

RELATIONSHIPS BETWEEN TWO METHODS OF VOCABULARY INSTRUCTION,
VOCABULARY ACHIEVEMENT, READING ATTITUDE, AND LOCUS OF CONTROL
IN A COMMUNITY COLLEGE READING COURSE

by

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ABSTRACT

The purpose of this study was to examine effects of interactions between learner characteristics and instructional approaches on vocabulary skill development. Aptitude variables included language background (English first or second language), prior vocabulary achievement, attitude toward reading, and locus of control. Dependent variables included vocabulary achievement, attitude toward reading, satisfaction with instruction, and achievement attribution.

Two methods of teaching general reading vocabulary were developed which varied in instructional task and format of learning materials, designed to interact with the locus of control construct. Treatment A centered around the use of a daily newspaper, and was intended to capitalize on strengths of internal locus of control students by fostering self-direction and decision making. Treatment B used wordlist-classification vocabulary exercises developed especially for this study, and was designed to facilitate learning for external locus of control individuals. Approximately twelve hours of vocabulary instruction were delivered during an eight-week period.

Treatment group subjects were community college students enrolled in a reading and study skills course at the grade 11 level. The control group was composed of students enrolled in business education courses at the same school. The final sample included 35 students in Treatment A, 37 in Treatment B, and 17

in the control group. English was the native language for 65 percent of participants in the study.

Measuring instruments included the vocabulary subtests from the Gates-MacGinitie Reading Tests, Level F, Forms 1 and 2; the Mikulecky Behavioral Reading Attitude Measure (used for both pre and post measures); Rotter Internal-External Scale; and two questionnaires developed for this study, Vocabulary Study Evaluation Questionnaire (satisfaction measure) and Vocabulary Attribution Scale.

Analysis to detect main effects and aptitude treatment interactions consisted of forward stepwise multiple regression with hierarchical inclusion. Regression analyses are reported for each of the four dependent variables. The full model regression was found to be significant on two of the dependent variables, vocabulary achievement and attitude toward reading. For the dependent variable vocabulary, significant aptitude main effects were found for language background and prior vocabulary achievement; for reading attitude, prior vocabulary achievement and initial reading attitude were significant; for attribution the significant aptitude variables were prior vocabulary achievement and locus of control. A significant treatment effect was found when the combined treatment groups were compared with the control group in the vocabulary achievement regression. The Treatment A-Treatment B contrast was not significant for any of the dependent variables.

Four aptitude by treatment interactions are discussed: (1) attitude x group (treatment versus control) on vocabulary, (2) vocabulary x group on attitude, (3) attitude x treatment (Treatment A versus Treatment B) on attribution, and (4) locus of control x treatment on attribution.

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CHAPTER I

INTRODUCTION

Researchers have spent vast amounts of time and effort in an attempt to discover how best to teach vocabulary. A 1963 bibliography of vocabulary studies listing 3,125 titles (Dale & Razik, 1963) prompted the Executive Committee of the National Council of Teachers of English to initiate a study of vocabulary research (Petty, Herold, & Stoll, 1968). The investigating committee selected and analyzed eighty studies and concluded that, to their satisfaction, no particular method was superior to any other method. The search for a better method continues, reviews and bibliographies of vocabulary studies continue (Bowker, 1980; Dale, Razik, & Petty, 1973; Fairbanks, 1977), but still there are only generalizations about the effectiveness of specific vocabulary teaching methods.

The majority of investigations in the area of vocabulary instruction attempt to measure the effectiveness of isolated factors. A more fruitful approach might be to adopt an interaction research design. Aptitude treatment interaction (ATI) research, a method of inquiry attributed to Lee J. Cronbach and his colleagues, has evolved from a continuing attempt by educators to determine how and why individuals learn differently.

The scientific problem is to locate interactions of individual differences among learners with instructional treatments, that is Aptitude x Treatment

interactions. To establish the existence of interaction requires a special style of educational-psychological research. Two broad lines of behavioral science, the experimental and the correlational, have been the standard ways of investigating instructional methods and aptitudes, respectively. Interaction research combines the two. (Cronbach & Snow, 1977, p. 2)

Although results from ATI research can provide direction for individualizing instruction (Carrier & McNergney, 1979), especially in reading instruction (Rodriguez, 1978; Wood & Hoose, 1972), few ATI studies at the secondary or adult level have been reported.

Statement of the Problem

This field-based study uses ATI methodology to investigate interactions between specific learner characteristics and two vocabulary instructional methods introduced as supplementary units in a community college reading and study skills course. The two methods of teaching vocabulary vary in amount of structure and format of learning materials. Treatment A, newspaper-context, used a daily newspaper as a source for selecting words to study. Treatment B, word list-association, used preselected vocabulary study words in an embedded classification system, using materials developed by the investigator. Students enrolled in business education courses served as a control group in the study.

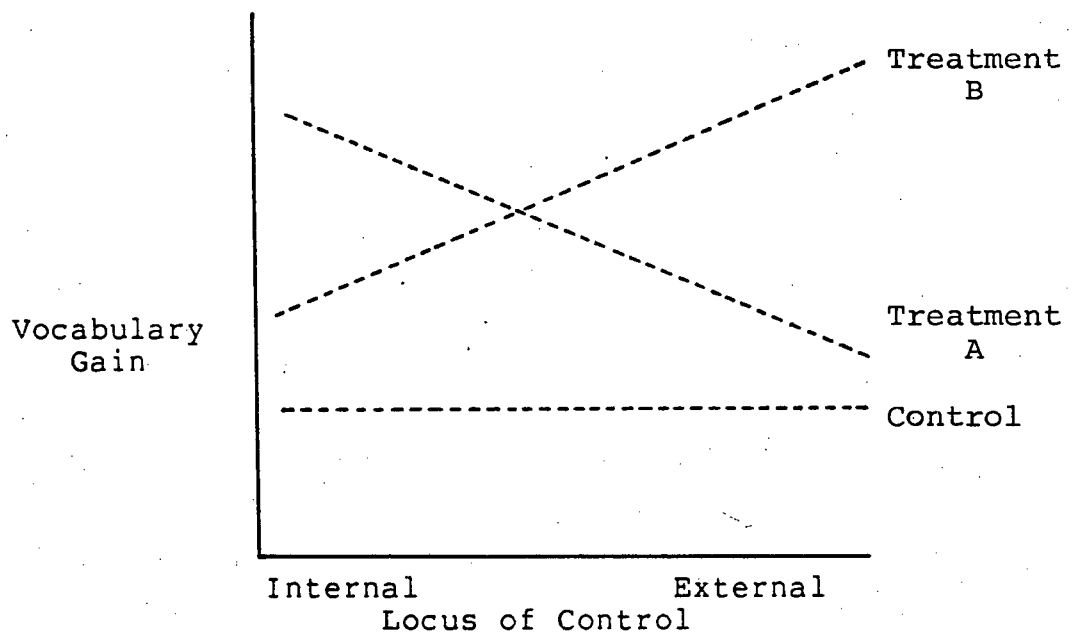
Learner variables included vocabulary achievement, reading attitude, locus of control, satisfaction with treatment, achievement attribution, and a categorical variable, language

background (English first or second language). Demographic data were also collected to describe the sample. Effectiveness of the vocabulary instructional methods was tested by administering two forms of a vocabulary subtest from a standardized reading test as pre- and posttests.

Specifically, this study examined main and interaction effects of four independent variables (language background, prior vocabulary achievement, initial reading attitude, and locus of control) on each of a series of four dependent variables (vocabulary achievement, reading attitude, satisfaction, and attribution). The following research hypotheses were constructed for this study:

- H.1 Students in the treatment groups will demonstrate greater gains in vocabulary achievement than students in the uninstructed control groups.
- H.2 Treatments A and B will not be differentially effective in increasing vocabulary achievement when averaged across levels of aptitude.
- H.3 Treatment A will be of greater benefit in increasing vocabulary achievement for students with relatively high internal locus of control scores, whereas Treatment B will be of greater benefit for those with relatively greater external scores.

The joint effects of these three hypotheses can be illustrated as:



This is to illustrate the general form of the hypothesized interactions; exact slopes are not hypothesized.

In addition to the two principle hypotheses, three ancillary research questions were addressed:

- Q.1 How does language background influence scores on vocabulary achievement, reading attitude, satisfaction, and attribution?
- Q.2 Does prior attitude toward reading interact with instructional treatment on vocabulary achievement, reading attitude, satisfaction, or attribution?
- Q.3 Does prior vocabulary achievement interact with instructional treatment on vocabulary achievement, reading attitude, satisfaction, or attribution?

Significance of the Problem

The 1980 British Columbia Reading Assessment revealed a weakness in vocabulary skills at the grade 12 level (Tuinman & Kendall, 1980b). A mean percentage score of 62 was reported on items testing multiple meanings, which the interpretation panel rated as marginal performance. The importance of vocabulary skills was emphasized:

There is little doubt in our minds that the performance of the students in this domain is cause for concern. The objectives involved are very important; they represent skills which are a key to independent progress as a reader. (p. 78)

In addition, the authors speculated that the 62% mean score for items testing multiple meanings indicated that too many graduates of grade 12 are likely to have problems using the dictionary (Tuinman & Kendall, 1980a).

Students need instruction in vocabulary. Few reading teachers would argue the importance of an adequate vocabulary, its contribution to academic success, or the relationship between vocabulary and reading comprehension. However, rarely would reading teachers agree on one best method for improving vocabulary skills. Agreement might be reached on the relative merits of techniques or combinations of techniques for learners possessing specific characteristics, but at present the teacher must rely heavily upon intuition and experience when assigning students to methods and materials. Information derived from ATI research could provide direction for individualizing vocabulary instruction.

Definition of Terms

In an attempt to control some of the ambiguities in vocabulary research, researchers have defined "vocabulary" by designating subsets of words students know according to some dimension. Burmeister (1978) contends that

We all have two types of vocabularies-- receptive and expressive. Our receptive vocabulary is composed of the words we recognize through reading and listening. This vocabulary is usually several times larger than our expressive vocabulary, which is made up of the words we use when we speak and write. Our total vocabulary is composed of the words we recognize and/or use in receptive and expressive ways. (p. 127)

Five different types of vocabularies involved in communication are discussed by Olson and Ames (1972): nonverbal, listening, reading, speaking, and spelling. Another classification scheme (Dale & O'Rourke, 1971) follows four levels of comprehension involved in word knowledge which range from "I never saw it before" to "I know it." In their analysis of eighty vocabulary studies, Petty et al. (1968) noted that researchers tended to break vocabulary into groupings such as the vocabularies of speaking, writing, listening, and reading. This study also addresses a subset of vocabulary. Definitions of constructs applicable to the study are listed below.

1. Reading vocabulary. Includes words recognized and understood when encountered in written prose.
2. Vocabulary achievement. Level of competence in word recognition as measured by a subtest of a standardized reading test.
3. Reading attitude. Feelings toward reading as measured by a behaviorally oriented instrument.

4. Locus of control. A personality construct whereby an individual perceives a reinforcement as contingent upon his own behavior (internal) or as being outside his control (external).
5. Language background. Classification of students according to first language learned: native speakers learned English as a first language, whereas ESL students learned English as a second language.
6. Vocabulary instruction. Activity designed to accelerate acquisition of word meanings and concepts.

Overview

The present study is designed to examine effects of interactions between learner characteristics and two instructional approaches on vocabulary skill development. Chapter II reviews literature relating to the problem, develops constructs defined above, and synthesizes previous research to provide a conceptual base for the study. In Chapter III the methodology is outlined, including development of the instructional strategies and experimental materials. The results of the study are presented in Chapter IV. The study is summarized in Chapter V, and conclusions and recommendations for further research complete the report.

CHAPTER II

REVIEW OF LITERATURE

Literally thousands of vocabulary studies have been published. The first section of this chapter reviews a selection of literature concerning the teaching of vocabulary at the secondary, college, and adult levels, addressing three areas of concern in the present study: (1) methods of teaching vocabulary, (2) research in the teaching of vocabulary, and (3) materials for vocabulary study. Aptitude-treatment interaction research is reviewed in the second section of the chapter, which is further divided into two parts: (1) instructional treatments, and (2) aptitude variables of prior learning/achievement, attitude, locus of control, and attribution theory.

Vocabulary Instruction

Methods of teaching vocabulary

Vocabulary is gained from experiences and the association of these experiences into words. Stated with some oversimplification, the process involves sensory perception of an object or the attributes of an object, or perception of the relationships of objects with one another. Each new perception is added to earlier perceptions, the composite then being associated with the words whose meanings are already known or with new words spoken or written by another person. (Petty et al., 1968, p. 14)

Vocabulary acquisition is an ongoing, human process which, research has shown, can be accelerated by instruction. Methods of teaching vocabulary are labeled and categorized in a number

of ways.

In the NCTE investigation of vocabulary studies concerned directly with pedagogical method, Petty et al. (1968) observed that the teaching of vocabulary usually consists of

- (1) the teaching of words and their meanings through their use in the context of other words,
- (2) a process of word analysis and synthesis in which the meanings of word elements are taught, and
- (3) the direct teaching of the meanings from listings of words thought to be important.

After noting the variations in teaching procedures in the studies, the investigators classified the various procedures under the two general headings of direct and context methods. Included in the direct methods were the word lists and word parts approaches; subcategories within context methods were context clues and incidental learning.

In an attempt to update the Petty et al. (1968) reports, Bowker (1980) grouped teaching methods employed in fourteen recently published studies. Bowker's categories included

- (1) concept learning,
- (2) imagery (use of visual aids),
- (3) natural word learning (an experience approach appropriate for young children), and
- (4) cognitive style (analytic/holistic approach).

Eisenberg (1979) claims that the various techniques for teaching vocabulary tend to endorse four common tactics:

- (1) etymological history,

- (2) morphological components of words,
- (3) sentence context, and
- (4) dictionary drills.

Kingston (1965) discusses incidental and direct approaches and recommends that instructional procedures should move from concrete toward abstract and from simple associations to more complex. Four basic aids in attacking unknown words form the basis for another classification system for vocabulary development (Olson & Ames, 1972):

- (1) context,
- (2) structure,
- (3) sound, and
- (4) dictionary.

Several authors discussed vocabulary teaching methods by illustrating specific teaching strategies. Dale and O'Rourke (1971, p. 5) emphasize that

vocabulary development in school must be a planned program. The research in the field indicates that this is a sound principle. Incidental teaching, alone, tends to become accidental teaching.

Their textbook, Techniques of Teaching Vocabulary, lists and illustrates seventeen categories of word development, emphasizing the ordering of concepts.

Another excellent reference for developing vocabulary strategies (Burmeister, 1978) supports teaching concepts through vocabulary development, and illustrates strategies in four areas:

- (1) denotations of words,

- (2) word connotations and figurative language,
- (3) diachronic (language as it changes through time), and
- (4) phonics.

Based upon cognitive theories for associative memory structure, hierarchical memory structure, and interactive long-term memory structure, Gipe (1978-1979) developed and tested three techniques for teaching word meanings which represented each of these three views. The three techniques were described as follows:

The association method paired the unknown, or target, word with a familiar synonym or brief definition. The task required that the subjects memorize the pairings in order to be able to write the original pairs without referring to the study sheet.

The category method required that the subjects add to a list of words fitting a general category. Each list provided for the subject contained 1 target word and 3 familiar words. The subjects were asked to study the lists, to add words from their own background to each list, and then to recategorize a random listing of all the previously provided words without referring to the study list.

The context method utilized the target words in meaningful sentences. This method required that the subjects read a 3-sentence passage in which each sentence used the target word in a defining context. The context of the sentences were of a simple sentence structure and contained common words to make the context familiar. Each subject was asked to respond in writing to a question at the end of the passage with a word or phrase from his personal background experiences that further exemplified the target word.
(p. 627)

In addition to the three methods reflecting the views on word learning, a fourth method, labeled dictionary, was also described. Using this method, students would look up the target words in the dictionary, copy their definitions, and then write a sentence containing the new word.

A three-step categorization strategy,

- (1) word fluency,
- (2) list-group-label lesson, and
- (3) feature analysis,

is described by Readence and Searfoss (1980), which was designed both to improve prediction and problem-solving skills and to assist students in ordering their own experiences. The classification technique was also used by two researchers (Catterson, 1960; Corcoran, 1962) when comparing inductive and deductive methods of teaching word analysis.

