interest in the subject, prior knowledge related to the subject, and even what skills the learner has or does not have. Of those learner characteristics, the one which has received the most attention is prior knowledge and its activation in the reading/learning process.

Studies on the activation of prior knowledge include 1) a study by Bransford, Stein, Shelton, and Owings, (1980) which showed that less successful fifth graders had little tendency to relate the text information to their prior knowledge, 2) a study by Bransford, et al. (1980) which reported success in training students to ask questions for the purpose of activating their prior knowledge, 3) a study by Sullivan (1978) which indicated that high school students have difficulty making use of their prior knowledge during reading, and 4) a study by Spiro and Tirre, (1979) which reported that even college students do not all equally use their prior knowledge.

Summary

The findings of this review of literature underscore the need to empirically research the SQ3R study strategy,

which is the basic purpose of this experimentally designed investigation. The literature also confirms the need to identify those components or strategies which will be most effective and efficient in study. The multiplicity of variables which the literature revealed in relation to reading/study effectiveness also validates the need to include as many variables as measurement will allow in research on reading/study. This review of literature certainly corroborated the use of self-questioning as one of the more powerful strategies of study. In addition, the need to introduce strategies to increase level of awareness into the study process was strengthened. The literature helped to clarify the meaning of level of awareness strategies in study and how they might be taught to students to increase comprehension effectiveness in text study.

Finally, the literature findings support the two strategies, QRR and QRQ-P, selected for comparison to the SQ3R strategy. Because the literature revealed that survey as a study strategy was not particularly more effective than other strategies (Williams, 1983) and because self-generated questions proved from the literature to be effective, the student-generated questioning had to be included in any effective strategy, but not necessarily the survey strategy. The recite step was, then, the natural strategy to be included with student-generated questioning since the recite

procedure is so closely linked to the questioning technique. Thus QRR was developed.

After reviewing the literature it was also obvious that any contemporary comparison of study strategies would have to incorporate findings related to metacognition. Each of the steps of the QRQ-P strategy resulted from the literature on metacognitive strategies for study. These include, that reading/study strategies should be active, during reading strategies; that student-generated questions should also be generated during reading, not before or after; that comprehension monitoring should be a part of the student's repertoire of study strategies; and that use of the text structure and organization should be utilized for effective comprehension. In short, every aspect of the QRQ-P study strategy was developed from findings in the review of the metacognitive literature.

Chapter 3

METHODOLOGY

The purpose of this study was to compare the effectiveness, efficiency, and level of awareness of the three study strategies 1) Survey, Question, Read, Recite, Review (SQ3R), 2) Question, Read, Recite (QRR), a less complex strategy, and 3) Question, Read, Question - Product (QRQ-P), a strategy designed to increase level of awareness. This study was a true experimental one factor, three group, post-test only design. Analysis was performed by means of multivariate analysis of covariance (MANCOVA). The dependent variables of the first MANCOVA were a comprehension accuracy test measure, a confidence in test answers measure, and a time measure. Reading ability, a measure of prior knowledge of the text, and time to use the study strategy were the planned covariates. One final MANCOVA analysis used comprehension of different question types (main idea, inference, details) as the criterion measures. Separate MANCOVA analyses were performed with time and then with prior knowledge as the covariate.

Sample

The participants in this study were college level freshmen students enrolled in a required study skills course for freshmen scoring 350 or below on the SAT, or 15 or below

on the cumulative ACT test. All participants attended a private university. A contact list of 1034 students was used to randomly select the sample size of 45 participants, or 15 participants per treatment, randomly assigned.

Before assignment to treatment groups, the 45 participants were divided into low and average readers on the basis of scores from The Nelson-Denny Reading Test, Advanced Level, Forms C or D (Brown, 1976). The test was administered as part of the standard procedures for the study skills course during the first week of classes of a semester. "Average" reading level (ARL) was defined as high school (grades 10, 11, 12) or college level reading ability; "Low" reading level (LRL) was below high school (below grade 10) reading ability. The mean reading levels and standard deviations for each treatment group are shown in Table 1.

Participants in the study were issued one raffle ticket (see Appendix A, Raffle Ticket Form) for a drawing of one first prize of \$100.00 and two second prize drawings for \$50.00. The drawings were held after the completion of the data collection, or after the final dependent measure was administered.

In addition the participants were given extra credit in their study skills course for completing the project. These rewards were offered to entice students to remain in the study from beginning to end.

Metacognitive Operational Definitions

In this investigation metacognitive awareness was operationally defined as the student's level of awareness of comprehending the text during the reading of the text and taking the necessary remedial action if comprehension was not occurring. It was reasoned that this awareness would result in greater student confidence in the information being acquired from study of the text. This confidence would then result in greater comprehension accuracy of the text information on the criterion measure for measuring comprehension and would also result in fewer wild guesses on the comprehension test items (Johnston and Pearson, 1982). Comprehension accuracy was defined as the certainty of having answered a comprehension question correctly. If students can indicate that they are sure their answers on a comprehension test following text study are correct, when in fact they are, they are considered good comprehension monitors (Baker and Brown, 1984). Confidence was defined as not guessing wildly on the answers to the 50 comprehension test items. The statistical analysis was intended to determine if any of the three study strategies resulted in significantly fewer guesses on this confidence measure.

Design

The design of this study was a one factor, multigroup, post-test only, experimental design (see Table 2). Three

study strategies (SQ3R, QRR, QRQ-P) served as the three levels of the independent variable or factor. Subjects were trained to use one of the three study strategies as the treatment conditions. Three different sets of post-test data were collected as dependent measures. The three dependent measures consisted of 1) a comprehension accuracy test score taken after the application of the study strategy, 2) a confidence in answering test questions score, and, 3) a measure of time to use the study strategy before taking the comprehension test. In a separate analysis a fourth dependent variable was comprehension of the three question types of main idea, inference, and details. Each treatment condition had an equal number of 15 subjects, with a mixture of males and females (SQ3R = 3 male, 12 female; QRR = 9 male, 6 female; QRQ-P = 7 male, 8 female).

Three covariates -- reading level, prior knowledge, and time to use the study strategy -- were proposed in the initial design; however, the preliminary data analysis indicated low correlations for both the prior knowledge and time data with the dependent measures; thus reading level was the only covariate used in the MANCOVA analysis of the data. Other separate MANCOVA analyses were performed with prior knowledge, then time, as the covariate, in order to determine possible effects of these variables on treatment differences.

Table 1

Mean (M) Reading Levels And Associated Standard Deviations Of Treatment Groups

READING LEVELS		
TREATMENT	MEANS	STANDARD DEVIATION
SQ3R	11.99	1.99
QRR	11.66	3.05
QRQ-P	10.97	2.59

Table 2

Multigroup Post-Test Only Design

Random Assignment	Treatments	Post-Test Measures
R	X ₁	M ₁ 2 3
R	X ₂	M ₁ 2 3
R	X ₃	M ₁ 2 3

Measurement

Five test measures were used in this study: 1) the dependent measure comprehension accuracy test; 2) the recording of time to study using the study strategy; 3) a test for the second dependent measure of confidence derived from a confidence rating in answering the comprehension items of the dependent measure comprehension test; 4) a test for the covariate of prior knowledge; and 5) a reading ability grade equivalent score taken from a standardized reading achievement test, The Nelson-Denny Reading Test, Forms C and D (Brown, 1976). The comprehension test used for the dependent measure was developed by the researcher, as were the tests used for the prior knowledge, and confidence (metacognitive awareness).

Comprehension test. The test from which the major criterion measures of comprehension accuracy and confidence (see Appendix B, Tests) were derived, consisted of a combination of question probes and objective multiple-choice questions, both commonly found in teacher devised college level tests. Before the writing of the test items, the target textbook chapter was analyzed by the researcher to determine the main idea of each paragraph. This analysis of main ideas was performed so that it could be determined which dependent test items required knowledge of paragraph main ideas to respond correctly, and which test items required knowledge of supportive details to respond

correctly, and finally, which test items required inferencing to respond correctly. Further, the breakdown of the questions into the different types, that is, main idea (MI), detail (D), and inference (I), was useful to assess an important area, namely the effectiveness of each of the study strategies relative to each type of comprehension question (see Appendix B for a list of the questions by types). It was reasoned that the three study strategies might affect type of recall differently. That is, recognition of main ideas, inferences, or details might vary because of the different procedures followed for each strategy. For example, the QRR required writing main idea questions for a whole section, whereas QRQ-P required writing main idea questions for each major paragraph, and SQ3R did not train the students to write any main idea question.

To check agreement of the question classifications of the 50 item comprehension test, two individuals, one a history professor and the other a business administrator, were asked to read the textbook chapter. They were assigned the task of determining the main ideas of each paragraph and then rating the questions of the dependent measure as main idea, detail, or inference. Following these ratings, the classifications were compared for agreement among the raters. Consensus was then reached on the classification for each question.

A pilot study was conducted to assess the reliability of the comprehension criterion test. Twenty-five freshmen students read the target text material and took the comprehension test measure following the reading. The reliability of the final comprehension test using Cronbach's Alpha was $r = .826$ (see Appendix B, Table B-1, Reliability Analysis Of Comprehension Test).

When the fifty items for the comprehension test had been determined, a rating scale for each item was added for participants to use for rating their confidence in their responses to each item. This rating procedure was used to collect the data for the confidence criterion measure. Both the comprehension accuracy measure and the confidence measure were used in the analysis to determine the effects of the three different treatments (study strategies) on the student's level of awareness. The comprehension accuracy measure was used to assess awareness of the accuracy of the knowledge gained from study. The confidence measure was used to probe the level of awareness that the knowledge required to answer a test question was not learned from the study process, or put another way, that guessing was required to answer the question.

Dependent measures derivation. The time measure data was derived from the amount of time the student consumed in the study of the target social studies text using the particular study strategy. The comprehension accuracy

scores were calculated from the number of correct answers on the comprehension test that the student rated high in confidence. The confidence measure was derived from a raw score of the number of wild guesses the student admitted taking in answering the comprehension objective test items. With the confidence measure, the lower the score, the more confident the student was in the answer marked for the test items.

Each participant was required to record the total time to study the text material. A recording sheet was provided for this purpose. The time was recorded in minutes only and used as one of the three dependent measures in the multivariate analysis of covariance. The time measure began when the group started study of the text material and ended when study of the chapter was completed by each individual. A large clock was displayed in the room for each student to record his finish time before requesting the comprehension test. Each participant's time recording was checked before the criterion comprehension test was issued.

Awareness measures. Both comprehension accuracy and confidence were measured in this study as awareness measures. From the total correct answers on the comprehension test, the student was given credit for only those correct answers which he rated as 100% sure as the comprehension accuracy score. Correct answers not rated as "CORRECT" (100% sure) were considered the result of

guessing. The confidence score was derived from the total number of guesses made on the comprehension test items. The guesses were items rated "GUESS" by the student. This level of awareness measure was modeled after one used by Johnston and Pearson (1982). Their approach was based on the idea that regardless of the study strategy used, those readers aware of comprehending the text being studied, would feel more confident about the information they had gathered from the text. This greater confidence would be exhibited by not guessing as often on test items and rating themselves accurately (Baker and Brown, 1984). This presumably required increased awareness by the student. That is, the students needed to be aware of when they were and when they were not understanding the text. Student awareness of study strategy effectiveness in comprehending the text should result then, in greater confidence in the knowledge gained from study. This awareness was assessed by having the student rate the confidence he/she had in the selected answer to a given item. Johnston and Pearson (1982) point out that ... "confidence ratings such as these are an assessment of awareness of partial knowledge", or a metacomprehension (knowing about knowing) component.

The rating scale used for the items of the dependent measure of this study ranged from 1 to 4, with 1 as the low confidence or "total guess", 2 as "unlikely", 3 as "likely", and 4 as high confidence or knowledge that it is the

"correct" answer. Each of the ratings were described to the students as follows:

Rating 1 - "Guess": You did not recall this information from your study. None of the answers of the multiple-choice items seemed more correct than the others or in the case of the short answer probes, the answer you entered was a "wild guess" or you did not write in an answer at all.

Rating 2 - "Unlikely": You knew that one of the four answers of the multiple choices was definitely incorrect, but among the other three choices you are guessing. In the case of the short answer probes, you wrote an answer but you were more doubtful than confident that the answer was correct.

Rating 3 - "Likely": You knew that two of the answers of the multiple choices were incorrect, but between the remaining two answers you had to guess; however, this gave you a 50% "likelihood" of having the correct answer. In the case of the short answer probes, you remembered the information discussed in the question and you wrote an answer feeling more confident than not that your answer was the "likely" answer.

Rating 4 - "Correct": You knew, and were 100% confident, that your answer was correct. This is the same for either multiple-choice or the short answer questions.

The level of awareness or confidence score, recorded as a total number of "guesses", was used in the analysis of the data (MANCOVA) as one of three dependent measures. The questions with ratings of either a "1" or a "2" were considered guesses (less confident) and used in the raw score count for the confidence score (see Table 6, Chapter 4 for the means and standard deviations).

Prior knowledge test. A measure for determining each subject's prior knowledge of the text's content was administered at the conclusion of the 3rd training session. The measurement instrument (see Appendix B, Content Specific Vocabulary Test) was a content-specific vocabulary test (Johnston, 1984) devised from the vocabulary of the text material used for the dependent measure. According to a study by Johnston (1984), a content specific vocabulary test administered before the reading/study of any content is an effective means of determining the amount of variance in comprehension accounted for by prior knowledge.

After considering other available measures of prior knowledge, e.g. Langer's (1984), passage specific knowledge measure, and passage independent questions, (Johnston and Pearson, 1982) the researcher decided to use the content-specific vocabulary test for the statistical analysis of this study. It was simple to devise, was easily checked for reliability, and was simple to administer and score. In addition, a substantial number of vocabulary

items were included in the test, thus reducing the possibility of a ceiling or floor effect in the test scores.

Forty vocabulary terms out of a total of 219 in the text reading were randomly selected for use as test items. The random selection of words in the test measure gave the test adequate content validity for use in measuring prior knowledge. In addition, a pilot study using 113 subjects was conducted to assess the reliability of the 40 question prior knowledge measure (Content-Specific Vocabulary Test). Using Cronbach's Alpha the reliability was .78 from the pilot study data. From the final experimental group data the reliability was .69 (see Appendix B, Table B-1, Reliability Analysis For CSVT).

A reliability check of the researcher selected words from the text reading was also conducted. A history teacher checked the text reading to identify what was believed to be the specialized and technical terms from the text reading. Additional words were identified and 15 additional words were randomly selected for inclusion in the Content-Specific Vocabulary Test. The original test of 25 items was increased to 40 items.

The vocabulary words for the content-specific vocabulary test were taken from a college level history textbook, Chapter 6, "The Pax Romana", A History of Western Society, John McKay, Bennett Hill, and John Buckler. This

same chapter is the designated text reading material for the dependent measure comprehension test. A list of all terms identified from Chapter 6 to develop the Content-Specific Vocabulary Test is in Appendix B.

The prior knowledge score was to be used solely as a covariate in the MANCOVA analysis. However, preliminary correlation analysis indicated that prior knowledge correlated too low with the criterion measures and too high with the other covariate of reading level.

Reading ability test. Scores from the Nelson-Denny Reading Test for each group provided the reading ability measure. Only the comprehension subtest scores were used to determine the reading level, since the total reading score from the Nelson-Denny Reading Test is an average of the comprehension and vocabulary subtest. This study was primarily interested in reading comprehension, not vocabulary level.

Treatment Training

Text study materials. The materials used for practice and application of the study strategy for each treatment were taken from the textbook A History Of Western Society by John McKay, Bennett Hill, and John Buckler. Portions of Chapter 3 (pp. 70-107), Chapter 4 (pp. 110-118, 137, 138) and Chapter 5 (pp. 142-149, 172) were used for training and practice purposes. A portion of Chapter 6 (pp. 176-181,

188-192, 210) was used for the application of the study strategy. Chapter 6 served as the target text material from which, therefore, the criterion measure comprehension test was developed.

The readability level of each of the chapters to be used was determined through computer analysis using an average readability of three different readability formulas, including the Dale-Chall, Fog, and Flesch, (see Appendix C, Table of Readabilities). Using this readability approach, the readability level for Chapter 4 was 14.3, for Chapter 5, 12.8, and for Chapter 6, 12.8. The computer program used was Reading Level Analysis version 3.3 Bertamax, Inc.

The chapter pages were copied so that their appearance and structure were as near normal textbooks as possible. Each chapter to be used in the experiment included the title page of the chapter, the introduction to the chapter, selected sections of the chapter, and the summary or conclusion of the chapter at the end. All pictures, maps, charts or other illustrations were copied whenever they were important to the chapter reading. Every effort was made to provide materials which would be as close to college textbook material as possible, so that the generalizability of the results of the study to normal college textbook study could be made.

Training procedures. In order to insure greater internal validity of the study, each subject was trained by

the investigator by means of videotape instruction. Each videotaped training session took 60-90 minutes to complete. A thorough outline of each of the videotaped presentations is in Appendix C, "Videotape Training Scripts".

In the first training session the subjects were given an outline and description of the study strategy they would use. Practice text materials were distributed for use as the videotape instructor modeled the study strategy, followed by practice in the text materials. In the second and third sessions the text materials were distributed for guided practice of the strategy as instructions were given over the videotape. Subjects' questions were answered during practice times when the videotape was off. In the fourth and final session a text chapter was distributed to the subjects and instructions were given by the researcher without the use of videotape for the final application of the study strategy. When each subject had completed study of the text chapter ("The Pax Romana"), and had recorded the time required to study the chapter, the comprehension criterion test was taken. Incorporated into the procedures of the comprehension test was the procedure for rating confidence in answering the test items; therefore, the comprehension test data and the confidence score data were collected together on the same test. A copy of the test is in Appendix B.

The general procedures for the four treatment sessions were as follows:

Session 1. The purpose of the first session for all treatment level groups was to present the respective study strategy and to guide the subjects through each step of the study strategy in detail via videotape. The researcher answered any questions about the procedures and use of the study strategy.

To begin session one, attendance was taken and practice materials were distributed for use during the videotape instructions. Chapter 3, "The Legacy of Greece" was used for the initial guided application of the study strategy. Once each subject had the practice text material, the researcher presented the videotape instruction. After the videotape instruction, the researcher answered subjects' questions, reminded the subjects of the rewards for those who complete the study, and distributed an "Honor Pledge" for each subject to sign (see Appendix A). This declaration was intended to minimize discussion of the study strategies between the three treatment level groups. It was hoped in this way to insure greater internal validity of the study (Cook and Campbell, 1979). Session one was concluded with a reminder of the time and date for the second session.

Session 2. The purpose of session two was to refine the subjects' knowledge and skill of the study strategy through review of the procedures to be followed and through

application to actual textbook material. Attendance was taken and the practice textbook materials (Chapter 4, "Hellenistic Diffusion") were distributed for use during the videotape instruction. Next, the participants viewed the videotape.

The application procedure was highly structured, requiring the subjects to apply each step or procedure of the study strategy under the guidance of the videotape instructor, following generally a five-step procedure: 1) description and modeling of the step by videotape instructor, 2) guided application of the step via the videotape instruction, 3) independent practice of the step by subjects using practice text, 4) question and answer time, 5) return to the videotape for next step. Session two concluded with reminders of the rewards (raffle tickets and extra course credit) and of the time and date for session three.

Session 3. The purpose and procedures for session three were identical to that of session two, with the exception of the post videotape activity. Attendance was taken and the practice textbook materials (Chapter 5, "The Rise of Rome") were distributed for use during the videotape instruction. The subjects then viewed the videotape. Following the videotape presentation of guided practice with the study strategy, the subjects were given the "Content Specific Vocabulary Test" of prior knowledge to assess the

subjects' prior knowledge of Chapter 6, "The Pax Romana," which was used as the target materials for the dependent measure administered in the fourth session. The third session concluded with reminders of the rewards (raffle tickets and extra course credit) and of the time and date for session four.

Session 4. Session four began with the usual roll call, and the distribution of the textbook materials, Chapter 6, "The Pax Romana" and the announcement of the time for the raffle ticket drawing. In this final session the text materials were enclosed in an envelope with a raffle ticket. On the outside of the envelope was attached an information sheet (see Appendix A) for the students to complete. The purpose of session four was to apply the study strategy for each treatment level group and to collect the criterion variables data.

Since time in using the study strategy was also a variable of interest in this experiment, before the subjects applied the study strategy on the Chapter 6 text, each subject was asked to record the time indicated on the clock displayed at the front of the room as they began study. Instructions were also given to record the time of completion of study just before the student came to receive the comprehension dependent measure test.

After the participant had completed study, the completion time was recorded and the text materials with all notes resulting from the study were inserted into the envelope and returned to the researcher. The researcher gave the participant the comprehension test with the confidence rating for each item. When each participant had completed the comprehension test with the confidence rating for each item, and had returned the test and answer sheet to the researcher, the subject completed the questionnaire as the final procedure.

Data Analysis Procedures

Four types of data were derived from the experimental procedures: 1) The comprehension test score from which was derived the comprehension accuracy dependent measure and the different question types dependent measure; 2) The level of awareness confidence rating score used as the confidence dependent measure; 3) The time required to apply the study strategy, used as a dependent measure, and intended for use as a covariate; and 4) The prior knowledge content vocabulary score, intended for use as a covariate. The data for the covariate of reading ability was derived prior to the experimental procedures.

The necessary preliminary tests were performed on the covariate and dependent measure data to determine the appropriateness of the variables for use in multivariate

Table 3

The Four MANCOVA Analyses Showing The Variables For Each

Variables			
Analysis	Dependent	Covariates	Independent
MANCOVA 1	1. TIME	1. Reading ability (READL)	Study Strategy 1. SQ3R
	2. Comprehension Accuracy (COMPAC)		2. QRR
	3. Confidence (CONFID)		3. QRQ-P
MANCOVA 2	1. Main idea (MI) Questions	1. READL	1. SQ3R
	2. Inference (I)		2. QRR
	3. Detail (D)		3. QRQ-P
MANCOVA 3	1. COMPAC	1. TIME	1. SQ3R
	2. CONFID		2. QRR
			3. QRQ-P
MANCOVA 4	1. TIME	1. Prior Knowledge (PRKN)	1. SQ3R
	2. COMPAC		2. QRR
	3. CONFID		3. QRQ-P

analysis of covariance (MANCOVA). Once the appropriateness of the variables was determined for use in MANCOVA, analysis was conducted to determine if there existed a significant difference in the three treatments (study strategies) on the dependent measures after controlling for differences caused by the covariate. The four MANCOVA analyses are shown in Table 3 above. If the results of the omnibus MANCOVA test were significant, post hoc multiple comparisons tests, using the Tukey procedure, were performed to determine which means differed significantly.

Chapter 4

RESULTS

Rationale For Multivariate Analysis

The analysis. The statistical analysis used for this study was the one factor multivariate analysis of covariance (MANCOVA), which is an analysis of covariance with several dependent variables analyzed at the same time. Thus, MANCOVA is a synthesis of analysis of variance and analysis of covariance, which requires not only that the assumptions of both be met in order to have confidence in results, but also, in the case of using two or more covariates in the same analysis, that the correlations among the dependent and concomitant (covariates) variables must be appropriate.

