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The Ohio State University, Ph.D., 1974
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INTERNAL VERSUS EXTERNAL LOCUS OF CONTROL AND PERFORMANCE IN
CONTROLLED AND MOTIVATED READING RATE IMPROVEMENT INSTRUCTION

DISSERTATION

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

By

James David Brandt, B.A., M.A.

* * * * *

The Ohio State University

1974

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Major Field: Counseling Psychology

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CHAPTER I

INTRODUCTION

One of the major problems faced by learning theory approaches to the prediction and control of human behavior has been the theoretical specification of the relationship of the construct of reinforcement to mediational constructs attributed to human functioning. A strict reinforcement, mechanical, drive reduction model has not been consistent or adequate for the prediction of human behavior in complex learning tasks. Social Learning Theory (SLT) formulated by Rotter (1954), has generated relevant research to the problem of the relationship of mediational and reinforcement constructs. Rotter felt that one of the factors which influences a human subject's performance in learning situations was the subject's expectancy of success. One of the variables which determines expectancy in a new learning situation is the personality variable of Internal versus External (I-E) locus of control of reinforcement.

Locus of control refers to an expectancy or person's belief, generalized across many situations, concerning the contingency between one's behavior and reinforcing events. Individuals who score high on the locus of control or I-E dimension (externals) tend to perceive that events are due to factors beyond their personal control. People who score low on the I-E dimension (internals) tend to perceive that they have a considerable degree of personal control over events in their lives.

The I-E locus of control of reinforcement construct has received increasing attention since being introduced by Rotter in 1954. Rotter (1966) and Lefcourt (1966) have discussed the relevant literature on this topic up to 1966. Joe (1971) has reviewed the more recent literature of the I-E concept since Rotter's (1966) monograph; concluding that the research substantiated the concept's usefulness in several areas of psychology. Throop and MacDonald (1971) in a survey of several bibliographic sources listed 339 manuscripts, 169 published and 170 unpublished, appearing between 1954 and 1969, directly discussing the I-E construct and its applications (206 of the 339 articles appeared after 1966). In addition, eleven different instruments assessing the I-E concept have been constructed for different populations, using different theoretical approaches and different assessment techniques:

- Battle, E.S. and Rotter, J.B. (1963) The Children's Picture Test of Internal-External Control.
- Bialer, I. (1961) The Locus of Control Scale for Children---Orally administered true false scale.
- Crandall, V.C., Katkovsky, W., and Crandall, V.J. (1964) The Intellectual Achievement Responsibility Questionnaire.
- Dean, D.G. (1961) The Powerlessness and Normlessness Scales.
- Dies, R.R. (1968) Development of a projective measure of perceived locus of control.
- Gozali, J., and Bailer, I. (1968) The Locus of Control Scale for Children---an alternate form.
- Graves, T.D. (1961) An adaptation of the Internal-External Control Scale (Rotter, 1966) for high school students.
- Harrison, F.I. (1968) View of the Environment Test.

James, W.H. (1957) The James-Phares Scale. A more lengthy version of the Phares scale (1955).

Jessor, R., Graves, T.D., Hanson, R.C., and Jessor, S.L. (1968)
A shorter, adult population version of Rotter's (1966) Internal-External scale. Included was a 5-item open-ended questionnaire devised to assess parental teaching of internal-external control.

Phares, E.J. (1955) Phares scale - A 13-item Lickert-type scale.

Rhienyelheim, D., Bialer, I., and Morrissey H. (1969) modified version of Intellectual Achievement Responsibility Questionnaire (Crandall, et al., 1964) for use with mentally retarded children.

Rotter, J.B. (1966) The Internal-External Control Scale.

The majority of research studies of the I-E construct have used Rotter's 23-item forced choice format for measuring locus of control (Rotter, 1966).

In addition to the above personality dimension of the I-E construct, James (1965), James and Senn (1965) and Shepel and James (1973) have proposed that learning situations or tasks can be ordered on a locus of control dimension (I-E dimension) independently of personality variables, according to the degree to which reinforcements are controlled by the subject versus the degree to which they are controlled by external factors. At the I_t end of the dimension are those tasks where cues, reinforcements and general feedback concerning performance are seen as being directly contingent upon the subject's own responses. This would include learning tasks such as target tracking, pursuit rotor performance, individual physical skills such as golfing, or the academic skills which a college student uses (Shepel and James; 1973). Here the reinforcements are primarily subject-contingent rather than experimenter-contingent. Toward the E_t end of the dimension are operant or instrumental conditioning

tasks where the subject is somewhat free to respond but where the reinforcements are primarily controlled by the experimenter. At the extreme E_t end are classical conditioning tasks where there are high degrees of response restriction and where cues and reinforcements are almost completely controlled by the experimenter (Shepel and James; 1973).

When referring to the situational locus of control dimension the subscript (t) will be used to indicate learning task, e.g., I_t-E_t ; when referring to the personality locus of control dimension the subscript (p) will be used, e.g., I_p-E_p .

Interactions between the personality (I_p-E_p) dimension and the learning task (I_t-E_t) dimension have been suggested for further research by Ducette and Wolk (1972). They observed from reported research (reviewed in more detail in Chapter II) with internal (I_p) and external (E_p) subjects in different types of learning situations that I_p 's sometimes scored higher, and sometimes lower, than E_p 's on the criterion variables. The learning situation seemed to affect I_p 's and E_p 's performance. This observation suggested that controlling the learning situation, among other variables, might attenuate the predictive ability of the I_p-E_p dimension. Basically, I_p 's were expected to perform better than E_p 's in internally (I_t) classified learning situations; and E_p 's were expected to perform better than I_p 's in externally (E_t) classified learning situations, when performance was defined as acquisition and extinction of behavior.

Of particular interest to the experimenter is the application of the interaction of the I_p - E_p and I_t - E_t dimensions to improvement of skills associated with success in college academic environments. Internals have generally been viewed to be more successful in college than externals (Foster and Gade; 1973). There is some evidence to support the possibility that courses designed to increase the academic and study skills of college students work most effectively with those students who are already successful in college course work (Robinson; 1970). It would be difficult to provide evidence for the proposition that E_p 's do not learn as much as I_p 's in study skills courses. However, attempts are made in this study to describe some of the dynamics of improving the reading skills of externally oriented college students.

The present investigation examined differences in correlation of the I_p - E_p dimension and performance and evaluation variables for college students engaged in three different learning situations: a controlled approach to improvement in reading rate, a motivated approach to improvement in reading rate, and a control procedure included as a nonspecific treatment of reading performance. The controlled and the motivated procedures used in this study were identified, respectively, as a more externally (E_t) oriented learning situation and as a more internally (I_t) oriented learning situation from perceptions of 63 pilot study subjects who had just completed the treatment programs. Subjects rated their learning situation on a nine-point scale along the continuum: felt your improvement

in reading rate was a result of your own effort, versus; felt reading rate improvement was due to the application of the procedures on the instruction sheet (see Appendix A). Subjects who received the controlled treatment ($n=33$) rated the experience near the center of the continuum ($M=5.8$; $SD=1.5$). Subjects who received the motivated treatment ($n=30$) rated the experience as toward the lower end of the continuum ($M=2.9$; $SD=1.2$).

Harris (1970) defined controlled and motivated approaches as being based on different assumptions regarding how to increase reading ability. The controlled approach was based on the assumption that training in the most efficient eye movements for reading, using mechanical devices, would result in the elimination of faulty reading habits which slow reading. Increasing rate through motivated reading was based on the assumption that the major causes of slow reading were lack of enough practice in reading easy, interesting material and lack of motivation to improve speed. Treatment of reading rate problems under this approach emphasized increasing participants' motivation to increase their speed.

Research comparing the effectiveness of controlled versus motivated approaches has led to the conclusion that controlled approaches have resulted in an increased rate of reading, but this increase has not been superior to motivated approaches when other factors were held constant. Several reading experts have suggested that mechanical reading training devices also have motivational values. Dearborn (1938) has suggested that controlled approaches, "because of the novelty of

their appeal and their assurance of success, arouse the student to new hopes and efforts at improvement." Referring to visual training devices, Dearborn commented that their effectiveness was not due to stretching the visual span, but to increasing the perceptual span by "spurring the mind." Spache (1958) pointed out that, "While the training devices do seem to contribute to rate increases, ..., this contribution is as often a reflection of teacher variance and perhaps motivation as it is an intrinsic result of the method." Increasing expectancy of success, instructor variables, and intrinsic interest of the method have been offered as explanations for the success of the controlled approaches.

An important assumption of the present study was that the effectiveness of both controlled and motivated reading programs used in this investigation was based on one of the assumptions of the motivated approach: one of the major causes of slow reading is lack of motivation to increase speed. The success of both of the controlled and motivated approaches used in this study was assumed due to the ability of both approaches to increase the motivation of participants to improve their reading rate. Support for this argument will be discussed in Chapter II.

Assuming that the success of controlled and motivated approaches is based on the motivational aspects of their respective procedures, it was hypothesized that because of individual differences, subjects would respond differentially to these procedures. Some subjects would learn or perform more efficiently with one set of procedures than with the other procedure. The thesis investigated in this study was that

E_p 's were expected to increase their reading rate to a greater degree and value their training experience more highly than I_p 's when engaged in the controlled reading rate improvement program; and, I_p 's were expected to increase their reading rate to a greater degree and value the training experience more highly than E_p 's when engaged in the motivated reading rate improvement program.

In summary, this investigation is based on the following theoretical model, to be developed in detail in Chapter II:

A_1 : Important factors determining the effectiveness of the controlled and motivated approaches to increasing reading rate used in this study are the motivational aspects of the procedures.

A_2 : An important variable influencing the motivation of subjects in learning situations is the interaction of the I_p-E_p dimension and the I_t-E_t dimension.

Thesis: An important factor determining the effectiveness of the controlled and motivated approaches to increasing reading rate used in this study is the interaction of the I_p-E_p dimension and the I_t-E_t dimension.

CHAPTER II

DEVELOPMENT OF THE HYPOTHESES

A discussion of the background and development of the hypotheses for this study requires attention to each of the three components of the deductive model presented at the end of Chapter I. The first assumption concerned the view that the effectiveness of controlled and motivated approaches to increasing reading rate is based on the motivational aspects of both procedures. This assumption is supported in this chapter by reference to reading research comparing the two approaches, oculomotor research into the nature of eye-movements during reading, and research concerning the effect of instructor variables in controlled approaches. The second assumption concerned the interaction of the I_p-E_p and I_t-E_t dimensions as it influences the motivation of human subjects in learning situations. Rotter's Social Learning Theory (SLT) is presented as a definition of motivation for human subjects in learning situations. The I-E control of reinforcement construct, as derived from Rotter's SLT, is discussed and the development of the I-E Scale is detailed. Finally, research investigating the interaction effect of the I_p-E_p and I_t-E_t dimensions on the acquisition and extinction of specific behaviors in different learning situations is reviewed. Research related to the thesis of this research is discussed and consequent hypotheses to test the thesis of this research are presented in the final section of this chapter.

A₁: Important factors determining the effectiveness of the controlled and motivated approaches used in this study are the motivational aspects of the procedures.

Research comparing the effectiveness of controlled versus motivated approaches has led to the conclusion that controlled approaches have resulted in an increased rate of reading, but this increase has not been superior to motivated approaches when other factors were held constant. Westover (1946) found that college students using ordinary printed materials made gains in reading rate as great as students who were using a Metron-O-Scope. Lewis (1949) compared a combined motivated and controlled approach with a controlled approach using 27 college students. He found that mechanical devices combined with an emphasis to work hard on comprehension was more effective than mechanical devices alone. Weber (1939) found that a control group without special training showed gains in both rate and comprehension. His two experimental groups included one group using the Pressey Manual of Reading Exercises (motivated approach) and a second group given tachistoscopic* exercises. Both experimental groups obtained approximately equal amounts of improvement in reading rates, which, were greater than the control group's improvement.

Thompson (1956), using 438 U.S. Air Force officers, compared improvement in reading using three procedures: a book-centered

*Tachistoscope procedures attempt to broaden the visual span (span of apprehension, or perceptual span) which is the amount of numbers or letters that can be seen in one fixation. The assumption is that broadening the visual span will result in fewer fixations per line and thereby increase reading rate.

(motivated) procedure, a machine-centered (controlled) procedure, and a control group. He found in his 21 one-hour treatments that the book-centered approach resulted in reading speeds significantly greater than those attained by the machine-centered approach, with no significant differences in comprehension scores.

The above research and similar studies have led Smith and Dechant (1961) and Harris (1970) to conclude that both controlled and motivated approaches increase reading rate through direct practice. There appeared to be no consistent evidence in their reviews of reading research to suggest that either approach was more effective than the other.