Analogies, according to Ignoffo (1980), are effective because they not only develop vocabulary acuity but also the skills of thinking and reading. Ignoffo points out that analogies carry an implied context, require the student to create thought patterns, and effect inductive and deductive reasoning. Similar to analogies, a strategy described by Kurth (1980) suggests that categories of meaning developed by Osgood could be used as a basis for a developmental vocabulary program. Modified descriptions of Osgood's twenty categories are presented which can be used to develop lessons which, according to Kurth, give students practice in using words in context and enable students to see relationships between words.

Vocabulary strategies described by Kaplan and Tuchman (1980) were developed to more actively involve students in order to foster independent learning skills. Students are required to select their own words for study, and learn them using context, prediction, and association activities. A similar procedure,

recommended by Hoover (1979), was designed for students to improve their vocabularies by selecting words from their reading and learning them via a carefully designed writing exercise.

Summary and conclusions. Numerous vocabulary teaching techniques are available to the reading teacher, and a representative group of those methods which could be adapted for the adult learner have been discussed above. The major fault of the techniques reviewed is that they present teaching strategies alone. Only the methods developed by Gipe (1978-1979) were based directly upon theoretical rationale relevant to learning word meanings.

Vance (1979) reviewed recent psychological research relating vocabulary and memory and concluded that the teaching techniques endorsed by educational psychologists--field trips, experiential learning, vocabulary in context, using imagery, vivid examples, and categorizing words--

may be part of any good teacher's repertoire of methods for advancing students' knowledge of words. What is significant is that psychologists have conducted research which helps to verify those assumptions, and gives teachers an empirical foundation to support their pedagogical decisions.
(p. 51)

It can be concluded, therefore, that many of the vocabulary teaching methods can, in fact, be directly related to psychological research on processing and memory.

Further inspection of the teaching methods described and listed above reveals that they vary in two dimensions, selection of vocabulary study words and format of instructional materials. Recent studies (Kaplan & Tuchman, 1980; Hoover, 1979) recommend

strategies which require the students to select their own vocabulary study words; however, the teacher selects words in the majority of the techniques. The second dimension of variability in techniques, format, concerns presentation of study words. Although most of the techniques reviewed adopted polar positions of words presented either in context or in isolation, more recent studies present words with associations. Vance (1979) contends that

it would be easier to learn several words from a single category than a random list. This suggests that categorizing and grouping words would be a good activity for vocabulary building. (p. 48).

The selection/format schema can be applied to vocabulary methods discussed in this section (see Table 1). Each method is classified in terms of format (words in context, words with associations, or words in isolation) and source of words (teacher selected or learner selected).

Table 1. Classification of vocabulary teaching methods¹

Format	Source of words for study	
	Teacher Selected	Learner Selected
1. Words in context		
-- words in sentences	*	
-- wide reading		*
-- cloze procedures	*	
2. Words with associations		
-- category techniques	*	
-- imagery (audio visual)	*	
-- natural word learning	*	*
-- analogies	*	
-- synonyms/antonyms	*	
3. Words in isolation		
-- word lists	*	
-- dictionary study	*	
-- structural analysis	*	

¹"*" indicates source of words.

Research in the teaching of vocabulary

In reviewing the literature on vocabulary instruction at the secondary and adult levels, it was found that professional reference books contained basic information on methodology, while a multitude of journal articles provided more innovative teaching techniques. The review by Petty et al. (1968), The State of Knowledge about the Teaching of Vocabulary, provides excellent background in vocabulary research. Since 1968 many of the more comprehensive research efforts have resulted from doctoral dissertations in reading. Ten of those recent studies, which have direct bearing on the two treatments designed for this study, are examined in detail in this section. The studies are reviewed from four instructional perspectives:

- (1) context-wordlist,
- (2) direct-incidental,
- (3) association, and
- (4) ATI research.

Context-wordlist. Several studies were designed to compare achievement resulting from teaching techniques presenting words in context as opposed to word lists. Two treatments developed in a study by Brown (1978) were described as

- (1) new words introduced organically with contextual relationships developed, and
- (2) new words introduced inorganically without contextual relationships.

Analysis of pretest-posttest scores revealed that there was a statistically significant difference between the language

acquisition change scores of adults taught by the two methods. Greater gains were made by students in the inorganic group, where students learned words from instructor-prepared wordlists which had no relationship to the remainder of their classwork. Also, females demonstrated greater vocabulary acquisition than males, as did students classified as average and high in mental ability as compared with those of lower ability. No significant differences were found, however, when comparisons were made by student age.

An identical group of words was taught to two groups of secondary students to compare

- (1) a modified cloze story procedure and
- (2) isolated lists with definitions

in an eighteen week study conducted by Swing (1978). No significant differences were found between the gain scores of the cloze group and the traditional group on either a standardized test (Gates-MacGinitie Reading Test-Survey F) or a criterion referenced vocabulary test.

Nichols (1977) conducted a study designed to improve both spelling abilities and vocabulary comprehension in a college freshman English course. The experimental group read investigator-prepared passages in which selected words were used at least three times. Students in the control group were given study sheets containing a list of the selected words and their meanings for memorization. At the conclusion of the four week experiment, there was a significant difference in favor of the control group on both spelling ability and vocabulary ability.

Direct-incidental. Varied findings were reported when two evaluative instruments were used to compare the effectiveness of three approaches to vocabulary improvement in grade 9. The three approaches,

- (1) direct-teaching,
- (2) interest-in-words, and
- (3) wide-reading,

were used in eight classes in a fourteen week study. Using the Nelson-Denny Reading Test, no significant differences were found when the experimental groups were compared to a control group. When the Diagnostic Reading Test was used to make the same comparisons, the "interest-in-words" approach showed improvement significant at the .05 level. The investigator (Hammack, 1971) concluded that further research is needed in specific structured approaches to teaching vocabulary as well as in improving vocabulary measuring instruments.

Achievement resulting from three methods of vocabulary instruction,

- (1) contrived contextual,
- (2) wide reading, and
- (3) practical high school English,

was compared in a thirteen week study by Blevins (1971). The contrived contextual method was found to be inferior to the wide reading and traditional English course when pretest-posttest scores from The Nelson-Denny Reading Test were analyzed. It was concluded that vocabulary instruction that provides for word study in the broader natural context of the message conveyed by

connected words was superior to isolated (contrived) vocabulary instruction.

Wright (1974) designed and conducted a study to compare the differential effectiveness of three developmental reading treatments upon the rate, vocabulary, and comprehension skills of white and black students. The three treatments varied in delivery and materials:

- (1) teacher-directed, large group instruction plus workbook,
- (2) teacher-directed, large group instruction plus individual self-instruction and workbook, and
- (3) individual self-instruction plus multi leveled, multi media utilization.

A multiple regression analysis was used to answer twenty research questions. Statistical findings relating to vocabulary indicated an ordinal interaction between race and treatment effecting the criterion vocabulary scores.

Association. A carefully designed set of vocabulary exercises was designed and tested by D'Abre (1977). The exercises utilized 1120 words, using a categorization technique, team learning techniques, and a self-directing, self-correcting format. The control classes spent the same amount of time during the seven week period using traditional methods and materials: looking up meanings in dictionaries, writing out meanings, and writing the words in sentences. Gains in learning the specific vocabulary of the study, when measured by an investigator designed test, revealed a significant difference in

favor of the experimental group. Although the experimental group also registered slight gains in vocabulary as measured by the Gates-MacGinitie Vocabulary Test, the gains were not of a magnitude to be statistically significant. The categorization method was quite effective in teaching the words selected for the study, but did not produce a transfer effect.

A traditional and a mnemonic method of vocabulary development were compared by Johnston (1975) using a randomly selected sample of 96 average ability grade 10 students. The traditional group received instruction in the use of synonyms, word analysis, and context clues; the mnemonic group received a limited amount of traditional instruction plus the use of an artificial memory aid; and the control group received no specific vocabulary instruction. Four teacher-constructed tests were administered: (1) pretest, (2) posttest, (3) follow-up, and (4) a second follow-up testing cognates of words on the list. There were no significant differences between means on Tests 1 and 4, but significant differences at the .05 level on Tests 2 and 3. Johnston concluded that the traditional and mnemonic methods were equally effective for the specified word list, but for the word cognates neither method produced gains greater than the control group.

The relationship between aptitude factors and vocabulary learning at different stages of practice was investigated by Dumlao-Valisno (1972). Two forms of vocabulary materials were used:

- (1) word meanings taught through the use of synonyms, and

- (2) word meanings taught through the use of definitions of words found in the dictionary.

A battery of ten ability tests measuring perceptual speed factors was administered to each student, and then classes of grade 10 students were randomly assigned to the two treatments. Students were required to learn four words per day, with scores from timed daily criterion achievement tests, and length of time each subject spent completing each set of learning materials, serving as criterion measures. A major finding in the fifteen day investigation was evidence for the "learning how to learn" phenomenon: the students improved on the achievement test and took less time in learning the material as the study progressed in both of the treatment groups.

ATI research. One vocabulary study was located which followed the aptitude-treatment-interaction model (Cronbach & Snow, 1977). Krevoy (1978) investigated the relationships between individual differences in ability to utilize analytic and holistic encoding strategies and vocabulary learning and recall. Students ($n = 161$) were first tested and classified as more competent in either analytic or holistic processing, then randomly assigned to experimental (instructional tasks with an analytic-sequential organization or instructional tasks with a holistic-simultaneous organization) or control treatments. Results of a Newman-Keuls test showed that a match between treatment and encoding strategy resulted in significant increases in vocabulary learning and retention, suggesting compatibility between encoding strategies and teaching method

may be an important contributor to successful vocabulary learning. Furthermore, vocabulary learning and retention significantly increased under treatments calling for generative elaboration of concepts in both analytic and holistic strategies in comparison to the control treatments.

Summary and conclusions. The ten studies reviewed above and summarized in Table 2 were selected because they represent recent research efforts comparing different approaches in vocabulary instruction. In the context-word list group, results from two studies (Brown, 1978; Nichols, 1977) favored the word list treatment; a third study (Swing, 1978) found no significant differences between word list and modified cloze procedures. Results from these three studies suggest that word list methods are equal to or surpass context methods. When Petty et al. (1968) in their review of eighty vocabulary studies found accumulating evidence supporting the teaching of words in isolation over words in context, they regarded that finding as "something of a fluke" due to inadequate measurement instruments or ineffective context treatments. Superiority of the word list method seems to contradict conclusions drawn from learning theory, but if evidence in its favor continues to accumulate, it should not be disregarded.

The Petty et al. (1968) review reported increasing amounts of support for direct vocabulary teaching methods as opposed to incidental methods; the authors seemed to view dispelling the "wide reading" approach as a positive step in the teaching of vocabulary. Generalizations cannot be drawn from three direct-

incidental studies reviewed here, as results appear to be somewhat inconclusive. Results from the study reported by Blevins (1971) favored the connected prose treatments, but the study was based upon only 36 subjects divided into three treatment groups; the small sample would certainly render results tenuous. Results reported by Hammack (1971) varied according to the vocabulary instrument used: significant gains for the experimental groups using the Nelson-Denny Reading Test, but no significant gains using the Diagnostic Reading Test. Perhaps, as Hammack concludes, validity of the standardized tests of vocabulary is suspect. On the other hand, fault may lie in the method used to analyze the data, as the t-test statistic was used repeatedly.

Three of the studies reviewed tested teaching methods which presented words with associations. D'Abre's (1977) results favored a categorization method over traditional methods on a corpus of 1120 words, but no significant gains were shown on a standardized reading test. Johnston (1975) found traditional instruction and an experimental mnemonic treatment equally effective for a specified word list, but again no transfer effect when students were tested on word cognates. An association method (synonyms) was also found as effective as a traditional method (definitions) by Dumlao-Valisno (1972), but again only with a selected group of words. It appears from these three studies that association methods are effective for learning a specified group of words, but questionable if aiming

for a general transfer of learning as measured by standardized vocabulary tests.

Results from the ATI study conducted by Krevoy (1978) suggest that compatibility between encoding strategies and teaching methods contribute to successful vocabulary learning. However, the results reported were based upon Newman-Keuls tests, indicating that data were analyzed using analysis of variance techniques; regression analysis is the preferred statistical test in ATI studies.

Table 2. Summary of ten recent vocabulary instruction studies

Research area and Investigator	Grade Level	Number of Ss	Treatments/groups	Treatment Length	Vocab. Instruments	Results
<u>Context-Wordlist</u>						
Brown (1978)	2 year college	unknown	1) organic contextual 2) inorganic noncontextual 3) control	unknown	unknown	Treatment 2 superior to 1
Nichols (1977)	1st yr college	20 classes	1) incidental reading of selected passages 2) word list	4 weeks	unknown	Treatment 2 superior to 1
Swing (1978)	high school	45 49	1) modified cloze 2) word lists	18 weeks	Gates-MacGinitie	No. sig. diff.
<u>Direct-Incidental</u>						
Blevins (1971)	adult	36 total	1) contrived contextual 2) wide reading 3) published program	13 weeks	Nelson-Denny	Treatments 2 & 3 superior to 1
Hammack (1971)	9	130 exp. 34 con.	1) direct teaching 2) interest in reading 3) wide reading 4) control	14 weeks	Nelson-Denny Diagnostic Rdg Test	No sig. diff. Treatment 2 superior to 1, 3, and 4
Wright (1974)	college	74 exp. 25 con.	1) directed large group 2) large group+self-inst. 3) individualized self-inst. 4) control	1 sem.	Diagnostic Rdg Test	Sig. interactions
<u>Association</u>						
D'Abre (1977)	8	128 136	1) category 2) control	7 weeks	Gates-MacGinitie	No sig. gains
Dumlao-Valisno (1972)	10	5 classes	1) definition 2) synonym	15 days	Researcher developed	Evid. of "learning how to learn"
Johnston (1975)	10	96	1) traditional 2) mnemonic 3) control	8 weeks	Researcher developed	Treatments 1 & 2 equally effective for word list
<u>ATI Research</u>						
Krevoy (1978)	1st yr college	161	1) analytic-sequential 2) holistic-simultaneous 3) control	unknown	unknown	Sig. ATI's

Materials for vocabulary study

Numerous published vocabulary programs are available to the reading teacher. Most of the programs rely heavily on repetition and memorization of words selected from lists based upon frequency counts. Dale and O'Rourke (1971) suggest that in vocabulary development teachers and students should concentrate on "almost known" words--words students have heard of or seen before but are unsure of their exact meanings. What proportion of "almost known" words are contained in published vocabulary programs? Students can best identify their own "almost known" words, and in an effort to lead students to become independent learners, several professionals in the field (Hoover, 1979; Johnson, 1969; Kaplan & Tuchman, 1980; Moore, 1979) have suggested that students should assume greater responsibility for their vocabulary development.

Several studies (Johnson, 1969; Kamal, 1981; Moore, 1979) report successful use of the newspaper in vocabulary building. Moore (1979) lists four advantages of using the newspaper:

- (1) it contains interesting material;
- (2) it uses a somewhat repetitious vocabulary, which reinforces learning;
- (3) it will help students realize the value of succinct language; and
- (4) it has a positive affective effect.

In addition, the newspaper route to vocabulary collection promotes a lifelong habit of vocabulary growth:

After high school, some students will continue to read books; very few (if any) will read vocabulary workbooks; however, most of them will read the newspaper. (Moore, 1979, p. 37)

A six-week study conducted by Kamal (1981) was designed to assess the impact of two different types of instructional material for reading skills development:

- (1) the newspaper and newspaper related activities, and
- (2) basal reader and workbook activities.

The sample included 161 language arts students in grades 6, 7, and 8. Highly significant differences were found between the change scores in listening vocabulary, inferential, and total comprehension for students in the newspaper group; no significant differences between the changes occurred in the same areas for students using the basal reader approach. Results of the study indicate that the newspaper is an effective resource for developing reading skills and that newspaper activities have a positive effect in the classroom.

The importance of reading attitude was emphasized in the British Columbia Reading Assessment Summary Report (Tuinman & Kendall, 1980a). Included in the twenty-one recommendations to raise students' overall performance were two in the reading attitude domain:

- Rec. 15. We recommend that all teachers provide programs that encourage and require students to engage in independent reading, both in and out of class.
- Rec. 16. We recommend that all teachers take active measures to stimulate interest in reading with the goal of increasing positive attitudes toward reading. (Tuinman & Kendall, 1980a, p. 63)

A newspaper vocabulary building approach, presenting words through a popular medium and in an interesting context, would address those goals.