The covariates. The reason for choosing to use multiple covariates was to increase the power of the test statistic. This increase in power may be achieved if 1) the correlation between each covariate and the dependent variable(s) is high and, 2) if the correlation between each pair of covariates is low. Therefore, the correlations among the criterion variables and the covariates are important, (Huck, Cormier, and Bounds 1985, p. 145). Cochran (Barcikowski, 1957, p. 262, 263) concluded that the correlation between a criterion variable and a covariate, had to exceed 0.3 in absolute value for covariance analysis to have the precision to warrant its use. As Table 4 shows,

prior knowledge and time correlate below 0.3 with all the criterion variables; whereas reading level exceeds 0.3 in two of the three correlations with the criterion variables.

Originally the planned analyses of this study had two covariates in several of the MANCOVA procedures. However, because the two covariates of time and prior knowledge correlated too low with the criterion variables and too high with the other covariate of reading level, the number of covariates per analysis was reduced to the one covariate of reading level for the final analyses.

The decision to use the specific covariates of this study was made for two reasons: 1) the covariates (reading level of the subjects, and prior knowledge of the history text information, and time to use the study strategy) would effect the scores on the dependent measure, and thus account for some of the differences (variance) between the group means regardless of the study strategy group membership. Analysis of covariance permits comparison of group means on the dependent variable(s) after these group means have been adjusted for differences between the groups on the covariate; 2) the covariates would increase the sensitivity of the statistical test to differences among the groups being compared, that is, the power of the statistical test would be increased. Since the use of the paired covariates, reading level with prior knowledge and reading level with time, did not achieve an increase in the

Table 4

Correlations And p Values Between Criterion Measures
(CM) And Concomitant Variables (CV)

Variables					
	CV	CV	CM & CV	CM	CM
	Reading Level (Readl)	Prior Knowledge (Prkn)	Time	Confi- dence (Confid)	Compre- hension (Compac)
Readl	1.000	.2843	-.3096	-.1707	.3630
Prkn		1.000	.1240	-.1283	.2692
Time			1.000	-.0124	.2024
Confid				1.000	-.6353
Compac					1.000

power of the test statistic, it was decided to perform a MANCOVA with reading level as the only covariate.

The dependent variables. The dependent variables of the major analysis of this investigation were time, comprehension accuracy, and confidence in answering the comprehension test questions. Of interest to this study was the contribution of each of these three separate dependent variables to the study strategy group differences; that is, which study strategy group was significantly different from the others on a particular criterion measure. To determine this, if a MANCOVA resulted in a significant multivariate F value, a post hoc Tukey test of multiple adjusted mean comparisons was calculated to determine which study strategy groups were significantly different on the significant univariate criterion variable(s). If the univariate F test for the variable resulted in a nonsignificant F, no post hoc test was used since none of the adjusted means of the study groups were significantly different on that criterion measure.

Assumptions Of Multivariate Analysis Of Covariance

All assumptions of analysis of variance (ANOVA) and analysis of covariance (ANCOVA) must be met in multivariate analysis of covariance (MANCOVA) to be confident in the results. The ANOVA assumptions (Hinkle, 1988), required in the analysis of this study are as follows:

1. The observations are random and independent samples from the populations. Meeting this assumption makes the samples representative of the populations. The samples for this study were randomly selected and randomly assigned to treatments according to reading level.

2. Measurement of the dependent variables is on at least an interval scale. All of the dependent variables of this study met this assumption.

3. The populations from which the samples are selected are normally distributed. It was assumed from the process of randomized sampling that this assumption was met. Outliers were also deleted from the final analyses of the data.

4. The variances of the populations are equal. Through the multivariate test of homogeneity of dispersion matrices this assumption was tested.

The ANCOVA assumptions (Huck, et al. 1985), required to be met in this study are as follows:

1. The various comparison groups must have parallel slopes or homogeneous regression coefficients. The SPSS^x computer program for testing this assumption was used for each MANCOVA (SPSS^x, 1986).

2. The relationship between the covariate variable and the dependent variable must be linear. This is known as the assumption of linearity. This assumption was met as

determined from the regression analysis for the variables of the MANCOVA.

Preliminary Analysis Of Normality

Preliminary tests for normal distribution of scores on each of the variables (dependent and covariate) revealed outliers out of the range of the normal distribution. In order to better meet assumptions of normality, it was decided to remove all outliers or those cases which exceeded the valid percent allowable in the normal distribution curve. These cases fell beyond the third standard deviation from the mean for that set of scores. Deletion of the outliers resulted in the consequence of losing those cases in the analysis of the data for significant effects. Instead of 15 cases for each treatment group, the number was reduced. The number of cases (N) for each treatment level in each of the MANCOVA analysis is displayed in Table 5.

Summary Of Statistical Analysis Procedures

1. The SPSS^X computer program for MANCOVA (p. 521 SPSS^X) was used for the overall multivariate omnibus test of significance.

2. If the multivariate test of significance resulted in a significant F, the test for the assumption of homogeneity of dispersion matrices was checked.

Table 5

Sample Sizes For Each MANCOVA Analysis

MANCOVA Analysis				
	N For	N For	N For	N For
	COMPAC	QTMI	COMPAC	COMPAC
	CONFID	QTI	CONFID	CONFID
	TIME	QTD	TIME	
Treatment	WITH	WITH	WITH	WITH
Levels	READL	READL	PRKN	TIME
SQ3R	14	14	12	12
QRR	14	13	14	14
QRQ-P	14	13	13	15

3. If the assumption of homogeneity of dispersion matrices was met (nonsignificant F), the test of homogeneous regression coefficients was checked (parallel slopes).

4. If the assumption of parallel slopes was met (nonsignificant F) the analysis of the original MANCOVA was accepted as the appropriate model for interpretation.

5. If the assumption of parallel slopes was not met, an SPSS^X procedure was used to fit separate regression coefficients in each of the three groups of the factor, and the results were used as the appropriate model to interpret the multivariate test of significance.

6. Once the appropriate omnibus test was determined, the multivariate test of significance was checked. If the F value was nonsignificant, all analysis stopped with the conclusion that there were no statistically significant differences in the three levels of the factor (study strategy groups) on the criterion measures even after adjusting for the covariate effects. An analysis of possible differences in the groups based on practical importance was reserved until last.

7. If the F value was significant, the univariate tests were checked to determine which dependent variable(s) resulted in a significant F. Those with significant levels of F were chosen for further analysis to determine which adjusted means differed significantly from the other(s).

8. A Tukey test of post hoc multiple comparisons was used to determine the differences between the adjusted means of study groups on the statistically significant criterion measure(s).

Research Questions

The questions for this study were as follows:

1. Does use of a study strategy (SQ3R, QRR, or QRQ-P) on text material affect comprehension accuracy, confidence in answering test questions, or the amount of time required to study when controlling for reading level of the student?

2. Which dependent variable contributes most to study strategy group differences?

3. Does use of a study strategy (SQ3R, QRR, or QRQ-P) on text material affect comprehension of the different question types of main idea, inference, or details when controlling for reading level of the student?

4. Does reading level affect comprehension accuracy, confidence in answering questions, or time to study?

5. Does prior knowledge of the text material affect comprehension accuracy, confidence in answering questions, or time to study?

6. Does time to study text material affect comprehension accuracy, or confidence in answering test questions?

Analysis For Each Question

To address the issues of this study, four one-way multivariate analyses of covariance (MANCOVA) were conducted. Because multivariate analysis of covariance was used, several questions were addressed in the analysis for some of the six questions.

For questions 1 and 2, a MANCOVA was used to determine the differences in the three study strategies in comprehension accuracy, in confidence of answering the test questions, and in time to apply the strategy (see Appendix D, Analysis 1 for the data output).

Preliminary analysis. The observed means and standard deviations, and the adjusted means for each dependent variable were determined for the study strategy treatments of SQ3R, QRR, and QRQ-P. These data revealed that with the dependent variable of time to use the study strategy, QRR took the least time, followed by SQ3R. QRQ-P took the most time. These differences in time to use the study strategy were as expected, with QRQ-P requiring more involvement than SQ3R and finally QRR. Observation of the means and standard deviation also showed that comprehension accuracy (COMPAC) was highest for the QRQ-P, followed by QRR and then SQ3R. These differences in the comprehension accuracy adjusted means are related to some degree to difference in time, since the highest COMPAC score took also the most time (QRQ-P). However, some other explanation than time must

account for the difference in the comprehension accuracy between the QRR and SQ3R. The QRR strategy resulted in 2.58 more correct answers for comprehension accuracy (QRR, mean = 14.00 total questions correct; SQ3R, mean = 11.42 total questions correct) (see Table 6).

Finally, the means and standard deviations showed that the number of guesses (CONFID) for each study strategy was highest for the SQ3R group (adjusted mean = 11.73) followed by QRQ-P subjects (adjusted mean = 8.08), then by QRR subjects (adjusted mean = 7.26). This result was consistent with the expectation that students who understood the purposes and reasons for using the study strategy would be more confident of the results. Both the QRR and QRQ-P included the purposes and learning theory behind the use of each step, but SQ3R did not.

MANCOVA for questions 1 and 2. The MANCOVA showed that differences did exist among the three study strategies on the variables. Using MANCOVA, with degrees of freedom (2, 38), all multivariate tests of significance yielded an approximate $F = 5.55$ (Wilks), $p < .001$ (see Appendix D, Analysis 1). Therefore, the multivariate hypothesis that the three groups would differ on at least one of the criterion measures was not rejected at the .05 level of significance.

The test of the assumption of homogeneous dispersion matrices for the omnibus multivariate test was warranted

Table 6

Observed (OB) And Adjusted (AD) Means And Standard
Deviations For The Covariate READL And For The
Treatment Dependent Variables

	SQ3R		QRR		QRQ-P	
	OB	AD	OB	AD	OB	AD
READL	11.99	-	11.66	-	10.97	-
	(1.99)	-	(3.05)	-	(2.59)	-
TIME	56.64	57.59	46.71	46.97	80.93	79.72
	(13.82)	-	(11.57)	-	(24.26)	-
COMPAC	11.92	11.42	14.14	14.00	17.29	17.93
	(6.21)	-	(6.36)	-	(6.84)	-
CONFID 1	11.57	11.73	7.21	7.26	8.29	8.08
	(5.68)	-	(5.47)	-	(5.40)	-

OB = Observed means

AD = Adjusted means

() = Standard deviations

1 = A low mean is more favorable

($F = 1.21575$, $df = 20/5459$, $p = .229$) as was the test (Wilks) for the assumption of homogeneous regression coefficients ($F = 1.00014$, $p = .429$).

Since the omnibus multivariate test resulted in a significant difference in the study strategy groups on the three criterion measures, investigation of the univariate F-tests (see Appendix, Analysis 1) were required to determine the probable dependent variables of importance (see Table 7). Both time ($F = 13.65$, $p < .001$) and comprehension accuracy ($F = 4.30$, $p = .021$) were significant variables for the differences in the study strategies when controlling for reading level. The F ratio does not tell, however, which pairs of means differ significantly. Therefore, it was necessary to perform the Tukey Multiple Comparison procedure.

The results of the Tukey pairwise comparisons on the criterion of comprehension accuracy demonstrated that the adjusted mean for the QRQ-P study group was significantly different from the adjusted mean of the SQ3R study group in favor of QRQ-P. The other two pairwise comparisons, QRQ-P with QRR, and QRR with SQ3R did not yield any significant differences (see Table 8).

The results of the Tukey pairwise comparisons on the criterion variable of time, revealed that the adjusted mean for QRQ-P differed significantly from the adjusted means of

Table 7

Univariate F-Tests From Overall Multivariate Test

Source of Variation	df	SS	MS	F	Sig. of F
TIME	2, 38	10682.375	281.115	13.651	.000
CONFID	2, 38	1146.258	30.165	2.597	.088
COMPAC	2, 38	1293.109	34.029	4.304	.021

Table 8

Adjusted Means (Y) And Studentized Range Statistics (Q)
From Tukey Multiple Comparison Procedure For COMPAC

COMPAC	Y ₁ (SQ3R) (11.41999)	Y ₂ (QRR) (14.003341)	Y ₃ (QRQ-P) (17.93375)
		Q	Q
Y ₁	-	2.58342	6.51376*
Y ₂		-	3.93034
Y ₃			-

* Significant at alpha .05

both QRR and SQ3R study groups, $p < .05$. No difference was found for the comparison of SQ3R with QRR (see Table 9).

The results with both time and comprehension accuracy were in the expected direction with QRQ-P higher in comprehension accuracy, yet taking more time to apply. However, it was also expected that QRR would take significantly less time than SQ3R, though it did not.

As a result of the MANCOVA for Questions 1 and 2, and the Tukey multiple comparisons tests for Question 1, it was determined that significant differences did exist in the three treatment groups at the .05 level of significance, and that comprehension accuracy and time were the variables which contributed most to those differences. The three groups differed in both time to use the study strategy and in comprehension accuracy as a result of using the strategy, but they did not differ on the variable of confidence in answering test questions.

MANCOVA for question 3. The MANCOVA for Question 3, testing differences of the study strategy groups on comprehension of the three question types (main idea, inference, details) criterion measures while controlling for reading level, was nonsignificant (see Appendix D, Analysis 2 for the data output). There was therefore no differences in the three treatment groups in ability to correctly answer one question type more than another when testing for those differences at the .05 level of significance.

MANCOVA for question 4. Question 4 asked if reading level affected any of the criterion measures of comprehension accuracy, confidence in answering comprehension questions, or time. The results of the analysis (see Table 10) of the effect of the covariate of reading level on each of these criterion measures, revealed a significant effect for reading level on time, ($F = 4.24248, p < .05$) and for reading level on comprehension accuracy, ($F = 10.06170, p < .004$), but not for reading level on confidence (guessing score) ($F = 1.07361, p > .05$).

MANCOVA for questions 5 and 6. Because prior knowledge and time were not appropriate for use as covariates with the other covariate of reading level, the analyses on these two covariates were performed separately. The results were nonsignificant, as expected, after the preliminary analysis revealed the inappropriateness of the data for prior knowledge and for time as covariates (see Appendix D, Analysis 3 and 4).

Analysis Of Measurements

Prior knowledge. The results of the prior knowledge covariate data was closely associated with the prior knowledge test instrument. The failure of the prior knowledge data, derived from the content specific vocabulary test (CSVT), to serve as a viable covariate placed doubt on the use of the content specific vocabulary measure used in

Table 9

Adjusted Means (Y) And Studentized Range Statistics (Q)
From Tukey Multiple Comparison Procedure for TIME

TIME	Y ₁ (QRR)	Y ₂ (SQ3R)	Y ₃ (QRQ-P)
	(46.975)	(57.592)	(79.719)
		Q	Q
Y ₂	-	10.617	32.744*
Y ₁		-	22.127*
Y ₃			-

Table 10

Univariate Tests For The Effects of Reading Level
On Group Differences

Criterion	Univariate Tests		
	Error MS	F value	Significance of F
COMPAC	34.02918	10.06170	.003*
CONFID	30.16468	1.07361	.307
TIME	281.11514	4.24248	.046*

* significant at alpha .05

the study. Preliminary procedures for establishing reliability of the content specific vocabulary test were followed, resulting in a Cronbach's Alpha of .783 ($X = 19.345$, $SD = 5.91$, $N = 113$) for the 40 vocabulary item multiple choice test (see Appendix B).

Despite this relatively strong reliability coefficient, the test analysis showed 22 of the items with a low point biserial below .19. Before the use of the test as the criterion measure the multiple choice responses of the weak test items were rewritten in the attempt to strengthen them. This resulted in too much of an increase in the difficulty of the test items, as revealed by the final analysis of the prior knowledge test. The preliminary analysis indicated a mean total score of 19.345 of a possible 40 for the CSVT. The final analysis indicated a substantial drop in the total mean score to 13.311. This increase in difficulty of the test decreased the reliability to $r = .696$ ($X = 13.244$, $SD = 4.438$, $N = 45$). Of the 40 items on the final test, 22 of the 40 items were answered incorrectly by 30 or more of the 45 subjects. Eight of the items were answered incorrectly by 40 or more of the 45 subjects. In the opinion of this researcher, this increase in difficulty of the Content Specific Vocabulary Test, confounded the results of the prior knowledge measure as a covariate.

Comprehension test reliability. Preliminary reliability testing of the comprehension test (see Appendix

B) resulted in $r = .817$ ($X = 15.75$, $SD = 6.833$, $N = 28$) for the original 50 item test. Weak items were revised in the effort to increase the point biserial for each item.

Reliability by Cronbach's Alpha of the final data derived from the treatment groups was $r = .826$ ($X = 25.217$, $SD = 7.419$, $N = 45$) for the final 50 item test of 40 multiple choice and 10 short answer questions. The high reliability of the comprehension criterion measure suggests that the test instrument was a statistically sound instrument for use in the study.

Metacognition. Because there was no significant differences in confidence of the three groups, no significant differences in metacomprehension or "knowing that you know" existed either. That is, the participants' confidence in what they knew from the text study and as a result of using the study strategy for their group was statistically the same across all three treatments. No study strategy resulted in statistically more confidence (less guessing) on the comprehension test items than the other two study strategies. The validity of this interpretation is based on the statement of Johnston and Pearson (1982) that a measure of student admitted guessing is a measure of student confidence in what is learned from the study or knowing that he/she knows.

As a measure of good comprehension monitoring skill (Baker and Brown, 1984), the comprehension accuracy results

indicated that the QRQ-P strategy did result in significantly greater comprehension accuracy (comprehension monitoring skills) than the SQ3R strategy, but not significantly greater than the QRR strategy. Also, the QRR strategy did not result in significantly greater comprehension accuracy (self-monitoring skill) than the SQ3R. Since the QRQ-P treatment was designed to increase the level of the student's awareness in study, this result indicated that the training given to the QRQ-P group did significantly increase the level of awareness in the QRQ-P group above that of the SQ3R group, but not above that of the QRR group. This conclusion is based, however, on the assumption of Baker and Brown (1980, p. 21) that student rating of confidence is a measure of awareness resulting in comprehension monitoring strategic behavior.

Attitudes

A questionnaire was used following the comprehension test which attempted to qualitatively assess differences in attitudes of the students with regard to the use of the study strategy (see Appendix A, Information Sheet). The results of the questionnaire revealed a rating in favor of QRR (see Table 11). Only SQ3R subjects responded unfavorably to question 4, (Did you enjoy using the study strategy?) with six (6) "no" and eight (8) "yes" responses.

Table 11

Summary Of Questionnaire Responses

 Question #

1. Study strategy?	SQ3R		QRR		QRQ-P	
	Y	N	Y	N	Y	N
2.	14	0	15	0	14	0
3.	14	0	15	0	14	0
4.	8	6	15	0	11	3
5.	4	10	2	13	6	8
6.	* 9	2	14	1	** 10	3
9.	11	3	11	4	10	4
Total respondents	14		15		14	

 * Three responded with "part" or "some of it".

** One responded with "yes" and "no".

In response to question 5, (Did the study strategy take you too much time to use?) the QRQ-P and the SQ3R groups both replied "yes" with some frequency: QRQ-P group replied six (6) "yes" and eight (8) "no"; SQ3R - four (4) "yes" and ten (10) "no". In the areas of understanding the study strategy (question 2) and believing the strategy would improve ability to understand the text material (question 3), all subjects responded favorably in all three of the treatment groups. On question 6, (Do you think you will use this study strategy on your own?), the SQ3R group responded least favorably with nine (9) "yes", and two (2) "no" and three (3) stating they would use "some" or "part of it". The QRR group responded most favorably on question 6 with fourteen (14) "yes" and only one (1) "no", and the QRQ-P group responded with ten (10) "yes", three (3) "no", and one (1) wrote "yes and no", apparently meaning sometimes or some parts would be used. Finally on question 9, (Do you believe you will score well on the test after you use the study strategy?) the results were about even for all three treatment groups.

Comparing the three study strategies on the attitudinal results of the questionnaire, QRR received the most favorable reaction. The SQ3R and QRQ-P seemed about equal overall, but each received unfavorable reactions on different issues.

Chapter 5

INTERPRETATION OF RESULTS

Summary

This study was initiated with clearly established assertions from the literature: 1) SQ3R is a widely used study strategy; 2) further empirical research is needed on the effectiveness and efficiency of SQ3R; 3) student generated questioning in the study/learning process is well substantiated in research literature; 4) effective study should be active; 5) adequate reading ability is required for effective and efficient study; 6) prior knowledge is an important factor for effective reading/study.

This study addressed the issues of how SQ3R compared to two other study strategies in 1) effectiveness (comprehension accuracy of text); 2) efficiency (time to study); 3) confidence in answering test questions following study; and 4) ability to answer certain question types as a result of the study strategy. With the established importance of reading ability and prior knowledge, measures of these variables were used as controls, or covariates, in the analysis of the treatment results. Time was also planned as a covariate, but neither time nor prior knowledge could be used as covariates because of inappropriate correlations with other variables.

The test instruments used in the data collection of comprehension accuracy, and prior knowledge were designed, tested for reliability, and administered by the investigator. The data on time and confidence in answering the test questions were collected using informal procedures. A questionnaire, another informal procedure, was used to assess differences in attitudes of the three treatment groups related to the study strategy.

Forty-five college freshmen from a private university in Virginia who were enrolled in a study skills program served as the subjects for this study. The data used in the analysis were collected in April and May 1986. The forty-five subjects were randomly assigned to one of the three treatments, making three groups of fifteen for each treatment.

Training in the three study strategies (treatments) was developed and guided by the investigator using videotape and group instruction. Training and data collection occurred over a three week period. Because of absences, some training sessions were held on an individual basis, but the videotape lesson was the same regardless. Data collection was performed in large group sessions with each individual present applying the study strategy. Reading level and prior knowledge data were collected for covariance analysis prior to the administration of the criterion measures of

comprehension, time, and confidence in answering the questions.

Multivariate analysis of covariance (MANCOVA) was used on the data to answer the questions of the study. Preliminary analysis, including condescriptives, normal curve distribution, and correlations were performed to determine the appropriateness of the data in meeting the assumptions of multivariate analysis.

Major Findings

Investigations of the questions of this study resulted in these findings: 1) significant differences in the three study strategy treatment groups existed on the criterion measure of comprehension accuracy, that is, the groups differed in effectiveness of the study strategy; 2) significant differences in the three study strategy treatment groups existed in the dependent measures of the overall multivariate test; 3) the pairwise comparison of adjusted means for comprehension accuracy between QRQ-P (mean = 17.93) and SQ3R (mean = 11.42) was the only significant pairwise comparison of the three study strategy treatment groups in favor of QRQ-P, that is, QRQ-P was more effective than SQ3R as a study strategy; 4) significant differences in the three study strategy treatments existed on the criterion measure of time to study, that is, the three strategies differed in efficiency; 5) the pairwise

comparisons of adjusted means for time between QRQ-P (mean = 79.72) and SQ3R (mean = 57.59) and between QRQ-P and QRR (mean = 46.97) were significant, while the pairwise comparison between SQ3R and QRR were not, that is, QRQ-P was less efficient than either SQ3R or QRR, whereas SQ3R was not statistically less efficient than QRR; 6) reading ability was significant in its effect on time to study and on comprehension accuracy but not on the student's confidence in answering questions, that is, reading ability affects both effectiveness and efficiency of study regardless of the strategy used; and 7) the three study strategy treatment groups showed no significant differences in answering different question types.