Another approach to the issue of controlled versus motivated approaches to reading rate improvement was taken by Tinker (1965; p. 111). On the basis of his own and other's research he concluded that there is no evidence to support the view that eye movements determine reading proficiency. This directly questioned the basic assumption of the controlled approach to improving reading rate: training in the most efficient eye movements for reading will eliminate faulty reading habits and improve reading proficiency. Tinker (1965) clarified that for most normal adult readers the research on eye movement training has not supported the view that oculomotor factors are dominant in determining reading ability. Tinker (1946) determined that the central nervous system processes of perception and comprehension are the important determinants in reading performance. The oculomotor reactions of fixations, regressions, visual span, etc.,

were highly flexible and quickly reflected changes according to the content of the reading material. Tinker (1965) concluded that progress in reading programs would be achieved if the term and concept of "rhythmical eye movements" were abandoned or confined to research, and if the use of "gadgets" and other techniques to train eye movements were discarded. In their place Tinker (1965) recommended emphasis on perception, comprehension and assimilation of the content of reading material to increase reading ability.

Research which investigated the instructor variable in controlled approaches to improving reading rate provided evidence that the effectiveness of controlled approach programs was at least partially determined by motivational aspects of the applied procedures. Freeburne (1949) and Glock (1949) found that instructor variances were more important than method variances for determining improvement in reading rate in their multivariate studies of reading rate improvement.

Freeburne (1949) compared two methods of direct practice to improve reading rate and a control group using freshmen enrolled in six sections of a remedial reading course (N=110). Two instructors were also compared in a 3x2 factorial experimental design. The two methods included training in perceptual span and training in perceptual speed. Training in perceptual span attempted to increase the amount of reading material a subject could "grasp" in one fixation. Training in perceptual speed attempted to increase the speed with which subjects could "grasp" phrases of constant length.

The experimental groups did not show any more gain than the control group when tested by several reading tests. Instructor A's span-training group however significantly ($p < .05$) exceeded the improvement made by his speed-training group. The difference in mean gain between Instructor A's span-training and control group was not significant. For Instructor B none of the differences between groups were large enough to be significant. Instructor A was more effective in his administration of perceptual span-training than perceptual speed-training.

Glock (1949) reported results of a 3x2 factorial experiment comparing three methods of reading rate improvement training and two instructors. College freshmen from six sections of a remedial reading class were administered three controlled methods of instruction by two instructors. One instructor taught three sections; a different method with each section. Significant differences were found between instructors on several of the reading performance measures. Comments from both of the instructors suggested that the most effective method also obtained the most "enthusiastic" and "cooperative" response from the subjects. The important consideration of both the Freeburne (1949) and Glock (1949) studies was that improvement in reading rate can be determined by something other than the eye movement training procedures used in these investigations.

The above arguments were presented to support the assumption that the effectiveness of both the controlled and motivated approaches to increasing reading rate was based on one of the assumptions of the motivated approach: one of the major causes of slow reading is lack of motivation to increase speed.

Concerning motivated approach procedures, Andrews (1952) and Harris (1970; p. 507) have reported success with reading rate improvement programs similar to the program utilized in the present study (Hauer; 1972). Use of these procedures has suggested that substantial improvement can be expected when administered to college populations.

Andrews (1952) reported from casual observation a steady increase in reading speed using fifty ten-minute motivated approach practice sessions with elementary school students. The practice sessions were spaced throughout the school year. The practice sessions consisted of having the students read easy material as rapidly as possible for a minute, and then count the number of words that they had read. The reading materials were of low level reading difficulty for the age and grade of the students observed. Andrews observations were not quantified or objective, nor were control groups or other elements of experimental design present.

Harris (1970; p. 507) reported results from application of a motivated approach using 29 college students in an educational psychology course. Harris reported a median improvement of 96 words per minute; a 39% improvement over the beginning rate of 247 words per minute. Comprehension accuracy scores varied somewhat, but ended up about as high as they were at the beginning of the program (median accuracy score for session 1 was 94%; for the final session 93%). The program included sixteen 10 to 15 minute practice sessions over sixteen class meetings. At a signal from the instructor all students began to read selected reading material as fast as they felt they

could, and recorded the number of minutes they had been reading when they had finished the material. They then answered items from prepared comprehension tests and recorded their computed rate and comprehension scores on a progress chart. The results of this procedure, however, were not assessed using standardized reading tests, nor were control group data reported.

Reading research comparing controlled and motivated approaches to reading rate improvement, oculomotor research into the nature of eye movements during reading, research concerning the effect of instructor variables in controlled approaches, and research suggesting the effectiveness of motivated approaches were presented to support the first assumption of the deductive model presented in Chapter I. The first assumption concerned the view that the effectiveness of controlled and motivated approaches to increasing reading rate was based on the motivational aspects of both procedures. Important variables which might influence the motivation of subjects in learning situations were assumed to be the I_p-E_p dimension, the I_t-E_t dimension, and their interaction.

A₂: An important variable influencing the motivation of subjects in learning situations is the interaction of the I_p-E_p dimension and the I_t-E_t dimension.

Rotter's Social Learning Theory

Rotter's SLT (1954; 1972) provided a definition of human motivation and its determinants in learning situations which is utilized in this investigation. Rotter's theory of human motivation can best be discussed by considering three basic constructs utilized by SLT in

the prediction of human behavior. Behavior potential (BP) is defined as the potentiality of the occurrence of a specific behavior in any given situation or situations in relation to any single reinforcement or set of reinforcements. Expectancy (E) is defined as the probability held by the individual that a particular reinforcement will occur following a specific behavior in a specific situation or situations. In a given situation, expectancy is a function of two components: probability of occurrence based upon past experiences in situations perceived as the same, and generalized expectancies from other related behavior - reinforcement sequences. Finally, reinforcement value (RV) is defined as the degree of preference for any one of several reinforcements to occur when the probabilities of occurrence are equal. These preferences are thought of as independent of expectancies.

These constructs are related to each other in the manner of the following formula (Rotter; 1972):

$$BP_{X, S1, Ra} = f(E_{X, Ra, S1} \cdot RV_{a, S1})$$

The formula is read: the potential for behavior (X) to occur in situation (1) in relation to reinforcement (a), is a function of the expectancy of the occurrence of reinforcement (a) following behavior (X) in situation (1), and the value of reinforcement (a) in situation (1). Each of these variables will be discussed in the following paragraphs. It is important to emphasize that Rotter attempts to apply a learning theory to the complex social behavior of human beings. To an empirical reinforcement principle he adds

an expectancy principle to formulate a more molar expectancy - reinforcement theory. The main objective is to present a system of constructs which provides the greatest prediction and control of behavior. The theory, by admission of its author, is incomplete, especially in defining the nature of the interaction between expectancy and reinforcement for determining behavior.

Behavior Potential

Behavior is broadly defined in SLT to include all human responses having an effect on the environment that can be measured either directly or indirectly. Cognitive, implicit or higher level cortical processes are included as areas of study.

Behavior potential is a function of both expectancy and reinforcement value. However, the theory lacks a systematic definition of "function." No functional statement has been formulated to denote the precise relation between expectancy and reinforcement value. When considering an arithmetic or a geometric relationship between the two variables, recent reviews of the theoretical research favor a multiplicative relationship (Rotter, 1972; p. 16).

In any given situation, it is presumed that the behavior with the highest potential is the one that actually occurs. As situations change and the individual encounters new experiences, his expectancies and reinforcements change.

Reinforcement Value

SLT does not rely upon a primary drive reduction assumption

to determine the value of reinforcements. Instead, SLT argues that psychological goals, needs, or reinforcements depend upon other psychological reinforcers for their value. The value of any given reinforcer depends upon its learned association with other reinforcers. The value of a reinforcer is determined by the value of the reinforcements with which it has been previously associated for the individual, and by the frequency that its occurrence leads to the subsequent occurrence of related reinforcements.

Reinforcers are expected to change value in different situations, and to some extent under differing conditions. Thus, in the terms of this study, one should not expect that the reinforcement value of an increase in reading ability would be the same when measured in a physical education class as in a study skills course.

Reinforcement value is operationally defined by SLT researchers as a degree of preference for any one of a group of reinforcements to occur, if the probabilities of all occurring are equal. Assessment of reinforcement value is a relative measure, and values of reinforcements are determined only in relation to the preference for other reinforcements. Previous research (Phares and Rotter, 1956; Lotsof, 1956) has utilized several procedures including: ranking of potential reinforcers, rating procedures, forced choice techniques and projective techniques. The measurement of reinforcement value is limited by this operational definition. Statements concerning reinforcement value can be made only by

specifying the potential reinforcements that were considered and their relative strengths.

Expectancy

Expectancies are determined by the probability, calculated on the basis of one's past history of reinforcement, that a specific reinforcement will occur in a given situation, and a generalization of expectancies from other related behavior-reinforcement sequences. A generalized formula from SLT, on the basis of which Expectancy can be predicted is:

$$E_{S_1} = f (S_1 \text{ \& } GE)$$

Expectancy (E_{S_1}) is a function of the probability of occurrence based on past experience in situations perceived by a subject as the same (S_1), and his generalization of expectancies (GE) for the same or similar reinforcements to occur in other situations for the same or functionally related behaviors (Rotter; 1972).

Expectancy in a situation (S_n) is measured by direct methods, asking subjects to state the probability of a particular outcome on a scale of 1 to 10 (Phares, 1964; Schwarz, 1966). The necessity for a generalization term in the formula was demonstrated when subjects showed marked and consistent individual differences in their expectancy statements. Even though subjects experienced identical reinforcement patterns during an experiment, they did not react by stating identical expectancies in response to identical reinforcement.

The generalized expectancy (GE) concept is based on how

individuals categorize or perceive situations, with the basis for generalization being the situational stimuli rather than the nature of the reinforcement (Rotter, 1972; p. 42). This aspect constitutes the major revision of Rotter's SLT from his statement of the theory in 1954. Several dimensions of generalized expectancies have been suggested from SLT investigations. These include a generalized problem-solving expectancy, with individuals differing in orientation toward looking for alternatives in a problem-solving situation (Rotter, 1972; p. 42); an interpersonal trust dimension, whether to believe or not to believe statements of another person (Katz and Rotter; 1969); and internal versus external control of reinforcement (Rotter; 1966).

The Internal versus External Locus of Control of Reinforcement Scale

The earliest attempts to measure the I-E locus of control reinforcement general expectancy were based on the work of Phares (1955), who produced a 13-item Likert-type scale. A more lengthy revision of the Phares Scale was completed by James (1957), titled the James-Phares Scale. This was a 60-item Likert scale containing 30 items designed to measure internal versus external locus of control and 30 filler items. Rotter (1966) later developed his 23-item forced choice method of measurement. Using the James-Phares scale, Rotter attempted to broaden and develop the scale. The forced-choice item construction was introduced as a control for the social desirability of the items. Items were also modified and eliminated according to item analysis with the Marlowe-Crowne Social Desirability

Scale, and the wording of items was modified for use with non-college adult and high school populations. The final scale was reduced to 23 items with 6 filler items intended to make more ambiguous the purpose of the scale (see Appendix C).

Reliability measures reported for the I-E Scale have been consistent. The test-retest reliability measures reported by Rotter (1966) from three samples, and for intervening time periods varying from 1 to 2 months, ranged between .49 and .83. Sixty male and female Ohio State University Elementary Psychology students obtained a combined test-retest reliability coefficient of .72 (males .60; females .83) for a one month intervening period. A second sample of 117 male and female Ohio State University Elementary Psychology students obtained a combined test-retest reliability coefficient of .55 (males .49; females .61) for a two month intervening period. Jessor (1964) reported a test-retest reliability coefficient of .78 for 28 male prisoners at the Colorado Reformatory for a two month period. Hersch and Scheibe (1967) also found test-retest reliability coefficients that ranged between .48 and .84 for a two month period using college students. Harrow and Ferrante (1969) found for 86 psychiatric S's a test-retest reliability of .75 over a six month period.

Internal consistency estimates have ranged from .65 to .79 (Rotter; 1966). One hundred male and female Ohio State University Elementary Psychology students obtained split half Spearman-Brown estimates of .73 and Kuder-Richardson estimates of .73. A second sample of 400 male and female Ohio State University Elementary

Psychology students obtained Kuder-Richardson estimates of .70.

An independent Purdue opinion poll, which used a national stratified sample of 1,000 tenth, eleventh and twelfth grade students (Franklin; 1963), reported Kuder-Richardson estimates of internal consistency of .69.