Aptitude Treatment Interaction Research

Interaction research as a form of inquiry is referred to by a variety of terms, including trait-treatment interaction, person-situation or person-environment interaction, and attribute-treatment or aptitude-treatment interaction. The terms may differ, but interaction research has a common goal which, stated simplistically, is finding out what instructional method works best with which types of students. An increasing number of articles have appeared during the last decade which report interaction research. An extensive review of research efforts in this area and statistical and methodological issues was provided by the 1977 publication of Aptitudes and Instructional Methods: A Handbook for Research on Interactions by Lee J. Cronbach and Richard E. Snow. Their terminology, Aptitude x Treatment interaction, shortened to ATI, has become the most widely recognized cognomen for interaction research.

Parkhust (1975) provides a succinct definition of ATI:

An aptitude variable can be any personological or organismic variable upon which individuals differ (e.g., IQ, anxiety, dogmatism, etc.). A treatment is any instructional strategy or combination of instructional strategies that structures information for the purpose of having students learn that information. An aptitude-treatment-interaction exists when, as a result of a given treatment, individuals at one end of an aptitude variable perform at one level on a criterion measure. Also, individuals at the other end of the aptitude variable perform at a

significantly different level on the criterion measure and the reverse trend holds true for a second treatment. (p. 172)

Instructional treatments

Designing ATI research requires simultaneous consideration of learner attributes and instructional options. Salomon (1972), noting the lack of conceptual tools for designing ATI research, developed three heuristic models based upon the function of instructional treatment:

1. Remedial--treatments lead to mastery of necessary deficient subordinate objectives.
2. Compensatory--treatments provide the learners with the necessary mediators, organization of materials, modality and the like, which they cannot provide for themselves; or circumventing debilitating effects of certain psychological traits or states.
3. Preferential--treatments call upon and utilize learners' higher aptitudes, neither making up for deficiencies nor compensating for them.

The fact that many instructional treatments tend to overlap in function, contends Salomon, does not preclude the need to clarify those functions.

The need for a taxonomic analysis of instructional treatments from a stimulus point of view is pointed out by Cronbach and Snow (1977). Readers of Cronbach and Snow's Handbook, after encountering what seems like an endless list of instructional treatment descriptions--

guided-discovery/didactic,

conventional/programmed,
 directive/nondirective,
 inductive/deductive,
 self-discovery/structural, etc.

--would certainly agree. As Cronbach and Snow point out powerfully, until such a taxonomy or theory of instruction is developed and accepted, comparisons and replications of ATI studies will remain difficult, and generalization of results must be approached with caution.

Aptitude and outcome variables

A purposely broad conception of aptitudes is put forth by Cronbach and Snow (1977):

..."aptitude" is here defined as any characteristic of a person that forecasts his probability of success under a given treatment. We emphatically do not confine our interest to "aptitude tests." Personality as well as ability influences response to a given instruction. Nontest variables (social class, ethnic background, educational history) may serve as proxies for characteristics of the learner that are not directly measurable. (p. 6)

As a research strategy the investigator can select an aptitude variable and design instructional treatments that are likely to interact with that variable. Locus of control, a personality variable, was chosen as the key variable in this study. It is generally recommended (Carrier & McNergney, 1979; Cronbach & Snow, 1977; Parkhust, 1975) that ATI studies consider several measures of the person, and also that the construct entering the main hypothesis be appraised by at least two methods. Within these guidelines, the following aptitude

variables were included in this study:

- (1) locus of control (key variable of interest),
- (2) vocabulary achievement (general measure of ability; pretest used as covariate),
- (3) reading attitude (affective measure; pretest used as covariate), and
- (4) language background (to statistically control for differences in experimental population).

Outcome measures (dependent variables) in the study included:

- (1) vocabulary achievement (alternate form of pretest),
- (2) reading attitude (pretest repeated),
- (3) achievement attribution (an index related to locus of control), and
- (4) satisfaction with instruction (student evaluation of instructional units).

Literature was reviewed to select and design measures for the aptitude and outcome variables.

Prior learning/achievement. Tobias (1976), after reviewing a number of ATI studies, established a general hypothesis that the higher the level of prior achievement, the lower the instructional support required to accomplish instructional objectives. Parkhurst (1975) concurs, and supports the notion of students' prior knowledge of subject matter as an aptitude variable in ATI research. This variable can be defined as a pretest score, and sometimes easily measured as such.

Attitude. Attitude can be used either as an aptitude or as an outcome of instruction in ATI research design. A recent study using a community college population (Tolsma, 1981) found a correlation of .19 between students' reading scores (Gates-MacGinitie) and their attitude scores (Mikulecky Behavioral Reading Attitude Measure) on pretest measures. This correlation was lower than expected, tending to confirm Mikulecky's (1976) claim that reading attitude, as measured by the Mikulecky Behavioral Reading Attitude Measure, is a construct separate from reading competency. Further research is necessary to determine the relationship between reading attitude and aptitude and treatment variables.

Locus of control. The concept of locus of control as a psychological construct was first put forth by Rotter (1966) as part of a social learning theory. This construct refers to an individual's perception of the basis of his rewards and punishments in life--whether they are a consequence of his action or are totally unrelated to his behavior. Rotter constructed and validated a test, The Rotter Internal-External Locus of Control Scale, to order people along a continuum according to the extent to which they perceive the effects of reward or reinforcement on preceding behavior. Rotter further hypothesized that

this variable is of major significance in understanding the nature of learning processes in different kinds of learning situations. (p. 1)

The 1966 publication of Rotter's theory and test has formed the conceptual base for thousands of studies. Additional instruments have been generated to measure the extent to which people accept personal responsibility for events in their lives. Atkinson (1976) conducted an extensive review of locus of control tests and literature at the secondary level of education. He concluded that locus of control was a viable construct, which should be utilized by educators to improve instruction. In addition, research directions were outlined, with multiple-moderator and person-environment interaction recommended as methods of research. Morgan and Culver (1978) concur that the locus of control concept should be considered in instructional strategies and recommend continued research concerning affect and reading.

An ATI study conducted by Daniels and Stevens (1976) used locus of control as an aptitude variable (Rotter's I-E instrument) and designed two instructional methods, traditional learning and self-directed learning, as treatments. A strong interaction was found between locus of control and instructional method, and additional research was recommended to further investigate what kind of students benefit most from a particular method of instruction.

Reading achievement for internal-oriented students was significantly higher than external-oriented students at the conclusion of an individualized community college reading course in a study reported by Drummond, Smith, and Pinette (1975). Based upon these findings, Drummond et al. urged that

if the internal-external control of the student contributes significantly to the success or failure of his performance in an individualized reading course, then decisions about instructional methods and teacher behavior should be made on the basis of this type of information as well as on the basis of scholastic information. (p. 37)

Fisher and Dyer (1978) continued this line of inquiry with college students in a reading improvement course to determine

- (1) the relationship between locus of control and reading achievement under two methods of instruction, teacher-directed classroom and self-directed laboratory, and
- (2) the relationship between locus of control and preference for hardware (external devices) or software (internal devices).

Although results indicated no significant preference for laboratory or teacher-directed instruction, differences were observed on the hardware-software comparisons. Externals preferred using hardware (mechanical reading pacers and listening tapes) and significantly improved their reading rate using those devices as opposed to software (workbooks, skill exercises, and textbooks). Internals did not show a preference for materials, but evidenced greater reading improvement when using software devices.

Locus of control and mode of presentation were also investigated in a recent ATI study conducted by Rodriguez (1981). The experiment, designed to aid in individualizing instruction in college reading labs and classes, involved six treatment groups (total $n = 144$) using various forms of materials--audio, print, or a combined form--together with or

without a mathemagenic device (inserted organizational and attentional aid), in a two-part lesson on the concept of the syllable. Three student traits were considered: locus of control, reading comprehension, and prior achievement as measured by a syllable pretest. Analysis of variance techniques were employed to test for interactions and main effects. One two-way interaction, mode (form of material) x reading comprehension, was observed, but four main-effect differences on the dependent variable (syllable pretest) emerged:

- (1) locus of control in favor of internals,
- (2) pretest in favor of high scorers,
- (3) mathemagenic device in favor of those who used the device, and
- (4) reading comprehension in favor of the high ability group.

Webster (1981) investigated the relationship between reading achievement level (Nelson-Denny Reading Test) and locus of control (Scale to Measure Internal versus External Control) with a sample of 320 first year college students. No significant relationships were found between locus of control, reading achievement, or any of the several demographic variables considered.

Attribution theory. Attribution theory, a relatively recent development in psychology, concerns perception of causality. A subset of the literature in this area relates attribution theory and achievement motivation. In developing a classification scheme for perceived causes of success and

failure, Bernard Weiner was guided by Rotter's internal-external locus of control concept and four causes of success and failure--ability, effort, task difficulty, and luck--outlined by Heider (Weiner, Heckhausen, Meyer & Cook, 1972; Weiner, 1974a, 1974b). The resulting two-dimensional taxonomy classifies ability and effort as properties internal to the person, while task difficulty and luck are external factors. The second dimension of the classification scheme is stability; ability and task difficulty are seen as stable causes, while effort and luck are classified as being unstable. Table 3 delineates the 2 x 2 classification scheme, which Weiner contends is a key to the understanding of achievement striving.

Table 3. Weiner's classification scheme for the perceived determinants of achievement behavior

Stability	Locus of Control	
	Internal	External
Stable	Ability	Task difficulty
Unstable	Effort	Luck

Contradictions appear when Rotter's locus of control construct and Weiner's achievement attribution theory are compared. Some researchers (Cosner, Chandler, & Spies, 1980; Lefcourt, 1976) suggest that Weiner has "added to" locus of control theory. Ickes and Layden (1978) disagree:

It is nearly impossible to meaningfully compare and integrate the findings of the locus-of-control literature with the findings relevant to perceived locus of causality. (p. 126)

Differences between the two theories, according to Weiner, Nierenberg, and Goldstein (1976), are evident in interpretation of expectancy of success:

On the one hand, social learning theory makes use of concepts from reinforcement theory to furnish an explanation of clinical phenomena. In contrast, attribution theory utilizes concepts that evolved from "everyday life" to provide an analysis of social perception. (p. 52)

Both theories, then, are concerned with personal control. Social learning theory (locus of control) examines a person's perceptions of control over the positive and negative reinforcements he receives, while attribution theory (locus of causality) analyzes a person's perceptions of the cause of his successes and failures.

Thomas (1980) discussed the role of attribution theory as it relates to achievement:

Causal attributions then, act as a moderating variable between characteristics of students (attitudes, abilities, and need for achievement) and experiences of success and failure in school. Success-oriented students tend to attribute their successes to ability and effort and their failures to lack of ability. Failure-avoiding students tend to attribute their failures to a lack of ability. When successful, however, these students have a tendency to attribute this success to luck or to the easiness of the task. (p. 227-228)

Research reviewed by Thomas (1980) and Weiner (1980) indicates that to profit academically from successes and failures, students must attribute success to internal characteristics and

view lack of effort as the cause of failure. These findings have led educators to "attribution training"--an attempt to alter academically oriented attributions. Training programs based upon attribution principles usually attempt to change a low-ability attribution for failure to a lack of effort ascription. Attribution training studies reviewed by Thomas (1980) report successful results with students in elementary grades.

Although Weiner's model of causal attributions for success and failure has generated a great deal of research, few of the studies have been based in the community college classroom. A study conducted by Duby (1981) investigated the mediating role of causal attributions with community college students taught under two methods: (1) mastery learning conditions, and (2) conventional instructional procedures. It was found that attributions could be altered by instructional conditions, and Duby concludes:

The major implications to be drawn from this work are that instructional efforts should be directed at providing the student with learning experiences which encourage him to clarify and define his role in achievement situations. Therefore, use of instructional approaches which provide evidence of personal involvement as well as successful performance should be encouraged since they tend to result in both academic and attributional development. (p. 3066A)

Based upon Cronbach and Snow's ATI model, Cosner, Chandler, and Spies (1980) reported theories and instruments for student assessment at the community college level. Attribution theory was discussed, and although no commercially produced instrument

is available, Cosner et al. report tentative findings which recommend matching student academic attributions and instructional approach. Using an experimental instrument, it was found that a personalized system of instruction was more compatible with students exhibiting internal-effort attributions, while students with external-context attributions performed at a higher level in a lecture course.

An innovative application of attribution theory principles was described by Legare (1980): the use of attribution theory as a guide in the collection and interpretation of data when evaluating the effectiveness of educational programs. Information concerning success or failure of a program and causal explanations of participants can be obtained by questionnaire. Guidelines for attribution questionnaires have been provided by Elig and Frieze (1979). Causal attributions for a manipulated success-failure event were collected on five different measuring instruments. After careful comparisons, structured independent rating scales were found to be superior to open-ended or ipsative measures.

Summary and conclusions

The ATI approach appears to be a viable method of inquiry in the area of vocabulary instruction. Careful attention must be given to designing and defining the two instructional treatments which, using Salomon's (1972) models, would most approximate preferential treatments. According to Tobias' (1976) general hypothesis (the higher the level of prior achievement, the lower the instructional support required to

accomplish instructional objectives), the two treatments designed for the present study are likely to interact with vocabulary achievement level. The inclusion of attitude as an aptitude variable is for exploratory reasons. Locus of control appears to have impact on learning (Daniels & Stevens, 1976; Drummond, Smith, & Pinette, 1975; Fisher & Dyer, 1978; Rodriguez, 1981) and is most commonly measured by The Rotter Internal-External Locus of Control Scale. Attribution theory can be used both as a basis for evaluation and as a measure associated with locus of control. Both instructional treatments emphasize personal involvement and encourage successful performance, as recommended by Duby (1981). Therefore, students in both treatments should attribute their success in vocabulary development to the internal characteristics of ability and effort.

CHAPTER III

DESIGN AND METHODOLOGY

The present study uses ATI methodology to investigate relationships between specific learner characteristics and two vocabulary instructional methods introduced as supplementary units in a reading and study skills course offered in a community college. Although the ATI approach focuses on interaction analysis, an uninstructed control group was also included in this study.

Sample

Treatment groups

Students enrolled in two reading and study skills courses during the fall 1981 term at Vancouver Community College, King Edward Campus, served as treatment group subjects for this study. The day and evening reading and study skills courses are offered by the College Foundations Division and both carry grade 11 credit in an adult secondary program leading to a British Columbia grade 12 equivalency certificate. Course descriptions from the King Edward calendar are as follows:

Reading & Study Skills 077. An individualized course, Reading & Study Skills 077 is designed to help students whose reading ability is weak, to practise and develop the skills necessary for efficient reading and studying. Lecture time is limited; most of the five hours per week are spent working in the laboratory. Prerequisite: A desire to improve one's

reading and a score of 79 or lower on the Gates-MacGinitie Reading Assessment.

Reading & Study Skills 097. This course helps the student who can read reasonably well to become efficient in all reading and study areas. The student learns a variety of methods in dealing with printed material, as well as some basic skills in reading/writing work. Attention also is given to speed. Prerequisite: A score of 80 or higher on the Gates-MacGinitie Reading Assessment, or completion of Reading & Study Skills 077. Note: Students do not have to take both Reading & Study Skills 077 and 097. Credit is granted for one or the other, not both.

Five sections of the 077 course, one section of Reading & Study Skills 097, and one 077-097 mixed section were offered during the fall term. Enrollment in the seven sections ranged from 10 to 21 students. Intact classes were assigned to each of the two treatments, attempting to equate the groups in terms of day-evening classes, 077-097 students, and sample size. Four experienced reading teachers instructed the seven reading and study skills sections.

Control group

A person's vocabulary increases merely as a function of living in a social environment; that increase is further accelerated within an educational environment. To offset this maturational factor a control group, receiving no special vocabulary instruction, was included in the present study. Students in the control group were enrolled in three day and evening sections of beginning and intermediate touch typing courses and received no direct instruction in vocabulary improvement. Class lists were cross-checked to assure that no

students were concurrently enrolled in a reading and study skills course and either of the typing courses.

Instructional Strategies

Two eight-week units of instruction in vocabulary skills were developed based upon synthesis of the professional literature on vocabulary teaching methods, consideration of procedures which were likely to interact with aptitudes, and experience teaching in the field. The instructional treatments have a common objective--to increase reading vocabulary--and a number of common components. Differences in the treatments are in the nature of the instructional tasks and materials used to present those tasks.