Conclusions

Interpretations

Question 1. Does use of a study strategy (SQ3R, QRR, or QRQ-P) on text material affect comprehension accuracy, confidence in answering comprehension test questions, or the time required to study when controlling for reading level of the student?

The significant differences in the criterion measure of time to use the study strategy as shown by the significant univariate test on time was an important finding of this study. While the QRQ-P strategy resulted in significantly higher comprehension accuracy than the SQ3R strategy, the

fact that QRQ-P took significantly more time than SQ3R (approximately 22 more minutes on the average) greatly reduces any practical advantage of using QRQ-P over SQ3R. On the other hand, the significantly greater time to use QRQ-P than to use QRR (approximately 33 more minutes on the average) made the QRR strategy the most efficient strategy. Because there was no significant difference in comprehension accuracy between QRQ-P and QRR, QRR was not more effective. Since these two study strategies showed only chance differences in comprehension score, and the QRR took significantly less time to use than the QRQ-P, then the QRR strategy, requiring less time with equal comprehension would clearly be the student's choice on the basis of efficiency and its relative effectiveness.

Finally, considering the shortened review procedure of the SQ3R group, consisting only of rereading the self-generated questions and quickly reciting the answers, the results of both the comprehension accuracy and time measures for the SQ3R treatment may have been significantly different had the SQ3R review step been applied as prescribed. Had the SQ3R review step been thoroughly applied, QRQ-P may not have been significantly higher in comprehension accuracy, and for certain the differences in time would have been greatly reduced, perhaps even below the level of significant differences. The fact that the SQ3R subjects did not perform a thorough review was

also further evidence of some of the problems students have with the SQ3R strategy as attested also by the literature (Lazarus, 1979; Tadlock, 1978; Robyak, 1977, 1978).

The differences in the three treatment groups in comprehension accuracy are difficult to be interpreted clearly, aside from the differences in time. In the final analysis, the differences in time made QRR the most effective and most efficient of the three study strategies of this investigation. This conclusion in favor of QRR is made because QRQ-P had the highest adjusted mean for comprehension accuracy, and was significantly higher than SQ3R, but not significantly higher than QRR.

The analysis indicating that time did not affect comprehension accuracy and was therefore a poor predictor of how well the students would perform in comprehension accuracy, means factors other than time contributed to the differences in comprehension accuracy between SQ3R and QRQ-P. Reading level was clearly one of these contributing variables, but other possible variables were the differences in the training procedures for each strategy, as well as metacognitive learner variables.

The lack of significant differences of the univariate test in the treatment groups on the confidence criterion measure indicates that: 1) none of the three study strategies were statistically proven to promote greater confidence in answering test questions. Or, in other words,

none of the three strategies tested resulted in significantly less overall guessing on the comprehension test items; 2) differences in reading level did not result in significantly different confidence in answering test questions among the three strategies.

One of the predictions regarding the confidence measure was apparently substantiated. It was reasoned that the subjects would guess less (more confidence) when the study strategy was effective for comprehending the text. Two sets of information appear to substantiate this prediction: 1) the SQ3R treatment group had the highest number of guesses (though not significantly different than QRR or QRQ-P), and was significantly lower in comprehension accuracy than QRQ-P; 2) The correlation between comprehension accuracy and the confidence score was significant on the negative side ($-.6353$, $p = .000$). This high negative correlation indicated that when the number of guesses was low (high confidence), the comprehension accuracy score tended to be high.

Investigation of the studentized range statistic (Q) of the Tukey multiple-comparisons for adjusted mean differences on the criterion of confidence was revealing. Though no statistical differences existed, the Q value between QRR and QRQ-P was the least (.829), between QRR and SQ3R was the greatest (4.471), and between SQ3R and QRQ-P was close to the QRR and SQ3R (3.641). These Q values revealed a trend

of least confidence for the SQ3R subjects in the correctness of the answers for the questions, and little difference in confidence for the QRR and QRQ-P subjects. It should be remembered that it was the SQ3R strategy group that was significantly lower than the QRQ-P group on the comprehension accuracy criterion measure. While not conclusive, these unanalyzed trends provide encouragement for further research into the student's confidence in answering test questions resulting from the strategy used for study.

Finally, the attempts in this study to quantify aspects of metacognition were the confidence criterion measure and the comprehension accuracy measure. Both of these measures were attempts to determine the level of awareness of the student resulting from the training and study strategy used. Lack of statistical difference on the confidence measure does not exclude the possible effects of metacognitive awareness on the students' study effectiveness. In fact, since all of the subjects of this study were identified as weak in study skills, the probable positive effects of receiving intensive training in any study strategy would be likely, thus accounting for the no significant difference in confidence scores. This increased awareness or confidence that they were comprehending more effectively (knew they knew the text information), may have resulted from learning a study strategy and using it for the

first time. This possible conclusion is further substantiated by the fact that the mean number of guesses for all three treatments was low for the 50 item test. SQ3R was the highest, but still showed an observed mean of only 11.57 guesses. The QRR strategy group guessed the least with only a mean of 7.21, and QRQ-P was nearly the same with a mean of 8.29. What this indicated was the high level of confidence (decrease in guessing) which occurred across all three treatments.

Evidence of this overall positive effect for all treatment groups was reflected also in the questionnaire (see Appendix A, Information Sheet). Three of the questions (#'s 3, 4, and 6) asked for specific responses to questions about the subject's attitude toward the study strategy. The responses to these attitude questions were largely positive. It is especially interesting that all participants in all three treatments believed "the study strategy will improve ability to understand... the text material" (Question 3). Only the SQ3R strategy received a high number of negative responses to question 4 (Did you enjoy using the study strategy?). Remember too, that the SQ3R strategy treatment group was also significantly lower than the QRQ-P strategy treatment group on the adjusted mean comprehension accuracy criterion measure.

While the statistical analysis of the confidence measure did not result in evidence of the effects of

increased level of awareness, other qualitative evidence cited above indicated that other metacognitive factors had some bearing on the statistical differences that were found. Exactly what these influences were, was not determined from this study.

Question 2. Which dependent variable contributes most to differences in the treatment groups?

The significant omnibus multivariate test of the analysis for question 1, means that the three study strategies were different on at least one of the three dependent measures of comprehension accuracy, confidence in answering the test questions, and time to use the study strategy. The variable of time contributed most to treatment group differences, then comprehension accuracy, with confidence contributing the least. However, the fact that time contributed most to differences in the three treatment groups does not mean that differences in time caused differences in the student's comprehension of the text. Neither the research literature (c.f. Willmore, 1967), nor the analyses of this study, support that causal relationship. The significant difference in time between the treatment groups indicated only that the three study strategies differed in time to follow or apply the procedures of the strategy.

Willmore (1967) used time as a covariate in comparing SQ3R, underlining, reading, and outlining, and also found a

significant difference in time to apply the study strategy. Outlining and SQ3R took the most time, yet underlining (second lowest in time) resulted in higher comprehension on the average than the others.

The use of more time on a study strategy did not result in higher comprehension in this study. While time was inappropriate as a covariate in the same MANCOVA with reading level, a separate MANCOVA with time as a single covariate with the two criterion variables of confidence and comprehension accuracy, showed a nonsignificant effect in the three study strategy treatments (multivariate omnibus test), and, of course, a nonsignificant univariate test for both criterion measures. While the three treatment groups differed significantly on the criterion of time, there was no evidence that time contributed significantly to differences in comprehension or confidence in answering test questions.

Further evidence of the lack of significant relationship between time and the other two dependent variables was the low correlations (see Table 4, Chapter 4) between time and comprehension accuracy, and between time and confidence. Thus, while time represents engagement, it apparently should not be confused with more active or focused cognitive engagement.

Question 3. Does use of a study strategy (SQ3R, QRR, QRQ-P) affect ability to answer different question types of

main idea, inference, or details when controlling for reading level?

The result of no significant differences with regard to question 3 may have several explanations. First, each of the study strategies may be equally as effective in aiding the student to answer the different types of questions. Second, the labelling of the different questions of the comprehension test may be inaccurate. No analysis was performed on the differences in the ratings of the question types to determine the reliability of the question types as labeled. Third, the sample size for each question type may not have been large enough to detect differences in the strategies on this criterion. Because all three of these are probable reasons for the results as they were, further research is warranted in investigating the relationship of question types to study strategy.

Question 4. Does a student's reading level affect comprehension accuracy, confidence in answering test questions, or the time required to study?

The significant effect of reading level on treatment group differences on the three dependent variables of comprehension accuracy, confidence in answering tests questions, and time is consistent with other findings in the literature. Willmore (1967), for example, found that reading score was one of the major predictors of comprehension after use of a study strategy.

The significant effects of reading ability on study effectiveness and efficiency emphasizes the need for study skills programs to take into account the student's reading level before and during study skills training. In this study the readability of the target text material used for study with the criterion comprehension measure was assessed at 12.8, which was significantly above the reading level of the low readers of each of the treatments. The strong correlation between comprehension accuracy and reading level indicates that the difficulty of reading the text material contributed to the low readers lower comprehension accuracy scores. Also, the comprehension scores and the time to study were significantly correlated with reading level (see Table 4, Chapter 4). These facts indicate that there are limitations on what a student may be trained to do to improve understanding of text material for study. This study indicates that text material should be at least on or near the level of the student's reading level if strategies for study are to increase study effectiveness and efficiency to any significant degree.

Question 5. Does prior knowledge of the text information affect comprehension accuracy, or confidence in answering test questions, or time to study?

The analysis for question 5 resulted in a nonsignificant F, indicating that prior knowledge had no effect on any of the criterion variables, other than those

which happened by chance. This result seems clearly related to the unreliable measure used to determine the student's prior knowledge, not the true effects of prior knowledge on the student's reading comprehension. In fact, since the research literature is quite clear on the role of prior knowledge in comprehension of text (Johnson, 1984; Johnson and Pearson, 1982; Langer, 1984, 1981, 1980; Manzo, 1976; Pearson, 1978; Stevens, 1980) a percentage of the variance in the dependent measures of this study may certainly be attributed to the effects of prior knowledge. Just how much, this study did not adequately measure.

Question 6. Does time to study text material affect comprehension accuracy, or confidence in answering test questions?

The nonsignificant results of the omnibus MANCOVA, using the covariate of time, indicates that time had no significant effects on the group differences on the comprehension accuracy or confidence criterion measures. Thus, the differences in the treatment groups on the comprehension accuracy score had little to do with the major differences in time to use the study strategy. Simply increasing the time on the study task, regardless of the strategy, does not necessarily increase comprehension. The results of this study suggest that the quality of the time spent, or what the student does, is more important than the quantity of time, or how long he studies. The significant

differences in comprehension accuracy (see Appendix D, Analysis 1) favoring QRQ-P suggest that it is more important that the student organize the text information into relationships of main ideas and details, and that the student is cognitively active during the reading phase of study; that is, the student is aware of the effectiveness of his study, monitoring his own understanding and applying "fix-up" strategies when necessary. Study strategies which require these qualities of study are more effective than strategies which require greater expenditures of time and do not apply these qualities.

The research literature also agrees with the importance of quality of study. Anderson and Armbruster (1980, p. 12, 13) refer to the principle of "levels of processing" in the context of effective study. This principle, they say, states that stimuli are analyzed in a hierarchy of processing stages, from an analysis of physical or sensory features to extraction of meaning. One implication of this principle for studying "...is that performance on criterion task requiring comprehension and recall will be facilitated to the extent that students attend to, interact with, and elaborate on the underlying 'meaning' of the text." They further declare "...that studying will be effective if students process the right information in the right way." Quality, or the meaningful level of involvement with the

text, and not length of time spent in study, will therefore determine the effectiveness of the study strategy.

Other Findings

The most influential variable of the study was time. While the time differences between QRQ-P and both SQ3R and QRR were statistically significant, the difference in time between QRR and SQ3R was not statistically different according to the data collected. However, an important point for consideration in the comparison of QRR and SQ3R on time is that the SQ3R approach was shortened considerably in the review step (the final R). After completing the survey, question, read, recite of the SQ3R strategy for the entire chapter of target text material, the review procedure amounted to little more than rereading the student generated questions over the headings by the SQ3R subjects. This differs somewhat from the suggested SQ3R procedure of a thorough review conducted in a subsequent study session. The abbreviated review procedure unquestionably shortened the time required for the study strategy. Adding time for a thorough review as prescribed by SQ3R would have widened the differences in time between QRR and SQ3R, perhaps even to the level of statistically significant difference. According to the Tukey multiple comparisons procedure of the adjusted means of the study groups on TIME, only an

additional 4 minutes to the SQ3R adjusted mean would have made SQ3R significantly different from QRR.

However, even the 10.6 minute difference between QRR and SQ3R in this study is noteworthy. One of the most valuable commodities in study is time. Any strategy which can decrease time by approximately 18%/hr and also increase comprehension accuracy by 2.58 or slightly over 5% more correct answers (the difference in the adjusted means for comprehension accuracy between QRR and SQ3R) on the test is worthy of consideration. Add to this the fact that the QRR strategy resulted in effective comprehension equal to the SQ3R, yet the QRR required less steps and less complication in procedures to complete study of the text. One must keep in mind, however, that the differences in time in this study between the QRR and SQ3R by definition of being statistically different could have been by chance, not by differences in the two study strategies. Further investigation is needed to answer this question.

Another practical point in favor of QRR over SQ3R is the fact that the comprehension accuracy scores were statistically the same (not significantly different), yet the QRR required fewer steps and therefore, perhaps less complicated for learning to use. In this sense, then, QRR was more effective than SQ3R; that is, QRR required less input for the same (or slightly improved) output. This rationale also may be applied to the comparison of QRR and

QRQ-P. QRR was not significantly different from QRQ-P in comprehension, yet it was significantly different in time. This would mean that QRR was more efficient. Further, because it required fewer steps, it may be considered less complicated to use.

A point in favor of SQ3R could be made if the review step had been performed as prescribed by the SQ3R group. If the review step had been performed as prescribed, comprehension may have increased to a significantly different level for the SQ3R group, putting SQ3R in much the same category as QRQ-P with a higher comprehension, but also requiring considerably more time than the QRR. Accepting the differences as they were in this study, left QRR as the more efficient (less time) study strategy with no significant differences in comprehension (equally as effective) as a result of using the two strategies.

How then did SQ3R compare to these two strategies from a practical standpoint according to the results of this study? The order of choice for these three strategies would be QRR, then QRQ-P, then SQ3R. Why? Because of the nature of study habits. If a student knew a study procedure would take significantly more time and also be more complicated, and the comprehension benefit would not be significantly greater, the student would most likely choose the less complicated, less time consuming strategy. Thus, QRR would most likely be the chosen strategy. The QRQ-P has the

obvious advantage over SQ3R of increased comprehension or greater effectiveness, but at the cost of efficiency.

Implications

Instruction

This study has implications for the use of SQ3R as it is described in many of the study skills texts. Modifications of SQ3R, reducing its complexity and time demands, seem warranted. The need to use the survey step as part of the strategy may be questioned. This conclusion is consistent with the research literature on survey, which indicates that survey as a strategy for study is unproven for effective study. A study by Williams (1983) showed that two types of survey were effective in the formation and/or activation of prereading text schemata of varying accuracy. Yet, these favorable results interacted strongly with prior knowledge and ability of the student. The Williams' study concluded that survey alone may have little effect without adequate student prior knowledge of the text content.

Perhaps even the need for a review as part of effective study is unnecessary when it is performed with the other steps in the same study session. In short, it appears that any study strategy could be limited to fewer steps than what is required in SQ3R. The important steps seem to be self-questioning, reading (for main idea) and reciting. It seems reasonable to assume that review should be taught,

but as a separate activity performed after the initial study of the text. Such changes in what constitutes effective and efficient study could alter instruction in high school and college study skills programs. If teachers apply the results of this study, they should devote more instructional time to "why" a certain strategy needs to be used in study. In addition, teachers should teach strategies which will assist the student to understand the importance of text structure and to use the text structure to perceive main ideas. Training in self-questioning should be a priority of study skills teachers; however, self-questioning training should focus on generating main idea questions, or questions which help the student to perceive the whole idea before reading for the details. Students' comments on what they liked most about the strategy they used was often related to the value they placed on the self-questioning technique, which is the identical conclusion of most research literature on student-generated questioning (Cohen, 1983; Anderson, 1978). Moreover, teachers should emphasize active study strategies, which blend with those strategies that require processing of information during reading, thereby adding purpose to the reading component of study and incorporating increased cognitive awareness into the study process.

Finally, teachers of study skills should understand that any study strategy taught to students with low reading

levels is likely to have little effect on improved comprehension of text material which is significantly above the student's reading level. Strategies for improving the student's reading ability should be instructional priority for low readers, not strategies for study. This study helps to clarify the fact that study strategy training is not a "quick-fix" for low reading ability, although there are certain benefits of learning any study strategy for even low readers, when the student previously used none.

Research

This experiment was conceived on the theoretical model of reading as an interactive process; that is, numerous factors are involved in the reading process. Therefore, any investigation of reading/study skills based on the interactive model must attempt to account for as many sources of variance in the reading/study process as possible. This study, for example, attempted to include as many of the variables either known or expected to affect the comprehension of text material measured in this investigation. The results of this study verifies the need to design research after the interactive model of reading. For example, if reading level as a covariate had not been used in this study, the differences in the three treatments would have been nonsignificant. Clearly, the differences in the means adjusted for reading level were different from the

observed means (without adjusting for reading level of the subjects) as shown in Table 6 (Chapter 4). In a trial multivariate analysis of variance using comprehension accuracy, confidence in answering test questions, and time as dependent measures, only time showed a significant F value. Comprehension accuracy, clearly affected by reading level, was not significantly different among the three treatments without reading level as a covariate. Research in reading/study should, therefore, incorporate as many variables into the design as can be measured. What this implies is that reading research is now at the stage where more sophisticated research design, using the most powerful statistical tests available, must be used if the true relationship of the various factors of the reading/study process are to be determined.

With regard to specific research, this study strongly suggests the need to investigate more thoroughly the efficacy of using such study heuristic as SQ3R. Research which assures the application of all parts of SQ3R, particularly the review step, should be conducted to determine the effects on comprehension (effectiveness) and on time (efficiency). Perhaps QRR, and reading only, could be the comparative strategies in such a study. This study raises serious questions about the widespread acceptance of SQ3R as the most effective and efficient strategy for

textbook study. Further research is needed to resolve these questions.

The more simple QRR approach needs further experimentation with other abbreviated strategies. Is QRR more effective and efficient than the commonly used reading and underlining strategy? Would a strategy including survey, read, and recite (SRR) be just as effective and efficient as QRR? The issue in such a study would be the relative effectiveness of survey versus self-generated questions. Would a read and review (RR) procedure be more effective and efficient? Would question, read, and review be more effective and efficient? Would QRR be as effective without the emphasis on generating main idea questions?

Further research into ways to incorporate metacognition into study is needed. The use of the confidence scale measure of this study needs further investigation as a method for measuring guessing and for measuring the confidence of the student taking a test. Other aspects of increased level of awareness need to be investigated since this study indicated that the study strategy which attempted to increase the student's level of awareness was the most effective. Instruments to measure the various factors of metacognition need to be developed in order to determine the exact role of increased awareness in the development of more effective study skills.

The issue of the effects of different study strategies on different question types was left unresolved by this

study, as was the issue of effective use of the content specific vocabulary test to measure prior knowledge. Both of these areas of study are important. Therefore, more reliable and valid means of measurement are needed to probe these issues. The failure to adequately measure prior knowledge and question types resulted in the inability to acquire valid data for interpretation.

Finally, the technology of the videotape allowed this investigator to perform research by himself, which otherwise would have required the cooperation of a team of researchers or would have required a training time for the treatment groups to be carried out over a much greater time period. The videotape also assured that all groups could receive training from the same teacher, thus adding a source of validity to the study.

Closing Statement

This research has had a definite effect on the thinking and professional activities of the researcher. Prior to the decision to investigate study skills, I had considered the area of study skills as passe. However, not far into the literature search I realized that the area of study skills and study strategies was the hotbed of future research. What I quickly realized was that the findings of sound empirical research about how effective learning occurs was not being implemented in the teaching/learning process in

the schools of America. Practical application is lagging far behind the research findings. As a result, I determined to do two things. First, I would attempt to provide evidence for the validity of continuing the course of action being followed in the schools today or for the need to seriously consider changing in the area of what constitutes effective study. Second, I would begin immediately upon knowing the results of this investigation to implement the findings in my own teaching as a reading specialist.

From the literature and from the results of this study, I have become a firm advocate of teaching strategic behaviors of study. As a reading resource teacher in a large metropolitan area public school system, I am active teaching students and teachers what I have gained from this research. Also, in an adjunct teacher role with a large Community College system, I am actively training college freshmen in effective and efficient study strategies. In both situations the results and reactions from students and professional educators alike are overwhelmingly positive.

For the future I am determined to continue research in effective and efficient strategies for learning, until that which is empirically proven is dominant and that which is unproven is relegated to further research.

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Appendix A
GENERAL MATERIALS

Letter To Enlist Subjects

February 26, 1986

BOX 20000, LYNCHBURG, VIRGINIA 24506
(804) 237-5961

Dear Liberty University Student:

As a Liberty University student in either EDUC 100 or EDUC 102 courses this semester or last semester, you are eligible for participation in an official research project.

This research will be conducted during the winter '86 semester under the direction of Mr. A. E. Hickey with the assistance and approval of the Liberty University Learning Assistance Center, directed by Dr. Lila Bruckner.

The purpose of this research is to determine effective methods of study for college-age students.

The data for the research will be collected over a 1½ week period with the assistance and cooperation of approximately 150 Liberty University students. The amount of time required of each student will be minimal. There will be four (4) meetings of 1-2 hours per session. These meetings will be held in the evenings or possibly a Saturday session. Every effort will be made to keep scheduled research sessions free of conflict with the schedule of the participants. However, those who participate must commit themselves to the full research project during the 1½ week period.

Perhaps you're wondering what's in this for you??!! If you are selected and complete the research project, you will benefit in the following three (3) ways.

- 1) You will be contributing to the search for knowledge as a part of an official research project, which will be published.
- 2) You will gain valuable personal knowledge of proven effective study methods. This alone could contribute greatly to your success as a student at Liberty University and to your future.
- 3) Money \$ 100.00 - 1st prize drawing
Money 50.00 - 2nd prize drawing
Money 25.00 - 3rd prize drawing

There are three (3) cash prizes to be awarded upon completion of the research project. There will be a drawing to determine winners. You must attend all sessions to be eligible.

DEADLINE for registration is 3/7/86. You may register for selection into the final group one of two (2) ways.

- 1) Call 237-5961, ext. 6696. Ask for Judy Smith and register your name.
- 2) Complete the form attached and return it to Judy Smith in the Teacher Education Building, Room 185.

Liberty University Student

Page 2

February 25, 1986

From the voluntary list of participants, the necessary number of participants will be randomly selected. Those selected will be notified in their LU mailbox. A meeting will be set for further planning and scheduling as part of the notice of acceptance.

I hope you will be a part of this research. Thank you in advance for your cooperation and help.