Rotter (1966) reported good discriminant validity for the I-E Scale indicated by low correlations with measures of intelligence, social desirability and political affiliation. Nonsignificant correlations were observed between the I-E Scale and several measures of intelligence. Using the Ohio State Psychological Examination with 107 female students from Elementary Psychology classes at Ohio State University, Strickland (1962) reported a correlation with the I-E Scale of $-.09$. From a sample of 72 male and female students from the same source using the same instruments Cardl (1962) reported a correlation of $-.11$. Ladwig (1963) reported correlation coefficients of the Revised Beta intelligence test with the I-E Scale using 80 male Ohio Federal prisoners aged 18-26, excluding those with less than 8th grade reading ability. His results were consistent with the above correlations ($.01$).

Since Rotter's 1966 review, Hersch and Scheibe (1967) found nonsignificant correlations between I-E Scale scores and three different measures of intelligence: Otis Quick-Scoring Mental Ability Test, Terman Concept Mastery Test, and the Differential Aptitude Language Test. The subjects were members of the 1964, 1965 and 1966 Connecticut Service Corps. Correlations for the above three groups ranged between $-.07$ to $.17$. None of these correlations were significant.

Minton (1967) reported that the I-E total scores of 60 college males were unrelated to political liberalism or conservatism ideology or attitudes concerning international relations. However, for 67 females significant correlations were observed between external control and both conservatism ($r = .26, p < .05$) and an attitude of exaggerated patriotism regarding international relations ($r = .28, p < .05$).

Regarding the relationship between I-E Scale and social desirability, Rotter (1966) reported low negative correlations between the I-E Scale and the Marlowe-Crowne Social Desirability Scale. Using 136 Ohio State University Elementary Psychology male students, Schwarz (1962) observed a correlation of $-.22$ between the I-E Scale and the Marlowe-Crowne Social Desirability Scale. Strickland (1962) observed a correlation of $-.12$ from 180 female students drawn from the same source. Watt (1962) reported a correlation of $-.29$ for male and female students from the above source. Ware (1964) observed a correlation of $-.28$ for 113 male and female subjects from Kansas State University Elementary Psychology classes. Ladwig (1963) reported a correlation of $-.41$ from scores gathered from 80 Ohio Federal male prisoners, aged 18-26, with at least an 8th grade reading ability.

Other research since Rotter's (1966) monograph has presented contradictory evidence on this topic. Strickland (1965), Tolor (1967), and Tolor and Julowiec (1968) found nonsignificant correlations between the I-E Scale and the Marlowe-Crowne Social Desirability Scale. Feather (1967) and Altrocchi, Palmer, Hellman and Davis (1968) reported significant correlations between I-E total scores and the Marlowe-Crowne

Social Desirability Scale ($-.42$, $p < .01$; and $-.34$, $p < .05$ respectively). Berzins, Ross and Cohen (1970) reported a significant ($p < .05$) correlation of $-.23$ between the I-E Scale and Edwards' social desirability scale. Cone (1971) in a study of locus of control using a population of Army recruits, also noted a significant correlation ($-.48$; $p < .01$) between the I-E Scale and scores on Edwards' social desirability scale. These results suggest the presence of a social desirability factor despite Rotter's attempts (1966) to remove it from the scale.

Although Rotter (1966) stated that sex differences on the I-E Scale among college students appeared to be minimal, in one later study by Feather (1968) the I-E Scale did not appear to be totally free of a sex bias. Feather reported that females earned significantly higher external scores than males among students at a university in England. These sex differences might have been due, however, to geographical differences.

Differences in attitudes of I-E control between ethnic groups and social classes have been reported. Significant differences between blacks and whites in mean I-E Scale scores were obtained by Lefcourt and Ladwig (1965). They used 60 white and 60 blacks from two correctional institutions who were not significantly different in social class, age, intelligence, or reason for incarceration. Blacks were significantly ($p < .05$) more external than whites ($M=8.97$ and $M=7.87$, respectively). Scott and Phelon (1969), in a study comparing hard-core unemployed males, noted that unemployed whites were significantly ($p < .05$) more internally oriented

than unemployed blacks or Mexican-Americans. After reviewing much of the research in this aspect of the I-E Scale, Joe (1971) concluded that social class interacts with race so that individuals from the lower classes and culturally different groups tend to have higher expectancies of external control.

Recent factor analytic studies have contradicted evidence presented in Rotter's (1966) review of research with the I-E Scale. Rotter (1966) mentioned two factor analyses of the I-E Scale. In the first analysis the source and the method used to extract factors was not reported; however, Rotter suggested the presence of a general factor accounting for much of the variance. Several small additional factors were extracted but were said to be highly specific, involving only two or three items. Franklin (1963) performed the second analysis employing a principal components analysis with seven factors rotated to simple structure by the Carroll Biquantum Oblique Solution (Carroll; 1957). Franklin obtained evidence suggesting several subareas of the I-E Scale; however, the factor coefficients of the items on the factors failed to be very impressive ($\leq .30$). From these studies, Rotter (1966) assumed the I-E Scale was relatively unidimensional.

Gurin, Gurin, Lao and Beattie (1969) factor analyzed responses of 1,695 black students and found four independent factors. Gurin et.al. used a principal components analysis with Varimax rotation of four factors. The factors identified were:

Control Ideology which referred to how much control one believes most people in the society possess;

Personal Control which referred to how much control one believes they personally possess;

System Modifiability measured the degree to which an individual believes racial discrimination, war and world affairs can be modified; and

Race Ideology the attribution of blame either to oneself or a faulty social system. Most race-related items were contained in this factor.

The four factors of the Gurin et.al. (1969) study were defined by item loadings greater than $\pm .40$ for each of the factors.

Mirels (1970) investigated by factor analysis the responses of 316 Ohio State University college students enrolled in the introductory psychology course. Mirels defined two factors after applying a principal component analysis with components rotated to orthogonal simple structure by Kaiser's (1958) Varimax method. Separate analyses were performed for males and females. Factor I concerned the amount of control one believes he personally possesses, while Factor II concerned the extent to which one believes a citizen can exert control over political and world affairs. Both factors were the same for both sexes. Mirel's findings along with Gurin, et.al. strongly supported the notion that the locus of control variable should be studied in a multidimensional rather than a unidimensional manner.

Consistent with these suggestions, the present study utilized the two factors of the I-E Scale described by Mirels (1970) as separate subscales. Subscale 1 included nine items of the I-E Scale which obtained item loadings on Factor 1 greater than $\pm .30$. Subscale 2

included four items of the I-E Scale which obtained item loadings on Factor II greater than $\pm .30$ (see Appendix D).

Other characteristics of responses to the I-E Scale by college students at Ohio State University enrolled in Elementary Psychology courses were noted from the data reported by Rotter (1966). The distribution of I-E total scores for both males and females was leptokurtic and somewhat positively skewed (males, $N=575$, $M=8.15$, $SD=3.88$; females, $N=605$, $M=8.42$, $SD=4.06$). The problems that these characteristics created for analyzing the results of this study will be discussed later in this Chapter.

The I_p - E_p and I_t - E_t Interaction

Having discussed the reliability, validity and several characteristics of the I-E Scale, there remains another area of research which provided background for the development of the hypotheses of the present study. This area of research involved the performance of I's and E's in different learning situations and the applications of the I-E Scale in educational settings. The discussion of this area of research will be initiated by reintroducing the concept of the I_t - E_t classification of learning environments. James (1965), James and Senn (1965) and Shepel and James (1973) have proposed that learning situations or tasks can be ordered on a locus of control dimension (I_t - E_t) independently of subjects' personality variables. This classification of situations was accomplished according to the degree to which the learning task was controlled by the subject versus the degree to which it was controlled by external factors (e.g., schedules of

reinforcement, random reinforcement of responses, the experimenter, reflex responses, etc.). At the I_t end of the dimension were those tasks where cues, reinforcements and general feedback concerning performance were seen as being directly contingent upon the subject's own responses. This included learning tasks such as target tracking, pursuit rotor performance, individual physical skills such as golfing, or the academic skills which a college student used (Shepel and James; 1973). Here the reinforcements were primarily subject-contingent rather than experimenter-contingent. Toward the E_t end of the dimension were operant or instrumental conditioning tasks where the subject is somewhat free to respond but where the learning tasks were primarily controlled by the experimenter. At the extreme E_t end were classical conditioning tasks with high degrees of response restriction, where cues and reinforcements were almost completely controlled by the experimenter (Shepel and James ; 1973). While the I_p - E_p dimension is based on subject's generalized expectancies of success in learning situations, the I_t - E_t dimension is based on the degree of external control of subject's responses and reinforcements in learning situations.

Neff (1956), Phares (1957), James (1957), James and Rotter (1961), and Rotter, Liverant and Crowne (1961) have investigated the changes in expectancies of subjects in learning situations located at different points along the I_t - E_t dimension. Generally, these researchers found that the acquisition, generalization, and extinction of expectancies in learning situations were markedly influenced

depending upon whether the subjects viewed the resulting rewards of the task as being due to skill or chance. According to James' (1965) definition of the I-E dimension, skill learning situations can be viewed as internally oriented learning situations, and chance learning situations can be viewed as externally oriented learning situations.

Neff (1956) investigated the differential effect of a partial reinforcement learning situation and a 100% reinforcement learning situation upon extinction rates with college students in a verbal learning task. He found that there were no significant differences in extinction rates between fifty per cent reinforced groups and the continuous reinforcement groups. This was an unexpected finding, incongruent with the reported results of other studies investigating this area (Jenkins, and Standley; 1950). The major factor that distinguished Neff's experimental procedures from other studies of partial reinforcement and extinction appeared to be that Neff had used a task on which success or failure could be perceived as being within a subject's control. This procedural difference suggested that subjects might react differently in situations in which success or failure could be perceived as being within a subject's control, and situations in which reinforcement could be perceived as under the experimenter's control or under chance conditions.

Phares (1957) attempted to demonstrate the effect of situational variables on changes in expectancies in skill and chance learning situations. Seventy-seven female students from introductory psychology courses were presented two learning tasks with two sets of instructions

for both tasks. One set of instructions emphasized that the task was difficult but could be mastered by the subjects, and performance on the task was related to the subject's ability. The other set of instructions emphasized that the task was extremely difficult, and no one was expected to do better than chance; correct responses were due only to luck. Chance conditions produced smaller changes in expectancy of success on future trials than the skill conditions. In the chance situation, the obtained scores did not generalize to other future learning situations. The subject's perception of a skill or chance learning situation affected the subject's responses to the learning task.

In his dissertation, James (1957) demonstrated that the description of tasks as being skill or chance---internally or externally controlled---related significantly to the generalization of expectancies as well as the changes in expectancies observed in the Phares (1957) study. James presented his subjects with a difficult line judging task described to the subjects as a "perceptual discrimination" task. One group of subjects received the instructions that success on the task was due to the skill of the subject. The other group was instructed that success was purely a chance matter since the task was so difficult. The first group generalized their measured expectancies of success to a new but similar task to an extent significantly ($p < .01$) greater than subjects in the second group. James concluded that subjects in the skill described condition attributed their degree of success to their ability; subjects in the chance described condition did not attribute their degree of success to themselves, and therefore had no basis to form an expectancy

for the new task. James' (1958) investigation suggested that the learning situation affected subjects' responses to a new but similar learning task.

James and Rotter (1961) produced a follow-up study of some of the implications presented by Neff (1956). The authors studied the interaction of skill versus chance descriptions of a learning task and partial versus continuous reinforcement conditions. During extinction of a learned behavior, under chance conditions the partially reinforced subjects took significantly ($p < .01$) more trials to reach extinction than the continuous reinforcement group. Under skill conditions, however, the continuous reinforcement group showed slightly more but not significant ($p > .01$) resistance to extinction than the partially reinforced group. The partial chance group took significantly ($p < .01$) longer to extinguish than the partial skill group, while the continuous skill group took significantly ($p < .01$) longer to extinguish than the continuous chance group.

Rotter, Liverant and Crowne (1961) studied the behavior of subjects in two different learning situations. In their study, attempts were made to construct two different tasks which were hypothesized to be regarded as skill and chance controlled tasks on the basis of the previous cultural experience of the subjects, rather than by instructions. Eight groups of subjects were studied with an apparatus involving a motor skill of steadiness and one of guessing cards, under four levels of partial and continuous reinforcement. The hypothesis tested was that under chance conditions the occurrence of reinforcement leads to

less learning, in that previous experience is a less stable predictor of the future occurrence of the event. This hypothesis was supported by the results. Major differences (significant at $p < .01$) were observed between the groups tested in the skill task and in the chance task in terms of the acquisition, maintenance and extinction of expectancies. All four groups receiving different schedules of reinforcement under the skill condition changed their expectancies to a greater extent and maintained them longer during extinction than the four groups under the chance condition.