Treatment A (newspaper-context) centered around the use of a daily newspaper, intending to capitalize on strengths of internal locus of control students. The instructional task required that the student select three words from the newspaper each day for vocabulary study; this self-selection task fostered independent decision making. After selecting study words, the student used a dictionary to complete a section of a recording form (see Appendix B) for each word, then constructed a sentence using the new word. Teachers offered assistance upon request, but did not mark or evaluate the students' vocabulary work.

Treatment B (wordlist-association) used vocabulary exercises developed especially for this study. Each exercise consisted of thirty words, varying in difficulty, which were to be classified in one of three related categories. The task was more structured than in Treatment A, and was designed to

facilitate learning for external locus of control students. After classifying the thirty words students were given immediate feedback by marking their own papers. Next, they chose three words for intensive study and completed a recording form (see Appendix A) similar to that used in Treatment A. The exercises were then submitted to instructors for marking. Structure was imposed in Treatment B by the materials used (word list provided as opposed to self-selecting words) and by teacher monitoring (marking of sentences).

Students assigned to Treatment A (newspaper-context) would, of course, be exposed to larger bodies of discourse during the experimental period. However, since the thirty minute vocabulary unit used only one-fourth of the two hour class period, leaving an additional ninety minutes of time for instruction in reading improvement each day, the difference in amount of discourse encountered during the experimental period was not expected to effect performance on the vocabulary achievement outcome measure.

Both treatments required use of a dictionary, afforded practice in sentence construction, and provided for regular review. In addition, both treatments were innovative, departed from the traditional workbook approach, and were designed to motivate adult students.

All students in the reading and study skills courses received instruction and practiced using context clues during the week before the experiment began. In addition, a general dictionary skills unit preceded the treatment exercises,

introducing students to entry format of The Oxford Paperback Dictionary (1979) and its pronunciation key; individual copies of that dictionary were available in the classroom for student use throughout the study.

Development of experimental materials

The vocabulary exercises for Treatment B, the word list-association method, were developed by first selecting three major categories which were related in some dimension (beginning-middle-end, happy-sad-angry, etc.), and then compiling lists of words for each category. The Living Word Vocabulary (Dale & O'Rourke, 1976) was then consulted to determine the grade level at which the specific meaning of each of the words could be readily understood. The initial list of thirty words chosen for each exercise represented grade levels ranging from 4 to 16, with the majority of words at the grades 10 and 12 levels. The exercises were tested in two sections of the reading and study skills courses during the King Edward summer 1981 term. Students were quite receptive to the format and required tasks; however, 25-35 percent of the list words on some exercises were totally unfamiliar to the students. In order to make the task less formidable, and so that it could be accomplished within the time allotment, the difficulty level of the exercises was lowered by replacing some grade 12, 13, and 16 words with lower grade level words. The revised exercises were used with students in a third reading and study skills section and found to be at a satisfactory difficulty level.

Median grade levels for the final set of fourteen exercises ranged from 8.50 to 11.27; mean grade levels ranged from 8.03 to 10.57, with the majority of exercises (eight of fourteen) at the grade 9 level. The first seven exercises contain general categories while the remaining seven categories represent content area reading vocabulary: business, health, social studies, science, and math. Categories, grade level range, median, and mean for each exercise are reported in Table 4, and copies of the exercises are included in Appendix A.

Table 4. Treatment B exercises: categories, grade level ranges, and average difficulty of words in each exercise¹

Exercise No.	Categories	Range	Median	Mean
1	happy/sad/angry	4-16	10.44	9.33
2	beginning/middle/end	4-16	10.17	8.70
3	friend/enemy/stranger	4-13	8.83	8.03
4	past/present/future	4-16	10.38	9.27
5	female/male/male or female	4-16	10.50	9.27
6	foolish/worthless/cruel	4-16	9.14	9.07
7	taste/touch/smell	4-16	9.00	8.97
8	labor-management/ insurance/investments	4-16	11.27	10.25
9	government/education religion	4-16	10.75	9.70
10	data processing/economics real estate	4-16	10.83	9.86
11	air travel/land travel/ water travel	4-16	8.50	9.20
12	nutrition/stress/fitness	4-16	8.65	8.53
13	music/art/literature	4-16	8.90	9.07
14	history/science/math	6-16	10.75	10.57

¹Grade levels from The Living Word Vocabulary (Dale & O'Rourke, 1976).

Treatment A

Based on the research literature, it was expected that internal locus of control students would prefer Treatment A. Using a daily newspaper, students selected their own words for vocabulary study, which required that they assume partial responsibility for their own vocabulary development. Students were encouraged to select both words with which they may be somewhat familiar but don't know their exact meanings and totally unknown words. Although words could be chosen from any part of the newspaper, students were advised that the more difficult words are usually found on the editorial page. A class set of the current edition of The Province was available each day. A recording form was designed for use in this treatment (see Appendix B). Students were to select three vocabulary study words per day, then complete a section of the recording form for each word as follows:

1. Write the word you have chosen to study on the appropriate line.
2. Copy the entire sentence in which the word occurs and underline the word in question.
3. Before looking up the word, read the sentence carefully and try to determine what the word might mean. Write down your prediction.
4. Find the word in your dictionary and
 - (a) copy the pronunciation,
 - (b) copy the entire dictionary definition, and
 - (c) list "other forms of the word" if any are listed.

5. Reread the newspaper sentence containing the word and underline the definition which seems to clarify the sentence best.
6. Check your prediction of what the word might mean.
7. Compose and write your own sentence using the word.

Students were allowed a maximum of thirty minutes to complete the above assignment, which was repeated fourteen times during the experimental period, with each fifth period used for review.

Treatment B

Treatment B, the word list-association method, was designed to maximize achievement for externally oriented students. Structured vocabulary study exercises were provided for the students, and progress was carefully monitored. The fourteen vocabulary exercises each contained thirty words, listed in alphabetical order, and the student used a two-step procedure to classify the words into three related categories. After completing the classification task the student received immediate feedback by marking his own paper, then selected three words from the list for intensive study. Information concerning the three words was located in a dictionary and recorded on the exercise sheet, the student constructed a sentence using each word, and the instructor marked the sentence, providing the student with additional feedback concerning his understanding of the word in question. Students were to follow these instructions when completing the vocabulary exercises:

1. Write each list word under one of the three categories,

using a two-step procedure:

- (a) First, go through the list and for the words that you already know, write them in the appropriate category.
 - (b) Then, go back and look up the unknown words in your dictionary and add them to the category lists.
2. Mark your paper by folding down the upper third and comparing your responses to the answer key.
 3. Choose three words from the list that you missed or words whose meanings you are unsure of, and list them in the appropriate places on the back of this exercise sheet.
 4. For each word, find it in your dictionary and
 - (a) copy the pronunciation.
 - (b) copy the entire dictionary definition, and
 - (c) list "other forms of the word" if any are listed.
 5. Compose and write your own sentence using the word.
 6. Submit your paper to your instructor for marking.

Again, students were allowed a maximum of thirty minutes to complete each of the fourteen assignments. Every fifth period was used for review.

Design

This quasi-experimental study uses a pretest-posttest design, with two experimental groups and a control group. Intact classes were assigned to each of the experimental treatments. Independent variables included language background,

vocabulary achievement, reading attitude, and locus of control. Dependent variables included post vocabulary achievement and post reading attitude for all groups with additional measures of satisfaction and attribution for the two experimental groups.

Aptitude and outcome measures

Three aptitude measures were administered to experimental and control groups during the first week of the study.

1. Vocabulary achievement: The vocabulary subtest of the Gates-MacGinitie Reading Tests, Level F, form 1, Canadian Edition, was used as a vocabulary measure. The 45-item multiple choice test consists of items composed of a test word followed by five words or phrases; students choose the word or phrase that means most nearly the same as the test word. Kuder-Richardson Formula 20 reliability coefficients for the norming group of 3500-4000 students ranged from .85 to .94.
2. Reading attitude: The Mikulecky Behavioral Reading Attitude Measure (MBRAM) was administered for a measure of reading attitude. A self-report measure, the MBRAM consists of 20 statements, each briefly describing a specific behavioral situation related to reading, which the student responds to on a 5-point scale between the poles of VERY UNLIKE ME and VERY LIKE ME. Mikulecky (1976) reported test-retest reliability of .91 during initial norming of the instrument. A recent field study (Tolsma, 1981), using a community college

population comparable to the sample in this investigation, reported an estimated reliability coefficient of .87 (Cronbach's Alpha) for the attitude measure.

3. Locus of Control: The Rotter Internal-External Locus of Control Scale was used as a measure of locus of control. The scale is a 23-item forced choice questionnaire with 6 additional filler items, scored in the external direction. Acceptable test-retest reliabilities (in the .70's and .80's) are reported in studies with college-age students (Daniels & Stevens, 1976).

Outcome measures were administered during the week following the study. Form 2 of the Gates-MacGinitie Reading Tests was used as a post-vocabulary measure, and the MBRAM was repeated for a post-attitude measure. Students in the experimental groups completed two additional questionnaires developed especially for this study:

1. Satisfaction: The satisfaction scale (Vocabulary Study Evaluation Questionnaire, Appendix C) consisted of 7 items with a 4-point Likert-type response format.
2. Attribution: A vocabulary improvement attribution scale was constructed based upon Weiner's (1974a) classification scheme for perceived causes of success and failure. Four items with a 4-point Likert-type response format were included for each of the quadrants, resulting in four subtests: ability, effort,

task difficulty, and luck. The questionnaire was scored in the internal direction by reversing the polarity of responses on the two external subtests, task difficulty and luck. The attribution scale, piloted in two sections of the reading and study skills course, was revised on the basis of those results, and appears in final form in Appendix D.

Since English is the second language of a large proportion of King Edward students, information concerning language background was collected so that results of the study could be adjusted to account for variance due to that categorical variable.

Data Analysis

The data were analyzed in three steps. First, all measurement instruments were scored and reliability and test characteristics were determined by computer analysis using the Laboratory of Education Research Test Analysis Package (Nelson, 1974). Subprograms from the Statistical Package for the Social Sciences (SPSS) (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975) were used to tabulate descriptive statistics and calculate correlations between independent and dependent variables.

Second, the analysis to detect main effects and ATI's consisted of forward stepwise multiple regression with hierarchical inclusion, again using an SPSS subprogram. Regression is the preferred method of analysis for ATI studies. Cronbach and Snow (1977) state:

Regression analysis is always the method of

choice. Past studies have often relied on analysis of variance and have clouded their results in so doing. Even in the extreme groups design to which it is logically appropriate, anova has no advantage. (p. 514-515)

When a study uses multiple outcome measures the researcher has several data analysis options. In this study the four outcome measures were considered singly as dependent variables; this is a common choice of researchers because it provides the greatest amount of descriptive and interpretable results.

Language background was the first entry of the regression equation in order to statistically control for that categorical variable. Orthogonal coding was used to make two comparisons: (1) Treatment A versus Treatment B, and (2) Treatment A + Treatment B versus Control. As recommended by Kerlinger and Pedhazur (1973), raw deviation scores were used for all continuous independent variables.

Third, each aptitude treatment interaction identified in step two was further examined by correlating residuals with independent variable deviation scores. This relationship is then presented graphically for interpretation in Chapter IV.

CHAPTER IV

RESULTS

The organization of this chapter parallels the three data analysis steps outlined in Chapter III: (1) descriptive statistics concerning the sample and measurement instruments, (2) regression analysis, and (3) aptitude treatment interactions.

Descriptive Statistics

Sample

One hundred thirty-four students completed the pretest measures, resulting in initial sample sizes of 55 students in Treatment A, 50 in Treatment B, and 29 in the control group. Demographic information was tabulated to describe the sample and analyzed to determine comparability of the three groups.

Demographic characteristics of the sample are presented in Table 5. The composition of the three groups was similar in terms of age and educational background. Ages of the students ranged from 15 to 56 years, with a median age of 20.9. The average school grade completed was 10.71, although a wide range of educational levels (grade 7 to university graduates) was represented. A majority of the students (71.5%) listed their educational level as having completed grade 11 or lower.

Table 5. Demographic characteristics of the sample

	Group			Total n=134
	Trt.A n=55	Trt.B n=50	Control n=29	
Age				
under 18 years	11 ¹	8	10	15
18-25 years	63	70	60	60
over 25 years	26	22	30	25
Educational background ²				
below grade 10	23	20	0	18
grade 10	37	34	34	35
grade 11	20	16	22	19
grade 12 and above	20	30	42	28
Native language				
English	62	70	61	65
Chinese	13	6	20	12
French	5	2	3	4
Japanese	2	0	7	2
Other	18	22	9	17
Sex				
male	47	46	10	38
female	53	54	90	62
Class time				
day	80	72	55	72
night	20	28	44	28

¹Frequencies have been converted to percentages.

²Last grade completed.

The ratio of native English speakers to English second language (ESL) speakers was also similar across the three

groups. English was the native language for 62 percent of students in Treatment A, 70 percent in Treatment B, and 61 percent in the control group. When native language of ESL students was tabulated, the largest group (34%) listed Chinese as first language learned, followed by French (11%).

Crossbreak analysis of two attributes, sex and class time, showed significant differences between the three groups. However, within the two treatment groups the day-evening and male-female proportions were comparable. Therefore, the differences between the combined treatment groups and the control group, on these two dimensions, would not influence interpretation of results in treatment comparisons, but should be noted in treatment-control comparisons.

The regression model chosen for this study employs reading attitude and vocabulary achievement pretest scores as independent variables, effectively treating them as covariates. Analysis of variance (ANOVA) was used to compare means for the three groups on the Rotter Internal-External Scale. The ANOVA for the locus of control pretest showed no differences across the three groups, $F(2,131) = .49, p > .05$.

Posttest data were collected for a total of 94 students, 35 in Treatment A, 38 in Treatment B, and 21 in the control group. The posttest data included scores for five students who had joined the sections subsequent to the pretesting sessions. Complete pre-post data were available, then, for 89 students ($A = 35, B = 37, C = 17$), a 34 percent reduction of the original sample due to attrition. In order to maximize statistical

power, cases which had complete data concerning the variables in question were used in the data analyses which follow.

Aptitude and outcome measures

Means, standard deviations, standard errors of measurement, and internal consistency reliability coefficients for all aptitude and outcome measures are presented in Table 6. Reliabilities for the instruments ranged from .74 to .92, all within an acceptable range for further analysis. Although forms 1 and 2 of the Gates-MacGinitie vocabulary subtest are parallel forms, they are not equivalent. Form 2 was slightly more difficult than Form 1. Since the forms were not equivalent, they were not counterbalanced as pre- and post tests in this study; to do so would have introduced additional measurement error. Vocabulary scores in T-score units (based upon tables of norms from the test manual) are shown in Table 7. The T-score units more accurately reflect the change in scores from pretest to posttest.

Table 6. Characteristics of aptitude and outcome measures

Instrument	Mean	SD	SEM	r ¹	n
Vocabulary achievement					
Pretest	28.88	9.26	2.66	.92	134
Posttest	27.81	9.61	2.70	.92	94
Reading attitude					
Pretest	67.36	15.36	5.24	.88	134
Posttest	70.67	13.87	4.51	.89	94
Locus of control	8.57	4.07	2.02	.74	134
Satisfaction	20.16	4.09	1.40	.86	73
Attribution	47.15	5.80	2.59	.79	73

¹Internal consistency reliability coefficient.

Table 7. Mean, standard deviation,¹ and sample size by group on all measuring instruments for cases used in regression analysis

Instrument	Groups				
	A	B	C	A+B	A+B+C
Vocabulary pretest (T-scores)	46.97 (9.83) n=35	52.84 (14.47) n=37	48.53 (13.53) n=17	50.03 (12.73) n=72	49.74 (12.82) n=89
Vocabulary posttest (T-scores)	47.66 (9.87) n=35	53.63 (11.07) n=38	45.38 (13.53) n=21	50.77 (10.86) n=73	49.56 (11.65) n=94
Reading attitude pretest (raw scores)	63.80 (14.28) n=35	70.57 (15.68) n=37	71.53 (13.55) n=17	67.28 (15.29) n=72	68.09 (15.00) n=89
Reading attitude posttest (raw scores)	67.66 (13.92) n=35	73.45 (13.41) n=38	72.52 (14.25) n=21	70.67 (13.87) n=73	71.09 (13.90) n=94
Locus of control pretest (raw scores)	9.57 (3.78) n=35	8.70 (3.61) n=37	8.53 (3.76) n=17	9.13 (3.70) n=72	9.01 (3.69) n=89
Satisfaction posttest (raw scores)	20.14 (4.14) n=35	20.18 (4.10) n=38		20.16 (4.09) n=73	
Attribution posttest (raw scores)	45.86 (6.07) n=35	48.34 (5.34) n=38		47.15 (5.80) n=73	

¹Standard deviations are shown in parentheses.