Sincerely,

A. E. Hickey
Research Project Coordinator

AEH/jas

Enclosure

Form Used to Register Subjects

RESEARCH PARTICIPATION REGISTRATION FORM

Name: (print) _____

Study Skills Course Taken (circle one) EDUC 100 EDUC 102

INSTRUCTOR: _____

I hereby volunteer for participation in the Study Skills research conducted by A. E. Hickey. I realize that this act of volunteering does not assure my participation but only makes me eligible for selection.

Signature_____
Date

Raffle Ticket Form

RAFFLE TICKET

Your participation in the study skills research will entitle you to a raffle ticket for one of three prizes: 1st prize \$100.00 or one of two \$50.00 second prizes. The drawing will be held after the final test measure is administered. The date of the drawing will be May __, 1986.

I, (Name) _____, (telephone) _____, participated in the study skills research conducted by A. E. Hickey. I completed all sessions of the research and am therefore entitled to this raffle ticket for the prize of either \$100.00 if this ticket is drawn first, or \$50.00, if this ticket is drawn second or third.

Form for Honor Pledge Statement

HONOR PLEDGE

As a participant in this research study, on my honor, I pledge that ...

1. I will study the assigned text material on my own without assistance.
2. I will not discuss the study procedures or the content of the text materials with any other student, particularly my classmates in EDUC 100 or EDUC 102, or other L.U. students.
3. I will return all materials given me - text study materials, test and answer form.
4. I will approach the study of the text materials seriously, and conscientiously do my best in study and in the taking of the test.

Signature

Form for Gathering Post-Study Information

INFORMATION SHEET

NAME _____ PACKET # _____

AGE _____ SEX _____

Please answer the following questions: Circle one answer for each question.

1. What study strategy group were you in? (circle one)
SQ3R QRR QRQ-P
2. Did you understand how to use the study strategy?
YES NO
3. Do you believe the study strategy will improve your ability to understand what you study in text material?
YES NO
4. Did you enjoy using the study strategy?
YES NO
5. Did the study strategy take you too much time to use?
YES NO
6. Do you think you will use this study strategy on your own?
YES NO
7. What was the best part of the study strategy for you?
8. What was the worst part of the study strategy for you?
9. Do you believe you will score well on the test after you use the study strategy in this session?
YES NO

Appendix B

TESTS

Comprehension Test: Dependent Measure

DO NOT WRITE ON THIS TEST

COMPREHENSION TEST FOR CHAPTER 6

"The Pax Romana"

A History of Western Society

DIRECTIONS: Choose from the answers A,B,C,D for questions 1-40 below. Mark your choice on the SCAN-TRON Answer Form 883 with a #2 pencil.

To the right of each question circle the number 1,2,3,4 to indicate your confidence in the answer choice you have made. The scale of confidence is listed below.

1. GUESS - No confidence
2. UNLIKELY - Little confidence
3. LIKELY - More confidence
4. CORRECT - Total confidence

	Guess	Unlikely	Likely	Correct
1. In attempting to restore the republic of Rome, Augustus	1	2	3	4
A. Rebuilt the republic to become an even greater republic than before his reign				
B. Failed to restore the republic but instead created a constitutional monarchy				
C. Decided later that a republic was not good and deliberately created a dictatorship				
D. Restored the republic but almost totally reformed the government				
2. After Julius Caesar's death in 44 B.C. the condition of the Roman Empire	1	2	3	4
A. Became increasingly more wartorn and confused until its final defeat in A.D. 337				
B. Gradually improved until the revolt of the Roman army in 66 A.D.				
C. Became more peaceful and prosperous under the emperor Augustus				
D. Became more of an anarchy until the "Five Good Emperors" began to restore peace				
3. Which Roman Emperor is credited with creating the structure known as the Roman Empire	1	2	3	4
A. Julius Caesar				
B. Caesar Augustus				
C. Hadrian				
D. Vespasian				

	Guess	Unlikely	Likely	Correct
4. The central theme of this textbook chapter (Chapter 6) - <u>The Pax Romana</u> was	1	2	3	4
A. To show the development and lasting influence of the rule of Augustus over the Roman Empire				
B. To summarize the achievement of the four Roman dynasties beginning with the Julio-Claudians				
C. To outline the major contributions of each of the Roman Emperors after Julius Caesar				
D. To summarize the factors leading up to the fall of the Roman Empire				
5. The governmental monarchy set-up by Augustus was	1	2	3	4
A. A full-blown monarchy giving Augustus the office of principate with definite rights and powers				
B. Only a monarchy in name; in reality it was an oligarchy with Augustus sharing the rule				
C. The first step in the gradual improvement of Roman government				
D. A constitutional monarchy with powers shared in the government				
6. <u>The Pax Romana</u> was	1	2	3	4
A. A period of security, order and flourishing culture and economy in the Mediterranean world during the 1st and 2nd centuries, A.D.				
B. A time in Roman history when no wars were fought				
C. The period from 31 B.C. when Augustus restored peace to Rome to the fall of the Roman Empire				
D. The time in Roman history known also as the rule of the "Five Good Emperors"				
7. When Augustus became one of the chief magistrates following Julius Caesar's death, he	1	2	3	4
A. Was soon declared dictator by the Roman senate				
B. Sought to restore the republic of Rome				
C. Took control of the military and mobilized the forces for warfare				
D. Began a reformation that resulted in a new government for Rome				
8. Which of the problems listed below is not one of the three problems that faced Augustus in his attempt to restore the republic of Rome?	1	2	3	4
A. To rebuild the constitution and the organization of government				
B. To demobilize the army and care for the welfare of the provinces				
C. To restore the senate to its proper governmental function as chief legislative body				
D. To meet the danger of barbarians at Rome's European frontiers				

	Guess	Unlikely	Likely	Correct
9. Why did the Roman senate fail to live up to its responsibilities given to it by Augustus during his rule? Because	1	2	3	4
A. Most of the senators did not understand what Augustus wanted				
B. The senate was divided in its loyalty to Augustus				
C. The responsibilities given to the senate by Augustus were incompatible with the republican form of government desired by Augustus				
D. Augustus failed to give the senate adequate power to exercise its responsibilities				
10. What was Augustus's solution to the problem of maintaining his sole power over Rome, yet at the same time, retain a republican constitution?	1	2	3	4
A. He became <u>princeps civitatis</u>				
B. He declared himself sole ruler				
C. He manipulated the senate into voting him proconsular				
D. He rewrote the constitution providing for the office of constitutional monarch				
11. Which of the powers voted to Augustus by the Roman Senate directly gave him the right to be involved in making laws of government?	1	2	3	4
A. <u>Pontifex maximus</u>				
B. Proconsular				
C. <u>Princeps civitatis</u>				
D. <u>Tribunicia potestas</u>				
12. Augustus's main source of power as the emperor of Rome was	1	2	3	4
A. His position as commander of the Roman army				
B. His control of the religious life in Rome				
C. His control of the senate				
D. His general popularity among the people of Rome				
13. What one problem did Augustus fail to solve through his governmental settlement of Rome?	1	2	3	4
A. The rebellious nature of the Roman senate				
B. The defeat of Britain				
C. The lack of loyalty to Rome by the Roman army				
D. The attempt by Roman generals to seize power				
14. The manner in which Augustus dealt with Judaea, the Jewish province of Rome, indicated that Augustus	1	2	3	4
A. Feared the rebellious Jewish state				
B. Respected the local customs in the provinces of Rome				
C. Wanted the provinces to obey Roman law				
D. Did not know what to expect from the Jews so he "left them alone"				

	Guess	Unlikely	Likely	Correct
15. Which phrase below gives evidence during Augustus's reign that some Romans practiced idol worship? A. <u>Augustus's Res Gestae</u> B. <u>Roma et Augustus</u> C. <u>Princeps civitatis</u> D. <u>Pontifex maximus</u>	1	2	3	4
16. The "Five Good Emperors" formed the dynasty of A. Flavians B. Severi C. Antonines D. Constantines	1	2	3	4
17. Augustus established the dynasty of A. Severi B. Flavians C. Julio-Claudians D. Antonines	1	2	3	4
18. The Praetorian Guard was A. The legion of the Roman army assigned to guard the city of Rome B. The special force of soldiers guarding the tombs of the emperors C. The standing force of special bodyguards of the emperor D. The soldiers assigned to act as guards over Roman soldiers' families in Rome	1	2	3	4
19. The Roman emperor, Nero, A. Ruled wisely and ushered in the golden age of Rome B. Was a tyrant who murdered four possible successors to his throne C. Was the first of four emperors in the year of the Four Emperors D. Broke the Julio-Claudian dynasty by selecting Vespasian as his successor	1	2	3	4
20. Which dynasty of emperors was in power over Rome during the life of Jesus Christ on earth? A. Julio-Claudians B. Flavians C. Severi D. Antonines	1	2	3	4
21. Which dynasty of Roman emperors gave the Roman world peace and paved the way for the era of the "Five Good Emperors"? A. Julio-Claudians B. Flavians C. Severi D. Antonines	1	2	3	4

	Guess	Unlikely	Likely	Correct
22. The successors of Augustus probably	1	2	3	4
A. Wanted Rome to increase its borders over more of the world				
B. Wanted to draw back the army of Rome out of barbarian territory				
C. Wanted the size of the Roman Empire to remain as it was and not to increase it				
D. Wanted other countries to join the Roman Empire peacefully				
23. The author of <u>The History of the Decline and Fall of the Roman Empire</u> is	1	2	3	4
A. Marcus Aurelius				
B. M. Hammond				
C. James E. Goodin				
D. Edward Gibbon				
24. If Caesar Augustus had been present when the Jews asked Pilate to release Barabas and to crucify Jesus according to a custom of the Passover, Augustus probably would have	1	2	3	4
A. Overruled the custom completely				
B. Allowed the Jews to follow their own custom				
C. Released Jesus for lack of evidence				
D. Told Pilate to keep both Barabas and Jesus in prison				
25. The Roman poet Virgil	1	2	3	4
A. Was highly critical of Rome and its government				
B. Thought Rome was too expansive and powerful				
C. Loved Rome and glorified it in his writings				
D. Loved Rome but sought to reform its government through his poems				
26. During the reign of the "Five Good Emperors"	1	2	3	4
A. Peace prevailed without war				
B. Wars were minor and confined to the frontiers				
C. Each of the five emperors spread the Roman Empire to engulf more of the world				
D. Not a single battle was lost in the frequent wars throughout the Roman Empire				
27. According to the historian, M. Hammond, the monarchical form of government in Rome was the result of	1	2	3	4
A. The existence of the empire itself				
B. Power-hungry autocrats who became the emperors				
C. The overall poor distribution of power in the government of Rome				
D. The desire of the people of Rome to have a ruler				

	Guess	Unlikely	Likely	Correct
	1	2	3	4
28. Describing Augustus's military achievements in expanding the Roman frontiers, any historian must conclude that Augustus	1	2	3	4
A. Was monumentally successful in spreading the northern frontier				
B. Failed to expand the Roman Empire at all				
C. Lost territory during his reign				
D. Successfully expanded the Roman frontier on all borders of the Roman Empire				
29. During the reign of the emperor Augustus, the Roman senate was different from the Senate of the United States of America mainly because the Roman senate	1	2	3	4
A. Gave more power to the senators				
B. Dealt only with judicial matters, not lawmaking as the U.S. Senate does				
C. Had no distinct power in the government of Rome as the U.S. Senate does in the balance of powers of the U.S. government				
D. Was also the official "supreme" court of Rome				
30. In his attempt to restore the republic of Rome, how did Augustus retain power but still maintain a republican form of government?	1	2	3	4
A. He became princeps civitatis, or the most distinguished of all Roman citizens				
B. He convinced the senate that he must have sole rule				
C. He took control of the Roman senate which voted him special powers of rule				
D. He controlled the Roman army, therefore killing all threats to his rule				
31. What eventually happened about the 3rd century A.D. which proved that Augustus's settlement had not completely succeeded?	1	2	3	4
A. The barbarians on the Roman frontier rebelled				
B. The Roman colonies declared independence				
C. The constitution Augustus wrote proved to be flawed				
D. The Roman army became disloyal to the reigning emperor				
32. What was the result of the Battle of Teutoburger Forest?	1	2	3	4
A. The area of Germany was lost as part of the Roman Empire				
B. The island of Britain was lost forever as a part of the Roman Empire				
C. The Rhine River became the established front of the Roman frontier				
D. The area North of the Main River and West of the Elbe became a Roman province				

	Guess	Unlikely	Likely	Correct
33. On the whole the reign of the Julio-Claudian dynasty may be described as A. Filled with war and civil rebellion B. Marked with notable achievements and prosperity C. A period of reforms in the Roman army D. Years of economic and moral deterioration	1	2	3	4
34. One of the most momentous achievements of the Julio-Claudians was Claudius's creation of A. The Praetorian Guard B. A second branch of legislative government C. A court of high judges D. An imperial bureaucracy	1	2	3	4
35. Which emperor became the first to turn the principate into an open and admitted monarchy? A. Augustus B. Vespasian C. Titus D. Hadrian	1	2	3	4
36. When Vespasian became emperor one of his first major tasks was to A. Strengthen the Roman army B. Reorganize the bureaucracy C. Expand the frontiers of the Roman Empire in Germany D. Suppress rebellion in the provinces of Rome	1	2	3	4
37. As one of the "Five Good Emperors" what was Hadrian's most significant contribution? He... A. Reformed the imperial bureaucracy of Rome B. Relinquished much of his powers to the Roman senate C. Freed all the Roman slaves D. Reorganized the provinces of the Roman Empire	1	2	3	4
38. As an emperor of Rome, Hadrian A. Gave more power to the senate to control the army B. Took total control of more areas of government C. Increased his authority as emperor through reforms in government D. Sought to do away with the office of the principate to end monarchical rule in Rome	1	2	3	4
39. If legionaries of Julius Caesar's army had seen the Roman troops of Hadrian's rule, they probably would have A. Been more patriotic to Rome B. Laughed at their weakness C. Been surprised to see women in the army D. Not liked the barbarians in the army	1	2	3	4

	Guess	Unlikely	Likely	Correct
40. When Augustus first rose to power he probably	1	2	3	4
A. Wanted to become dictator but did not have the power to declare himself dictator				
B. Did <u>not</u> want to be dictator				
C. Intended only to restore the republic and give power back to the people				
D. Wanted to destroy the republic and establish a monarchy				

DIRECTIONS: For each of the questions below write a brief answer from your knowledge of Chapter 6 "The Pax Romana". Enter your answers on the SCAN-TRON Answer Form 883, numbers 66-75.

66. Who was the Roman consul who restored peace to the Roman world in 31 B.C.?
67. Augustus held the position of "principate" of Rome. Tell what this position meant.
68. What power did the position of principate give to Augustus?
69. What office did Augustus hold on an annual basis before he became emperor of Rome?
70. What is the modern day meaning of the Roman title of imperator?
71. In what modern day country were the most active military frontiers of the Roman Empire during Augustus's rule?
72. What title meaning "sovereign ruler" did Augustus hold?
73. In what year did the Roman army lay seige to Jerusalem of Judaea and destroy it?
74. The first problem facing Augustus as he became ruler of Rome was to rebuild the _____.
75. What dynasty did the emperor Vespasian establish?

Answer Key For Comprehension Test

MULTIPLE CHOICE

1. B
2. C
3. B
4. A
5. D
6. A
7. B
8. C
9. D
10. A
11. D
12. A
13. C
14. B
15. B
16. C
17. C
18. C
19. C
20. A

SHORT ANSWERS

21. B
22. C
23. D
24. C
25. C
26. B
27. A
28. A
29. C
30. A
31. D
32. C
33. B
34. D
35. B
36. D
37. A
38. C
39. D
40. B
41. Augustus
42. First Citizen
43. none
44. consul
45. emperor
46. Germany
47. princeps
48. 70 A.D.
49. constitution
50. Flavian

Question Types In The Comprehension Test

MI = main idea

I = inference

D = detail

1. MI	21. MI	41. MI
2. MI	22. I	42. D
3. D	23. D	43. D
4. MI	24. I	44. D
5. MI	25. D	45. D
6. D	26. D	46. D
7. I	27. MI	47. D
8. D	28. MI	48. I
9. D	29. I	49. D
10. MI	30. MI	50. D
11. I	31. I	
12. MI	32. D	
13. MI	33. MI	
14. MI	34. MI	
15. D	35. D	
16. D	36. MI	
17. D	37. MI	
18. D	38. I	
19. I	39. I	
20. I	40. D	

Materials For Reliability Check Of Comprehension Test**DEPENDENT COMPREHENSION TEST RELIABILITY CHECK****Directions To Rater:**

Each of the questions of the "Comprehension Test For Chapter 6" is numbered to indicate the paragraph(s) in Chapter 6 from which the information in the question is taken. Your task is to rate or classify each of the questions on the test into one of the following types:

MI = Main idea question: If the question and answer in your opinion cover the main idea of the numbered paragraph, put an MI in the column "Question Class" for that question number.

I = Inference question: If the question and answer in your opinion requires the test taker to draw an inference (the answer is not directly stated in the paragraph) from some statement in the numbered paragraph(s), put an I in the column, "Question Class" for that question number.

D = Detail: If the question and answer in your opinion is a detail (or simple fact) stated in the numbered paragraph(s), put a D in the column "Question Class" for that question number.

Table B-1

Reliability Analysis Of Comprehension Test

Summary Statistics	Pre-Experiment	Post-Experiment
Number of Cases:	28	45
Number of Items:	50	50
Mean Total Score:	15.750	25.217
Standard Deviation:	6.833	7.419
Cronbach's Alpha:	0.817	0.826
Error of Measurement:	2.926	3.098

Original Content Specific Vocabulary Test
to Measure Prior Knowledge

Content-Specific Vocabulary Test of History Prior Knowledge

Directions: Each of the words below are terms you would find in the subject of history. Choose the answer A,B,C, or D below the word which you believe defines or describes the the word as it would be used in a history book. Mark your answer with a #2 pencil on the Scan-Tron Answer Form 882.

1. Augustus
 - A. A Roman senator who conspired to kill Julius Caesar
 - B. A Greek philosopher and sculptor
 - C. An Italian artist famous for Christian Art
 - D. An emperor of the Roman Empire

2. Virgil
 - A. An early Greek philosopher who first taught that the earth was round
 - B. A Greek philosopher, father of Stoicism
 - C. The emperor of Rome when the Roman Empire fell
 - D. A renown Roman poet

3. republic
 - A. A state or nation ruled by a dictator
 - B. A government headed by a monarch
 - C. A state or nation run by elected officials
 - D. A form of government under military rule

4. monarchy
 - A. A government in the state of chaos
 - B. A government with a few persons holding power
 - C. A government under the rule of a single ruler
 - D. A government ruled by a religious sect of monks

5. senate
 - A. The branch of government dealing with judicial matters
 - B. A local or city form of government
 - C. In Greek democracy, the leader of the government
 - D. The supreme council in the ancient Roman government

6. Roman Empire
 - A. The largest building in the city of Rome
 - B. The sole ruler of the Roman government
 - C. The countries, provinces, territories making-up the world that Rome ruled
 - D. What is now the country of Italy
7. Pax Romana
 - A. The period of peace and security in Roman history
A.D. 1 and 2
 - B. The official constitution of the Roman government
 - C. A decree made by Julius Caesar declaring himself dictator
 - D. The "destruction of Rome" during Nero's reign
8. autocrat
 - A. An individual belonging to the autocratic political party
 - B. A ruler with absolute power
 - C. The chief ruler of an oligarch
 - D. The ruling senator of the Roman senate
9. anarchy
 - A. The complete absence of government
 - B. A government in perfect harmony with the citizens
 - C. A state of warlessness between nations
 - D. A government ruled by a monarch
10. constitution
 - A. The governing agent in any government
 - B. The Bill of Rights
 - C. The citizens that make up any nation
 - D. The system of laws and principles of a government
11. Princeps civitatis
 - A. A title for the most distinguished of all Roman citizens
 - B. A decree made by a Roman emperor declaring all citizens equal
 - C. A Roman law forbidding plebians to hold office
 - D. "Roman citizens are privileged"
12. magistracies
 - A. Free provinces of the Roman nation
 - B. Powers of rule held by a governmental magistrate
 - C. Rules of conduct for a Roman magistrate
 - D. A latin term for the wife of a magistrate

13. principate
 - A. The position of the first citizen of Rome
 - B. The principal leader of the Roman senate
 - C. A title reserved solely for Julius Caesar in Roman history
 - D. The chief governing body of any government
14. Tribunicia potestas
 - A. A revolt led by the tribunes of Rome in A.D. 33
 - B. The full power of the tribunes granted to the emperor Augustus
 - C. The chief tribune of the Roman tribunes
 - D. A law passed by the Roman senate giving the tribunes ruling power
15. imperator
 - A. A title given to the emperor Marcus Aurelius for his peacemaking efforts
 - B. The chief legislative body of the Roman government
 - C. A title honoring a Roman general after a major military victory
 - D. The form of government led by a dictator
16. legionaries
 - A. Veteran members of the Roman army
 - B. Any member of a legion of soldiers
 - C. A member of the American legion
 - D. The servants of Roman soldiers in a legion
17. Tacitus
 - A. An evil and immoral Roman emperor ruling in A.D. 65-72
 - B. A Roman historian who wrote about the emperors of Rome
 - C. A philosopher in Roman history who lived during the height of the Roman Empire
 - D. The servant of Julius Caesar who helped the conspirators to kill him
18. Nero
 - A. An emperor of Rome who suffered from insanity
 - B. One of the "Five Good Emperors" of Rome
 - C. A Roman emperor who brought great reforms to the Roman form of government
 - D. One of the worst emperors in Roman history who also killed himself

19. freedman
- A. The tax collectors of Rome
 - B. A retired senator who was considered the "most free" Roman citizen
 - C. A man legally freed from slavery
 - D. A person born free, never to be a slave
20. Praetorian Guard
- A. The imperial bodyguard of Augustus, the Roman emperor
 - B. The special standing guard of the city of Rome
 - C. The tribunes of the Roman army who guarded senators
 - D. The name given to the prison guard of a Roman emperors assassin
21. Year of the Four Emperors
- A. The year A.D. 73 when four emperors ruled Rome with equal power
 - B. A year in Roman history when Roman senators sought to overthrow four emperors of Rome
 - C. The year A.D. 69 when four men became emperor for short times
 - D. The year A.D. 68 when Nero killed four different men who aspired to be emperor of Rome
22. Domitian
- A. One of the weakest of all Roman emperors who was controlled by the senate
 - B. The last of the Flavian emperors who was also assassinated
 - C. The most loved of all Roman emperors
 - D. The emperor who burned the city of Rome before it was finally attacked
23. bureaucracy
- A. A form of government similar to democracy but allowing two executive leaders
 - B. The lawmaking branch of government
 - C. The administration of government through many departments following inflexible routine
 - D. The wealthy politicians of government

24. Edward Gibbon
- A. The author of the History of the Decline and Fall of the Roman Empire
 - B. An English author who wrote Pax Romana, a satire of Roman history
 - C. The Roman poet who wrote the memoirs of emperors
 - D. The author of the revealing History of the Personal Lives of the Emperors
25. Hadrian
- A. One of the "Five Good Emperors" who was assassinated nonetheless
 - B. The Roman emperor who reformed the bureaucracy of Rome to be more departmentalized
 - C. The tyrant Roman emperor who led a bloody revolt inside Rome
 - D. One of the "Five Good Emperors" who decreased the authority of the Roman emperor
26. century
- A. A ten year time period
 - B. Two decades of time
 - C. One hundred years
 - D. Over one hundred years of time
27. B.C.
- A. The designation of calendar time before Christ's birth
 - B. The years of time following Christ's death
 - C. The initials of one of Rome's great emperors
 - D. The son of Julius Caesar
28. Gaul
- A. The ancient name for Babylon
 - B. The ancient name for what is now modern France
 - C. The name for modern day Germany in the Roman Empire
 - D. A synonym for the Roman Empire
29. census
- A. The act of condemning something as wrong
 - B. An incense burning container
 - C. A Roman magistrate appointed to number population of a province
 - D. In ancient Rome, the act of counting people and valuing property for taxation

30. jurisdiction
- A. The range or sphere of authority
 - B. A group of people selected to hear evidence in a law case
 - C. A judge over a civil court
 - D. The science or philosophy of law
31. Roma et Augustus
- A. The cult of worship of Caesar Augustus
 - B. The wife of Caesar Augustus
 - C. A phrase meaning "Rome loves Augustus"
 - D. The name given to the city of Rome during Augustus' reign as emperor
32. Varus
- A. The Roman emperor when the Roman empire fell
 - B. A servant of Julius Caesar who conspired to kill Caesar
 - C. A Roman general under the reign of Augustus
 - D. The last Roman emperor of the Flavian dynasty
33. Teutoburger Forest
- A. The location of the battle that gave Rome total control of Britain
 - B. A battle in which the Roman army lost twenty thousand troops
 - C. The forest known as the hiding place for the barbarian Germanic tribes
 - D. The location of the final victorious battle in Roman history
34. clan
- A. A Roman military legion
 - B. An early form of social group
 - C. A type of military armor to protect the chest
 - D. The act of avoiding others
35. successor
- A. One who comes before another in an office or position
 - B. One who does well in business ventures
 - C. A person who follows another person in an office or position of power, title, or etc.
 - D. The inheritor of property after death of the owner

36. usurper
- A. One who lends money at excessive interest rates
 - B. A person who uses drugs
 - C. A person whose official duty is to precede someone in a procession
 - D. One who assumes and holds power without right
37. siege
- A. The loss of a battle
 - B. A sudden and surprise attack at night
 - C. An attack of a fortified place by an opposing armed force usually by blockade and bombardment
 - D. A military strategy to win a battle by starvation of the enemy
38. despotic
- A. Of or like a tyrant or autocrat
 - B. Ruling by the power of democratic vote
 - C. Of or like a prince or king
 - D. The feelings of sadness resulting from misfortune in life
39. garrison
- A. A military post fortified by troops
 - B. The space just below the roof of a house
 - C. A warship with guns on both sides
 - D. A place of execution by hanging
40. sovereign
- A. An item purchased for keepsakes
 - B. The ruling party in a two party system of government
 - C. An autocrat or dictator
 - D. One who is supreme in power or authority

Revised Content Specific Vocabulary Test
After Item Discrimination Analysis

Content-Specific Vocabulary Test of History Prior Knowledge

Directions: Each of the words below are terms you would find in the subject of history. Choose the answer A,B,C, or D below the word which you believe defines or describes the the word as it would be used in a history book. Mark your answer with a #2 pencil on the Scan-Tron Answer Form 882.