The experiments by Neff (1956), Phares (1957), James (1957), Rotter and James (1958) and Rotter, Liverant and Crowne (1961) investigated only the I_t-E_t dimension and its effect on the behavior of subjects. Generally they found that there was less change, generalization, and extinction of expectancies by subjects when engaging in learning situations in which the rewards are defined as due to chance, than learning situations in which they were defined as due to their own skill or ability.

Other investigators have studied the individual differences in performance of I_p 's and E_p 's in learning situations located at different points of the I_t-E_t dimension. Julian, Lichtman and Ryckman (1968) investigated the behavior of children determined to be I_p 's and E_p 's in a dart throwing game. Points in the dart throwing game were given to subjects based upon distance from the target, and accuracy of hitting the target. The investigators were testing the hypothesis that I_p 's prefer circumstances under which they can exert greater control over the outcomes of the learning situation. In

this study I_p 's showed a relatively stronger preference (significant at $p < .05$) for throwing darts at a closer distance.

Friedman (1972) investigated the responses of high test anxious students, characterized as I_p or E_p by scores on Rotter's I-E Scale, to three types of psychological treatment for test anxiety. Discussion oriented group treatment, systematic desensitization, and automated desensitization differed in the perceived amount of subject control over the learning situation, as reported from reactions of previously tested college students to descriptions of the three procedures. E_p 's reported less anxiety in subsequent test situations after being treated with automated desensitization than with systematic desensitization, which were both superior to the discussion oriented treatment. I_p 's who received the discussion oriented treatment reported less anxiety in subsequent test situations than E_p 's who had also received the discussion oriented treatment. These results on subjective measures were not, however, supported on more objective scales relating to test anxiety, nor was test performance affected to a noticable degree.

Generally, it has been suggested that in applications of the I_p - E_p dimension to college academic situations, I_p 's perform better academically than E_p 's (James, 1965; Foster and Gade, 1973). Mitchell (1969) treated matched groups of Rotter's I's and E's with two approaches to presenting study skills information. One approach involved six one-hour structured lectures covering material related to effective reading, notetaking, scheduling of time, concentration, habits, and term paper writing. The second approach consisted of consultant groups in which the subjects' control of the sessions was emphasized.

The instructor was utilized as a consultant, subject to the requests for specific help from the treatment group. In this instance the I_p - E_p dimension did not significantly ($p < .05$) affect the behavior of college students in these two learning situations. Mitchell mentioned several interpretations concerning this result. He suggested that perhaps the two learning situations were not perceived as psychologically different along the I_t - E_t dimension. If this were the case, this problem would have obscured the effect of the I_t - E_t variable.

James and Steele (1968) randomly selected I_p 's and E_p 's from the upper and lower 27% of the distribution of scores on James I-E Scale.* The experimental learning task consisted of reinforcing key presses on a variable ratio schedule. Reinforcement consisted of a brief flash of a red light in the experimental chamber. After 100 responses subjects were put on an extinction schedule. Externals tended to make more responses during extinction than internals. The learning situation was defined by the experimenters as an externally oriented learning situation. This result contradicted previous research in which internals generally persist in making more responses during extinction. The external orientation of the learning situation suggested to the experimenters that the I_t - E_t orientation of the learning situation might differentially affect the performance of internals and externals on the personality dimension.

*The James I-E Scale is a revision of the James-Phares Scale; a Lickert type response scale from which Rotter's forced choice scale (Rotter; 1966) was developed.

In this section of Chapter II the background for the second assumption of the logical development of the thesis of this study was discussed. The I_p-E_p dimension was defined by the Rotter I-E Scale, and its place as a generalized expectancy in Rotter's (1954; 1972) definition of motivation was discussed. The development of the I_t-E_t dimension was detailed beginning with early research on the effect of different learning situations on the acquisition, generalization and extinction of expectancies. It was generally found that different learning situations differentially affect the behavior of subjects. Several examples of research were also cited which attempted to explore the interaction of the I_p-E_p dimension and the I_t-E_t dimension as variables determining the performance of subjects in learning situations. The next section discusses research related to the thesis of this study.

Thesis: An important factor determining the effectiveness of the controlled and motivated approaches to increasing reading rate used in this study is the interaction of the I_p-E_p dimension and the I_t-E_t dimension.

The first section of this chapter reviewed much of the background and assumptions of the controlled and motivated approaches to improving reading rate. The two procedures used in this study which are representative of the above approaches were designed so that they fitted two distinct points along the I_t-E_t dimension. Reading Program I was designed to be an externally (E_t) oriented situation, stressing the control of the task by a particular external controller of the

subjects' performance. Reading Program II emphasized the subjects' control of the task and made the subjects' performance directly related to their own efforts and abilities. Basically, it had been assumed by the experimenter that the effectiveness of the two reading programs is based on the subjects' motivation in each of the two learning situations. Because of individual differences in subjects, it was proposed that some subjects would do better in one of the reading programs than the other, and that this difference in effectiveness of the programs was related to the I_p-E_p dimension characteristic of the subjects.

Some research has suggested that personality variables influence learning performance in reading improvement programs. Chansky and Bregman (1957) correlated improvement of vocabulary and reading comprehension with scores on the Hysteria and Psychosthenia scales of the Minnesota Multiphasic Personality Inventory, using college students enrolled in a reading improvement course. The authors based their hypotheses that the above correlations would be significant on a study by Deese, Lazarus, and Keenan (1953) which found that anxious people learn better under stress, when the stress is such that it can be avoided by learning. Hysteria was moderately correlated with improvement (vocabulary .36; comprehension .30) and Psychosthenia was inversely correlated with improvement (vocabulary -.35; comprehension -.46). From a multiple correlation analyses a significant combination of variables included: Psychosthenia scale, Survey of Study Habits and Attitudes (SSHA) total score, and the American Council on Education Language Test (ACE:L). Multiple correlations were .79 with improvement in vocabulary, and .87 with improvement in comprehension.

Chansky and Bregman's study suggested that personality characteristics of college students did affect their performance in a reading improvement program.

Whitehill and Kamm (1969), using the Introversion-Extroversion (I-E) scale of the Eysenck Personality Inventory (EPI), found that extroverts tended to drop out of a traditional reading program based on timed readings, accelerator pacing devices, and timed reading tests more quickly than did introverts. Whitehill and Jipson (1970) compared the differential performance of extroverts and introverts in a traditional reading program and in a motivated approach reading program using popular novels, with student controlled timing devices, and comprehension tests. Results suggested that there were no significant differences in the performance of extroverts and introverts in the traditional program. However, in the motivated approach, the extroverts accrued significantly ($p < .05$) higher percentage speed gains than the introverts. This series of studies demonstrated a differential effect of different reading improvement programs on subjects with different personality characteristics.

The application of the Internal-External construct to reading improvement programs was established by Mathis, Hippe and James (1968). Using the James I-E Scale described previously, Mathis, et al. studied the performance of I's and E's under three levels of situational expectancy (high, low, and neutral) and during five weekly test trials. The reading improvement treatment was a modified version of Educational Developmental Laboratories' Learning 300 program. This was defined by Mathis, et al. as an internally oriented approach to reading rate improvement which included the use of several automated devices:

reading pacers, which allowed for the control of the rate of sentence presentation; Tach X, a tachistoscope with which subjects practice fixating on words at various speeds; and a skimming and scanning training device. Comprehension tests were also provided for additional feedback of results. Subjects worked individually once a day, five days a week, over a five week period. Situational expectancy was manipulated by informing the subjects of specific reading rate changes they could expect by the end of the five week period. High expectancy subjects were informed they could expect at least a 250 word per minute increase in their reading rate; low expectancy subjects were told to expect a 125 word per minute increase; and neutral expectancy subjects received no formal expectancy instruction. I's were randomly selected from males in the lower 22 percent and E's from males in the upper 22 percent of scores on the James I-E scale from a pool of 600 freshman college students.

In a $2 \times 3 \times 5$ analysis of variance, the main effects of I-E control, expectancy and trials were significant ($p < .01$). Also, significant ($p < .01$) interactions were observed between I-E and expectancy, I-E and trials, and expectancy and trials. A significant ($p < .01$) triple interaction was also found. The authors concluded that the I-E control dimension is an important personality variable in accounting for individual differences in performance in reading improvement programs, with internals showing more rapid learning than externals. In the discussion of the results of their study, Mathis, et al. defined the learning task in this experiment as an internally oriented (I_t) learning situation. I_p 's were therefore

expected by the authors to perform better than E_p 's in this reading rate improvement program.

Further research is needed to determine the effect of the interaction of the I_p-E_p and I_t-E_t dimensions on the success of reading rate improvement programs. Chansky and Bregman (1957), Whitehill and Kamm (1969), and Whitehill and Jipson (1970) produced research suggesting that personality variables of subjects are important in determining the effect of a reading rate improvement program. Mathis, Hippe and James (1968), speaking from previous research of the interaction of the I_p-E_p and I_t-E_t dimensions in other learning situations, applied the concept to an internally oriented reading rate improvement program. Mathis, et al., established the usefulness of the I_p-E_p and I_t-E_t interaction in this learning situation.

The present study attempts to further define the nature of this interaction through assessment of the performance of internals and externals in two previously defined approaches to reading rate improvement. One reading rate improvement program (controlled approach) was defined as an externally oriented learning task, and the other reading program (motivated approach) an internally oriented learning task. A third nonspecific treatment was included as a control group. Generally, E_p 's were expected to increase their reading rate more than I_p 's in the externally oriented reading rate improvement program; and I_p 's were expected to increase their reading rate more than E_p 's in the internally oriented reading rate improvement program.

Most of the research in this chapter has focused on reading rate as the primary dependent variable. When considering the effect

of reading improvement instruction, however, it is also necessary to study the change in comprehension level associated with the change in reading rate. Smith and Dechant (1961, p. 235) concluded in their review of reading research that reading rate cannot be considered apart from comprehension when evaluating reading rate improvement programs. Changes in reading rates may be accounted for by changes in comprehension levels. The goal of reading rate improvement programs is to increase reading rate without negatively influencing comprehension levels. Because of these considerations parallel null hypotheses are presented below for changes in reading rate and changes in reading comprehension.

Hypotheses

A. Effectiveness of the Learning Situations

1. Change in Reading Rate

H₁: The differences in improvement of Reading Rate for subjects receiving the externally oriented reading program; subjects receiving the internally oriented reading program; and the control group, are equal to zero.

2. Change in Comprehension

H₂: The differences in improvement of Comprehension Skills for subjects receiving the externally oriented reading program; subjects receiving the internally oriented reading program; and the control group, are equal to zero.

B. Correlations between I-E Scale scores and Reading Improvement

1. Change in Reading Rate

H₃: Differences between correlation coefficients of the I-E Scale and improvement in reading rate for subjects receiving the externally oriented reading program; subjects receiving

the internally oriented reading program; and the control group, are equal to zero.

2. Change in Comprehension

H₄: Differences between correlation coefficients of the I-E Scale and improvement in comprehension skills for subjects receiving the externally oriented reading program; subjects receiving the internally oriented reading program; and the control group, are equal to zero.

Other variables that might affect reading instruction are intelligence, instructor variables, sex, and age of the subjects. Harris (1970) has concluded from his review of reading research that the effect of intelligence on improvement in reading ability during remedial instruction has generally been reported to be a positive but low correlation between measured I.Q. and improvement in reading ability. Chansky and Bregman (1957), however, found moderate but negative correlations (comprehension $-.37$; vocabulary $-.37$) between improvement in reading ability and measures of verbal intelligence. The correlations observed were not significant according to t test procedures at the $P < .05$ level. Although the evidence is somewhat inconsistent, intelligence is not assumed to be an important variable determining the effect of instruction in reading rate. However, the effect of this variable will be examined in the present study because of possible interaction effects with other variables.

Spache (1958) has previously mentioned the individual characteristics of instructors and their possible effect on the motivation of students in reading improvement programs. If motivation is the basic assumption for the effectiveness of reading improvement programs,

experimental control of the instructor variable would be important in any evaluation of reading improvement instruction. Other variables that might affect the motivation of subjects include the sex differences and age differences of subjects and how these might interact with the different reading programs and characteristics of the instructor.

The manner in which these hypotheses and variables will be studied is the topic of the next chapter.

CHAPTER III

METHOD

The reading material used in the experimental treatments of this investigation was identical for all experimental subjects. Attempts were made to select interesting reading material that also approximated the difficulty of reading material encountered in college courses. A book of readings edited by Wrenn and Ruiz (1970) titled The Normal Personality: Issues to Insights was finally selected. Eight reading selections which varied in length and varied slightly in reading ease and interest were determined to be appropriate for this investigation. Reading ease and human interest for each of the selections were assessed using Flesch's (1951) formulas and prescribed procedures. The scores are listed in Table 3.1.