In table 7 the sample is also partitioned into groups which served as units on the various regression analyses, allowing mean comparisons. The mean vocabulary scores for the two treatment groups (A and B) and the combined treatment groups (A + B) show slight increases from pre- to posttesting, while mean scores decreased for the control group (C) and the total sample (A + B + C). Post reading attitude mean scores are higher than pretest means on all groups and group combinations. Locus of control mean scores are highest in treatment group A (9.57), almost one point lower for treatment group B (8.70), and just slightly lower (8.53) in group C. Satisfaction mean scores for the two treatment groups are nearly equal, indicating that, overall, the treatments were equivalent in terms of interest and affective impact. According to attribution scale means, students in Treatment B attributed their vocabulary improvement more to internal characteristics than did students in Treatment A.

Correlations among aptitudes and outcome variables are shown in Table 8. A relatively strong relationship ($r = .46$) is shown between vocabulary and attitude pretests; the correlation between the same two variables as posttest measures is somewhat lower ($r = .32$). stronger than anticipated. Locus of control correlates negatively with all variables, with strongest relationships shown with reading attitude pretest ($r = -.27$) and reading attitude posttest ($r = -.28$). It must be noted, however, that the locus of control scale is scored in the external direction, which accounts for negative correlations.

Correlations among aptitude and outcome measures, based upon only the two treatment groups, are presented in Table 9. Correlations among the first five variables differ only slightly from those reported in Table 8 for the entire sample. Addition of the two treatment-specific dependent variables (satisfaction and attribution) creates interesting relationships. The two scales correlate relatively highly with each other ($r = .35$). Satisfaction and post-attitude show a slight positive relationship ($r = .10$), but the other four variables correlate with satisfaction in a negative direction. In general the relationships between satisfaction and the other variables, with the exception of attribution, appear to be minimal, indicating little correspondence between achievement and satisfaction.

A moderate relationship ($r = -.20$) is shown between attribution (internally scored) and locus of control (externally scored). The correlations between attribution and attitude pretest and attitude are puzzling. Attribution and pre-attitude appear to be unrelated ($r = .04$) while attribution and post-attitude are moderately correlated in a positive direction ($r = .32$). This apparent inconsistency may indicate an ATI.

Table 8. Intercorrelations and reliability coefficients¹ of aptitude variables and correlations with outcome variables, treatment and control groups

Variable	1	2	3	4	5
1. Vocabulary pretest	(.92)	.46	-.12	.93	.37
2. Attitude pretest		(.88)	-.27	.42	.65
3. Locus of control			(.74)	-.17	-.28
4. Vocabulary posttest				(.92)	.32
5. Attitude posttest					(.89)

¹Reliability coefficients are shown in parentheses.

Table 9. Intercorrelations and reliability coefficients¹ of aptitude variables and correlations with outcome variables, treatment groups only

Variable	1	2	3	4	5	6	7
1. Vocabulary, pre	(.92)	.51	-.16	.91	.33	-.12	.25
2. Attitude, pre		(.88)	-.25	.44	.62	-.16	.04
3. Locus of control			(.74)	-.18	-.29	-.05	-.20
4. Vocabulary, post				(.92)	.25	-.10	.23
5. Attitude, post					(.89)	.10	.32
6. Satisfaction						(.86)	.35
7. Attribution							(.79)

¹Reliability coefficients are shown in parentheses.

Regression Analysis

A generalized regression analysis was performed on each of the four dependent variables. The regression technique chosen was a forward stepwise procedure so that the amount of variance accounted for would be computed as each term entered the equation. A hierarchical model was used, and independent variables were always ordered the same: language background (English first or second language), prior achievement (vocabulary pretest), attitude (reading attitude pretest), and personality (locus of control). This sequence was established to reflect two purposes of the study. First, entering language background in the first step is comparable to controlling that variable as a covariate; the magnitude of the language background/criterion variable relationship can be established and "partialled out" at the onset of the analysis. Second, the remaining three independent variables were ordered according to predicted overall impact on vocabulary improvement in an attempt to explain variance in the criterion variables.

As recommended by Cronbach and Snow (1977), variables were added in three sets: (1) aptitudes, (2) treatment contrasts, and (3) ATI terms. Effect coding was used for the language background variable, and deviation scores were entered for the remaining three independent variables. Treatment comparisons were made by creating two orthogonal contrasts which were weighted for unequal sample size. Comparison 1 tests for differences between Treatment A and Treatment B, while

comparison 2 compares the combined treatment groups, A + B, with the control group, C. Interaction terms are computed by multiplying aptitude deviation scores by comparison codes. Correlations between all variables included in the regression analyses are presented in Appendix E.

Vocabulary

Variance in vocabulary achievement accounted for by main effects and ATI's is shown in Table 10 (see Appendix F for summary tables of regression analyses). The full model accounted for 91.61 percent ($F = 57.68$, $p < .01$) of the variance in vocabulary posttest scores, indicating that vocabulary posttest scores can quite accurately be predicted from the independent variables. Language background had a substantial impact upon predicted scores, as 25.85 percent of the full model variance was accounted for by that variable. As expected, prior achievement (vocabulary pretest) is the single best predictor, accounting for 63.50 percent of variance ($F = 559.76$, $p < .01$). Adding reading attitude and locus of control to the equation resulted in only a slight increase in prediction precision.

Although accounting for only 1.10 percent of variance, testing of the comparisons ($F = 5.37$, $p < .05$) showed significant differences. Comparison 2, contrasting the treatment and control groups, was significant at the .01 level ($F = 9.34$). The mean for the combined treatment groups on the vocabulary posttest, 50.77, was significantly higher than the control group mean of 45.53 (see Table 7), indicating a main effect for treatment. Comparison 1, contrasting the two

treatment groups, was not significant; the treatments were equally effective in increasing vocabulary achievement.

The entire set of ATI terms accounted for less than one percent of variance in vocabulary scores. One interaction, attitude by comparison 2, was found significant at the .05 level ($F = 5.37$) and will be further discussed in the ATI section of this chapter.

Table 10. Summary of regression analysis of vocabulary achievement: main effects and ATI, treatment and control groups

Variable in regression	df	% variance accounted for	F	sig.
Full model	14	91.61	57.68	.01
Aptitudes	4	89.66	224.48	.01
Language background	1	25.85	227.88	.01
Vocabulary pretest	1	63.50	559.76	.01
Reading attitude	1	.02	.16	--
Locus of control	1	.29	2.57	--
Comparisons	2	1.10	5.37	.05
A versus B (C1)	1	.04	.34	--
A + B versus C (C2)	1	1.06	9.34	.01
All ATI	8	.85	.93	--
Language background x C1	1	.00	.04	--
Language background x C2	1	.00	.04	--
Vocabulary x C1	1	.02	.19	--
Vocabulary x C2	1	.00	.04	--
Attitude x C2	1	.61	5.37	.05
Attitude x C1	1	.08	.72	--
Locus of control x C2	1	.03	.29	--
Locus of control x C1	1	.09	.77	--
Residual	74	8.40		

Reading attitude

As shown in Table 11, just over half (50.83%) of the variance in reading attitude posttest scores can be explained by the aptitude, treatment, and ATI sets of terms in the regression equation, and the full model is significant at the .01 level ($F = 5.46$). The aptitude set of variables ($F = 19.12$, $p < .01$) accounted for 44.76 percent of variance. Language background, however, accounted for less than one percent of full model variance, indicating little impact on reading attitude. Prior attitude was the strongest predictor, accounting for 28.21 percent of variance ($F = 42.45$, $p < .01$). The contribution of vocabulary pretest scores ($F = 22.39$, $p < .01$) also added significantly to prediction. Locus of control was not a strong predictor of reading attitude.

Neither of the comparisons between groups were significant. Apparently reading attitude was not affected by group membership. The set of ATI terms accounted for 5.97 percent of variance, nearly 12 percent of the full model variance. Again only one of the eight terms detected a significant interaction, vocabulary by comparison 2 ($F = 3.74$, $p < .10$).

Table 11. Summary of regression analysis of reading attitude:
main effects and ATI, treatment and control groups

Variable in regression	df	% variance accounted for	F	sig.
Full model	14	50.83	5.46	.01
Aptitudes	4	44.76	19.12	.01
Language background	1	.22	.33	--
Vocabulary pretest	1	14.88	22.39	.01
Reading attitude	1	28.21	42.45	.01
Locus of control	1	1.45	2.19	--
Comparisons	2	.09	.08	--
A versus B (C1)	1	.02	.03	--
A + B versus C (C2)	1	.07	.11	--
All ATI	8	5.97	1.12	--
Language background x C1	1	.08	.12	--
Language background x C2	1	.94	1.42	--
Vocabulary x C2	1	2.48	3.74	.10
Vocabulary x C1	1	1.80	2.71	--
Attitude x C1	1	.40	.60	--
Attitude x C2	1	.17	.26	--
Locus of control x C2	1	.08	.11	--
Locus of control x C1	1	.02	.02	--
Residual	74	49.17		

Satisfaction

The satisfaction scale was administered to both treatment groups at the completion of the study. The scale was designed to determine whether the students found the vocabulary exercises interesting and worthwhile. The variables entered in the regression analysis accounted for only 8.8 percent of the variance in satisfaction scores, as reported in Table 12. Given a students' scores on all predictor variables, an accurate prediction of satisfaction cannot be made. Consulting Table 7, it can be seen that the satisfaction scale mean was 20.14 for Treatment A, 20.18 for Treatment B, and 20.16 for the combined groups. The two groups, then, perceived their treatment exercises almost equally interesting and worthwhile. Degree of satisfaction appeared to be related very little to language background, prior vocabulary ability, initial reading attitude, or locus of control (see Table 9). Additionally, there were no ATI's.

Table 12. Summary of regression analysis of satisfaction: main effects and ATI, treatment groups only

Variable in regression	df	% variance accounted for	F	sig.
Full model	9	8.88	.67	--
Aptitudes	4	5.51	.94	--
Language background	1	3.54	2.41	--
Vocabulary pretest	1	.21	.14	--
Reading attitude	1	1.32	1.32	--
Locus of control	1	.44	.30	--
Treatment Contrast (C1)	1	.11	.07	--
All ATI	4	3.26	.55	--
Lang. background x C1	1	.14	.10	--
Vocabulary x C1	1	.29	.20	--
Attitude x C1	1	.03	.02	--
Locus of control x C1	1	2.80	1.90	--
Residual	62	91.12		

Attribution

As shown in Table 13, the full regression model did not produce a statistically significant prediction for attribution ($F = 1.89$). A total of 21.49 percent of variance in attribution scores was accounted for by the model, with that amount divided approximately equally between aptitude (9.53%) and ATI (10.05%) sets of variables. Reading attitude was not related to attribution scores (less than .01 percent variance accounted for) and language background accounted for less than one percent (.35%) of variance. The remaining two aptitudes, vocabulary ($F = 3.85$, $p < .10$) and locus of control ($F = 3.39$, $p < .10$) contributed significantly to the prediction.

The ATI set of variables accounted for slightly more variance than the aptitude set of variables, 10.05 percent as opposed to 9.53 percent. The strongest interaction was found for attitude by treatment ($F = 4.06$, $p < .05$). A lesser but statistically significant ($F = 3.39$, $p < .10$) interaction was revealed by the locus of control by treatment term.

Table 13. Summary of regression analysis of attribution scores:
main effects and ATI, treatment groups only

Variable in regression	df	% variance accounted for	F	sig.
Full model	9	21.49	1.89	--
Aptitudes	4	9.53	1.88	--
Language background	1	.35	.28	--
Vocabulary pretest	1	4.88	3.85	.10
Reading attitude	1	-0-	-0-	--
Locus of control	1	4.29	3.39	.10
Treatment Contrast (C1)	1	1.92	1.51	--
All ATI	4	10.05	1.98	--
Lang. background x C1	1	1.50	1.18	--
Vocabulary x C1	1	.24	.19	--
Attitude x C1	1	5.15	4.06	.05
Locus of control x C1	1	3.16	3.39	.10
Residual	62	78.51		

Aptitude Treatment Interactions

Although the design of ATI studies allows testing main effects and detecting treatment effects, the primary objective is to explore for aptitude by treatment interactions. Four such interactions were identified in this study. Interpretation of interactions requires that slopes be determined for each of the groups contained in the significant ATI term at that step of the analysis. To accomplish this the researcher has two choices: (1) disembed the regression equation to obtain separate regression equations (Kerlinger & Pedhazur, 1973), or (2) analyze residuals at the step preceding the interaction. The second method was used in this study. First, regression analyses were rerun to the step just prior to the significant interaction; second, raw residual scores were calculated at that point and split into the comparison groups of interest; finally, residuals were correlated with deviation scores of the interacting independent variable within each group. Results of those analyses appear in Table 14.

Two interactions involved comparisons between the two treatment groups, both with attribution as the criterion variable. Slopes for the attitude by treatment interaction are indicated by the regression weights (b) in Table 14. Inspection of Figure 1, a graphical representation of the interaction, reveals that the interaction is disordinal (the two lines cross within the range of interest), as expected. Disordinality is an artifact of interaction analysis which correlates raw residuals scores with independent variable deviation scores, since both

sets of scores have a mean of zero. Students in Treatment A (newspaper) with high positive reading attitude scores tend to attribute success in vocabulary to internal characteristics, and low reading attitude is associated with external attributions. Attribution residual scores correlate negatively ($r = -.21$) with reading attitude in Treatment B (classification) and a reverse of the Treatment A high-low relationship is shown.

A relatively strong disordinal interaction between locus of control and treatment on attribution is shown in Figure 2. Students in Treatment A (newspaper) with low locus of control scores have high attribution scores, while low attribution scores are associated with high locus of control scores. When this interaction is considered in terms of the scoring direction of the instruments, a definite relationship emerges: internally controlled students attributed their success to more internal characteristics, whereas externally controlled students perceived more external influence. Just the opposite was true for students in Treatment B (classification). Internal locus of control was associated with external attributions, and externally controlled students under Treatment B attributed their success in vocabulary study to internal attributions.

The two remaining interactions which emerged in this study involved comparisons of the combined treatment groups with the control group. Although these interactions have little impact in terms of choosing between the two vocabulary instructional procedures used in the study, both interactions--attitude x comparison 2 on vocabulary and vocabulary x comparison 2 on

attitude--involved vocabulary achievement and reading attitude, providing additional information on the relationships between the two variables.

Attitude residual scores for the combined treatment groups correlated $-.09$ with vocabulary achievement, whereas the correlation between control group residuals and vocabulary was $.52$. The interaction is disordinal, and as shown in Figure 3, the control group slope is positive and quite steep as compared to the treatment group slope. For the control groups, low vocabulary scores are associated with low reading attitude scores, whereas high vocabulary scores correspond with high attitude scores. The opposite is shown for the combined treatment groups, but to a much lesser degree, as shown by the slight negative slope ($b = -.11$) of the regression line.

When vocabulary residuals for the comparison groups are correlated with attitude deviation scores the coefficients are of approximately equal strength, but in opposite directions: $r = .14$ for the control group and $r = -.13$ for the treatment groups. As shown in Figure 4, the interaction is ordinal. The ordinal nature of the interaction is due to unequal sample sizes (Control group, $n = 17$; Treatment group, $n = 72$) and indicates that the relationship between vocabulary residuals and attitude deviation scores for the two groups is quite different. Greater disparity exists between the groups when attitude scores are high. High attitude control group scores correspond with high vocabulary scores, while high attitude treatment group scores correspond with low vocabulary scores.