1. Augustus
 - A. A Roman senator who conspired to kill Julius Caesar
 - B. A Greek philosopher and sculptor
 - C. An author and historian of the Roman Empire
 - D. An emperor of the Roman Empire

2. Virgil
 - A. An early Greek philosopher who first taught that the earth was round
 - B. A Greek philosopher, father of Stoicism
 - C. A senator of the Roman senate who lived through the reign of 4 emperors
 - D. A renown Roman poet

3. republic
 - A. A form of government allowing a council to rule
 - B. A government headed by a president
 - C. A state or nation run by elected officials
 - D. A form of government under military rule

4. monarchy
 - A. A government in the state of chaos
 - B. A government with a few persons holding power
 - C. A government under the rule of a single ruler
 - D. A government ruled by one body of elected officials

5. senate
 - A. The branch of government dealing with judicial matters
 - B. A local or city form of government
 - C. A body of judges in government
 - D. The supreme council in the ancient Roman government

6. Roman Empire
 - A. The entire civilized world during Roman domination
 - B. The sole ruler of the Roman government
 - C. The countries, provinces, territories making-up the world that Rome ruled
 - D. What is now the country of Italy and the continent of Europe

7. Pax Romana
 - A. The period of peace and security in Roman history
A.D. 1 and 2
 - B. The official constitution of the Roman government
 - C. A decree made by Julius Caesar declaring himself dictator
 - D. The "destruction of Rome" during Nero's reign

8. autocrat
 - A. An individual belonging to the autocratic political party
 - B. A ruler with absolute power
 - C. The chief ruler of an oligarch
 - D. The ruling senator of the Roman senate

9. anarchy
 - A. The complete absence of government
 - B. A government ruled by an elected body of officials
 - C. A nation in the state of war
 - D. A government ruled by a monarch

10. constitution
 - A. The governing agent in any government
 - B. The Bill of Rights
 - C. The overall structure of a government
 - D. The system of laws and principles of a government

11. Princeps civitatis
 - A. A title for the most distinguished of all Roman citizens
 - B. A decree made by a Roman emperor declaring all citizens equal
 - C. A Roman law forbidding plebians to hold office
 - D. "Roman citizens are privileged"

12. magistracies
 - A. Free provinces of the Roman nation
 - B. Powers of rule held by a governmental magistrate
 - C. Rules of conduct for a Roman magistrate
 - D. Binding laws on a magistrate

13. principate
 - A. The position of the first citizen of Rome
 - B. The principal leader of the Roman senate
 - C. A title reserved solely for Julius Caesar in Roman history
 - D. The chief governing body of any government
14. Tribunicia potestas
 - A. A revolt led by the tribunes of Rome in A.D. 33
 - B. The full power of the tribunes granted to the emperor Augustus
 - C. The chief tribune of the Roman tribunes
 - D. A law passed by the Roman senate giving the tribunes ruling power
15. imperator
 - A. A title given to the emperor Marcus Aurelius for his peacemaking efforts
 - B. The chief legislative body of the Roman government
 - C. A title honoring a Roman general after a major military victory
 - D. The form of government led by a dictator
16. legionaries
 - A. Veteran members of the Roman army
 - B. Any member of a legion of soldiers
 - C. A member of the American legion
 - D. The servants of Roman soldiers in a legion
17. Tacitus
 - A. An evil and immoral Roman emperor ruling in A.D. 65-72
 - B. A Roman historian who wrote about the emperors of Rome
 - C. A philosopher in Roman history who lived during the height of the Roman Empire
 - D. The servant of Julius Caesar who helped the conspirators to kill him
18. Nero
 - A. An emperor of Rome who suffered from insanity
 - B. The final emperor before the fall of the Roman Empire
 - C. A Roman emperor who brought great reforms to the Roman form of government
 - D. One of the worst emperors in Roman history who also killed himself

19. freedman
 - A. The tax collectors of Rome
 - B. A privileged class of Roman citizens
 - C. A man legally freed from slavery
 - D. A person born free, never to be a slave

20. Praetorian Guard
 - A. The imperial bodyguard of the Roman emperor
 - B. The special standing guard of the city of Rome
 - C. The tribunes of the Roman army who guarded senators
 - D. The name given to the prison guard of a Roman emperors assassin

21. Year of the Four Emperors
 - A. The year A.D. 73 when four emperors ruled Rome with equal power
 - B. A year in Roman history when Roman senators sought to overthrow four emperors of Rome
 - C. The year A.D. 69 when four men became emperor for short times
 - D. The year A.D. 68 when Nero killed four different men who aspired to be emperor of Rome

22. Domitian
 - A. One of the weakest of all Roman emperors who was controlled by the senate
 - B. The last of the Flavian emperors who was also assassinated
 - C. The most loved of all Roman emperors
 - D. The emperor who burned the city of Rome before it was finally attacked

23. bureaucracy
 - A. A form of government similar to democracy but allowing two executive leaders
 - B. The lawmaking branch of government
 - C. The administration of government through many departments following inflexible routine
 - D. The wealthy politicians of government

24. Edward Gibbon
 - A. The author of the History or the Decline and Fall of the Roman Empire
 - B. An English author who wrote Pax Romana, a satire of Roman history
 - C. The Roman poet who wrote the memoirs of emperors
 - D. The author of the revealing History of the Personal Lives of the Emperors

25. Hadrian
- A. One of the "Five Good Emperors" who was assassinated nonetheless
 - B. The Roman emperor who reformed the bureaucracy of Rome to be more departmentalized
 - C. The tyrant Roman emperor who led a bloody revolt inside Rome
 - D. One of the "Five Good Emperors" who decreased the authority of the Roman emperor
26. century
- A. A period of peace for one hundred years
 - B. A Roman field soldier
 - C. One hundred years
 - D. A Roman coin valued at one hundred dollars
27. B.C.
- A. The designation of calendar time before Christ's birth
 - B. A Latin abbreviation for time
 - C. Time following the year 1
 - D. A Roman calendar of time
28. Gaul
- A. The ancient name for Babylon
 - B. The ancient name for what is now modern France
 - C. The name for modern day Germany in the Roman Empire
 - D. A synonym for the Roman Empire
29. census
- A. The act of condemning something as wrong
 - B. An incense burning container
 - C. A Roman magistrate appointed to number population of a province
 - D. In ancient Rome, the act of counting people and valuing property for taxation
30. jurisdiction
- A. The range or sphere of authority
 - B. A group of people selected to hear evidence in a law case
 - C. A territory over which a judge holds civil rule
 - D. The science or philosophy of law

31. Roma et Augustus
- A. The cult of worship of Caesar Augustus
 - B. The wife of Caesar Augustus
 - C. A phrase meaning "Rome loves Augustus"
 - D. The name given to the city of Rome during Augustus' reign as emperor
32. Varus
- A. An influential senator during the reign of Caesar Augustus
 - B. A servant of Julius Caesar who conspired to kill Caesar
 - C. A Roman general who suffered defeat under the reign of Augustus
 - D. The last Roman emperor of the Flavian dynasty
33. Teutoburger Forest
- A. The location of the battle that gave Rome total control of Britain
 - B. A battle in which the Roman army lost twenty thousand troops
 - C. The forest known as the hiding place for the barbarian Germanic tribes
 - D. The location of the final victorious battle in Roman history
34. clan
- A. A Roman military legion
 - B. An early form of social group
 - C. A group of people with common religious beliefs
 - D. A "family" of Roman soldiers on the battlefield camp
35. successor
- A. One who comes before another in an office or position
 - B. One who does well in business ventures
 - C. A person who follows another person in an office or position of power, title, or etc.
 - D. The inheritor of property after death of the owner
36. usurper
- A. One who lends money at excessive interest rates
 - B. The leader holding sole power over a government
 - C. A person whose official duty is to precede someone in a procession
 - D. One who assumes and holds power without right

37. **siege**
- A. A hand to hand battle between two foes
 - B. A sudden and surprise attack at night
 - C. An attack of a fortified place by an opposing armed force usually by blockade and bombardment
 - D. A military strategy to win a battle by starvation of the enemy
38. **despotic**
- A. Of or like a tyrant or autocrat
 - B. Ruling by the power of democratic vote
 - C. Of or like a prince or king
 - D. The feelings of sadness resulting from misfortune in life
39. **garrison**
- A. A military post fortified by troops
 - B. The military headquarters during battle
 - C. A warship with guns on both sides
 - D. A place of execution by hanging
40. **sovereign**
- A. The chief ruler of an oligarchy
 - B. The ruling party in a two party system of government
 - C. The quality of leadership required of emperors
 - D. One who is supreme in power or authority

Answer Key To Content-Specific Vocabulary Test**Answers**

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

Statement Used To Develop
Content-Specific Vocabulary
Word List

Directions:

Read each paragraph of the history text Chapter 6, "The Pax Romana." As you read underline in ink each word which you believe is a specialized or technical history term. Remember that many history terms are proper names of people and places which have particular historic significance.

When you have read the entire chapter and underlined all history terms, return the copy of chapter 6 to Mr. A. E. Hickey. The deadline for completing this identification of history terms in chapter 6 is February 18, 1986.

Content-Specific Vocabulary Word List

- | | |
|-------------------------------------|-------------------------------|
| 1. A.D. | 43. confined |
| 2. abused | 44. conquests |
| 3. Achaea | 45. constitution |
| 4. Africa | 46. constitution |
| 5. Age of the
Antonines | 47. constitutional legitimacy |
| 6. ages | 48. constitutional monarchy |
| 7. anarchy | 49. consulship |
| 8. ancient | 50. crucifixion |
| 9. Antoninus Pius | 51. cult of Roma |
| 10. Antony | 52. culture |
| 11. Archilocus | 53. customs |
| 12. army | 54. Danube |
| 13. ascendancy | 55. delegate |
| 14. assassin | 56. demobilize |
| 15. atrocities | 57. despotic |
| 16. Augustus | 58. destiny |
| 17. auspices | 59. devolved |
| 18. Austria | 60. dictator |
| 19. autocrat | 61. Domitian |
| 20. B.C. | 62. dynasty |
| 21. barbarian | 63. East |
| 22. barbarism | 64. economic |
| 23. barbarization | 65. Elbe River |
| 24. Battle of
Teutoburger Forest | 66. emerge |
| 25. benevolent | 67. emperors |
| 26. bodyguard | 68. empire |
| 27. Britain | 69. enslaved |
| 28. Bulgaria | 70. era |
| 29. bureaucracy | 71. Europe |
| 30. Caligula | 72. executive |
| 31. campaigns | 73. executive powers |
| 32. census | 74. finances |
| 33. century | 75. Five Good Emperors |
| 34. Christianity | 76. Flavian dynasty |
| 35. civil service | 77. fleet |
| 36. civil war | 78. Forests of Etruria |
| 37. civilization | 79. formerly |
| 38. civilizing | 80. fortified camps |
| 39. Claudius | 81. forts |
| 40. clans | 82. freedman |
| 41. colonies | 83. frontiers |
| 42. commander | 84. garrison |
| | 85. Gaul |
| | 86. Germany |

87. Gibbon, Edward
 88. goddess
 89. Golden Age
 90. government
 91. governor
 92. graven images
 93. Greco-Romans
 94. Greeks
 95. guardian
 96. Hadrian
 97. Hellenistic
 98. heritage
 99. Herod the Great
 100. historian
 101. History of the
 Decline and Fall
 of the Roman Empire
 102. hostile
 103. Hungary
 104. hypocrite
 105. imperator
 106. imperial
 107. imperial bureaucracy
 108. independent
 109. indispensable
 110. inept
 111. innovations
 112. institutionalize
 113. interfere
 114. invasion
 115. Italy
 116. Jerusalem
 117. Jews
 118. Judaea
 119. Julio-Claudius
 120. Julius Caesar
 121. jurisdiction
 122. Jutland
 123. king
 124. king-worship
 125. laws
 126. legions
 127. legionaries
 128. literary flowering
 129. Macedonian
 130. magistracies
 131. magistrates
 132. Main river
 133. map
 134. Marcus Aurelius
 135. medieval world
 136. Mediterranean world
 137. military monarchy
 138. military service
 139. Mill, John Stuart
 140. modern work
 141. monarchy
 142. national
 143. nations
 144. Nero
 145. Nerva
 146. nobly
 147. North Sea
 148. ominous
 149. opponents
 150. Pax Romana
 151. peace
 152. period
 153. personnel
 154. Pisidia
 155. political
 156. politics
 157. Pontifex maximus
 158. Praetorian guard
 159. prerogatives
 160. priest
 161. Princeps civitatis
 162. principate
 163. proconsular
 164. provinces
 165. provincial
 administration
 166. rebellious
 167. reconstruction
 168. reforms
 169. reigns
 170. religion
 171. renown
 172. republic
 173. republican constitution
 174. Res Gestae
 175. reverence
 176. revolt
 177. revolutionary
 178. Rhine
 179. Roma et Augustus
 180. Roman Empire
 181. Roman expansion

- 182. Roman legions
- 183. Romans
- 184. ruler
- 185. Rumania
- 186. self-government
- 187. Senate
- 188. Serbia
- 189. serenity
- 190. settlement
- 191. Sicily
- 192. siege
- 193. sovereign
- 194. Spain
- 195. state
- 196. successors
- 197. Suetonius
- 198. surrender
- 199. Tacitus
- 200. territory
- 201. throne
- 202. title
- 203. traditions
- 204. Trajan
- 205. tribes
- 206. Tribunes
- 207. Tribunicia potestas
- 208. universal
- 209. urbanism
- 210. usurpers
- 211. valour
- 212. Varus
- 213. Vespasian
- 214. veterans
- 215. Virgil
- 216. war party
- 217. war-torn world
- 218. West
- 219. Year of the Four Emperors

Table B-2

Reliability Analysis For Content-Specific Vocabulary Test

Summary Statistics	Pre-Experiment	Post-Experiment
Number of Cases:	113	45
Number of Items:	40	40
Mean Total Score:	19.345	13.244
Standard Deviation:	5.906	4.438
Cronbach's Alpha:	0.783	0.696
Error of Measurement:	2.752	

Appendix C
TRAINING MATERIALS

Textbook Readability Analysis

TABLE OF READABILITIES *CHAPTER FOUR

Analysis - p. 110
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	14.1	Average - 14.5
(2) Fog.....	15.2	
(3) Flesch.....	14.3	

Analysis - p. 111
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	10.6	Average - 10.3
(2) Fog.....	10.3	
(3) Flesch.....	9.9	

Analysis - p. 112
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	15.0	Average - 14.6
(2) Fog.....	15.2	
(3) Flesch.....	13.7	

Analysis - p. 113
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	16.9	Average - 14.9
(2) Fog.....	13.5	
(3) Flesch.....	14.2	

* Readabilities done by computer analysis using BertaMax Reading Analysis Program published by BertaMax, Inc.

CHAPTER FOUR

Analysis - p. 114
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	14.6	Average - 13.2
(2) Fog.....	13.6	
(3) Flesch.....	11.4	

Analysis - p. 115
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	16.5	Average - 14.1
(2) Fog.....	14.0	
(3) Flesch.....	11.9	

Analysis - p. 116
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	16.5	Average - 14.4
(2) Fog.....	14.0	
(3) Flesch.....	12.6	

Analysis - p. 117
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	17.0+	Average - 16.5
(2) Fog.....	17.0+	
(3) Flesch.....	15.4	

CHAPTER FOUR

Analysis - p. 118
100 Word Sample

	<u>Grade</u>
(1) Dale-Chall.....	14.1
(2) Fog.....	14.0
(3) Flesch.....	12.4

Average - 13.5

Analysis - pp. 137-138
100 Word Sample

	<u>Grade</u>
(1) Dale-Chall.....	17.0+
(2) Fog.....	17.0+
(3) Flesch.....	15.4

Average - 16.5

TOTAL MEAN - 14.3

CHAPTER FIVE

Analysis - p. 142
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	14.1	
(2) Fog.....	13.5	Average - 13.7
(3) Flesch.....	13.6	

Analysis - p. 144
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	14.1	
(2) Fog.....	14.3	Average - 13.3
(3) Flesch.....	11.4	

Analysis - p. 145
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	14.1	
(2) Fog.....	15.6	Average - 14.3
(3) Flesch.....	13.1	

Analysis - p. 146
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	10.9	
(2) Fog.....	10.0	Average - 9.8
(3) Flesch.....	8.6	

CHAPTER FIVE

Analysis - p. 147
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	15.0	Average - 12.4
(2) Fog.....	11.9	
(3) Flesch.....	10.4	

Analysis - p. 148
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	14.1	Average - 11.3
(2) Fog.....	11.1	
(3) Flesch.....	8.7	

Analysis - p. 149
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	15.5	Average - 14.3
(2) Fog.....	14.4	
(3) Flesch.....	13.2	

Analysis - p. 172
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	15.5	Average - 13.4
(2) Fog.....	13.2	
(3) Flesch.....	11.4	

TOTAL MEAN - 12.8

CHAPTER SIX

Analysis - p. 176
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	11.9	Average - 9.5
(2) Fog.....	8.5	
(3) Flesch.....	8.1	

Analysis - p. 177
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	11.1	Average - 11.6
(2) Fog.....	12.2	
(3) Flesch.....	11.4	

Analysis - p. 178
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	13.2	Average - 11.3
(2) Fog.....	10.9	
(3) Flesch.....	9.8	

Analysis - p. 179
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	14.6	Average - 12.1
(2) Fog.....	12.8	
(3) Flesch.....	8.9	

CHAPTER SIX

Analysis - p. 181
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	15.6	Average - 14.3
(2) Fog.....	13.3	
(3) Flesch.....	13.9	

Analysis - p. 184
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	15.6	Average - 13.2
(2) Fog.....	11.3	
(3) Flesch.....	12.7	

Analysis - p. 185
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	12.8	Average - 10.8
(2) Fog.....	10.9	
(3) Flesch.....	8.7	

Analysis - p. 186
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	12.2	Average - 9.9
(2) Fog.....	9.3	
(3) Flesch.....	8.2	

CHAPTER SIX

Analysis - p. 187
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	14.7	Average - 11.2
(2) Fog.....	9.3	
(3) Flesch.....	9.6	

Analysis - pp. 187-188
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	15.0	Average - 15.1
(2) Fog.....	15.9	
(3) Flesch.....	14.3	

Analysis - p. 188
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	17.0+	Average - 16.5
(2) Fog.....	17.0+	
(3) Flesch.....	15.6	

Analysis - p. 189
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	17.0+	Average - 14.9
(2) Fog.....	14.3	
(3) Flesch.....	13.3	

CHAPTER SIX

Analysis - p. 190
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	13.1	Average - 14.1
(2) Fog.....	16.0	
(3) Flesch.....	13.2	

Analysis - p. 190
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	14.1	Average - 14.0
(2) Fog.....	15.2	
(3) Flesch.....	12.6	

Analysis - p. 192
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	16.3	Average - 15.1
(2) Fog.....	14.2	
(3) Flesch.....	14.9	

Analysis - p. 210
100 Word Sample

	<u>Grade</u>	
(1) Dale-Chall.....	11.5	Average - 11.5
(2) Fog.....	12.4	
(3) Flesch.....	10.6	

TOTAL MEAN - 12.8

Videotape Training Scripts

Outline of Session 1: SQ3R

I. Introduction To Research Project

Before introducing you to the study strategy you will be trained to use for this investigation, let me remind you of some important points for you to keep in mind throughout the four sessions we will meet.

- A. Be on time for each session.
- B. Do not discuss this research outside the class sessions. (Tell why).
- C. Try hard to learn the study strategy you are being trained to use.
 - 1. Trained to use just one strategy or method.
 - 2. May have heard of the strategy before or even have tried it. Even if you think it will not work, keep trying to use the strategy. If you do not use the strategy just as you are trained to use it, I cannot compare it with the other strategies in the other groups.
 - 3. Each of the study strategies are proven methods of study. You are helping to compare them, not prove their usefulness.
 - 4. You will benefit from learning the strategy.
 - a. Improve your insight into learning.
 - b. Improve your skill in study.
 - c. Could improve your academic grades.