The reading selections were used in ascending order of length in terms of number of words contained in the article. Examining the reading ease scores, which were determined by average number of words per sentence and number of syllables per 100 words, the difficulty of the reading materials decreases somewhat over the practice sessions. However, the range of the scores is narrow with a mean of 48.2 (Difficult), which, according to Flesch (1951; p. 43) is within the 13th to 16th grade (college) level category. The human interest scores were determined by per cent of "personal words" (e.g., pronouns, names, group words, etc.), and "personal sentences" (e.g., quoted sentences, questions, exclamations, etc.) of the content of the selection. These

TABLE 3.1: READING EASE HUMAN INTEREST SCORES
(FLESCH, 1951) AND NUMBER OF WORDS
FOR EACH OF THE READING SELECTIONS
USED IN THE EXPERIMENTAL TREATMENTS.

Reading Selection	Reading Ease	Human Interest	Length: No. of Words
1. Neurotic Patterns in Family Re- lationships	45 Difficult	36 Interesting	2231
2. Sex on the College Campus	43 Difficult	30 Interesting	3090
3. Who Cares for the Aged	37 Difficult	20 Interesting	3600
4. Youth in Ex- ploration of Man Emergent	49 Difficult	45 Very Interesting	4052
5. Draft Resister's Story	51 Fairly Difficult	48 Very Interesting	4208
6. The Young Divorcee	53 Fairly Difficult	40 Interesting	4684
7. Of Youth and the Time of Generations	53 Fairly Difficult	38 Interesting	6907
8. Communicating with One's Children	55 Fairly Difficult	44 Very Interesting	9378

scores gradually increase over the sessions with a mean of 37.6 (Interesting).

The content of the reading material consisted of authoritative essays concerning topics felt by the experimenter to be currently popular among college students.

Subjects

Subjects were recruited from study skills classes in the Department of Psychology at The Ohio State University, Summer Quarter, 1973. Thirty-seven male and twenty-two female volunteers for a reading improvement program were randomly assigned to four experimental groups and a fifth delayed-treatment group. The fifth group was included as a non-specific treatment control group; participating in the study skills class during the first half of the quarter, while the experimental treatments were conducted, and receiving the motivated treatment program in the second half of the quarter. Each of the groups met at a time which did not conflict with the class time of any of the study skills class sections to avoid any section bias to the groups.

In order to encourage subjects to participate in the experiment, subjects were allowed to deduct two hours a week from the time they were required to attend their study skills class, if they volunteered for the experiment. Arrangements were made for this deducted time with the instructor of each section.

One biasing effect occurred in the assignment of subjects to experimental groups. Although subjects were randomly assigned to treat-

ment groups, those subjects whose schedules conflicted with the pre-arranged meeting time of each of the groups were discarded, and other subjects were randomly assigned to replace them. This resulted in subjects who maintained daily work schedules being under-represented in the treatment groups that met in the afternoon. The order of administration of reading programs was alternated each day of the week which compensated for some of this bias in assignment of subjects when comparing reading programs (the schedule for administration of the treatment groups is included in the procedure section of this chapter).

Four of the sixty subjects who began the experiment did not complete the post-treatment assessment. One male subject had been involved in a car accident and was in a hospital in Kentucky; another male subject refused to complete the post-treatment testing. A female subject could not be contacted after failing to appear at the last session. Conversations with her study skills class instructor, landlord and neighbors indicated that she was having personal problems concerning her college work and had left town. No one knew where she had gone. The fourth subject could not be contacted after her failure to appear at the final testing session. Her attendance at the treatment sessions had terminated after the third session, about the same time she had withdrawn from classes. She could not be reached at the phone number and address she had provided the experimenter, nor could the Registrar's Office provide any additional information. These four subjects were eliminated from the experiment without any compensatory measures because it was assumed that this loss of subjects was in no

way related to the experimental treatments. A total of thirty-five male and twenty female subjects comprised the actual sample.

Treatments

The principle difference between the two reading rate improvement treatments used in this study was that the motivated treatment stressed subject control of the learning situation, and the controlled treatment removed control of the learning situation from the subject as much as possible. These two experimental treatments occupied different points along an internal vs. external locus of control dimension for learning situations with the motivated treatment toward the internal end of the dimension and the controlled treatment toward the external end of the dimension.

Controlled Approach: Reading Program I

The controlled approach included using the SRA (Science Research Associates) Reading Accelerator Model IV, comprehension tests, and interesting reading material (see Appendix B). The Reading Accelerator was a device which used an opaque shutter which descended down the reading page driven by a spring powered motor with a wide range of speeds. It was lightweight and could easily be held by hand over the reading material. Eight group practice sessions were held twice a week for one hour. Subjects at the first practice session adjusted the rate controller of the Reading Accelerator to a rate equivalent to the individual subject's base rate determined by pre-treatment testing.

The subjects then read the prescribed selection of reading material at the controlled rate. After completing the selection, the subjects then responded to a comprehension test and corrected their responses with a scoring key provided by the instructor. Whenever a subject scored greater than 70% on the comprehension test, he was instructed to increase the rate controller at the next practice session to a rate 15 per cent faster than his previous rate.

Motivated Approach: Reading Program II

The motivated approach (Hauer, 1971; see Appendix B) consisted of using warm-up readings, timed reading tests, comprehension tests, individual reading graphs, and interesting reading material over eight, one-hour, twice-a-week, group practice sessions. Warm-up readings consisted of having subjects, at the signal of the instructor, read at a comfortable pace for the first warm-up trial. At the end of the trial the subjects determined how many lines they had read and increased this number by 20 per cent. Next, they counted out the increased number of lines from where they had left off on the first trial. During the second warm-up trial, the subjects attempted to read all of the lines they had counted out in the same time interval as the first trial. This process was repeated for four warm-up trials each group session, increasing the amount to read by 20 per cent each trial. The time interval for each trial reading was controlled by the experimenter, and was gradually increased during the four weeks of group practice sessions. The first week the warm-up trial length was one minute, the second week two minutes, the third three minutes, and the fourth week four minutes.

Following the four warm-up trials, the subjects were administered a timed reading test which gradually increased in length over the eight group sessions. At the signal of the instructor, subjects began reading the selected reading material for that session. When a subject completed the selection, he raised his hand and the instructor verbally informed him how many minutes he had been reading. The subject recorded the number of minutes and proceeded with the next outlined step.

The subject completed a multiple choice comprehension test of the material he had just read, and scored his own responses with a scoring key issued to each subject.

Reading rate in words per minute, and comprehension percentage, were computed by the subject according to the directions provided him and recorded by him on his individual reading graph (see Appendix B).

Instruments

Form Am of the Otis Gamma Quick-Scoring Mental Ability Test, Forms A and B of the Nelson-Denny Reading Test, Rotter's Internal vs. External Scale (see Appendix C), the Canadian History Test and the Russian History Test from the Robinson-Hall reading test series, and the Modified Course Assessment Form (see Appendix D) were utilized in estimating some of the variables investigated in this study.

The Otis Gamma Quick-Scoring Mental Ability Test was selected as an estimate of a general mental ability factor. Based on Spearman's general factor approach to tests of ability and aptitude, Otis attempted to include items which depended less upon "schooling" and more upon

"mental ability;" that would be highly correlated (biserial coefficient) with the total test score; and that would generally reflect age or maturity. Lefever (1959) and Yates (1959), reviewers of the test in the Fifth Mental Measurements Yearbook, commented that the Otis Gamma Quick-Scoring Mental Ability Test is as good a predictor of academic success as other standardized instruments. Some of the items, however, seemed to be largely measures of achievement. Vocabulary and arithmetic reasoning items are included on the test which depend strongly on language and previous educational experiences. Even with these suggested verbal and academic achievement factors, the Otis seemed an appropriate instrument for this investigation because of its ease of administration, and as, perhaps, not a general factor but at least a group factor influencing academic progress.

Forms A and B of the Nelson-Denny Reading Test were selected as pre- and post-estimates of reading rate and comprehension. Only Part II of each form of the test was used, excluding the vocabulary section (Part I). A timed reading rate test and 36 reading comprehension items were included in Part II. Reading rate was estimated by the total number of words read during the first minute of the test. Comprehension was estimated by a speeded test procedure consisting of eight sections. Each section contained a reading selection and a series of questions. Subjects were allowed twenty minutes to work as many of the sections that they could. Correlations between both forms of the test were reported in the manual (Brown; 1960). The correlation between comprehension scores for forms A and B from a sample ($n=110$) of college students

enrolled in a non-credit reading course, half of whom were administered form A first, the others form B first, was .81. The correlation between reading rate scores for forms A and B from the same sample was .93. The rate correlation coefficient seems satisfactory; however, the comprehension correlation coefficient was low for justification of the use of the Nelson-Denny test in this investigation as a pre- and post-measure. Caution was used in interpretations of results based on the comprehension scores of this instrument. For this and other methodological reasons, another reading rate and comprehension estimate was included.

The Canadian History Test and the Russian History Test from the Robinson-Hall reading test series were also selected as pre- and post-estimates of reading rate and comprehension. Among standardized reading tests there exists a variance in the definition, description, and assessment of reading rate and comprehension. Because of this, researchers in the area of reading ability have recommended that at least two estimates of reading ability involving different standardized procedures be utilized in any reading research (Smith and Dechant, 1961; p. 235). The Robinson-Hall reading test series estimated reading rate by the number of words read in ten minutes of reading time. Comprehension was estimated by answering questions concerning the reading material in a power testing situation after ten minutes of reading the material. These were different tasks than those described for estimating reading rate and comprehension in the Nelson-Denny Reading Test.

Correlation coefficients between both the Canadian and Russian History tests for reading rate and comprehension were reported in the manual (Robinson and Hall; 1949). Subjects (n=112) from eight sections

of a required course in educational psychology at The Ohio State University in Spring of 1941 were administered the Canadian and Russian History tests in alternating order. The sample contained mostly freshmen and sophomore college students with some junior, senior and graduate students. Correlations reported for rate of reading and comprehension accuracy for the two tests are .98 and .96 respectively. The two instruments seem to correlate highly enough for use as pre- and post-estimates of reading rate and comprehension for this investigation.

The Modified Course Assessment Form (see Appendix E) was developed for use in this investigation from Fletcher's (1972) research with his Course Assessment Form. The instrument used in this investigation assessed subject reactions to two described experiential settings (Reading Program I and II) which were essentially identical for all participants in each setting, except for manipulation of the instructor and time of day variables mentioned later in this chapter. Each experiential setting was evaluated by subjects on four dimensions: I Level of Difficulty, II Course Content, III Instruction, and IV General Evaluation.

In developing the Modified Course Assessment Form, distracting items and items with insignificant factor loadings ($<.40$) on the four selected factors mentioned above from Fletcher's (1972) data were eliminated from the original Course Assessment Form. Fletcher's (1972) data were based on responses of students in: twenty-five sections of Introductory Psychology, Autumn Quarter, 1970; thirty-one sections of Introductory Psychology, Autumn Quarter, 1971; fifteen advanced courses in Mechanical Engineering; and eleven advanced courses in Psychology. The Level of Difficulty factor indicated a student's perception of the

relative difficulty of the course on a continuum from easy to difficult. The Course Content factor estimated the student's perception of the course content from emphasis on rote memory to emphasis on thinking or reasoning. Instruction was a factor which measured student views of the instructor from poor to excellent. The General Evaluation factor indicated how a student felt generally about the course from poor to excellent.

Items making up the assessment of each of these dimensions in the Modified Course Assessment Form are listed below. Items were assigned to each dimension based on factor loadings from Fletcher's (1972) data.

I. Level of Difficulty

<u>Easy</u>		<u>Hard</u>
Minimal studying	vs.	Time consuming
Little effort required	vs.	Extra effort required
Leisurely course	vs.	Strenuous course
My easiest course	vs.	My toughest course
Little work demanded	vs.	Much work demanded
Less studying than usual	vs.	More studying than usual

II. Course Content

<u>Rote Memory Emphasis</u>		<u>Thinking Emphasis</u>
Ordinary retention	vs.	Logical reasoning
Pertinent to everyday life	vs.	Little application
Stress on memorizing	vs.	Stress on understanding
Rote memory	vs.	Reflective consideration
Memory emphasized	vs.	Reasoning required
Retention of facts	vs.	Mastery of ideas

III. Instruction

<u>Poor</u>		<u>Excellent</u>
Unimaginative instructor	vs.	Creative instructor
Instructor below average	vs.	Instructor above average
Unimpressive instructor	vs.	Stimulating instructor
Routine instruction	vs.	Challenging instruction
Poor instructor	vs.	Excellent instructor
Routine instruction	vs.	Challenging instruction

IV. General Evaluation

<u>Poor</u>		<u>Excellent</u>
Will not recommend	vs.	Will recommend to others
Course lacks purpose	vs.	Meaningful course
Unimportant course	vs.	Significant course
Worthless course	vs.	Valuable course
Have had enough	vs.	Eager for more
Waste of time	vs.	Worth taking

The final Modified Course Assessment Form contained 24 items providing scores on four dimensions. Subjects' reactions to each item were scored from 1 to 7 and the mean of the six-item responses for each dimension was recorded.