Table 14. Residualized criterion regressions for ATI terms

Residualized criterion variable	ATI	Group	a	b	r
Attribution	Attitude x C1	A	.307	.090	.223
		B	.101	-.070	-.208
Attribution	L of Control x C1	A	.111	-.264	-.179
		B	-.019	.268	.193
Attitude	Vocabulary x C2	A+B	-.198	-.114	-.090
		C	.275	.337	.523
Vocabulary	Attitude x C2	A+B	.161	-.028	-.134
		C	2.680	.024	.140

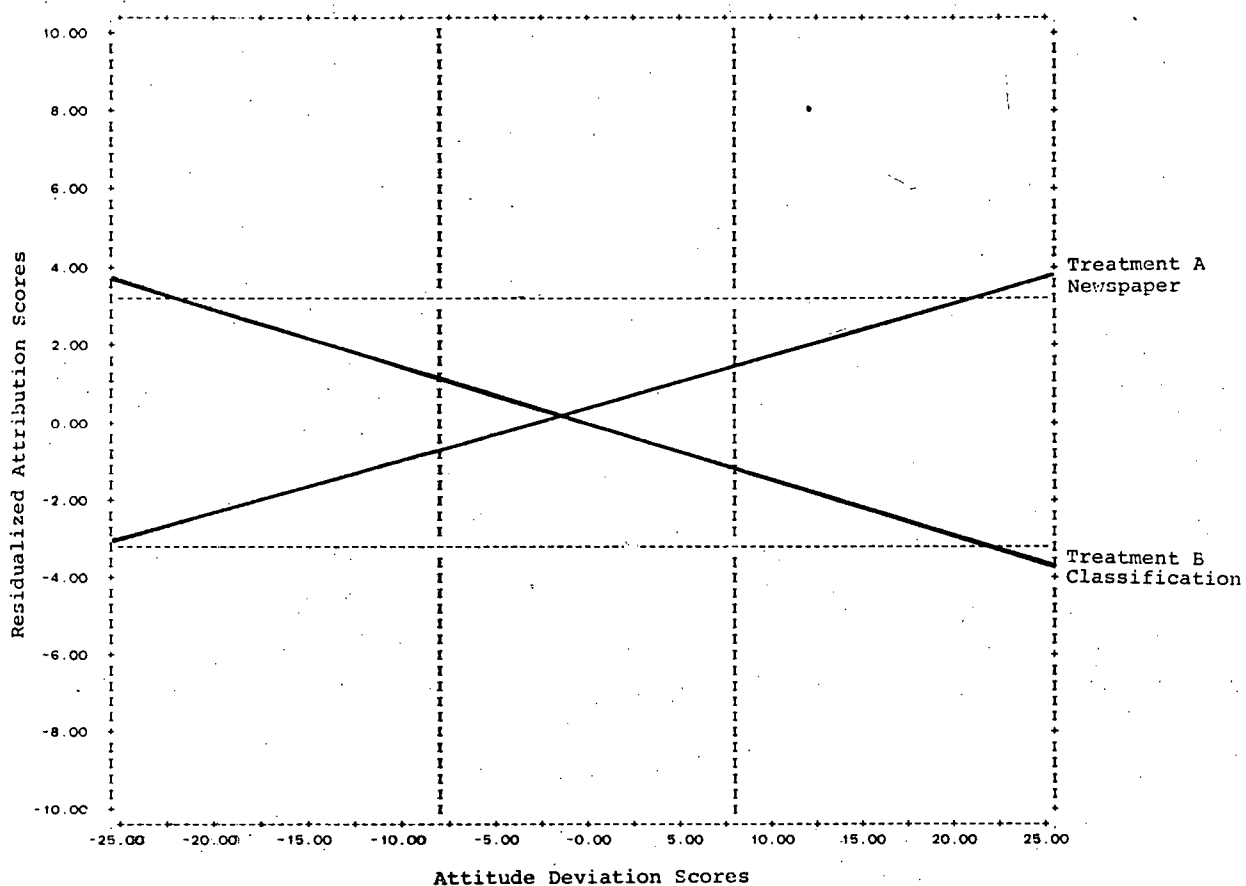


Figure 1. Representation of ATI for attitude x treatment on attribution scores

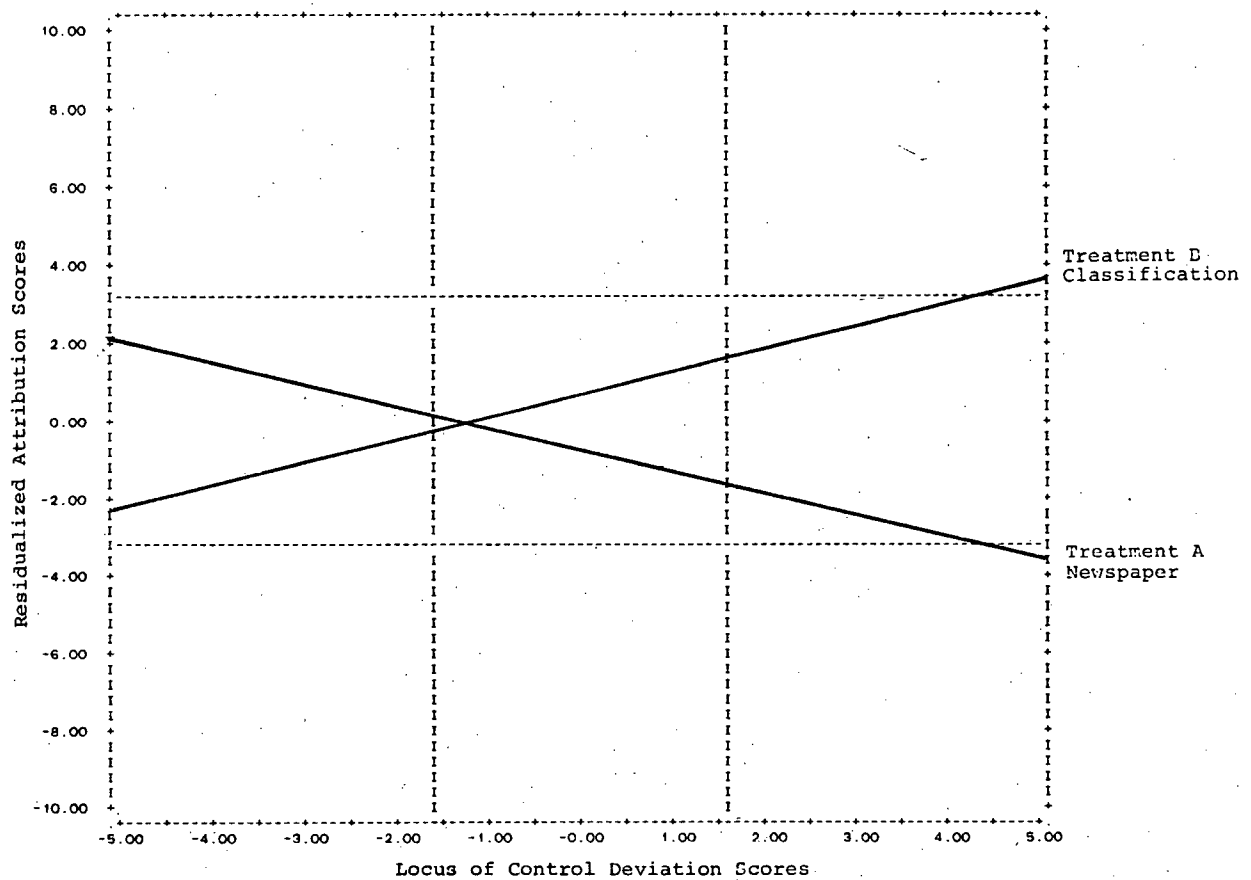


Figure 2. Representation of ATI for locus of control x treatment on attribution scores

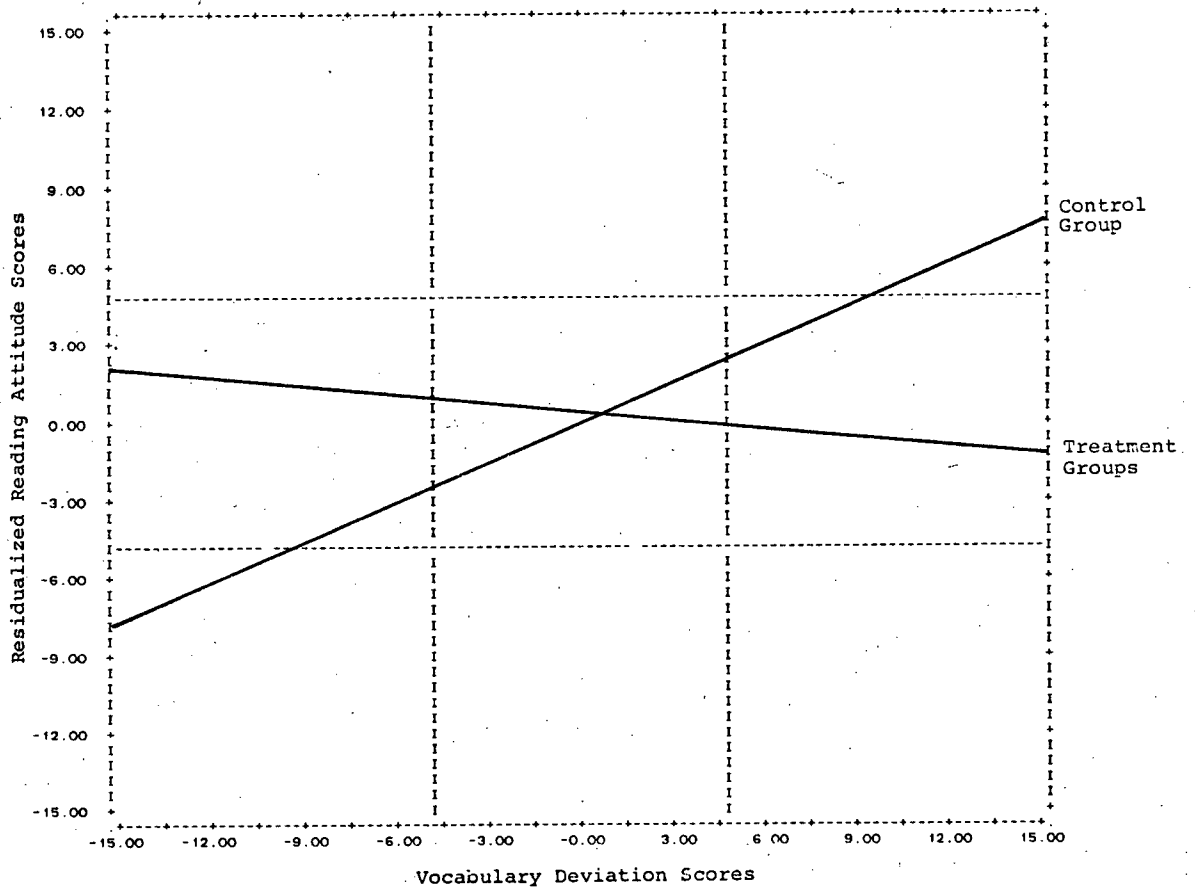


Figure 3. Representation of ATI for vocabulary x group (treatment versus control) on reading attitude posttest scores

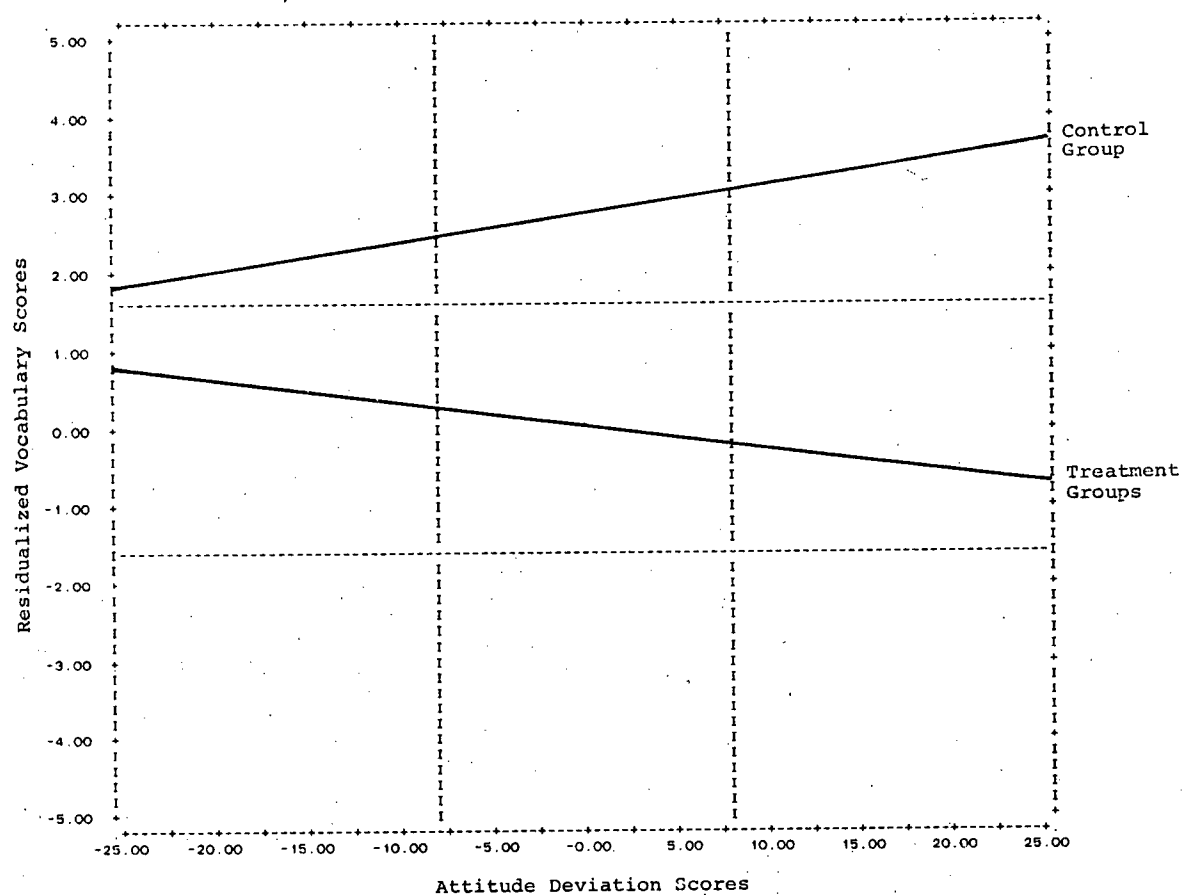


Figure 4. Representation of ATI for attitude x group (treatment versus control) on vocabulary achievement posttest scores.

CHAPTER V

SUMMARY, LIMITATIONS,
CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this field based study was to examine interactions between learner characteristics and instructional approaches in vocabulary skill development. Literature was reviewed in two areas, vocabulary instruction and ATI research. Method of teaching vocabulary, recent research in the field, and materials for vocabulary study were discussed. The ATI review concentrated on selection of aptitude variables and development of instructional treatments.

Two eight-week units of instruction in vocabulary skills, intended to maximize upon loci of control, were designed which differed in learner tasks and materials. In Treatment A students used a daily newspaper as a source for self-selection of vocabulary study words. Treatment B was more structured, and consisted of a word-category classification task designed by the investigator. The control group received no instruction in vocabulary development.

Aptitude variables included language background (English first or second language), prior vocabulary achievement (as measured by the vocabulary subtest of the Gates-MacGinitie Reading Tests, Level F, Form 1, Canadian edition), reading attitude (as measured by the Mikulecky Behavioral Reading

Attitude Measure), and locus of control (as measured by the Rotter Internal-External Scale).

Outcome variables consisted of a vocabulary test (Form 2 of Gates-MacGinitie), reading attitude (Mikulecky measure repeated), and two investigator-constructed questionnaires designed to measure satisfaction and achievement attribution.

Subjects in the study were community college students enrolled in a reading and study skills course at the grade 11 level (treatment groups) or typing courses (control group). Pretest measures were completed by 134 students, and posttest data were collected for 94 students. Complete data were available for 35 students in Treatment A, 37 in Treatment B, and 17 in the control group. English was the native language for approximately 65 percent of the participants in the study.

Descriptive statistics were presented for all aptitude and outcome measures in the first section of the results chapter. Next, four regression analyses were reported, one for each of the dependent variables. The full model regression on vocabulary posttest scores was statistically significant, as were the aptitude and comparison sets of variables. Both the full model and aptitude set produced statistically significant results on the reading attitude posttest regression. No statistically significant results were found in the regression on satisfaction with instruction, and the full model accounted for only 8.88 percent of variance in satisfaction scores. Although the full model for attribution was not statistically significant, the vocabulary and locus of control aptitudes

accounted for statistically significant portions of variance.