II. The SQ3R Study Strategy

- A. A Close Look At SQ3R
 - 1. SURVEY: Defined - survey is a pre-reading activity meant to help the reader identify the main ideas of the text before the detailed reading or study activity.
 - a. The Survey Procedure: Glance over the title and headings in the chapter to see the few big points that will be developed. Also, read the final introduction (if there is one) and the summary paragraph if the chapter has one. This survey should not take more than a minute or two and will show the three to six core ideas around which the discussion will cluster. This orientation will help you to

organize the ideas as you read them later.

b. The Survey Technique Modeled:

Step-by-Step (Instruct students to take out Chapter 3, "The Legacy of Greece" as practice text for learning the SQ3R strategy).

1) Look at Chapter Title. -

Ask yourself questions. Use your mind, not just your eyes. Ask what is the major idea implied by the Title?

2) Read the Headings - Why? To note or see how the text reading is organized.

How do the topics implied by the headings go together? What is the main subject or idea of each section? How many sections are there?

3) Look at the charts, pictures, graphs, etc. Demonstrate.

4) Read the introduction and summary at the end. As you read it, think about how the chapter is organized and what the main idea seems to be from the title and headings.

2. QUESTION

a. The Question Procedure: The question procedure is a self-questioning approach. To do this, after the survey of the chapter, go back to the first heading in the chapter and turn it into a question. This will arouse your curiosity and thereby increase comprehension. It will bring to mind information already known, thus help you to understand that section more quickly. The question you formulate also will make important points stand out at the same time that explanatory detail is recognized as such. Turning a heading into a question can be done at the instant of reading the heading, but you must exert a conscious effort to think of a question.

b. The Question Technique Modeled:

1) Look at the first heading of our practice text with me. You will notice that it is "The Land And The Polis". Keeping in mind that the chapter is about the legacy or what Greece handed down to the world, I would make up the question: "How are the Land of Greece

and the Polis part of the legacy of Greece?" And if you did not know the meaning of a word in the heading, such as "Polis", you might ask a second question: "What does 'Polis' mean?"

2) Write the question over the heading. It is a good idea to write your question as you think of it over the heading. This helps to fix the purpose of the reading in your mind and also gives you notes for review later.

3. READ: The First "R" of SQ3R.

In the SQ3R study strategy you read to answer the question or questions you made from the heading.

a. The Reading Procedure

1) Look at the question for the heading. Keep this question in mind.

2) Read to answer that question.

b. The Reading Technique Modeled

Time prevents reading the entire section; but if you were to read this section under the heading of "The Land and the Polis" with the question, "How are the Land of Greece and the Polis part of the legacy of Greece?", you would conclude with a definite answer. This brings you to the next step of SQ3R, the second "R" - recite.

4. RECITE: The Second "R" of SQ3R

Reciting or recitation means telling yourself or even talking aloud to yourself about what you have just finished reading. As soon as you finish reading a section under a heading you should stop and recite to yourself the answer to your question which you made from the heading. Use your own words and you might even write down in brief outline form what you remember. Use brief phrases, not long sentences, in making your outline.

a. The Recitation Procedure

1) Stop immediately after reading a section.

2) Recite the answer to your question to yourself.

3) Jot down brief cue phrases in outline form.

b. The Recitation Technique Modeled

After completing the reading, trying to answer the question generated from the heading, "How is the Land of Greece and the

Polis" part of the legacy of Greece?", stop before reading the next headed section and try to recite the answer to the question. Remember to recite by writing down brief cue phrases in outline form. By doing this you will have an outline of cue phrases for recitation on the first heading of Chapter 3 "The Land and the Polis."

c. The Next Headed Section

Once you have recited for the first headed section, repeat steps Question/Read/Recite with the next headed section and all successive headings; that is, turn the next heading into a question, read to answer that question, and then recite the answer by jotting down brief cue phrases in an outline form. Write your outline on a separate sheet of paper. Do each heading the same way until the assigned reading is completed.

5. REVIEW: The Final "R" of SQ3R

When steps 2, 3, 4 above (Question/Read/Recite) have been performed on each heading through the whole lesson, before stopping study, you should review your notes or the questions and answers for each heading. This will give you a final bird's eye view of the major points and how they relate to each other. In this review procedure you should check your memory of the content by reciting to yourself the major points under each heading. Do this by covering your outline notes and try to recall the main points. Then uncover the major points and try to recall the details under them.

a. The Review Procedure

- 1) Recite major points under each heading.
- 2) Recite all details related to the major points.
- 3) Reread some sections. If memory is bad for some sections, you should reread that section.

b. The Review Procedure Modeled
Demonstrate steps in "a." above.

III. Conclusion To Session One

- A. Practice this study strategy on your own. Use it on your next assigned chapter in one of your courses.
- B. Remember, do not tell others at LU what you are doing in this study project.

- C. Please be present at the next session. Your monitor will announce the date and time and place.
- D. After the videotape is turned off your monitor will answer any questions you may have.

Outline of Session 2: SQ3R

I. Outline of SQ3R Study Strategy

- A. Remember SQ3R is a study strategy for use in studying to remember text material. "Text" material means the material has the usual features of text such as titles, headings, bold-type words, introductions or summaries, chapter divisions, charts, graphs, pictures, etc.
- B. Reviewing the SQ3R Steps
 1. Survey: Glance through the chapter, reading the title and the headings and looking at the chapter graphics to get an idea of how the author organized the ideas and what are the major ideas. Read the introduction and/or the summary to see what other ideas can be added to the major points you get from the headings.
 2. Question: As you begin to read the headings, devise a question from the heading which seems to cover the main idea implied by the heading.
 3. Question: Read the section of the text under the heading to answer the question generated from the reading.
 4. Recite: After reading a section under a heading, recite to yourself the answer to the question. This recitation may be done by developing an outline of cue phrases during the recitation process on a separate sheet of paper. Repeat steps 2,3,4 above for each heading in the chapter.
 5. Review: After completing steps 2,3,4 for all headed sections, look over your notes or outlines and try to recite from memory the major points and the details written in the outlines.

II. Applying SQ3R In Practice Text

- A. Surveying Chapter 4 - Hellenistic Diffusion - Guided practice.
 1. Look at the title.
 - a. Do you know the meaning of the words in the title? Hellenistic? - Diffusion?
 - b. If not make note of this or look up the words.

- c. If so, you have an idea of the major idea of this chapter. In this case we may say that the main idea is something about how the culture and influence of Greece (In the Hellenistic period) was spread to other parts of the world (Diffusion).
2. a. How are major headings written? (Inside of lines in this text).
 b. What are the headings?
 1st major head: Alexander and The Great Crusade.
 2nd major head: Alexander's Legacy
 sub-heading 1) The Political Legacy
 sub-heading 2) The Cultural Legacy
 3rd major head: The Spread of Hellenism
 sub-heading 1) Cities and Kingdoms
 sub-heading 2) The Greeks and the Opening of the East
 minor heading: Hellenism and the Jews
 c. What are the major points the author discusses under the main idea of the spread of the influence of Greek culture and life?
3. Look at the graphics in the Chapter.
 p. 111 Coin of Alexander
 p. 112 Map: Alexander's Conquest
 p. 113 Picture: Alexander at the Battle of Isos
 p. 115 Map: The Hellenistic World
 p. 116 The Citadel of Perganum
4. Read the introduction and the summary.
 a. What did you add to your knowledge?
 Answer: Greek culture prepared the way for the more stable Roman world of law and political stability.
- B. QUESTION - Generating questions from the headings in Chapter 4 - Guided practice.
1. Look back at the 1st major heading.
 a. What question is implied by the heading related to the title?
 Heading: "Alexander and The Great Crusade"
 Self-Generated Question: " How did Alexander and his crusade help the spread of Greek culture and life?"
 b. Notice that the question is tied directly to the title.
2. Write the question over the heading.
 a. Do that now... Repeat the question!
 b. Now remember as you do the next step of

Reading, to keep this question in mind. Your purpose for reading is to answer this question.

c. Before the monitor turns off the tape to allow you to practice reading to answer the question, let's go over the important things you should be doing as you do the "Read" step.

C. READ

1. Fix the question in your mind.
2. Read to answer the question.
3. Make sense of what you read.

Now the monitor will turn off the tape and you should read to answer the question generated from the heading, Repeat the Question!! As soon as you have all finished the reading, the monitor will turn on the tape to continue the guided practice of SQ3R.

D. RECITE

Now that you have finished reading you should have a mental idea of the answer to the question. Let's see how you did.

1. What was our question?
"How did Alexander and his Great Crusade help to spread Greek culture and life?"

2. What is the answer? In brief outline form:
OUTLINE:

Alexander and The Great Crusade

- I. Alexander, new ruler of Greece
- II. Alexander announces attack of Persia - the Great Crusade
- III. Defeated Greeks/United Greeks and Macedonians
- IV. Led Army on Great Crusade to East
 - A. Conquered Persia
 - B. Set out to conquer Asia
 - C. Reached India, troops mutinied
 - D. Returned home, conquering on way South
 - E. Died one year later at Babylon
- V. Greek culture had spread by warfare to the east and south

E. REPEAT 2,3,4 for all headings

1. Now that we have an answer to our question we should go to the next part of the study of Chapter Four. Remember you should repeat steps 2,3,4 (Question/Read/Recite) for each heading before going to the Review step of SQ3R.
2. The monitor will turn off the tape in a few minutes. For practice, make a question for each heading, read to answer the question, then recite your answer in written outline form.

3. After you have practiced steps 2,3,4 for the rest of Chapter 4, remember to do your review: Remember to use the following steps in your review:

F. REVIEW

1. Recite to yourself the major points under each heading.
2. Recite to yourself as much detail as you can recall related to the major points.
3. Re-read sections where memory is weak.

The monitor will now turn off the tape.

Outline of Session 3: SQ3R

I. Brief Review of SQ3R

A. Survey - Look over the chapter title, headings, and graphics and read the introduction and summary, to determine the major idea and how the chapter is organized.

B. Question - Make a question out of the heading.

C. Read - Read to answer the question.

D. Recite - Recite the answer to the question; Write the answer as an outline with cue phrases on separate paper.

E. Repeat Question/Read/Recite steps for each headed section of the chapter.

F. Review - Go over the questions and outlines of answers immediately after completing the reading of the chapter.

II. Guided Practice of SQ3R - Chapter 5

A. Survey

1. Look at Chapter Title - What is the major idea?
2. Read headings - How is the chapter organized?
3. Look at graphics - What do they tell you?
4. Read the introduction and summary.

B. Student Practice of Survey: The tape will be turned off in a minute. You will follow the survey procedure and practice it on Chapter 5, "The Rise of Rome."

C. QUESTION

1. Read the 1st heading of Chapter 5.
2. Devise a Question from the heading.
3. Write the Question over the heading.

D. READ

1. Read the question you made up.
2. Read to answer the question.

E. RECITE

After reading to the end of the section -

1. Recite the answer to the question.
2. Jot down brief cue phrases in an outline.

F. Practice of Question/Read/Recite -

After the tape is turned off, practice the Question, Read, Recite procedure on the 1st heading.

The tape will be turned on again when most of you have finished.

G. Further Practice of Question/Read/Recite -

Now that you have finished the 1st heading (or if you haven't you will be allowed to do so in a minute) you should follow the Question/Read/Recite steps for the remaining two major headings of Chapter 5.

The tape will be turned off to allow you 10 minutes to complete the chapter reading using

Question/Read/Recite. If you do not complete it all, do not worry this is for practice only. However, try hard to complete the chapter using the Question/Read/Recite steps.

H. REVIEW

1. Recite the major points to yourself from memory.
2. Recite as much detail as possible without looking at the notes or the book.
3. Re-read sections if necessary.

I. Practice of Review -

When the tape is turned off, follow the review procedure for Chapter 5. You will be given 5 minutes for review as practice. If you were reviewing in real study, you might take longer. After 5 minutes the tape will be turned on again for a final activity.

J. Prior Knowledge Test

1. Before the fourth and final session of this study strategy training, I need for each of you to take a test that requires no preparation or study. It is called a prior knowledge test.
2. When the tape is turned off the monitor will hand out the test and give instructions. Please take the test seriously and try to answer the questions to the best of your knowledge and ability. When you have completed the test, return the answer sheet to the monitor with the test and you will be dismissed. We will see you in session four.
3. The time for the 4th and final session will be announced by the monitor.

Outline of Session 1: QRR

I. Introduction To Research Project

Before introducing you to the study strategy you will be trained to use for this investigation, let me remind you of some important points for you to keep in mind throughout the four sessions we will meet.

- A. Be on time for each session.
- B. Do not discuss this research outside the class sessions. (Tell why).
- C. Try hard to learn the study strategy you are being trained to use.
 - 1. Trained to use just one strategy or method.
 - 2. May have heard of the strategy before or even have tried it. Even if you think it will not work, keep trying to use the strategy. If you do not use the strategy just as you are trained to use it, I cannot compare it with the other strategies in the other groups.
 - 3. Each of the study strategies are proven methods of study. You are helping to compare them, not prove their usefulness.
 - 4. You will benefit from learning the strategy.
 - a. Improve your insight into learning.
 - b. Improve your skill in study.
 - c. Could improve your academic grades.

II. The QRR Study Strategy

- A. The method you will use is called QRR.
 - Q = Question: Asking self generated questions
 - R = Read: Reading the text material to answer the question.
 - R = Recitation: Recalling from memory, or reciting to oneself what was read.
- B. Based on Learning Principles and Research
 - 1. Active Study: Generating and writing questions.
 - 2. Purpose: Reading for the specific purpose of answering a question focuses and maintains concentration and interest.
 - 3. Self-testing: Recitation requires you to self test yourself to determine the effectiveness of your reading and study.
 - 4. Research on Self Questioning: Why it works?
 - a. Provides guidelines for "chunking" the reading into smaller comprehensible units.

- b. Requires a definite meaningful response to answer a question.
 - c. Encourages student to test himself on how well he/she knows what he/she knows.
- C. A Close Look at QRR
1. QUESTION: Usually referred to as self-questioning or student-generated questioning.
 - a. Why Important?
Asking questions is the foundation of learning. Unless we ask questions or are inquisitive, we do not learn as effectively. As children grow up they learn about the world around them almost in direct proportion to how inquisitive they are. Those who want to know or are more inquisitive, ask more questions and consequently learn more. In summary, the more questions one asks and finds answers to, the more one learns.
 - b. Asking A Question Gives Purpose To Reading:
As you generate a question, you establish for yourself a purpose to do the reading. More importantly, that purpose is specific and stated in the form of a question.
 - c. Why is Purpose Important?
Because without purpose or an aim, you do not know why you are studying or reading a particular passage. If you do not know why you are reading, you lose interest more quickly, and without interest as you read you fail to remember what you read.
 2. The Question Procedure - Use Chapter 3, "The Legacy of Greece"
The question procedure of QRR is a self-questioning approach, simply meaning that the student makes up the question and then attempts to find the answer through the reading.
 3. Modeling the Question Technique
 - a. Look at the Chapter Title
 - 1) Turn the title into a main idea question.
 - 2) Look at Chapter 3 title, "The Legacy of Greece".
 - What main idea is implied?
 - What question can be written?
"What are the things that Greece handed down to the world?"
 - 3) Write the question on the title page.
 - 4) You now have a main idea question to guide your thinking as you read.

b. Read the Introductory Paragraphs (if any) Why? (Explain).

c. Look at the 1st Heading (Chapter 3)

1) Example in Chapter 3: "The Land and the Polis".

2) Relate the heading to the main idea title.

3) Formulate the question.

4) Write the question over the heading - Helps to fix the purpose for the reading in your mind.

5) Get the question in mind as you begin to read.

4. READ: The First "R" of QRR

Once the question is formulated (or generated) and is written over the heading, you are ready to read with the purpose of answering the question.

Reading must never be passive. It must be active and purposeful. The reading of the QRR strategy is active and purposeful because you read to answer specifically the question you have generated and written.

a. The Reading Procedure

1) Look at the question written over the heading. Get it fixed in your mind.

2) Read to answer that question.

3) Mentally form the answer to the question as you read.

5. RECITE: The Second "R" of QRR

Reciting or recitation means telling yourself or even talking aloud to yourself about what you have just finished reading. Using recitation has proven to be effective for fixing in memory what you read. Reciting should be done after reading short selections of reading, not long and difficult passages. Therefore recitation is most effective if you recite as soon as you finish reading a section under a heading. As you recite use your own words and maybe even write down in brief outline form what you remember in cue phrases, not in sentences, in making your outline. While the outline is not absolutely necessary, it does help to fix the information in your memory for future recall. If you wish you may simply recite by verbally stating to yourself the answer to the question that was generated.

a. The Recitation Procedure:

1) Stop immediately after reading a section.

- 2) Recite to yourself the answer to the question.
 - 3) Jot down brief cue phrases in outline form on a separate sheet of paper.
- b. Modeling The Recitation Technique
- After completing the reading of the section, "The Land and the Polis", while trying to answer the question, "How are the Land and the Polis of Greece part of the legacy of Greece?", you would then stop before reading the next headed section and try to recite the answer to the question. Remember, you may recite by writing down brief cue phrases in outline form on a separate sheet of paper. The outline for the first heading of our example Chapter 3, "The Land and the Polis" might be something like this:

OUTLINE

I. Land: Hellas, Aegean Sea, and the Greek Peninsula.

- A. Mountainous beautiful land
- B. Life outdoors, mild climate
- C. Mountains kept life and communication apart.

II. Polis - city and surrounding countryside

- A. Separate governments
- B. Democracy, autocracy, tyrants
- C. Weakness in government
 1. kept foreigners out
 2. caused division - not united
 3. constant warfare between polis'
 4. vulnerable to attack - divided

This outline would be written on a separate piece of paper in your notebook for study.

6. Continuing the QRR Procedure
 - a. Repeat the Question and Recite Steps for the next heading and all succeeding headings in the chapter until the reading is completed.
 - b. For example, the next heading in Chapter 3 is "The Bronze Age". A question for this heading might be the following:
"What legacies did Greece leave to the world out of the Bronze Age of her history?"
 - c. Reminders:
 - 1) The question you make up should relate to the title main idea.

Questions that do not relate to the main idea are frequently too limited. For example, you might make up the question, "What is the Bronze Age?" or even "What happened in the Bronze Age?" but both of these only deal with limited facts and tend to be too specific.

2) Keep the question clear and simple.

3) Write the question over or by the heading.

4) Keep the question in mind as you read.

5) Read to answer the question.

6) Recite the answer to the question as soon as you complete the reading under a section.

d. Questions For Sub-Headings

The question procedure is supposed to be used on sub headings also, not just the main headings.

Example sub-head in Chapter 3, p. 80
"Overseas Expansion".

When questions are made from subheads you must remember that the question relates both to the title main idea and to the major heading under which it appears. For example, making up a question for the sub head on page 80, "Overseas Expansion", the question might be like this, "How did the expansion of Greece to overseas countries during the Lyric Age add to the legacy of Greece?"

NOTE: You will notice that the question relates to both the title (legacy) and to the major heading (Lyric Age).

Outline of Session 2: QRR

I. Review of QRR Study Strategy

A. Remember QRR is a study strategy for use in studying to remember text material. "Text" material means the reading material has the usual features of text such as a title, headings, and sub-headings, bold type words, introduction, summary, chapter divisions, graphs, charts, pictures, Table of Contents, index, glossary, and study helps such as questions, or vocabulary lists.

B. Reviewing The QRR Steps

1. QUESTION - Make up a main idea question for the chapter title and then make up a question from the

first heading after reading the introductory paragraph(s). Write the question you make up over the title and over the heading or in the margin of the text.

2. READ - Read the complete section under the first heading with the question in mind. Try to answer the question as you read.

3. RECITE - After reading a complete section under a heading, recite to yourself the answer to the question found through the reading. This recitation from memory may be done either orally aloud or by developing an outline of cue phrases during the recall process. If the outline approach is used, write the outline on a separate sheet of paper.

4. REPEAT QUESTION, READ, AND RECITE - On all headings and subheadings for the remainder of the chapter reading, repeat all steps, question, read, and recite.

NOTE: If there is a conclusion or summary, of course that should be read too, to complete your reading of the chapter.

II. Applying QRR In Practice Text

A. QUESTION

1. Look at the Chapter Title: Make up a main idea question from the title.
 - a. Do you know the meaning of the words in the title?
 - b. If not, look up these words.
 - c. If so, write the question that expresses the main idea over the title.
2. Read the Introductory Paragraphs.
 - a. Most introductory paragraphs either do not have a heading or it is simply labeled as "An Introduction". Since these introductory paragraphs are part of the reading, you should read the introduction before making up questions for the headings.
3. Look at the First Heading.
 - a. What question can you make up from the heading that is related to the title?
 - b. Write the question you have made up from the title.

B. READ

1. Now that you have the question written for the first heading, you are ready to read to answer the question.

2. Reminders as you Read
 - a. Read the question you wrote over the heading.
 - b. Read to answer that question.
- C. RECITE
 1. Now that you have completed the reading of the first heading, you are ready to do the "recite" procedures.
 - a. Stop reading at the end of a headed section.
 - b. Try to recall the answer to the question you wrote.
 - c. Verbally recite the answer.
 - d. Or write the answer in cue phrases in an outline on separate paper.
- D. COMPLETING the QRR Study Strategy
 1. Repeat the above steps (A,B,C) of Question/Read/and Recite procedure:
Now that you have finished the Question/Read and Recite procedures on the first heading, you should repeat the QRR on all succeeding headings of the chapter.
 2. In a minute the monitor will stop the tape. Complete Chapter 4 study using the QRR study strategy. When you have completed the QRR on Chapter 4, you may be dismissed. As soon as the tape is turned off the monitor will make some brief statements and then you will complete your practice of QRR on Chapter 4. The monitor will collect the Chapter 4 materials to see that you have practiced the QRR for the whole chapter. Do your best to learn the study strategy to perfection. Please be present for session three.
- E. Stop the Tape.

Outline of Session 3: QRR

I. Brief Review of QRR

- A. Read the chapter title and make a question out of it.
- B. Read the introductory paragraphs.
- C. QUESTION
 1. Look at the first heading.
 2. Make up a question from the heading.
 3. Write the question over the heading.
- D. READ
 1. Read the question over the heading.
 2. Read the section to answer the question.

3. Get the answer to the question in mind.
- E. RECITE
1. Recall from memory the answer to the question.
 2. Say the answer aloud to yourself.
 3. Or write the answer in cue phrases in an outline form.

II. Guided Practice of QRR: Chapter 5

- A. Chapter Title Question
1. Look at the chapter title.
 2. When the tape is stopped, write a question from the title over the title. When each of you have written your own question over the title and some of the questions are looked at, the monitor will resume the tape.
 3. Stop the tape.
- B. Reading the Introductory Paragraphs
1. Now that you have completed the question for the chapter title, you should read the introductory paragraphs. Read these paragraphs to help you get an overall idea of what the chapter is about. Read to understand, don't just rush your eyes over the print. Now read after the tape is turned off. When all of you have completed the reading, the tape will be resumed.
 2. Stop the tape.
- C. Completing the QRR Strategy
- When you have completed reading the introductory paragraphs, you are ready to use the QRR on the headings of the chapter reading. Follow these steps to the QRR:
1. QUESTION For the First Major Heading
 - a. Read the heading.
 - b. Make up a main idea question from the heading.
 - c. Write the question over the heading.
 2. READ
 - a. Read the question you made up.
 - b. Read to answer the question.
 - c. Get the answer to the question in your mind.
 3. RECITE After reading to the end of the section
 - a. Recall the answer to the question.
 - b. Say the answer to yourself aloud.
 - c. Or write the answer in brief cue phrases in an outline on separate paper.
- D. If You Need Help During Your Practice
1. If you have any problems during the reading in the use of the QRR, ask your monitor for help.