Information pertinent to Rotter's I-E Scale (see Appendix C) has been discussed previously.

Procedure

Each of two trained instructors, one male, one female, conducted one motivated and one controlled reading treatment. The instructors were third year graduate students in Psychology with nine months' experience teaching a college level study skills course. The instructors training consisted of reading the student instructions for each program (see Appendix B); an oral presentation by the experimenter on the assumptions upon which each of the programs were based; and a review and discussion of guidelines outlined by the experimenter on how to react to subjects' questions. Basically, the instructors responded to subject inquiries in Program I by emphasizing strict adherence to the procedures outlined for them. For subjects in Program II, the instructors responded by stressing the subject's own individual efforts in making himself read faster and with better com-

prehension. For example, a typical question involved why a subject's reading rate curve was not increasing. Upon inquiring of the instructor, he was told, "If you want to increase your reading rate you must concentrate harder and put more effort into making yourself read faster during the practice sessions."

One of the more important instructor functions was to introduce the treatments to the subjects. Attempts to standardize this aspect were made by handing out to each subject an outline of the treatment procedure (see Appendix B), and by having the instructors follow the same outline in their introductory statements. Instructors emphasized in the introduction that in Reading Program I the subjects should rely on the outlined procedures in order to improve their reading ability, and in Reading Program II, the instructors emphasized relying on the subject's own efforts for improvement.

The fifty-nine subjects who volunteered for participation in a reading improvement program were administered Rotter's I-E Scale, a biographical data sheet, and Form A of the Nelson-Denny Reading Test at the first general meeting of all subjects. Male and female subjects were randomly assigned by the experimenter to four treatment groups and a fifth delayed treatment control group before the second general meeting of all subjects. As noted earlier there was a bias in the assignment of subjects to groups, with an under-representation of subjects who maintained a daily work schedule in the afternoon sessions.

At the second general meeting of all subjects, the Otis Quick-Scoring Mental Ability Test and the Canadian History Test were admin-

istered. Subjects were informed of their assignments to experimental groups. The subjects were also informed that two different reading programs were to be conducted, when the experimenter read the following statement.

Over the next four weeks, two reading improvement programs will be conducted. Some of you will be involved in one program, and some of you will be involved in the other. Details about the programs will be discussed at your first session, so I won't answer questions about that now. However, let me assure you that from what reading experts know about these two programs, there is no reason to believe that either method is superior, more effective, or better than the other. They are both just as good. Participants in both programs can expect, on the average, a 30% increase in their reading rate, without any drastic change in their comprehension. At the end of the program we will again give you some reading tests to see how much you have improved. Are there any questions about when or where your reading class will meet? (pause) That is all for today, thank you.

The four experimental groups met for eight, one-hour, twice-a-week group treatment sessions presided over by one of the instructors.

The groups met at the following schedule:

Group	n	Program	Instructor	Days	Time
1	11	I Controlled	A (female)	MW	4:00-5:00 p.m.
2	12	II Motivated	A	MW	5:30-6:30 p.m.
3	12	II Motivated	B (male)	TR	4:00-5:00 p.m.
4	10	I Controlled	B	TR	5:30-6:30 p.m.
5	10				

The delayed treatment control group (group 5) was pretested and continued to attend their study skills class.

After eight practice sessions, the experimental groups met for the final post-testing session. The four groups were administered the Modified Course Assessment Form, Form B of the Nelson-Denny Reading Test, and the Russian History Test, in that order. The delayed treatment

control group was administered Form B of the Nelson-Denny Reading Test and the Russian History Test at their first group session which approximated in time the final testing session of the four experimental groups.

The final word to the experimental group subjects at the concluding session was that the results of the testing would be available by individual contact with the experimenter. Also, if any subjects were disappointed with the results of their participation in their reading program, they were encouraged to contact the experimenter to discuss the possibilities of further help. Several subjects did seek further assistance. For those subjects who felt they had significant reading problems, a reading problem diagnosis procedure defined by Ekwall (1970) was conducted by the experimenter. Subjects were then referred to the Counseling Center for further treatment. For those subjects who felt they had improved during the reading programs and wanted to continue improving, they were advised to continue, on their own, the procedures they had learned during the experiment. For those subjects who felt other problems interfered with their performance in the program, usually personal problems, they were referred to the Counseling Center and the Student Consultation Service.

Variables

After the post-testing session, scores on the experimental variables were computed and recorded (see Appendix F). A list of the variables follows with computation and coding procedures used for recording the data.

<u>Variable</u>	<u>Computation and Coding Procedures</u>
Sex of Subject	(1) Male (2) Female
Instructor	(1) Instructor A (female) (2) Instructor B (male)
Year in College	(1) Freshman status (2) Sophomore status (3) Junior status (4) Senior status
Age of Subjects	From last birthday as reported by subjects
Otis I.Q.	Scores from the Otis Gamma Quick-Scoring Mental Ability Test; using adult norms (18 years and over) provided in the manual (Otis; 1954)
I-E Scale, total score	Computed according to Rotter (1966)
I-E Scale, subscale 1	Mirels' (1970) Personal Causation Scale (see Appendix E)
I-E Scale, subscale 2	Mirels' (1970) Political Affairs Scale (see Appendix E)
Initial Reading Rate (Robinson-Hall)	Reading rate in words per minute from the pre-testing session, using the Canadian History Test
Initial Comprehension (Robinson-Hall)	Comprehension score in percent correct, from the pre-testing session, using the Canadian History Test
Initial Reading Rate (Nelson-Denny)	Reading rate in words per minute from the second pre-testing session, using form A of the Nelson-Denny Reading Tests
Initial Comprehension (Nelson-Denny)	Comprehension scores computed from the second pre-testing session, using form A of the Nelson-Denny Reading Tests
Slope of Rate Scores Over Practice Sessions	Obtained from nonstandardized reading material which differed in length, reading ease, interest and content over the eight practice sessions. Raw scores were computed

<u>Variable</u>	<u>Computation and Coding Procedures</u>
	by each subject at the end of each session as stated in the instructions given to each subject (see Appendix B)
Slope of Comprehension Scores Over Practice Sessions	Obtained from nonstandardized reading material which differed in length, reading ease, interest and content over the eight practice sessions. Raw scores were computed by each subject at the end of each session as stated in the instructions given to each subject (see Appendix B)
Reading Rate Improvement (Robinson-Hall)	Differences between pre and post estimates of reading rate from the Robinson-Hall (1949) reading tests: Canadian History Test; Russian History Test
Reading Comprehension Improvement (Robinson-Hall)	Differences between pre and post estimates of comprehension skills from the Robinson-Hall (1949) reading tests: Canadian History Test; Russian History Test
Reading Rate Improvement (Nelson-Denny)	Differences between pre and post estimates of reading rate from the Nelson-Denny reading tests: form A; form B
Reading Comprehension Improvement (Nelson-Denny)	Differences between pre and post estimates of comprehension skills from the Nelson-Denny reading tests: form A; form B
Attendance	Obtained from attendance records maintained by the instructors
Level of Difficulty	Evaluation score from dimension I of the Modified Course Assessment Form
Course Content	Evaluation score from dimension II of the Modified Course Assessment Form
Instruction	Evaluation score from dimension III of the Modified Course Assessment Form
General Evaluation	Evaluation score from dimension IV of the Modified Course Assessment Form

Analysis

The variables mentioned previously were analyzed by three separate procedures. First, analysis of variance procedures were used to compare the effects of the experimental and control procedures on changes in reading rate and comprehension (H_1 and H_2). Second, correlational analysis procedures were used to test the hypotheses that correlations between scores on the I_p-E_p dimension and improvement in reading rate and comprehension would differ according to membership in the four experimental and the control groups (H_3 and H_4). Third, factor analytic and multiple correlation procedures were used to investigate the possibility that significance in the correlation coefficients between the I_p-E_p dimension and reading rate and comprehension may be due to both variables being correlated with some other variable or variables. Another purpose of the third analysis of data was to explore the relationship of other variables to improvement in reading rate and comprehension, subjects' attendance, and subjects' evaluation of the experience.

Newman-Keuls tests of differences between all pairs of means for samples containing unequal n 's (Winer, 1971: p. 265) were computed following overall significant F tests of hypotheses H_1 and H_2 . Difference scores between pre- and post-measures of reading rate and comprehension were compared from two types of reading tests for four experimental groups (groups 1-4) and a fifth control group (group 5). Group 1 ($n=11$) received Reading Program I (controlled) administered by instructor A; group 2 ($n=12$) received Reading Program II (motivated) administered by instructor A; group 4 ($n=10$) received Reading Program I (controlled)

administered by instructor B; and group5 (n=10) was the delayed treatment control group.

Correlational analysis procedures were used to test hypothesis H_3 and H_4 , that correlations between scores on the I_p - E_p dimension and improvement in reading ability would differ according to membership in the four experimental groups and the fifth control group. Pearson r correlation coefficients were computed between variables of the I_p - E_p dimension: I-E Scale total scores, I-E subscale 1 and I-E subscale 2; and the difference scores between pre- and post-treatment measures of reading rate and comprehension from two reading ability tests.

Correlational analysis was preferred to analysis of variance procedures for investigation of Hypotheses H_3 and H_4 . Analysis of variance would have necessitated that subjects be categorized as Internals or Externals by either of two methods. Internals and Externals might have been defined as subjects with I-E Scale scores in the lower and upper thirds, respectively, of the distribution of the sample. This method disregards subjects falling in the middle third. If the I_p - E_p dimension is a useful concept, it should be applicable to this group also. The second method would be to define I's and E's as subjects with scores in the lower and upper halves, respectively, of the distribution of the sample. Rotter (1966) reported I-E Scale scores from a sample of undergraduates from The Ohio State University. Because the distribution of their scores was leptokurtic, the question was raised concerning the psychological difference between these two groups when most scores were expected to be grouped around the mean of the distribution. In view of

the undesirability of either of these two methods, correlational procedures were judged to provide the most appropriate analysis of these data.

Two further areas of inquiry were undertaken. One was to investigate the possibility that significance in the above correlation coefficients may be due to both variables being correlated with some other variable or variables. The second was to examine the relation of attendance and subjects' evaluations of the treatment procedures to other variables investigated in this study. Both were achieved by the following procedures. Two principal components analyses with Varimax rotations were computed on fourteen variables for subjects participating in Reading Program I and Reading Program II. Stepwise multiple correlations of seven rotated factors were performed on each of the variables measuring improvement in reading programs (Press, 1973; p.452).

The results of these analyses are presented in the next chapter.

Chapter IV

RESULTS AND DISCUSSION

The variables mentioned in Chapter III were analyzed by three separate procedures. First, analysis of variance procedures for samples with unequal sizes were used to test the effect of the five different treatments (Winer, 1971; p. 210). In the cases of significant ($p < .01$) overall F tests, Newman-Keuls tests of differences between all pairs of means for samples containing unequal n's (Winer, 1971; p. 265) were computed. Second, correlational analysis procedures were used to test hypotheses H_3 and H_4 , that correlations between the I_p-E_p dimension and improvement in reading rate and comprehension would differ according to membership in the four experimental and the control groups. The significance of the differences between all pairs of correlation coefficients for the four treatment groups and the control group were tested using Fisher's z transformation (Ferguson, 1966; p. 188). Third, principal components analyses with Varimax rotations of seven factors were performed on fourteen variables. Stepwise multiple correlations of the seven factors were then computed with each of the variables measuring improvement in reading rate and comprehension, subjects' attendance, and subjects' evaluations of the reading program. This third analysis was performed to investigate the possibility that correlations between the I_p-E_p dimension and reading ability may be due to both variables being correlated with some other variable or variables, and to further explore the relation-

ships of other variables.

Raw scores of the subjects on all variables are presented in Appendix F. Means and standard deviations of the investigated variables for the four treatment and the control groups are presented in Table 4.1.