A significant treatment effect was found when the combined treatment groups were compared to the control group on the vocabulary achievement regression. The Treatment A-Treatment B contrast was not significant.

Four ATI's were reported, (1) attitude x comparison 2 on vocabulary, (2) vocabulary x comparison 2 on attitude, (3) attitude x treatment on attribution, and (4) locus of control x treatment on attribution. The interactions were discussed and graphically presented.

Limitations

Sampling limitations

The most serious limitation of this study was the small sample size. Cronbach and Snow (1977) recommend sample sizes of 100 cases per treatment, much larger than customary in experimental research, in order to detect interaction effects. With smaller samples the researcher risks committing a Type I error, i.e., rejecting a true null hypothesis. Considering the exploratory nature of the present study, and in an attempt to decrease the probability of making a Type I error, a significance level of .10 was chosen to adjust for the small sample. The corresponding increase in the probability of a Type II error, not rejecting a false null hypothesis, was viewed as less serious in the context of this investigation.

Although intact classes were assigned to treatments in this study, it was not possible to test for class effects, again,

because of the small sample. Variation between and within classes--formation of classes (reasons why students enrolled in a particular day or night section), teacher effects, contamination effects, and chance effects that operate systematically on members of a class--are unavoidably confounded. Evaluating class effects is possible, according to Cronbach and Snow (1977), only if there are five or more classes per treatment. That requirement was not met in this study, and it was necessary to pool classes for analysis.

Albeit the sample was small, it appears to be representative. Results obtained in this study can be generalized to other groups of adult learners, providing those groups possess the same characteristics as the experimental population. The sample used in this study, adults pursuing an academic secondary certificate and enrolled in a reading improvement credit course, is a relatively unique subset of a larger population of adult students. Generalization to adults enrolled in grade 12 vocational or general equivalency programs would not be appropriate.

Methodological limitations

Validity of experimental results is questionable when nonstandardized instruments are used. Instruments used (Gates-MacGinitie Reading Tests, Rotter Internal-External Scale, and Mikulecky Behavioral Reading Attitude Measure) to test the three hypotheses in this study have been used extensively in previous research, verifying their reliability and validity. However, two instruments were developed especially for this

study to measure satisfaction and attribution. Although both instruments were tested and revised prior to the study, their psychometric qualities are not firmly grounded by previous research. Therefore, findings related to attribution and satisfaction must be interpreted with caution.

Self-report questionnaires were used as measurement instruments for some variables. Reading attitude, locus of control, satisfaction, and attribution were all assessed via self-report; data for these variables would necessarily be confounded by validity problems inherent to that method of data collection. Given that the student is able to select the proper option (description of himself) for the items, the questionnaires still require honesty and frankness on the part of the student. Since all testing was done by the regular classroom teacher, and even though students were told that marking would be done by an independent researcher, it is still possible that students' responses were influenced by a desire for teacher approval.

Conclusions

This study contributes significantly to vocabulary research by departing from traditional research design to employ ATI methodology. Hopefully, this venture into ATI will precipitate additional studies. It is time for researchers to redirect their energies from a search for the "best" vocabulary teaching method to investigations concentrating on matching students and methods. As Cronbach and Snow (1977) conclude,

ATI has come of age. Research on instruction

will need to incorporate its implications in theory and in practice, regardless of how one ultimately proceeds with instructional adaptation. ATI methods and ideas have a fundamental role to play in educational evaluation as well as in educational design, and in psychological science generally. As this role continues to unfold, we can expect new lines of research to reopen old questions, as well as to define issues not considered by the traditional experimental and correlational investigators working separately. (p. 424)

Perusal of reading research reveals a profusion of vocabulary studies, but few of those studies use adults as subjects. This study is distinctive not only in its methodology but also in the population assessed.

Specifically, this study was designed to test three research hypotheses and probe three areas via the ancillary research questions posed in Chapter I. The remainder of this section is correspondingly presented in six subsections, discussing results of the study and drawing conclusions stemming from the research hypotheses and questions.

H.1 Students in the treatment groups will demonstrate greater gains in vocabulary achievement than students in the uninstructed control groups.

Hypothesis one was accepted. Results of the regression analysis on vocabulary posttest scores did reveal significant differences when the combined treatment group was compared to the control group. Acceptance of hypothesis one, which generally states that some teaching effort results in greater gains than no teaching effort, would logically be expected; unfortunately, that is not always the case in vocabulary research. It might be concluded that the treatment group gains in this study can be attributed to an adequate research design

and carefully developed instructional methods and materials.

H.2 Treatments A and B will not be differentially effective in increasing vocabulary achievement when averaged across levels of aptitude.

Hypothesis two was accepted. The orthogonal contrast of Treatment A-Treatment B means was not significant, indicating that gains in vocabulary achievement were approximately equal. This finding is in line with the ATI philosophy upon which the study was designed: interaction research seeks a match between student characteristics and treatments as opposed to searching for a superior method of instruction that is suitable for all students.

H.3 Treatment A will be of greater benefit in increasing vocabulary achievement for students with relatively high internal locus of control scores, whereas Treatment B will be of greater benefit for those with relatively greater external scores.

Hypothesis three was rejected. No interaction was found between locus of control and treatment in the analysis of vocabulary scores. Several reasons can be conjectured for the lack of interaction between the personality variable and vocabulary. Certainly the sample size limited statistical power for detecting interactions. Possibly measurement of the locus of control construct is at fault.

The Rotter Internal-External Scale, although still widely used in research with adolescents and adults, was developed in 1966. Perhaps statements chosen in 1966 to reflect the internal-external locus of control continuum are not appropriate for use in 1981. It is possible that the attribution variable included in this study is a more contemporary internal-external

index. The Vocabulary Attribution Scale was designed to measure students' perceptions of causes for success in vocabulary improvement: whether they succeeded due to internal or external characteristics. Results of the analysis on attribution scores, then, are encouraging.

The locus of control by treatment interaction term was found significant in the attribution regression, partially affirming a premise on which the two treatments were designed. Using Treatment A, the less structured newspaper exercises, internally controlled students attributed their vocabulary improvement to internal factors, whereas externally controlled students cited more external reasons for their success. This finding indicates correspondence between student sense of internal personal control and perceived internal attributions for success, a desirable result in individualizing instruction.

When the regression slope for Treatment B (classification) was examined, however, results were opposite to those expected: internally controlled-external attributions and externally controlled-internal attributions. One explanation for this reversal might be that the classification task itself may have conveyed an element of luck--chances were one in three of putting each word in the correct category. This may have caused internally controlled students to tend to attribute success to chance to a greater degree than in Treatment A. Another explanation for the reversal might be that locus of control is a greater determinant of success and perceived success in unstructured tasks than in more direct instruction.

Q.1 How does language background influence scores on vocabulary achievement, reading attitude, satisfaction, and attribution?

Only on the regression of vocabulary posttest scores did language background prove to be a significant determiner of results in the study. A sizeable portion (25.85 percent) of variance in students' vocabulary scores can be explained by knowing whether English is the student's first or second language. Language background did not approach significance in the regressions on attitude posttest, satisfaction, or attribution, nor did any of the significant interaction terms contain language background. This represents an important finding: it appears that the two vocabulary instructional treatments used in this study do not require modification for use with ESL students who have a minimum grade 10 reading level.

Q.2 Does prior attitude toward reading interact with instructional treatment on vocabulary achievement, reading attitude, satisfaction, or attribution?

Two of the aptitude-treatment interactions reported in the study involved reading attitude. The attitude x treatment term in the regression analysis of attribution produced significant results. A disordinal interaction was shown, where high attitude students in Treatment A attributed their vocabulary success to internal characteristics and low attitude scores were associated with more external attributions; the reverse was true for Treatment B. It appears that using the newspaper in the classroom may tend to increase internal attributions for success.

The second attitude interaction occurred when the combined treatment groups were contrasted with the control group in the regression on vocabulary posttest scores. Although unrelated to method of presentation, it is interesting to note that in the control group (students not enrolled in a reading course) the correlation between attitude residual scores and vocabulary achievement is .52, but in the treatment groups (students enrolled in a reading course) the comparable correlation is -.09. Further research is necessary on the relationship between attitude and achievement for students enrolled in reading improvement courses.

Q.3 Does prior vocabulary achievement interact with instructional treatment on vocabulary achievement, reading attitude, satisfaction, or attribution?

Interactions between prior vocabulary achievement and treatment were not observed in the study. An interaction between prior vocabulary achievement between experimentals and controls was revealed in the regression on post reading attitude scores, providing further substantiation of a complex relationship between the two variables.

Recommendations

Although thousands of vocabulary studies have been reported, as pointed out by Petty et al. (1968, p. 85), "the investigation of the most satisfactory methods for teaching vocabulary appears to remain a rather 'wide open' area of research." The current study contributes substantively to vocabulary research: it provides a foundation for a method and theory of vocabulary interaction research. At the same time, it reveals areas in ATI methodology which must be refined through further research.

Recommendations for further research

- Rec. 1 Replicate the present study with a larger sample, including at least 100 students and five classes per treatment.

One paradox in the ATI design is that as error variance is minimized (as when aptitude variables explain large proportions of variance in outcome measures) small and practically unimportant treatment effects and interactions are more likely to be statistically significant. It is possible to speculate that the main effect for treatment reported in this study is an artifact of such a small error term. Accuracy and generalizability of these findings can only be determined through replication.

In addition, replication would further validate the attribution and satisfaction scales developed for this study.

Class units were assigned to treatments in this study, but the analysis was done at the individual level. It would be desirable, although perhaps not feasible, to enlarge the sample

to the point where data analysis could be done at the class level. Cronbach and Snow (1977) recommend 100 observations in each treatment and at least five classes per treatment. By repeating the experiment over several terms, at the cost of adding temporal errors, it would be possible to achieve a larger sample.

Rec. 2 Lengthen the treatment period to include the entire fourteen-week term.

Relatively high correlations between pre- and posttests were reported in this study. Outcome measures will correlate highly with beginning level aptitudes in ATI research unless treatments are powerfully differentially effective. Lengthening the treatment period might allow differential effects to become more apparent. However, another variable related to time, especially in adult education studies, is attrition. As the treatment length is extended the researcher must be prepared to accept a greater shrinkage in sample size.

Rec. 3 Examine and refine the aptitude variables included in the study.

An attempt should be made to isolate aptitude variables which are only moderately correlated with one another but which correlate highly with vocabulary achievement. The reading attitude-achievement relationship needs further clarification; development of reading attitude methods other than self-report is recommended.

It may be possible that language background, defined as a dichotomous variable in this study, obscures cultural differences within the ESL subgroup. With a larger sample it

might be possible to break down the ESL group into specific language groups, thereby considering cultural variations with more precision.

Rec. 4 Compare difficulty levels of words students selected to study in Treatments A and B.

In this study students in both treatment groups chose their own vocabulary study words from either a daily newspaper or from a provided list of thirty words. An interesting extension of this study would be to determine the difficulty of the self-selected words and compare the results between treatments. Inspection of word difficulties suggests that there are no differences between average difficulty level of words chosen for study under the two treatments. In addition, the difficulty of individual student choices could be compared with vocabulary achievement level to check the validity of the self-selection format.

Recommendations for instruction

Rec. 5 Use the two vocabulary instructional units developed for this study in reading and study skills courses.

This study has shown that both treatments are generally sound, and each significantly increases vocabulary achievement. While the sample in this study consisted of adults, it is reasonable to conclude that the instructional units could also be used in secondary classrooms. A distinct advantage of the two units is that they are not as boring as many of the commercially available materials. The newspaper-context treatment (Treatment A) might especially appeal to secondary

students, resulting in a positive effect on reading attitude as well as vocabulary achievement.

Rec. 6 Combine the two vocabulary instructional units for use in the classroom.

The two treatments for this study were designed to differentially enhance achievement by interacting with the locus of control personality variable; however, that ATI was not confirmed. Since there appears to be nothing mutually exclusive about the two treatments, greater gains in vocabulary achievement might be realized if the treatments are used in combination. Both treatments are flexible in length; either could be lengthened or shortened in developing a composite.

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APPENDIX A

Vocabulary Exercises used in Treatment B

Note: Student exercises were printed back-to-back.

WORDS :

annoyed

bliss

buoyant

convivial

dejected

delighted

doleful

ecstasy

elated

enraged

exasperated

frolicsome.

glee

gloomy

glum

grief.

indignant

infuriate

irascible

irate

jovial.

jubilation

maudlin

merriment

mournful

pathetic

poignant

rankle

rejoicing

wrath

CATEGORIES:

happy

[illegible]

sad

[illegible]

angry

[illegible]

happy
bliss
buoyant
convivial
delighted
ecstasy
elated
frolisome
glee
jovial
jubilation
merriment
rejoicing

sad
dejected
doleful
gloomy
gloom
grief
maudlin
mournful
pathetic
poignant

angry
annoyed
enraged
exasperated
indignant
infuriate
irascible
irate
rankle
wrath

Word: _____ Pronunciation: _____
Meanings: _____

Other forms of the word: _____
Our own sentence using the word: _____

Word: _____ Pronunciation: _____
Meanings: _____

Other forms of the word: _____
Our own sentence using the word: _____

Word: _____ Pronunciation: _____
Meanings: _____

Other forms of the word: _____
Our own sentence using the word: _____

WORDS :

adjourn

center

conclude

core

debut

destination

embark

epilogue

expire

finale

genesis

hub

inaugurate

incipient

incomplete

initial

initiate

launch

mean

midway

nucleus

partial

pivot

```
preliminary
```

```
prelude
```

primer

quietus

retire

termination

ultimate

CATEGORIES:

beginning

middle

end

[illegible][illegible][illegible]

ultimate
termination
retire
quietus
finale
expire
epilogue
destination
conclude
adjourn
end

pivot
partial
nucleus
midway
mean
incomplete
hub
core
center
middle

beginning
debut
embark
genesis
inaugurate
incipient
initial
initiate
launch
preliminary
prelude
primer

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

adversary	companion	oppressor
advocate	comrade	outlander
alien	confidant	outsider
ally	crony	partner
antagonist	distant	rival
archenemy	foe	scoundrel
associate	foreign	tyrant
buddy	hostile	unfamiliar
chum	newcomer	unknown
colleague	opponent	villain

friend.

[illegible]enemy[illegible]

stranger

[illegible]

friend
advocate
ally
associate
buddy
chum
colleague
companion
comrade
confidant
crony
partner

enemy
adversary
antagonist
archenemy
foe
hostile
opponent
oppressor
rival
scoundrel
tyrant
villain

stranger
alien
distant
foreign
newcomer
outlander
outsider
unfamiliar
unknown

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

WORDS :

ancestry	expectant	obsolete
anticipate	existing	prevailing
antiquity	extinct	prevalent
archaic	foretell	prospective
bygones	hereafter	retrospect
contemporary	historic	today
current	hitherto	tomorrow
doomsday	impending	topical
elapsed	millennium	ultimately
eventually	modern	yesterday

CATEGORIES:

past

present

future

[illegible]

ultimately
tomorrow
prospective
millennium
impending
hereafter
foretell
expectant
eventually
doomsday
anticipate
future

present
contemporary
current
existing
modern
prevailing
prevalent
today
topical

past
ancestry
antiquity
archaic
bygone
elapsed
extinct
historic
hitherto
obsolete
retrospect
yesterday

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

WORDS :

actress	dowager	princess
adolescent	egomaniac	sheik
androgynous	feminine	spinster
angel	gaucho	spouse
athlete	hussy	swain
bachelor	marionette	vagabond
baronet	martyr	vampire
beau	maternal	veteran
chairperson	paternal	wench
damsel	patriarch	widower

CATEGORIES:

female

male

male or femaleThis image shows a single sheet of white paper with horizontal black ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper appears to be a standard notebook or ledger page.

male or female
adolescent
androgynous
angel
athlete
chairperson
egomaniac
marionette
martyr
spouse
vagabond
veteran
vampire

male
bachelor
baronet
beau
gauch
paternal
patriarch
sheik
swain
widower

female
actress
damsel
dowager
feminine
hussy
maternal
princess
spinster
wench

Word: _____ Pronunciation: _____
Meanings: _____

Other forms of the word: _____
Your own sentence using the word: _____

Word: _____ Pronunciation: _____
Meanings: _____

Other forms of the word: _____
Your own sentence using the word: _____

Word: _____ Pronunciation: _____
Meanings: _____

Other forms of the word: _____
Your own sentence using the word: _____

WORDS :

abusive

asinine

atrocious

barbarity

barren

brutal

dispensable

dunce

fatuous

fiendish

fruitless

futile

harsh

ignoramus

imbecile

inane

ineffectual

inhumane

malevolent

malicious

moronic

obtuse

refuse

rubbish

ruthless

savage

simpleton

superfluous

valueless

venomous

CATEGORIES:

foolish

worthless

cruel[illegible]

Blank lined page for notes.