This is practice time so you may ask any questions you need to have answered.

2. Time - You will be given about 20 minutes maximum to complete as much of Chapter 5 as possible. When the time is up, the tape will be resumed for one final activity.

E. Prior Knowledge Test

1. Before the fourth and final session of this study strategy training, I need for each of you to take a test that requires no preparation or study. It is called a prior knowledge test.

2. When the tape is turned off the monitor will hand out the test and give instructions. Please take the test seriously and try to answer the questions to the best of your knowledge and ability. When you have completed the test, return the answer sheet to the monitor with the test and you will be dismissed. We will see you in session four.

3. The time for the 4th and final session will be announced by the monitor.

Outline of Session 1: QRQ-P

I. Introduction To Research Project

Before introducing you to the study strategy you will be trained to use for this investigation, let me remind you of some important points for you to keep in mind throughout the four sessions we will meet.

- A. Be on time for each session.
- B. Do not discuss this research outside the class sessions. (Tell why).
- C. Try hard to learn the study strategy you are being trained to use.
 - 1. Trained to use just one strategy or method.
 - 2. Even if you think it will not work, keep trying to use the strategy. If you do not use the strategy just as you are trained to use it, I cannot compare it with the other strategies in the other groups.
 - 3. You are helping to compare these strategies, not prove their usefulness.
 - 4. You will benefit from learning the strategy.
 - a. Improve your insight into learning.
 - b. Improve your skill in study.
 - c. Could improve your academic grades.

II. The QRQ-P Study Strategy

- A. The method you will use is called QRQ-P
 - 1. QUESTION - Ask yourself the simple question as you begin to read, "What main idea question(s) is answered by this paragraph reading?"
 - 2. READ - Read paragraph by paragraph and read to determine the main idea of each paragraph. Actively search for the topic sentence (or main idea sentence) of each paragraph as you read.
 - 3. QUESTION - After reading each paragraph, formulate and write in the margin the main idea question answered by the paragraph.
 - 4. PRODUCT - Underline the key words or main idea phrases which answer the main idea question. Make sure the main idea of the paragraph supports the idea implied by the heading of the section.

On each succeeding paragraph, follow the same simple four step procedure. After completing the reading of the chapter, you read the questions and underline answers to organize the ideas in your memory and to develop an idea of the structure of the text.

Introductions and conclusions to chapters are handled slightly different as you will see.

B. Based on Learning Principles and Research

1. Active Study - Generating questions and writing them in the margin, underlining answers, seeking main ideas, organizing ideas.
2. Purpose - The whole QRQ-P approach has the purpose of reading for main ideas and relating those main ideas to questions. This purpose oriented approach helps you to focus your mind on a single aim and aids concentration.
3. Self-Testing - Underlining the answer to the main idea question generated is a form of testing of yourself. The test is to find the exact answer to the main idea question which you have written in the margin.
4. Knowledge of text structure - Understanding the structure of the text by following the authors main idea is a key to facilitating or improving memory of what you study. Following the structure of the text aids organization of thinking, which also aids retention of information in memory.
5. Research - Self-Questioning: Why it works?
 - a. Provides guidelines for "chunking" the reading into smaller more comprehensible units.
 - b. Requires a definite meaningful response to answer the question from the reading.
 - c. Encourages comprehension monitoring to help reader to determine if he/she is understanding.
6. The Purpose of QRQ-P - To focus attention on the main ideas discussed in a chapter of text and to develop understanding of text structure.

C. A Close Look At QRQ-P

1. QUESTION
 - a. Different from other questioning approaches in other strategies.
 - 1) Ask the same question before reading each paragraph under a heading: "What main idea question is answered by this paragraph reading?"
 - 2) Keep the heading of the reading section in mind as you read for the main idea.
 - 3) Ask yourself, "How much do I know already about this subject?"
2. READ
 - a. With the goal of determining the main idea of the paragraph and with the heading in mind, you read a paragraph at a time.

b. Read to find the main idea. Main ideas in paragraphs are usually stated in a single sentence most often at the beginning of the paragraph, but not always. Sometimes the main idea is in the last sentence, in one of the middle sentences, or in no sentence at all. In the case where the main idea is not stated in a sentence at all, the main idea is said to be "implied". However, I emphasize that most often you should look for the main idea in the first or second sentence of the paragraph. Then you should look in the last sentence.

c. Read to the end of the paragraph or if the paragraph is very short you may decide to read on through the next paragraph before writing the main idea question. Short paragraphs are usually used to bridge or connect one paragraph main idea to another paragraph, or to introduce or summarize a group of paragraphs under a heading. In writing or text structure, these short paragraphs are known as "transitional paragraphs". When we practice the QRQ-P we will show you an example of short transitional paragraphs. Remember, you do not need to write main idea questions for these short paragraphs. This will shorten your study time and also help you to understand the structure of the text as you recognize these "transitional paragraphs".

3. QUESTION - After reading the paragraph:
 - a. Stop and formulate your main idea question.
 - b. Write the question in the margin.
4. PRODUCT - After writing the question in the margin:
 - a. Underline the answer to the question in the paragraph. Underline key words and phrases. Don't underline whole sentences. If the answer is in the paragraph it can be answered in a few key words and phrases.
 - b. Read the question and answer the question to yourself before going on to the next paragraph.
5. Repeat the QRQ-P procedure on each succeeding paragraph for the entire reading or chapter.

6. Use a different procedure on the summary. We will see this later.

III. Demonstration of the QRQ-P Strategy

Use text Chapter 3, "The Legacy of Greece".

- A. Look at the chapter title, "The Legacy of Greece".
 1. Turn the title into a main idea question - Chapter 3.
 2. How? - a) What main idea is implied by the title and b) What question can I write to state this main idea?
 - a. Implied: What Greece handed down to the world?
 - b. Question: What are the things Greece handed down to the world?
 3. Write the question on the title page.
 4. This main idea question should guide your thinking as you generate other questions for the paragraphs. This is the beginning of helping you to organize the text structure in your mind.
- B. Reading Introduction Paragraph(s) - (If any)
 1. "What main idea question is answered by introductory paragraphs?" In general, the question answered by any introduction to a chapter is - "What are the most important ideas discussed in the chapter?"
 2. Read the introductory paragraph(s) with this question in mind or write this question at the beginning of the introduction.
 3. After reading the paragraph(s) in the introduction, underline the key words or phrases which give the important idea(s) that will be discussed in the chapter.
 4. Structure of texts introductions to chapters
 - a. To give overview or preview of chapter content.
 - b. Focuses on main ideas or questions answered in the chapter.
 5. Look at Chapter 3 Introduction (p. 70).
 - a. Ask the question: "What are the most important ideas of the chapter?"
 - b. Write it in the margins.
 - c. Read to answer this question.
 - d. Underline key words or phrases which answer the question.
 - e. Review by reading the question to yourself and reciting the answer from the paragraphs.
- C. Applying QRQ-P To The First Headed Section
 - Q = 1. Look at heading "The Land and the Polis".

2. Ask yourself: "What do I already know about this subject?"
3. Then ask yourself: "What main idea question is answered by this paragraph?"
- R = 4. Read the first paragraph. If it is a short 4 or 5 line paragraph, consider it as a "transitional paragraph" and read the first two paragraphs with the question in mind. In our case we will read the first paragraph. Let's read it together as an example. I will read it aloud, while you follow along. Remember, we are reading to find the main idea and formulate a main idea question for the paragraph.
5. What is the main idea and where do we find it expressed in this paragraph?
 - a. Main idea: Geography of Greece encourages movement to the east.
 - b. Where is this main idea expressed? The last sentence is the topic sentence and therefore we find the main idea in it.
- Q = 6. Write the main idea question in the margin. "How did the geography of Greece influence the legacy of Greece to the east?" (Notice main idea of title is tied in).
- P = 7. Underline the key words which answer the question. Key words in the topic sentence and other key words throughout the paragraph:
 - a. Last sentence: geography encouraged Greeks to old civilization of Asia Minor and Egypt.
 - b. Others: Greek peninsula stretching in direction of Egypt and Near East; harbors look to the east; islands of Aegean sweep to the east.
8. Read the question again and recall the answer from memory.
9. Repeat QRQ-P on all succeeding paragraphs.
 - a. "What main idea question is answered by this paragraph?"
 - b. Read to find the main idea in the paragraph.
 - c. Write the main idea question in the margin.
 - d. Underline key words/phrases which answer the question.
 - e. Read the question and recall the answer.
 - f. Remember to ask yourself, "What do I already know about this subject?" with each new heading in the chapter.
- D. Applying QRQ-P to Summary (Conclusion)
 1. Same procedure as used with introductory paragraph(s).

- a. Use same question always on summary paragraph(s): "What important idea(s) does the author review?"
 - b. Write the question in the margin.
 - c. Read to answer the question.
 - d. Underline the important ideas in the summary.
 - e. Read the question to yourself and recall the answer by memory.
- E. After Completing the Chapter With QRQ-P
1. Reread the questions and underline answers from the beginning of the chapter to the end.
 2. As you do this, try to understand the structure of main ideas the author discusses in the chapter. Get a clear grasp of the main idea and the several major points discussed under that main idea.
 3. All of your main idea questions should be related to the main idea of the chapter, which you determined from the title and introduction.

IV. Conclusion To Session One

- A. Practice this study strategy on your own. Use it in your college course studies on your next assigned chapter.
- B. Remember, do not tell others at LU what you are doing in this research project.
- C. Please be present at the next session. Your monitor will announce the date, time, and place.
- D. After the videotape is turned off the monitor will answer any question you may have.

Outline of Session 2: QRQ-P

I. Review of QRQ-P Study Strategy

- A. QRQ-P is strategy for studying "text" material. Text features: title, headings, subheadings, bold type words, introductions, summaries, chapter divisions, graphs, charts, pictures, tables, Table of Contents (detailed), index, glossary, and study helps such as questions, or vocabulary list, and sometimes other suggested activities for learning.
- B. Reviewing QRQ-P Steps
 1. QUESTION - First Q: After developing a main idea question from the chapter title and reading the introductory paragraphs (if any) to get the important ideas discussed in the chapter, you

begin with the first headed section by asking yourself the question, "What do I already know about this topic?" as you study the heading. Think about what you know a few seconds and then ask yourself the question, "What main idea question is answered by this paragraph?"

2. READ - Read the first paragraph under the heading to find the main idea of the paragraph. Read to locate the topic sentence which has the main idea expressed.

3. QUESTION - Second Q: After reading a paragraph, make up and write the main idea question answered in the paragraph.

4. PRODUCT - Underline the key words or phrases of the answer to the main idea question you made up. Read the question and underline key word answers before going on to the next paragraph.

5. Continuing the Strategy - Follow these same four steps in each paragraph of the chapter until the chapter is complete. Then go back over each question and try to recall the answer. If you cannot recall the answer look at your underlined key words to help you remember.

II. Applying the QRQ-P Strategy

(Use Chapter 4, "Hellenistic Diffusion")

A. Beginning A Chapter With QRQ-P

1. Look at the chapter title.

- a. Turn the title into a main idea question.
- b. Write the question on the title page.
- c. Ask yourself: "Do I understand what the main idea of the chapter is?"

2. Read the introductory paragraph.

- a. Write the following question over the introduction: "What are the most important ideas discussed in the chapter?"
- b. Read the introductory paragraph(s) to answer this question.
- c. Underline the key words or phrases which answer the question.
- d. Reread the question and the underlined answer.

B. QUESTION - Look at the 1st heading.

1. Ask yourself: "What do I already know about the topic implied by the heading?"
2. Then ask yourself: "What main idea question is answered by this paragraph?"
3. You are now ready to read the paragraph.

C. READ - Once you have firmly fixed in your mind

that you are reading only to determine and know the main idea of the paragraph by asking yourself, "What main idea question is answered by the paragraph?" you are then ready to read to find the main idea. As you read the paragraphs, remember:

1. Paragraphs have main ideas.
2. The main idea is usually expressed in a topic sentence.
3. Topic sentences are usually at the beginning of the paragraph.

D. QUESTION - Now that you have finished reading the paragraph, you are ready to write the main idea question.

1. Make up a main idea question for the paragraph.
2. Write the question in the margin beside the paragraph.

E. PRODUCT - Do you have a good question written in the margin? Now that you have your main idea question written in the margin, you are ready to do the following:

1. Underline the key words and phrases which answer your question.
2. Read the question in the margin and recall the answer.

F. Repeating QRQ-P Throughout The Chapter

1. Now that you have completed one paragraph using QRQ-P, continue using QRQ-P on each of the paragraphs. Remember to follow these steps:
 - a. Ask yourself: "What main idea question is answered by this paragraph?"
 - b. Read the paragraph to find the main idea.
 - c. Make up a main idea question for the paragraph.
 - d. Write the question in the margin.
 - e. Underline the key words and phrases which answer the question.
 - f. Read the question and the underlined answer to yourself.
 - g. Go to the next paragraph.

2. When you come to a new heading?

When you complete the QRQ-P on all the paragraphs of a heading, you will be ready to start a new heading. Remember with each new heading:

- a. Ask yourself: "What do I already know about this?"
- b. Relate the topic to the main idea of the chapter.
- c. Follow the QRQ-P steps above - B,C,D,E.

G. Ending The Chapter With QRQ-P

If the chapter has a summary use the following method:

1. Ask the question, "What major ideas are reviewed in the summary?"
2. Write this question over the summary.
3. Read the summary to find the major idea reviewed in the summary.
4. Underline the major points after completing the reading.
5. Read the question and the underlined answer to yourself.

Outline of Session 3: QRQ-P

I. Brief Review of QRQ-P

- A. Read the chapter title and make a main idea question from it. Keep in mind the main idea of the chapter as you study.
- B. Read the introductory paragraphs to answer the question, "What major points are discussed in the chapter?" (This question is written in the margin).
- C. Underline the key words of the major points in the introductory paragraph(s).
- D. Read the question and the major points you underlined in the introductory paragraph(s).

II. Using QRQ-P Study Strategy

- A. QUESTION
 1. Look at the first heading.
 2. Ask yourself: "What do I already know about this topic?" Decide.
 3. Ask the question: "What main idea question is answered in this paragraph?"
- B. READ
 1. Read to determine the main idea of the paragraph.
 2. After reading the paragraph determine the main idea of the paragraph.
- C. QUESTION
 1. Make up the main idea question.
 2. Write the question in the margin.
- D. PRODUCT
 1. Underline the key words and phrases in the paragraph which answer the question you wrote in the margin.
 2. Read the question and the underlined answer to yourself.
 3. Repeat the procedures on the next paragraphs to the next heading.

III. Guided Practice of QRQ-P

(Use Chapter 5, "The Rise of Rome")

A. Chapter Title Question

1. Look at the chapter title.
2. When the tape is stopped write a main idea question from the title on the title page.
3. After discussion of the question you wrote, the monitor will resume the tape.
4. Stop the tape.

B. Reading the Introductory Paragraphs

When the tape is stopped follow these three steps to complete the reading of the introductory paragraph(s). If you finish early, wait quietly and patiently for the others to finish.

1. Write the question for introductory paragraph(s): "What major points are discussed in this chapter?"
2. Read the introductory paragraphs to answer this question.
3. Underline the key words and phrases which answer the question.
4. Stop the tape.

C. Practicing QRQ-P on the 1st Headed Section

1. When you have completed the reading of the introductory paragraphs, and the major points have been reviewed, you are ready to begin application of QRQ-P on each paragraph under a heading. Follow the procedures as you apply the QRQ-P strategy to your reading.

2. QRQ-P Procedures

These procedures are outlined for you on a handout sheet that the monitor will give to you as soon as the tape is stopped.

- a. Follow these procedures in the study of the paragraphs under the 1st heading: "The Land and the Sea".
- b. You will be given 10 to 12 minutes to practice QRQ-P on these paragraphs. Do not go on yet to the second heading of paragraphs, "The Etruscans and Rome". Stop when you reach this heading.
- c. When all of you have completed the 1st heading your monitor will answer any questions and discuss your main idea questions. You will then be able to see how you are progressing in locating main idea of paragraphs.

3. Stop the tape.

D. Continuing Practice of QRQ-P

1. You are now ready to practice QRQ-P on the rest of the chapter.
 2. Reminders:
 - a. Short paragraphs are usually transitional paragraphs and do not have a main idea. They
 - 1) connect one paragraph to another or
 - 2) introduce or
 - 3) combine sections of reading.
 - b. Main ideas are usually stated in topic sentences. Use this topic sentence to help you write your main idea question.
 - c. Be patient with yourself. If you are having trouble finding the main idea of a paragraph, just keep practicing. You will soon "get the hang of it".
 - d. Your questions should relate to the reading and should help to develop the main idea stated in the title.
 3. With your sheet of procedures to guide you, complete the QRQ-P strategy on the rest of Chapter 5 up to the summary on page 149.
 4. When you get to the summary on page 149, stop using the QRQ-P procedures for reading paragraphs under headings, and follow the procedures for reading a summary.
 5. When you have finished, or after 30 minutes of practice, the tape will be resumed for one final activity.
 6. Stop the Tape.
- E. Prior Knowledge Test
1. Before the fourth and final session of this study strategy training, I need for each of you to take a test that requires no preparation or study. It is called a prior knowledge test.
 2. When the tape is turned off the monitor will hand out the test and give instructions. Please take the test seriously and try to answer the questions to the best of your knowledge and ability. When you have completed the test, return the answer sheet to the monitor with the test and you will be dismissed. We will see you in session four.
 3. The time for the 4th and final session will be announced by the monitor.

Guide Sheet For Monitor In Training Sessions

Session 1: Monitor's Procedures

1. When all subjects have arrived (wait only 5 minutes for late ones), take attendance from the subjects list for the appropriate group; i.e. SQ3R, QRR, or QRQ-P.
2. Hand out the text material:
Session 1 - Chapter 3 "The Legacy of Greece"
3. Hand out "Honor Pledge" - Read the following instructions:

The "Honor Pledge" is a statement of your cooperation and confidentiality for the duration of this research; that is, for the four meetings we will hold for the training and data collection of this research. Please read the pledge and sign your name at the bottom to indicate your intention to keep the pledge. I will collect the forms as soon as you have signed it.

4. Collect the signed "Honor Pledge".
5. Preparations before turning on the videotape for Session 1
 - A. Make sure all subjects can clearly see the video screen.
 - B. Make sure all subjects have Chapter 3, "The Legacy of Greece".
 - C. Tell students the following: Do not try to take notes during the videotape viewing. Just listen and follow the demonstration of the study strategy with the text material only in front of you. You will be given outlines of the study strategy procedure for reference as you are receiving the training. You, therefore, do not need to take notes. Listen attentively and follow the instructions given on the videotape. No talking is permitted during the videotape showing.

The first videotape will continue for approximately 55 minutes continuous. If you have questions, jot them down on paper and I will answer these after the tape.

If you get lost in the material or procedure, raise your hand and I will come to help you. Try to hold all interruptions until the videotape is completed.

6. Turn on the videotape - Note to monitor: The videotape for the first session will be uninterrupted for approximately 55 minutes. Do not turn it off unless absolutely necessary. Anything that disrupts the whole group or distracts the group's attention would be the only reason for stopping the tape. If it is stopped, it would be a good idea to rewind the tape back to some logical breaking point and rerun some of it. Don't allow the group to miss any of the instruction.
7. When the videotape is finished, allow students to ask questions.
8. After the questioning time:
 - A. Collect the text materials, Chapter 3, "The Legacy of Greece".
 - B. Announce Session 2

	SQ3R	QRR	QRQ-P
Date -			
Time -			
Place -			
 - C. Remind students of the raffle drawing. Say: Remember only those students who complete all 4 sessions, and take the final dependent measure test, will be eligible for the raffle drawing. At the end of Session 4 each student who has perfect attendance for the four sessions will be given a ticket to sign and return for the drawing. The date of the drawing will be announced in Session 4. You do NOT have to attend the drawing to be the winner of the drawing.
 - D. Urge all subjects to be present for Session 2. Restate the date, time, and place.

Session 2: Monitor's Procedures

1. When all subjects have arrived (wait only 5 minutes for late ones), take attendance from the subjects list for the appropriate group; i.e. SQ3R, QRR, or QRQ-P.
2. Hand out text materials: Chapter 4 "Hellenistic Diffusion".
3. Hand out "Study Strategy Guide" - Be sure the SQ3R group gets SQ3R Guide, QRR gets QRR Guide, and QRQ-P gets QRQ-P Guide. Do not mix up the group guides.
4. Preparations before turning on the videotape Lesson 2
 - A. Make sure all subjects can clearly see the video screen.
 - B. Make sure all subjects have Chapter 4, "Hellenistic Diffusion".
 - C. Make sure all subjects have the appropriate "Study Strategy Guide" sheet.
 - D. Tell the students the following:
 - 1) Please pay close attention to the videotape. Listen attentively and try not to disturb others around you. No talking during the videotape showing is permitted.
 - 2) At certain times during the lesson, the videotape will be turned off. When it is, follow the instructions given on the videotape for practice of the study strategy. Do not talk. Work quietly and do not waste any time. When the tape is turned on again, continue to pay close attention.
 - 3) You will need a pencil (not a pen) for some of the practice. If you do not have a pencil, raise your hand and I will loan you one. Please return the pencil at the end of the lesson, if you borrow one.
 - 4) Do you have any questions before I turn on the videotape? (Answer any questions).

5. Turn on the videotape. Make sure the sound is appropriate for all to hear.

Note: Listen closely and be prepared to turn off the videotape when told to do so by the videotape instructor.

6. When the videotape is stopped for practice look briefly at some of the examples of the practice. Talk about the required skill to perform the study strategy. Try to correct any confusion or misconceptions students may have before resuming the tape. Allow students to ask questions to clarify problems.

7. When the tape is completed:

- A. Collect the text material, Chapter 4 "Hellenistic Diffusion".

- B. Announce Session 3

SQ3R

QRR

QRQ-P

Date
Time
Place

- C. Remind Students:

All students who complete all four sessions receive extra credit and a raffle ticket for the \$100.00, \$50.00, and \$25.00 drawings. The date of the drawing will be announced at the end of Session 4. You do NOT have to attend the drawing to win the raffle money.

- D. Remind students to be present and on time for Session 3. Restate the date, time, and place.

Thank you for your cooperation and help!