Improvement of Reading Rate and Comprehension in the Experimental and Control Groups

Analysis of variance was performed on the difference scores between pre- and post-tests of reading rate and comprehension from two different standardized reading ability tests. Hypothesis H_1 was tested using results of the Robinson-Hall reading tests (H_{1a}) and using results of the Nelson-Denny reading tests (H_{1b}) for purposes outlined in Chapter III. Hypothesis H_2 was also tested using the results of the Robinson-Hall reading tests (H_{2a}) and the results of the Nelson-Denny reading test (H_{2b}). In those cases where significant ($p < .01$) F levels were obtained, the data was further analyzed with Newman-Keuls tests of differences between all pairs of means for samples of unequal sizes (Winer, 1971; p. 216).

The results are discussed below according to the dependent variable being investigated.

Dependent Variable: Change in Reading Rate on the Robinson-Hall Reading Tests

Results of the analysis of variance for hypothesis H_{1a} for samples of unequal n's are presented in Table 4.2. A significant difference is observed between treatments for improvement in reading rate from the Robinson-Hall reading tests. Results of the Newman-Keuls tests for samples of unequal n's between all possible pairs of means for groups 1,

TABLE 4.1: MEANS AND STANDARD DEVIATIONS OF THE INVESTIGATED VARIABLES FOR GROUPS 1, 2, 3, 4, and 5.

Group	YEAR IN COLLEGE		AGE		OTIS I.Q.		I-E TOTAL SCORE		I-E SUBSCALE 1		I-E SUBSCALE 2	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
1	1.9	1.08	21.2	2.52	112.3	6.71	9.4	3.94	3.5	2.59	1.7	1.52
2	2.3	1.37	22.8	3.92	109.9	13.24	7.8	4.43	2.5	2.11	1.7	1.46
3	2.8	1.08	24.0	3.91	111.8	10.35	9.3	3.41	2.6	2.76	1.6	1.52
4	2.2	1.32	22.8	4.71	112.5	10.20	7.4	3.92	2.2	1.75	2.0	1.25
5	2.6	.96	24.1	4.25	114.6	10.26	8.9	4.54	3.4	2.00	1.8	1.40

Group	INITIAL RATE (R-H) _a		INITIAL COMPREHENSION (R-H) _a		INITIAL RATE (N-D) _b		INITIAL COMPREHENSION (N-D) _b		SLOPE OF RATE SCORES	
	M	SD	M	SD	M	SD	M	SD	M	SD
1	180.4	39.42	60.8	14.32	223.7	60.49	42.3	12.00	268.4	219.00
2	190.4	51.23	58.1	21.98	210.5	62.34	38.0	12.20	142.0	177.31
3	189.5	37.04	65.9	17.56	212.0	56.18	40.5	13.30	141.5	190.85
4	203.1	55.39	67.0	14.46	320.1	104.18	49.2	11.86	228.6	178.83
5	181.2	31.00	67.1	10.30	228.4	44.52	41.8	9.30		

Group	SLOPE OF COMPREHENSION SCORES		RATE CHANGE (R-H) _a		COMPREHENSION CHANGE (R-H) _a		RATE CHANGE (N-D) _b		COMPREHENSION CHANGE (N-D) _b	
	M	SD	M	SD	M	SD	M	SD	M	SD
1	27.9	49.57	12.4	22.39	0.1	9.79	27.5	58.61	2.3	6.02
2	7.2	29.70	77.8	48.10	1.6	17.87	156.6	111.35	4.5	9.27
3	6.1	15.50	81.6	38.58	4.2	16.87	114.6	71.31	4.5	7.14
4	9.5	54.00	20.3	54.36	0.5	13.00	6.6	109.26	0.0	5.25
5			9.2	12.70	3.8	10.54	2.0	30.02	4.4	5.02

Group	ATTENDANCE		LEVEL OF DIFFICULTY		MEMORY VS. THINKING		INSTRUCTION		GENERAL EVALUATION	
	M	SD	M	SD	M	SD	M	SD	M	SD
1	6.8	1.62	3.20	1.21	3.86	1.05	4.13	1.29	5.64	1.23
2	7.7	.37	2.91	1.00	4.55	.57	4.33	.99	5.80	.80
3	7.1	.96	3.25	1.21	5.21	.90	4.62	1.08	6.13	.84
4	7.2	.79	2.25	1.08	4.54	.78	3.98	1.17	5.21	1.48

a--Robinson-Hall Reading Test Series

b--Nelson-Denny Reading Tests

TABLE 4.2: ANALYSIS OF VARIANCE OF CHANGE IN READING RATE ON THE ROBINSON-HALL READING TESTS FOR FIVE TREATMENT GROUPS.

Source of Variation	SS	DF	MS	F
Treatments	59247.78	4	14811.95	9.87*
Experimental error	75017.42	50	1500.35	
Total	134265.20	54		

* $p < .01$

2, 3, 4, and 5 are presented in Table 4.3.

The rejected null hypothesis H_{1a} and the results of the comparisons of each possible pair of means are presented below.

H_{1a} : The differences in improvement of Reading Rate from the Robinson-Hall reading tests for the experimental and control groups are equal to zero.

Pairs of Groups	Significant Difference	Nonsignificant Difference
1&2	X	
1&3	X	
1&4		X
1&5		X
2&3		X
2&4	X	
2&5	X	
3&4	X	
3&5	X	
4&5		X

A schematic summary of Table 4.3 would be where groups underlined by a common line do not differ significantly, and groups not underlined by a common line do differ significantly:

2 3 1 4 5

Groups which received the motivated reading program (2 and 3) increased their rate significantly more than groups which received the controlled reading program and no specific reading program (1, 4, and 5). Groups which received the controlled reading program (1 and 4) did not improve more than the control group which received no specific reading program (5).

TABLE 4.3: NEWMAN-KEULS TESTS OF DIFFERENCES BETWEEN ALL POSSIBLE PAIRS OF MEANS FOR GROUPS 1, 2, 3, 4, AND 5 OF CHANGE IN READING RATE ON THE ROBINSON-HALL READING TESTS.

Groups		5	1	4	2	3
	Means	9.2	12.0	20.3	77.8	81.6
5	9.2		2.8	11.1	68.6*	72.4*
1	12.0			8.3	65.8*	69.6*
4	20.3				57.5*	61.3*
2	77.8					4.2
3	81.6					

			r=2	r=3	r=4	r=5	
	q _{.95}	(df = r, 50) =	2.86	3.44	3.79	4.04	
$\sqrt{\frac{MS\ error}{n_2}}$	x	q _{.95}	(df = r, 50) =	31.6	38.0	41.9	44.6

r = the number of steps in the arranged order which separate the means being compared.

*p<.05

Dependent Variable: Change in Reading Rate on the Nelson-Denny Reading Tests

Hypothesis H_1 from Chapter II which concerned the differences in improvement of reading rate of the experimental and control groups was also tested using results of the Nelson-Denny reading tests (H_{1b}). A summary of the analysis of variance for five treatment groups is presented in Table 4.4. The null hypothesis H_{1b} was rejected. To investigate the differences between specific treatments, Newman-Keuls tests of differences between all possible pairs of means for samples with unequal n 's were applied to the means of groups 1, 2, 3, 4, and 5. The results of this analysis are presented in Table 4.5.

Hypothesis H_{1b} and the results of the comparisons for each possible pair of means are presented below.

H_{1b} : The differences in improvement of Reading Rate from the Nelson-Denny reading tests for the experimental and control groups are equal to zero.

<u>Pairs of Groups</u>	<u>Significant Difference</u>	<u>Nonsignificant Difference</u>
1&2	X	
1&3	X	
1&4		X
1&5		X
2&3		X
2&4	X	
2&5	X	
3&4	X	
3&5	X	
4&5		X

A schematic summary of Table 4.5 may be represented as follows:

<u>2</u>	<u>3</u>	<u>1</u>	<u>4</u>	<u>5</u>
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TABLE 4.4: ANALYSIS OF VARIANCE OF CHANGE IN READING RATE ON THE NELSON-DENNY READING TESTS FOR FIVE TREATMENT GROUPS.

Source of Variation	SS	DF	MS	F
Treatments	219114.33	4	54778.58	7.88*
Experimental Error	347546.05	50	6950.92	
Total	566660.38	54		

* $p < .01$

TABLE 4.5: NEWMAN-KEULS TESTS OF DIFFERENCES BETWEEN ALL POSSIBLE PAIRS OF MEANS FOR GROUPS 1, 2, 3, 4, AND 5 OF CHANGE IN READING RATE ON THE NELSON-DENNY READING TESTS.

Groups		5	4	1	3	2
	Means	2.0	6.6	27.5	114.6	156.5
5	2.0		4.6	25.5	112.6*	154.5*
4	6.6			20.1	108.0*	149.9*
1	27.5				87.1*	129.0*
3	114.6					41.9
2	156.5					

$$\sqrt{\frac{MS_{\text{error}}}{n}} \times q_{.95} (df = r, 50) = \begin{array}{c|c|c|c} r=2 & r=3 & r=4 & r=5 \\ \hline 2.86 & 3.44 & 3.79 & 4.04 \\ \hline 71.5 & 86.0 & 94.8 & 101.0 \end{array}$$

r = the number of steps in the arranged order which separate the means being compared.

* $p < .05$

Groups underlined by a common line do not differ significantly; groups not underlined by a common line do differ significantly. Groups which received the motivated reading program (2 and 3) increased their reading rate significantly more than groups which received the controlled reading program and no specific reading program (1, 4, and 5). Groups which received the controlled reading program (1 and 4) did not improve significantly more than the control group (5), which received no specific reading program.

Dependent Variable: Change in Reading Comprehension on the Robinson-Hall Reading Tests

The hypothesis H_2 from Chapter II concerning the differences in improvement of comprehension skills was tested using results of the Robinson-Hall (H_{2a}) and Nelson-Denny (H_{2b}) reading tests. A summary of the analysis of variance for five treatment groups is presented in Table 4.6.

H_{2a} : The differences in improvement of Reading Comprehension from the Robinson-Hall reading tests for the experimental and control groups are equal to zero.

The null hypothesis H_{2a} was not rejected. There were no observed significant differences between the experimental and control groups for improvement of reading comprehension.

Depend Variable: Change in Reading Comprehension on the Nelson-Denny Reading Tests

The hypothesis H_2 concerning the differences in improvement of reading comprehension for the experimental and control groups was also tested with data from the Nelson-Denny reading tests. The results of the analysis of variance for hypothesis H_{2b} are presented in Table 4.7.

TABLE 4.6: ANALYSIS OF VARIANCE OF CHANGE IN READING COMPREHENSION FROM THE ROBINSON-HALL READING TESTS FOR FIVE TREATMENT GROUPS.

Source of Variation	SS	DF	MS	F
Treatments	153.24	4	38.31	.19
Experimental error	10125.60	50	202.51	
Total	10278.84	54		

TABLE 4.7: ANALYSIS OF VARIANCE OF CHANGE IN READING COMPREHENSION FROM THE NELSON-DENNY READING TESTS FOR FIVE TREATMENT GROUPS.

Source of Variation	SS	DF	MS	F
Treatment	166.80	4	41.80	.63
Experimental Error	3324.58	50	66.49	
Total	3491.38	54		

H_{2b} : The differences in improvement of Reading Comprehension from the Nelson-Denny reading tests for the experimental and control groups are equal to zero.

The null hypothesis H_{2b} was not rejected. There were no observed significant differences between the experimental and control groups for improvement of reading comprehension.

Summarizing the results of the analysis of variance and Newman-Keuls tests, the motivated reading program was significantly more effective than the controlled reading program and the control group in increasing reading rate on two reading ability tests. Reading comprehension was not significantly affected by the motivated, controlled, or control group treatments on the two reading ability tests, even with the large increases in reading rate observed in the motivated reading program groups.

Differences Between Correlation Coefficients for Subjects Receiving Different Treatment Procedures

Pearson r correlation coefficients were computed between the $I_p - E_p$ dimension, measured by I-E Scale total score, subscale 1, and subscale 2; and changes in reading ability from pre- and post-testing using the Robinson-Hall and the Nelson-Denny reading tests. Measures of reading rate and comprehension were obtained, and separate correlation analyses were computed for both. Correlation coefficients of each pair of variables for each experimental and control group are listed in Table 4.8.

Inspection of the bivariate frequency tables of the variables in the computed correlation coefficients revealed no gross departure from the assumption of linearity. It was assumed the correlation coefficients

TABLE 4.8: CORRELATION COEFFICIENTS BETWEEN MEASURES OF THE I_p-E_p DIMENSION AND MEASURES OF CHANGES IN READING ABILITY^p FOR GROUPS 1, 2, 3, 4, AND 5.