[illegible]

venomous
savage
ruthless
malicious
malevolent
inhumane
harsh
fiendish
brutal
barbarity
atrocious
abusive
cruel

valueless
superfluous
rubbish
refuse
ineffectual
futile
fruitless
dispensable
barren
worthless

simpleton
obtuse
moronic
lame
imbecile
ignoramus
fatuous
dunce
asinine
foolish

Word: _____

Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____

Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____

Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

WORDS :

abutting

ambrosia

aroma

bitter

bland

bordering

contact

contiguous

feel

flavor

fragrant

fume

insipid

malodorous.

manipulation

message

odor

olfactory

palatable

palpable

redolent

reek

saccharine

scent

sour

sniff

stench

stroke

tactile

tart

CATEGORIES:

taste

touch

smell

[illegible]

stench
stiff
scent
reek
redolent
olfactory
odor
malodorous
tune
fragrant
aroma
smell

tactile
stroke
palpable
massage
manipulation
feel
contiguous
contact
bordering
abutting
touch

tart
sour
saccharine
palatable
insipid
flavor
bland
bitter
ambrosia
taste

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

WORDS :

actuary	diversified	premium
annuity	futures	proxy
arbitration	grievance	scab
beneficiary	hedge	securities
blue chip	incentive	seniority
bond	injunction	slowdown
broker	negotiation	speculate
bumping	picket	strike
claimant	policy	underwriter
coverage	portfolio	waive

CATEGORIES :

[illegible]

investments
bond
broker
blue chip
diversified
futures
hedge
portfolio
proxy
securities
speculate

insurance
actuary
annuity
beneficiary
claimant
coverage
policy
premium
underwriter
waive

labor-management
arbitration
bumping
grievance
incentive
injunction
negotiation
picket
scab
seniority
slowdown
strike

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

WORDS :

alderman

alumni

biblical

bureaucracy

caucus

constituency

curriculum

deity

diploma

embassy

evangelist

filibuster.

gerrymander

hymn

inaugural

lecture

mandate

matriculate

monotheism

pious

professor

regime

scriptures

semester

sermon

supernatural

theology

truant

tuition

worship

CATEGORIES:

government

[illegible]

education

[illegible]

religion

[illegible]

worship
theology
supernatural
sermon
scriptures
pious
monotheism
hymn
evangelist
diet
biblical
religion

tuition
truant
semester
professor
lecture
matriculate
diploma
curriculum
alumni
education

regime
mandate
inaugural
gerrymander
filibuster
embassy
constituency
caucus
bureaucracy
alderman
government

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

WORDS :

barter	deed	lien
bungalow	depression	memory
capitalism	devaluation	monopoly
cartel	duplex	mortgage
collator	easement	oligopoly
commodity	encumbrance	programmer
compile	entrepreneur	recession
computer	escrow	software
currency	foreclosure	title
debug	hardware	verifier

CATEGORIES:

data processing

[illegible]economics[illegible]

real estate

[illegible]

recession
 oligopoly
 monopoly
 entrepreneur
 devaluation
 depression
 currency
 commodity
 cartel
 capitalism
 barter
 economics
 real estate
 bungalow
 deed
 duplex
 easement
 encumbrance
 escrow
 foreclosure
 lien
 mortgage
 title

data processing
 collator
 computer
 compile
 debug
 hardware
 memory
 programmer
 software
 verifier

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

WORDS :

aerodynamics

altimeter

aviation

barge

boulevard

bow

caboose

catamaran

cosmonaut

dirigible

flotilla

freeway

fuselage

hangar

hydrofoil

kayak

limousine

marine

monorail

omnibus

parachute

pedestrian

perambulator

schooner

sedan

seiner

skiff

toboggan

trawler

zeppelin

CATEGORIES:

air travel

land travel

water travel

[illegible]

trawler
skiff
seiner
schooner
marine
kayak
hydrofoil
flotilla
catamaran
bow
barge
water travel

topoggan
sedan
perambulator
pedestrian
omnibus
monorail
limousine
freeway
caboose
boulevard
land travel

zeppelin
parachute
hangar
fuselage
dirigible
cosmonaut
aviation
altimeter
aerodynamics
air travel

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

WORDS :

activity

aerobic

anxiety

calisthenics

carbohydrates

cholesterol

conflict

depression

dietary

digestion

distraught

enzyme

exercise

flexibility

frustration

glucose

insomnia

jogging

metabolism

nutrients

protein

psychosomatic

robust

stamina

suppleness

tension

tranquilizers

upset

vitamins

worry

CATEGORIES:

nutrition

stress

fitness

[illegible][illegible][illegible]

fitness	stress	nutrition
activity	anxiety	carbohydrates
aerobic	conflict	cholesterol
calisthenics	depression	dietary
exercise	distraught	digestion
flexibility	frustration	enzyme
jogging	insomnia	glucose
robust	psychosomatic	metabolism
stamina	tension	nutrients
suppleness	tranquillizers	protein
	upset	vitamins
	worry	

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

WORDS :

allegory

fable

opera

allegro

fiction

palette

anthology

fresco

portrait

autobiography

illustration

reggae

baritone

lithograph

sculpture

bass

jazz

soprano

cantata

memoir

staccato

etching

mural

syncopated

exhibition

myth

tenor

expository

narrative

woodcut

CATEGORIES:

music

art

literature

[illegible][illegible][illegible]

music	art	literature
allegro	etching	allegory
baritone	exhibition	anthology
bass	fresco	autobiography
cantata	illustration	expository
jazz	lithograph	fable
opera	mural	fiction
reggae	palette	memoir
soprano	portrait	myth
staccato	sculpture	narrative
syncopated	woodcut	
tenor		

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

WORDS:

angle	hemoglobin	nutrient
binomial	hypotenuse	osmosis
chromosome	insurrection	palindrome
covenant	integer	parliament
dendrite	jurisdiction	premier
embargo	legume	quotient
enzyme	metamorphosis	sovereign
equilateral	monarchy	theorem
exponent	neuron	trinomial
germinate	nonpartisan	tyranny

CATEGORIES:

history

science

math

math
angle
binomial
equilateral
exponent
hypotenuse
integer
palindrome
quotient
theorem
trinomial

science
chromosome
dendrite
enzyme
germinate
hemoglobin
legume
metamorphosis
neuron
nutrient
osmosis

history
covenant
embargo
insurrection
jurisdiction
monarchy
nonpartisan
parliament
premier
sovereign
tyanny

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Meanings: _____

Other forms of the word: _____

Your own sentence using the word: _____

APPENDIX B

Recording Form used in Treatment A

Word: _____ Pronunciation: _____

Newspaper sentence containing the word: _____

What you think the word might mean: _____

Dictionary definitions: _____

Other forms of the word: _____

Your own sentence using the word: _____

Word: _____ Pronunciation: _____

Newspaper sentence containing the word: _____

What you think the word might mean: _____

Dictionary definitions: _____

Other forms of the word: _____

Your own sentence using the word: _____

APPENDIX C
Satisfaction Scale

NAME _____

VOCABULARY STUDY
EVALUATION QUESTIONNAIRE

The following questions deal with how interesting and how valuable you found your vocabulary exercises so far this term. Please circle your answer to each question.

- | | | | | |
|--|---------------|-------------|----------------|----------|
| 1. The exercises were helpful in expanding my vocabulary. | NOT
AT ALL | A
LITTLE | QUITE
A BIT | A
LOT |
| 2. Most of the exercises were interesting. | NOT
AT ALL | A
LITTLE | QUITE
A BIT | A
LOT |
| 3. The vocabulary study was a worthwhile use of my time. | NOT
AT ALL | A
LITTLE | QUITE
A BIT | A
LOT |
| 4. The new words I've learned will be useful to me. | NOT
AT ALL | A
LITTLE | QUITE
A BIT | A
LOT |
| 5. As a result of completing the exercises, my vocabulary has increased. | NOT
AT ALL | A
LITTLE | QUITE
A BIT | A
LOT |
| 6. I liked doing the vocabulary exercises. | NOT
AT ALL | A
LITTLE | QUITE
A BIT | A
LOT |
| 7. I expect my work in other courses to improve as a result of my vocabulary study. | NOT
AT ALL | A
LITTLE | QUITE
A BIT | A
LOT |

APPENDIX D
Attribution Scale

NAME _____

During the past two months your vocabulary has increased. Why? Below are 16 reasons which might partially explain why you have learned new vocabulary words. Please consider each statement, then circle the number which tells how much or how often you think that statement describes you.

	<u>NEVER</u>	<u>SOME- TIMES</u>	<u>USUALLY</u>	<u>ALMOST ALWAYS</u>
1. If I work hard enough, I can learn new words.	1	2	3	4
2. Much of my vocabulary improvement is probably just a matter of chance.	1	2	3	4
3. I put a lot of effort into vocabulary study.	1	2	3	4
4. My vocabulary improvement is probably due to a run of good luck.	1	2	3	4
5. I understood how to do the vocabulary exercises.	1	2	3	4
6. The vocabulary exercises were quite easy for me to complete.	1	2	3	4
7. I tried very hard to remember new vocabulary words.	1	2	3	4
8. I find it easy to learn new words.	1	2	3	4
9. The directions for the exercises were clear and easy to follow.	1	2	3	4
10. I'm just one of those people who finds school easy, so reading and vocabulary are easy subjects for me.	1	2	3	4
11. I learn faster than the average person. ..	1	2	3	4
12. When I remember new words it's usually just because I'm lucky.	1	2	3	4
13. I worked very hard on vocabulary.	1	2	3	4
14. I usually do quite well in all of my school work, and vocabulary is just like the rest of it.	1	2	3	4
15. I found it easy to choose which vocabulary words I wanted to study.	1	2	3	4
16. I seem to be lucky lately, so my vocabulary improvement is probably due to good fortune.	1	2	3	4

APPENDIX E
Correlation Matrices

Appendix E.1

Correlation matrix¹ of variables used in regression analyses
of reading attitude and vocabulary achievement:
main effects and ATI, treatment and control groups

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Lang back															
2 Post vocab	51														
3 Post rdg att	05														
4 Comparison 1	-03	-22	-18												
5 Comparison 2	14	20	-06	-02											
6 Pre vocab	37	93	38	-27	09										
7 Locus of c	-10	-19	-29	11	06	-13									
8 Pre rdg att	09	43	65	-20	-11	47	-28								
9 Lang x C1	-03	-09	-10	29	-02	-10	-06	-21							
10 Lang x C2	-00	-15	-09	-01	01	-18	-01	04	-01						
11 Vocab x C1	-04	-11	-20	04	-14	-11	09	-12	26	-01					
12 Vocab x C2	-18	-15	-19	-12	-12	-12	04	-01	-04	56	-03				
13 Att x C1	-17	-11	-04	-06	-10	-11	12	-08	09	-08	44	-04			
14 Att x C2	07	-03	-07	-11	19	-02	03	11	-12	05	-10	50	-07		
15 Locus x C1	-09	08	07	03	05	08	02	13	-10	-05	-09	03	-24	08	
16 Locus x C2	-02	07	04	06	-10	05	02	03	-03	-11	06	-19	08	-35	00

¹Decimal points are implicit.

Appendix E.2

Correlation matrix¹ of variables used in regression analyses
of satisfaction and attribution:
main effects and ATI, treatment groups only

Variable	1	2	3	4	5	6	7	8	9	10
1 Language background										
2 Satisfaction	-19									
3 Attribution	06									
4 Comparison 1	-03	-01	-22							
5 Vocabulary	27	-09	23	-31						
6 Locus of control	-12	-01	-22	12	-12					
7 Reading attitude	12	-15	10	-22	47	-25				
8 Language back x C1	-03	07	-15	29	-12	-06	-23			
9 Vocabulary x C1	-03	-02	-11	-01	-10	10	-14	25		
10 Rdg attitude x C1	-18	01	12	-01	-14	15	-12	11	43	
11 Locus of con x C1	-10	-16	-20	00	10	02	15	-11	-08	-23

¹Decimal points are implicit.

APPENDIX F

Regression Summary Tables

Appendix F.1

Summary table: regression of vocabulary posttest

Variable	Multiple R	R ²	ΔR^2	Simple R	b
Language background	.50844	.25851	.25851	.50844	2.19337
Vocabulary pretest	.94525	.89351	.63499	.92574	.86685
Reading attitude pretest	.94535	.89369	.00018	.43940	.02799
Locus of control	.94689	.89660	.00292	-.19089	-.17018
Comparison 2 (A vs. B)	.95247	.90720	.01060	.19758	1.29845
Comparison 1 (A+B vs. C)	.95268	.90760	.00039	-.22304	.25001
Language background x C1	.95270	.90764	.00004	-.09492	-.11960
Language background x C2	.95272	.90768	.00004	-.15438	-.52991
Vocabulary x C1	.95284	.90790	.00022	-.11024	-.00295
Vocabulary x C2	.95286	.90794	.00004	-.14887	-.09357
Attitude x C2	.95605	.91403	.00609	-.03443	-.07264
Attitude x C1	.95648	.91485	.00082	-.11441	-.02872
Locus of control x C2	.95665	.91518	.00033	.06542	.05003
Locus of control x C1	.95710	.91605	.00087	.07761	.09124
(Constant)					27.31457

Appendix F.2

Summary table: regression of reading attitude posttest

Variable	Multiple R	R ²	ΔR^2	Simple R	b
Language background	.04690	.00220	.00220	.04690	-.77863
Vocabulary pretest	.38857	.15098	.14878	.37712	.09841
Reading attitude pretest	.65809	.43308	.28210	.65189	.54542
Locus of control	.66905	.44762	.01454	-.29212	-.37997
Comparison 2 (A vs. B)	.66920	.44783	.00021	-.05580	-.10101
Comparison 1 (A+B vs. C)	.66974	.44855	.00072	-.18321	-1.11835
Language background x C1	.67035	.44937	.00082	-.10378	.97433
Language background x C2	.67736	.45882	.00945	-.09071	-.11748
Vocabulary x C2	.69546	.48366	.02484	-.19135	-.22292
Vocabulary x C1	.70831	.50170	.01804	-.20024	-.32268
Attitude x C1	.71110	.50567	.00396	-.04276	.07870
Attitude x C2	.71230	.50737	.00171	-.06952	-.07267
Locus of control x C2	.71283	.50813	.00076	.03657	-.11594
Locus of control x C1	.71294	.50828	.00015	.07260	.05494
(Constant)					70.83770

Appendix F.3

Summary table: regression of satisfaction posttest

Variable	Multiple R	R ²	ΔR^2	Simple R	b
Language background	.18825	.03544	.03544	-.18825	-.90045
Vocabulary pretest	.19382	.03756	.00213	-.09463	.00469
Reading attitude pretest	.22534	.05078	.01322	-.14517	-.03218
Locus of control	.23489	.05517	.00439	-.01188	-.04566
Treatment contrast (C1)	.23712	.05623	.00106	-.00509	-.17518
Language background x C1	.24009	.05764	.00141	.06918	.17396
Vocabulary x C1	.24606	.06054	.00290	-.02287	-.01870
Attitude x C1	.24657	.06080	.00025	.00821	-.01803
Locus of control x C1	.29792	.08876	.02796	-.15936	-.19760
(Constant)					20.39813

Appendix F.4

Summary table: regression of attribution scores

Variable	Multiple R	R ²	ΔR^2	Simple R	b
Language background	.05920	.00350	.00350	.05920	-.07852
Vocabulary pretest	.22875	.05233	.04882	.22874	.15454
Reading attitude pretest	.22882	.05236	.00003	.10228	-.03149
Locus of control	.30864	.09526	.04290	-.22477	-.36244
Treatment contrast (C1)	.33825	.11442	.01916	-.21555	-.55724
Language background x C1	.35971	.12939	.01498	-.14890	-.77393
Vocabulary x C1	.36298	.13175	.00236	-.10651	-.10208
Attitude x C1	.42810	.18327	.05152	.12020	.08068
Locus of control x C1	.46356	.21488	.03161	-.20303	-.29797
(Constant)					47.24648