Session 3: Monitor's Procedures

1. Take attendance - Allow 5 minutes only for late ones.
2. Hand out Text Material: Chapter 5, "The Rise of Rome".
3. Hand out "Study Strategy Guide" sheets for appropriate group.
4. Preparations before turning on the videotape lesson 3.
 - A. Make sure all subjects can clearly see the video screen.
 - B. Make sure all subjects have Chapter 5, "The Rise of Rome".
 - C. Make sure all subjects have the appropriate "Study Strategy Guide" sheet.
 - D. Tell the students the following:
 - 1) Please pay close attention to the videotape. Listen attentively and try not to disturb others around you. No talking during the videotape showing is permitted.
 - 2) At certain times during the lesson, the videotape will be turned off. When it is, follow the instructions given on the videotape for practice of the study strategy. Do not talk. Work quietly and do not waste any time. When the tape is turned on again, continue to pay close attention.
 - 3) You will need a pencil (not a pen) for some of the practice. If you do not have a pencil, raise your hand and I will loan you one. Please return the pencil at the end of the lesson, if you borrow one.
 - 4) Do you have any questions before I turn on the videotape? (Answer any questions).
5. Turn on the videotape: Make sure the sound is appropriate for all to hear.

Note to monitor: Be prepared to turn off the tape frequently as instructed. Keep track of the time for practice. Do not exceed the one hour time limit for the practice. This third session will be followed by a "Prior Knowledge Test" which will take extra time after the hour practice.

6. When the videotape is stopped for practice of the strategy, try to be helpful to the students who need help. This is the last practice session so they should "get the hang" of the procedures by the end of this session.

7. When the tape is completed:

A. Collect the text materials, Chapter 5 "The Rise of Rome".

B. Announce Session 4 (All groups meet together).

Date _____ Time _____ Place _____

C. Remind Students:

All students who complete all four sessions receive extra credit and a raffle ticket for the \$100.00, \$50.00, and \$25.00 drawings. The date of the drawing will be announced at the end of Session 4. You do NOT have to attend the drawing to win the raffle money.

D. Remind students to be present and on time for Session 4. Restate the date, time, and place.

E. Hand out: "Prior Knowledge Test" and Answer Sheet and #2 pencil. Read instructions to test aloud to them. Tell students when they have completed the test to return:...

1. The test
2. The Scan-Tron Answer Form
3. The #2 pencil

... and then they may be dismissed.

8. Remind each one as they leave of Session 4:

Date _____ Time _____ Place _____

Guide Sheet For Monitor In Test Session

Session 4: Monitor's Procedure

1. Take attendance.
2. Hand out Packet Containing:
 - A. Chapter 6, "Pax Romana" (inside).
 - B. Raffle Ticket (inside).
 - C. Information sheet (outside).
3. Have subjects fill out "raffle ticket".
4. Collect "raffle tickets".
5. Announce raffle ticket drawing:

Date _____ Time _____ Place _____
6. Tell the students to review the study strategy appropriate for the group they are in: SQ3R, QRR, or QRQ-P.
7. General Instructions:

In a moment each of you will be asked to remove the text material for study from the envelope. You will apply the study strategy you have been trained to use exactly as you were trained to use it. Do not add steps or take shortcuts in the study of the text. Apply the study strategy thoroughly and seriously, attempting to understand the text material to the best of your ability through the study strategy you were trained to use. Even if you don't like using the study strategy or don't think it will work, still use it for this research project. Do your best, despite what you think about the study strategy.

In a moment, I will ask you to remove the text material from the envelope. We will record the beginning time of study together. I will give you the time to record and will give the signal to "start". When the signal to start is given, you will study the text (Chapter 6) using the study strategy.

When you have completed the study of the chapter, doing your best to use the study strategy, you will

notice that you are asked to record the time when you complete your study. Please record the time when you complete study of Chapter 6 as displayed on the clock in front of the room. Write the exact time shown on the clock in the blank of the statement, "I completed my study at the time of _____:_____ according to the clock at the front of the room." This statement is found on a sheet following the last page of the text study material.

When you have recorded the time that you completed your study, put the text material back into the envelope and come to the front of the room to receive the test over the text material.

Special instructions will be given to you as you get your test. These instructions will help you to take the test.

As you take the test, do your very best to recall the information from the text material. Don't rush through the test. Take your time. Try to answer each question from what you can remember from your study of Chapter 6, the text material. If you do not take the test seriously, all of the data in this study will be meaningless. Much depends on how seriously you take the test. It is not important that you make a high score, but it is important to try to make the highest score you can make.

Now, please remove the text material from the packet (envelope). (Pause). Please read with me the statement under "Time Study is Begun".

"The time I began to study the text was _____:_____."

Now, record the start time (have them record a time one minute later than the clock shows).

When I say "start" you may begin study of Chapter 6 using the study strategy you were trained to use.

At the time you had them record say..."Start".

8. As the text material is returned, be sure the finish time is recorded.

9. **Test Distribution:** As each student completes study of the text and comes to get the test, give to each one the instructions for the confidence rating for each test item. Give the sheet "Confidence Rating Instructions" to remind them as they take the test. Read the instructions for taking the test to each student to be certain he/she knows how to mark his/her answers on the Scan-Tron. Be sure they know how to write the short answer questions on the blanks on the Scan-Tron Form.
10. **Test Return:** When the test is returned, be sure that:
 - A. The Answer Form (Scan-Tron) is returned.
 - B. Answers are marked for multiple-choice questions and written in for short answer questions.
 - C. The test has the ratings completed.
 - D. The student's ID# matches on the Scan-Tron and his/her test copy. (Each test is numbered, and the Scan-Tron has the same number on it).
 - E. The "Information Sheet" is completed.
 - F. Each one knows the raffle ticket drawing date, place, and time.

Study Strategy Guide Sheets

SQ3R STUDY STRATEGY GUIDE

Below is a brief outline of the steps you will follow in the application of the study strategy you are learning. Keep this and bring it with you to each of the future sessions. Use it to help you recall the procedures until you learn it by memory. Try to commit the steps to memory by the fourth session.

1. Survey: Glance through the chapter, reading the title and the headings and looking at the chapter graphics to get an idea of how the author organized the ideas and what are the major ideas. Read the introduction and/or the summary to see what other ideas can be added to the major points you get from the headings.
2. Question: As you begin to read, use the headings to devise a question from the heading which seems to cover the main idea implied by the heading.
3. Read: Read the section of the text under the heading to answer the question generated from the heading.
4. Recite: After reading a section under a heading, recite to yourself the answer to the question. This recitation may be done by developing an outline of cue phrases during the recitation process on a separate sheet of paper.
Repeat steps 2, 3, 4 above for each heading in the chapter reading.
5. Review: After completing steps 2, 3, 4 for all headed sections, look over your notes or outlines and try to recite from memory the major points and the details written in the outlines.

QRR STUDY STRATEGY GUIDE

Below is a brief outline of the steps you will follow in the application of the study strategy you are learning. Keep this and bring it with you to each of the future sessions. Use it to help you recall the procedures until you learn it by memory. Try to commit the steps to memory by the fourth session.

1. QUESTION
 - a. Look at the chapter title: Make-up a main idea question from the title.
 - 1.) Do you know the meaning of the words in the title?
 - 2.) If not, look up these words.
 - 3.) If so, write the question that expresses the main idea over the title.
 - b. Read the Introductory paragraphs.
Most introductory paragraphs either do not have a heading or it is simply labeled as "An Introduction". Since these introductory paragraphs are part of the reading, you should read the introduction before making up questions for the headings.
 - c. Look at the First Heading
 - 1.) What question can you make up from the heading that is related to the title?
 - 2.) Write the question you have made up from the title in the margin or over the heading.
2. READ
 - a. Now that you have the question written for the first heading, you are ready to read to answer the question.
 - b. Reminders as you Read
 - 1.) Read the question you wrote over the heading
 - 2.) Read to answer that question
3. RECITE
 - a. Now that you have completed the reading of the first heading, you are ready to do the "recite" procedure
 - b. The Recite Procedure:
 - 1.) Stop reading at the end of a headed section
 - 2.) Try to recall the answer to the question you wrote.
 - 3.) Verbally recite the answer
 - 4.) Or write the answer in cue phrases in an outline on separate paper.
4. COMPLETING THE QRR STUDY STRATEGY
Repeat the above steps (1, 2, 3) of Question/Read/and Recite Procedures:
Now that you have finished the Question/Read/and Recite procedures on the first heading, you should repeat the QRR on all succeeding headings of the chapter.

HANDOUT FOR SESSION ONE - QRR

The list of headings and questions are examples of the kinds of questions you should try to make up from headings in chapters of text reading as you use the QRR Study Strategy. Look at them and use them to help you learn how to make up your own questions to guide your study.

Example Questions for all headings in Chapter 3

<u>Main Headings</u>	<u>Question</u>
The Land and the Polis	How are the Land and the Polis a part of the legacy of Greece?
The Bronze Age	What legacies did Greece leave to the world out of the Bronze Age of her history?
Homer, Hesiod, and the Heroic Past	What legacies does the world have from Homer, Hesiod, and other heroes in Greek history?
The Lyric Age	What legacies were given to the world out of the Lyric Age?
 <u>Sub-Headings</u>	
Overseas Expansion	How did the expansion of Greece overseas countries during the Lyric Age add to the legacy of Greece?
Lyric Poets	What legacies of poetry do we have from Greece from the Lyric Age?
The Growth of Sparta	How did the growth of Sparta add to the legacy of Greece during the Lyric Age?
The Evolution of Athens	What changes in Athens contributed to the legacy of Greece during the Lyric Age?
 <u>Main Heading</u>	
The Classical Period	What legacies do we have from Greece from the Classical Period?
 <u>Sub-Headings</u>	
The Deadly Conflicts	What "deadly conflicts" happened during the classical period the added to the legacy of Greece?
The Birth of Historical Awareness	What legacies do we have because of Greece's historical awareness during the classical period?

QRQ-P STUDY STRATEGY GUIDE

Below is a brief outline of the steps you will follow in the application of the study strategy you are learning. Keep this and bring it with you to each of the future sessions. Use it to help you recall the procedures until you learn it by memory. Try to commit the steps to memory by the fourth session.

1. BEGINNING A CHAPTER WITH QRQ-P
 - a. Look at the chapter title:
 - 1.) Turn the title into a main idea question
 - 2.) Write the question on the title page
 - 3.) Ask yourself: Do I understand what the main idea of the chapter is?
 - b. Read the introductory paragraphs.
 - 1.) Write the following question over the introduction:
"What are the most important ideas discussed in the chapter?"
 - 2.) Read the introductory paragraph(s) to answer this question.
 - 3.) Underline the key words or phrases which answer the question.
 - 4.) Reread the question and the underlined answer.
2. QUESTION
 - a. Look at the 1st heading
 - 1.) Ask yourself: "What do I already know about the topic implied by the heading?"
 - 2.) Then ask yourself: "What main idea question is answered by this paragraph?"
 - b. You are now ready to read the paragraph.
3. READ - Once you have firmly fixed in your mind that you are reading only to determine and know the main idea of the paragraph by asking yourself, "What main idea question is answered by the paragraph?", you are then ready to read to find the main idea.
 As you read the paragraphs, Remember:
 - a. Paragraphs have main ideas
 - b. The main idea is usually expressed in a topic sentence
 - c. Topic sentences are usually at the beginning of the paragraph
4. QUESTION: Now that you have finished reading the paragraph, you are ready to write the main idea question.
 - a. Make up a main idea question for the paragraph
 - b. Write the question in the margin beside the paragraph
5. PRODUCT: Do you have a good question written in the margin?
 Now that you have your main idea question written in the margin, you are ready to do the following:
 - a. Underline the key words and phrases which answer your question
 - b. Read the question in the margin and recall the answer
6. REPEATING QRQ-P THROUGHOUT THE CHAPTER
 - a. Now that you have completed one paragraph using QRQ-P, continue using QRQ-P in each of the paragraphs. Remember to follow these steps as you do:

- 1.) Ask yourself: "What main idea question is answered by this paragraph?"
 - 2.) Read the paragraph to find the main idea
 - 3.) Make-up a main idea question for the paragraph
 - 4.) Write the question in the margin.
 - 5.) Underline the key words and phrases which answer the question
 - 6.) Read the question and the underlined answer to yourself.
 - 7.) Go to the next paragraph
- b. When You Come To A New Heading
When you complete the QRQ-P in all the paragraphs of a heading, you will be ready to start a new heading.
Remember with every new heading to -
- 1.) Ask yourself: "What do I already know about this?"
 - 2.) Relate the topic to the main idea of the chapter.
 - 3.) Then follow the QRQ-P Steps above (steps 2, 3, 4, 5)
7. ENDING THE CHAPTER WITH QRQ-P
If the chapter has a summary use the following method:
- a. Ask the question: "What major ideas are reviewed in the summary?"
 - b. Write this question over the summary
 - c. Read the summary to find the major ideas reviewed in the summary.
 - d. Underline the major points after completing the reading
 - e. Read the question and the underlined answer to yourself

Appendix D
SPSS^x MANCOVA DATA OUTPUT

SPSSx MANCOVA Data Output

Analysis 1

MANCOVA OF 4 VARS.: TIME CONFID COMPAC WITH READL

EFFECT..STUQP

MULTIVARIATE TESTS OF SIGNIFICANCE (S = 2, M = 0, N = 17)

TEST NAME	VALUE	APPROX. F	HYPOTH. DF	ERROR DF	SIG. OF F
PILLAIS	.59405	5.21118	6.00	74.00	.000
HOTELLINGS	1.00906	5.88618	6.00	70.00	.000
WILKS	.46724	5.55546	6.00	72.00	.000
POYS	.46114				

NOTE: F STATISTIC FOR WILK'S LAMBDA IS EXACT

EFFECT..STUQP (CONT.)

UNIVARIATE F-TEST WITH (2,38) D. F.

VARIABLE	HYPOTH. SS	ERROR SS	HYPOTH. MS	ERROR MS	F	SIG. OF F
TIME	7675.26173	10682.37531	3837.63086	281.11514	13.65146	.000
CONFID	156.68312	1146.25779	78.34156	30.16468	2.59713	.088
COMPAC	292.94027	1293.10878	146.47014	34.02918	4.30425	.021

STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS

FUNCTION NO.

VARIABLE	1	2
TIME	-.89063	-.16451
CONFID	-.49183	-.69695
COMPAC	-.48722	.41836

Analysis 1 continued

MANCOVA OF 4 VAR.: TIME CONFID COMPAC WITH READL (CONT)

-----ANALYSIS OF VARIANCE-----

ESTIMATES FOR COMPAC ADJUSTED FOR 1 COVARIATE

ADJUSTED AND ESTIMATED MEANS
VARIABLE..TIME

FACTOR	CODE	OBS. MEAN	ADJ. MEAN	EST. MEAN
STUGP	1	56.64286	57.59205	56.64286
STUGP	2	46.71429	46.97455	46.71429
STUGP	3	80.92857	79.71912	80.92857

ADJUSTED AND ESTIMATED MEANS (CONT.)
VARIABLE..CONFID

FACTOR	CODE	OBS. MEAN	ADJ. MEAN	EST. MEAN
STUGP	1	11.57143	11.72784	11.57143
STUGP	2	7.21429	7.25717	7.21429
STUGP	3	8.28571	8.08641	8.28571

ADJUSTED AND ESTIMATED MEANS (CONT.)
VARIABLE..COMPAC

FACTOR	CODE	OBS. MEAN	ADJ. MEAN	EST. MEAN
STUGP	1	11.92857	11.41999	11.92857
STUGP	2	14.14286	14.00341	14.14286
STUGP	3	17.28571	17.93375	17.28571

Analysis 1 continued

MANCOVA OF 4 VAR.: TIME CONFID COMPAC WITH READDL (CONT)

-----ANALYSIS OF VARIANCE-----

EFFECT..WITHIN CELLS REGRESSION
MULTIVARIATE TESTS OF SIGNIFICANCE (S = 1, M = 1/2, N = 17)

TEST NAME	VALUE	EXACT F	HYPOTH. DF	ERROR DF	SIG. OF F
PILLAIS	.34656	6.36444	3.00	36.00	.001
HOTELLINGS	.53037	6.36444	3.00	36.00	.001
WILKS	.65344	6.36444	3.00	36.00	.001
ROY	.34656				

NOTE.. F STATISTICS ARE EXACT.

EFFECT..WITHIN CELLS REGRESSION (CONT.)
UNIVARIATE F - TEST WITH (1,38) D. F.

VARIABLE	SQ. MUL. R	MUL. R	ADJ. R-SQ.	HYPOTH. MS	ERROR MS	F	SIG. OF F
TIME	.10043	.31691	.07676	1192.62469	281.11514	4.24248	.046
CONFID	.02748	.16576	.00188	32.38507	30.16468	1.07361	.307
COMPAC	.20935	.45755	.18854	342.39122	34.02918	10.06170	.003

Analysis 2

MANCOVA OF QTM1 QTINF QTD WITH READL

ANALYSIS OF VARIANCE

EFFECT..STUGP
 MULTIVARIATE TESTS OF SIGNIFICANCE (S = 2, M = 1, N = 15)

TEST NAME	VALUE	APPROX. F	HYPOTH. DF	ERROR DF	SIG. OF F
PILLAIS	.35062	1.40301	10.00	66.00	.199
HOTELLINGS	.45112	1.39846	10.00	62.00	.202
WILKS	.67291	1.40192	10.00	64.00	.200
ROY'S	.26019				

NOTE.. F STATISTIC FOR WILK'S LAMBDA IS EXACT.

EFFECT..STUGP (CONT.)
 UNIVARIATE F-TESTS WITH (2,36) D. F.

VARIABLE	HYPOTH. SS	ERROR SS	HYPOTH. MS	ERROR MS	F	SIG. OF F
QTM1	4.01634	279.71429	2.00817	7.76984	.25846	.774
QTINF	5.77773	102.44523	2.88887	2.84570	1.01517	.372
QTD	44.65513	222.42391	22.32756	6.17844	3.61379	.037

STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS

FUNCTION NO.	VARIABLE	1
QTM1		4.78364
QTINF		2.01031
QTD		4.80970

Analysis 2 continued

MANCOVA OF QTMI QTINF QTD WITH READL (CONT.)

----- ANALYSIS OF VARIANCE -----

ADJUSTED AND ESTIMATED MEANS

VARIABLE..QTMI FACTOR	CODE	OBS. MEAN	ADJ. MEAN	EST. MEAN
STUGP	1	10.21429	9.93537	10.21429
STUGP	2	9.53846	9.59178	9.53846
STUGP	3	10.15385	10.37944	10.15385

ADJUSTED AND ESTIMATED MEANS (CONT.)

VARIABLE..QTINF FACTOR	CODE	OBS. MEAN	ADJ. MEAN	EST. MEAN
STUGP	1	5.57143	5.36580	5.57143
STUGP	2	6.15385	6.19316	6.15385
STUGP	3	5.23077	5.39709	5.23077

ADJUSTED AND ESTIMATED MEANS (CONT.)

VARIABLE..QTD FACTOR	CODE	OBS. MEAN	ADJ. MEAN	EST. MEAN
STUGP	1	11.50000	10.98876	11.50000
STUGP	2	10.23077	10.32851	10.23077
STUGP	3	12.46154	12.87504	12.46154

Analysis 3

MANCOVA OF TIME CONFID COMPAC, WITH PRKN

----- ANALYSIS OF VARIANCE -----

EFFECT..STUGP
 MULTIVARIATE TESTS OF SIGNIFICANCE (S = 2, M = 0, N = 15 1/2)

TEST NAME	VALUE	APPROX. F	HYPOTH. DF	ERROR DF	SIG. OF F
PILLAIS	.57437	4.56606	6.00	68.00	.001
HOTELLINGS	.98837	5.27131	6.00	64.00	.000
WILKS	.47706	4.92599	6.00	66.00	.000
ROYS	.46338				

NOTE.. F STATISTIC FOR WILK'S LAMBDA IS EXACT.

EFFECT..STUGP (CONT.)

UNIVARIATE F-TESTS WITH (2,35) D. F.

VARIABLE	HYPOTH. SS	ERROR SS	HYPOTH. MS	ERROR MS	F	SIG. OF F
TIME	7830.03964	11327.07537	3915.01982	323.63072	12.09718	.000
CONFID	141.49597	1139.76583	70.74799	32.56474	2.17253	.129
COMPAC	181.80363	1478.52638	90.90181	42.24361	2.15185	.131

----- STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS -----

FUNCTION NO.

VARIABLE	1	2
TIME	-.93685	-.00871
CONFID	-.48078	-.89309
COMPAC	-.56776	.15589

Analysis 3 continued

MANCOVA OF TIME CONFID COMPAC, WITH PRKN (CONT)

----- ANALYSIS OF VARIANCE -----

ADJUSTED AND ESTIMATED MEANS

VARIABLE..TIME FACTOR	CODE	OBS. MEAN	ADJ. MEAN	EST. MEAN
STUGP	1	55.58333	56.01186	55.58333
STUGP	2	46.71429	46.52162	46.71429
STUGP	3	80.07692	79.84106	80.07692

ADJUSTED AND ESTIMATED MEANS (CONT.)

VARIABLE..CONFID FACTOR	CODE	OBS. MEAN	ADJ. MEAN	EST. MEAN
STUGP	1	12.00000	11.87750	12.00000
STUGP	2	7.21429	7.26936	7.21429
STUGP	3	8.46154	8.52896	8.46154

ADJUSTED AND ESTIMATED MEANS (CONT.)

VARIABLE..COMPAC FACTOR	CODE	OBS. MEAN	ADJ. MEAN	EST. MEAN
STUGP	1	11.08333	11.34651	11.08333
STUGP	2	14.14286	14.02454	14.14286
STUGP	3	16.92308	16.77822	16.92308

Analysis 4

MANCOVA OF CONFID COMPAC WITH TIME

----- ANALYSIS OF VARIANCE -----
 EFFECT..STUGP
 MULTIVARIATE TESTS OF SIGNIFICANCE (S = 2, M = -1/2, N = 17 1/2)

TEST NAME	VALUE	APPROX. F	HYPOTH. DF	ERROR DF	SIG. OF F
PILLAIS	.19205	2.01827	4.00	76.00	.100
HOTELLINGS	.21436	1.92925	4.00	72.00	.115
WILKS	.81647	1.97400	4.00	74.00	.107
ROYS	.12259				

NOTE..F STATISTIC FOR WILK'S LAMBDA IS EXACT.

EFFECT..STUGP (CONT.)

UNIVARIATE F-TESTS WITH (2,38) D. F.

VARIABLE	HYPOTH. SS	ERROR SS	HYPOTH. MS	ERROR MS	F	SIG. OF F
CONFID	151.27153	1162.26551	75.63576	30.58593	2.47289	.098
COMPAC	132.36722	1630.75000	66.18361	42.91447	1.54222	.227

ESTIMATES FOR COMPAC ADJUSTED FOR 1 COVARIATE

ADJUSTED AND ESTIMATED MEANS
 VARIABLE..CONFID

FACTOR	CODE	OBS. MEAN	ADJ. MEAN	EST. MEAN
STUGP	1	11.57143	11.39370	11.57143
STUGP	2	7.21429	6.66784	7.21429
STUGP	3	8.28571	9.00988	8.28571

ADJUSTED AND ESTIMATED MEANS (CONT.)

VARIABLE..COMPAC

FACTOR	CODE	OBS. MEAN	ADJ. MEAN	EST. MEAN
STUGP	1	11.92857	12.02429	11.92857
STUGP	2	14.14286	14.43714	14.14286
STUGP	3	17.28571	16.89571	17.28571

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