	Rate Change (R-H) ^a	Rate Change (N-D) ^b	Comprehension Change (R-H) ^a	Comprehension Change (N-D) ^b
Group 1				
I-E total score	.14	.40	.06	.03
I-E subscale 1	-.10	.28	.16	.18
I-E subscale 2	.10	.46	.01	.01
Group 2				
I-E total score	.05	-.12	-.02	-.40
I-E subscale 1	-.03	-.32	-.33	-.38
I-E subscale 2	.09	.02	.11	-.16
Group 3				
I-E total score	-.36	-.57	-.20	-.19
I-E subscale 1	-.14	-.35	-.41	-.38
I-E subscale 2	-.44	-.45	.15	.29
Group 4				
I-E total score	-.19	.06	-.45	.03
I-E subscale 1	-.15	.39	-.24	-.02
I-E subscale 2	-.10	-.45	.00	.27
Group 5				
I-E total score	-.46	.65	.26	-.78
I-E subscale 1	-.43	.77	.21	-.58
I-E subscale 2	-.22	.68	.27	-.61

a--Robinson-Hall Reading Test Series

b--Nelson-Denny Reading Tests

were not obscuring any curvilinear relation of the variables.

Fisher's z transformations (Ferguson, 1966; p. 187) were used to test the hypotheses of the differences between correlations of the I_p-E_p dimension with improvement in reading ability, comparing subjects in the four experimental groups and the control group. The correlation coefficients for each group were converted into z_r 's according to Ferguson (1966; p. 188). The unit-normal-curve deviate was computed and interpreted (see Tables 4.9a, 4.9b, 4.9c; 4.10a, 4.10b, 4.10c; 4.11a, 4.11b, 4.11c; 4.12a, 4.12b, and 4.12c). In the above tables, the correlation coefficients for the four experimental groups (groups 1-4) and the control group (group 5) are arranged in order of increasing magnitude along the horizontal and vertical axes.

In the following sections, tests of hypotheses H_3 and H_4 will be considered separately for the Robinson-Hall and Nelson-Denny reading tests. The correlation of each of the three measures of the I_p-E_p dimension (I-E Scale total scores, subscale 1, and subscale 2) with one of the measures of reading ability will be presented in each of four sections.

Improvement in Reading Rate on the Robinson-Hall Reading Tests

Results of tests of the null hypothesis H_3 based on correlations of the I_p-E_p dimension with improvement in reading rate on the Robinson-Hall reading tests are shown in Tables 4.9a, 4.9b, and 4.9c. The hypothesis H_{3a} is presented below. A summary of the results of the comparisons between correlation coefficients of each measure of the I_p-E_p dimension with reading rate improvement on the Robinson-Hall tests for each possible

TABLE 4.9a: FISHER'S z TRANSFORMATION TESTS OF DIFFERENCES BETWEEN CORRELATION COEFFICIENTS FOR I-E TOTAL SCORE AND RATE CHANGE ON THE ROBINSON-HALL READING TESTS.

Groups		1	2	3	4	5
	Correlation Coefficients	.14	.05	-.19	-.36	-.46
1	.14		.187	.644	1.068	1.234
2	.05			.481	.907	.998
3	-.19				.481	.571
4	-.36					.239
5	-.46					

TABLE 4.9b: FISHER'S z TRANSFORMATION TESTS OF DIFFERENCE BETWEEN CORRELATION COEFFICIENTS FOR I-E SUBSCALE 1 AND RATE CHANGE ON THE ROBINSON-HALL READING TESTS.

Groups		2	1	3	4	5
	Correlation Coefficients	-.03	-.10	-.14	-.15	-.43
2	-.03		.144	.236	.241	.795
1	-.10			.085	.099	.696
3	-.14				.020	.634
4	-.15					.579
5	-.43					

TABLE 4.9c: FISHER'S z TRANSFORMATION TESTS OF DIFFERENCE BETWEEN CORRELATION COEFFICIENTS FOR I-E SUBSCALE 2 AND RATE CHANGE ON THE ROBINSON-HALL READING TESTS.

Groups		1	2	4	5	3
	Correlation Coefficients	.10	.09	-.10	-.22	-.44
1	.10		.021	.387	.627	1.179
2	.09			.378	.607	1.193
4	-.10				.232	.740
5	-.22					.493
3	-.44					

*Significant at the $p < .05$ level (1.96)

pair of the five groups is presented following the hypothesis.

H_{3a} : Differences between the correlation coefficients of the I_p-E_p dimension and improvement in reading rate on the Robinson-Hall reading tests for each possible pair of groups are equal to zero.

For correlations between the I-E Scale total score and rate improvement on the Robinson-Hall reading tests (Table 4.9a):

<u>Pairs of Groups</u>	<u>Null Hypothesis Rejected</u>	<u>Null Hypothesis Not Rejected</u>
1&2		X
1&3		X
1&4		X
1&5		X
2&3		X
2&4		X
2&5		X
3&4		X
3&5		X
4&5		X

For correlations between the I-E subscale 1 and rate improvement on the Robinson-Hall reading tests (Table 4.9b):

<u>Pairs of Groups</u>	<u>Null Hypothesis Rejected</u>	<u>Null Hypothesis Not rejected</u>
1&2		X
1&3		X
1&4		X
1&5		X
2&3		X
2&4		X
2&5		X
3&4		X
3&5		X
4&5		X

For correlations between the I-E subscale 2 and rate improvement on the Robinson-Hall reading tests (Table 4.9c):

Pairs of Groups	Null Hypothesis Rejected	Null Hypothesis Not rejected
1&2		X
1&3		X
1&4		X
1&5		X
2&3		X
2&4		X
2&5		X
3&4		X
3&5		X
4&5		S

None of the above null hypotheses was rejected. The Pearson r correlations between I-E Scale total score, I-E subscale 1, and I-E subscale 2, and change in reading rate on the Robinson-Hall tests were not significantly different for any of the four experimental and the control groups.

Improvement in Reading Rate on the Nelson-Denny Reading Tests

A second measure of improvement in reading rate was obtained from the pre- and post-treatment administrations of the Nelson-Denny reading tests. Parallel hypotheses to those investigated in the previous section were studied using the results of forms A and B of the Nelson-Denny tests. The results of tests of the hypothesis H_3 based on correlations of the I_p-E_p dimension and improvement in reading rate on the Nelson-Denny reading tests are shown in Tables 4.10a, 4.10b, and 4.10c. The hypothesis H_{3b} is presented below. Summaries of the results of the comparisons between correlation coefficients of each measure of the I_p-E_p dimension with reading rate improvement on the Nelson-Denny for each

TABLE 4.10a: FISHER'S z TRANSFORMATION TESTS OF DIFFERENCES BETWEEN CORRELATION COEFFICIENTS FOR I-E TOTAL SCORE AND RATE CHANGE ON THE NELSON-DENNY READING TESTS.

Groups		5	1	4	2	3
	Correlation Coefficients	.65	.40	.06	-.12	-.57
5	.65		.679	1.339	1.781	2.827*
1	.40			.704	1.124	2.210*
4	.06				.360	1.408
2	-.12					1.119
3	-.57					

TABLE 4.10b: FISHER'S z TRANSFORMATION TESTS OF DIFFERENCES BETWEEN CORRELATION COEFFICIENTS FOR I-E SUBSCALE 1 AND RATE CHANGE ON THE NELSON-DENNY READING TESTS.

Groups		5	4	1	2	3
	Correlation Coefficients	.77	.39	.28	-.32	-.35
5	.77		1.139	1.416	2.688*	2.753*
4	.39			.240	1.475	1.545
1	.28				1.278	1.344
2	-.32					.070
3	-.35					

TABLE 4.10c: FISHER'S z TRANSFORMATION TESTS OF DIFFERENCES BETWEEN CORRELATION COEFFICIENTS FOR I-E SUBSCALE 2 AND RATE CHANGE ON THE NELSON-DENNY READING TESTS.

Groups		5	1	2	3	4
	Correlation Coefficients	.68	.46	.02	-.45	-.45
5	.68		.642	1.644	2.612*	2.461*
1	.46			.984	2.025*	1.899
2	.02				.987	.924
3	-.45					.000
4	-.45					

*Significant at the $p < .05$ level (1.96)

possible pair of the five groups are presented following the hypothesis.

H_{3b} : Differences between the correlation coefficients of the I_p-E_p dimension and improvement in reading rate on the Nelson-Denny reading tests for each pair of groups are equal to zero.

For correlations between the I-E Scale total score with rate improvement on the Nelson-Denny reading test (Table 4.10a):

<u>Pairs of Groups</u>	<u>Null Hypothesis Rejected</u>	<u>Null Hypothesis Not Rejected</u>
1&2		X
1&3	X	
1&4		X
1&5		X
2&3		X
2&4		X
2&5		X
3&4		X
3&5	X	
4&5		X

For correlations between the I-E subscale 1 and rate improvement on the Nelson-Denny tests (Table 4.10b):

<u>Pairs of Groups</u>	<u>Null Hypothesis Rejected</u>	<u>Null Hypothesis Not Rejected</u>
1&2		X
1&3		X
1&4		X
1&5		X
2&3		X
2&4		X
2&5	X	
3&4		X
3&5	X	
4&5		X

For correlations between I-E subscale 2 and rate improvement on the Nelson-Denny tests (Table 4.10c):

<u>Pairs of Groups</u>	<u>Null Hypothesis Rejected</u>	<u>Null Hypothesis Not Rejected</u>
1&2		X
1&3	X	
1&4		X
1&5		X
2&3		X
2&4		X
2&5		X
3&4		X
3&5	X	
4&5	X	

For group 3, which received the internally oriented reading instruction from instructor B, the correlation between I-E Scale total score and reading rate improvement on the Nelson-Denny reading tests was significantly different from the correlation received by the control group. Group 3 also differed from group 1, which received the externally oriented reading instruction from instructor A.

For subjects who received the internally oriented instruction from instructors A and B (groups 2 and 3), significantly different correlations were obtained between I-E subscale 1 and rate improvement on the Nelson-Denny tests compared with subjects in the control group.

Subjects who received reading instruction from instructor B in both the internally and externally oriented treatments (groups 3 and 4), obtained significantly different correlations between I-E subscale 2 and rate improvement on the Nelson-Denny tests than subjects in the control group. A significant difference in these correlation coefficients was also observed between group 3, which received internally oriented instruction by instructor B, and group 1, which received the externally oriented instruction from instructor A.

Improvement in Reading Comprehension on the Robinson-Hall Reading Tests

Hypothesis H_4 concerned the differences between experimental and control groups of correlation coefficients between the I_p-E_p dimension and improvement in reading comprehension. The test of this hypothesis was based on the significance of differences between correlation coefficients of the I-E Scale total score, subscale 1, and subscale 2; with two measures of improvement in reading comprehension. The first measure, from the Robinson-Hall tests, will be discussed in this section, and the second measure, from the Nelson-Denny tests, will be discussed in the next section of this chapter.

Results of test of hypothesis H_{4a} , based on correlations between each of the measures of the I_p-E_p dimension with improvement in reading comprehension from the Robinson-Hall tests, are shown in Table 4.11a, 4.11b, and 4.11c. Summaries of the results of significance tests of differences between correlation coefficients of I-E Scale total score, subscale 1, and subscale 2, with improvement in reading comprehension from the Robinson-Hall tests for each possible pair of the five groups are presented following the hypothesis.

H_{4a} : Differences between the correlation coefficients of the I_p-E_p dimension and improvement in reading comprehension on the Robinson-Hall reading tests for all pairs of groups are equal to zero.

TABLE 4.11a: FISHER'S z TRANSFORMATION TESTS OF DIFFERENCES BETWEEN CORRELATION COEFFICIENTS FOR I-E TOTAL SCORE AND COMPREHENSION CHANGE ON THE ROBINSON-HALL READING TESTS.

Groups		5	1	2	3	4
	Correlation Coefficients	.26	.06	-.02	-.20	-.45
5	.26		.398	.569	.932	1.406
1	.06			.175	.553	1.064
2	-.02				.522	.924
3	-.20					.435
4	-.45					

TABLE 4.11b: FISHER'S z TRANSFORMATION TESTS OF DIFFERENCES BETWEEN CORRELATION COEFFICIENTS FOR I-E SUBSCALE 1 AND COMPREHENSION CHANGE ON THE ROBINSON-HALL READING TESTS.

Groups		5	1	4	2	3
	Correlation Coefficients	.21	.16	-.24	-.33	-.41
5	.21		.101	.858	1.105	1.290
1	.16			.785	1.039	1.231
4	-.24				.193	.380
2	-.33					.197
3	-.41					

TABLE 4.11c: FISHER'S z TRANSFORMATION TESTS OF DIFFERENCES BETWEEN CORRELATION COEFFICIENTS FOR I-E SUBSCALE 2 AND COMPREHENSION CHANGE ON THE ROBINSON-HALL READING TESTS.

Groups		5	3	2	1	4
	Correlation Coefficients	.27	.15	.11	.01	.00
5	.27		.250	.332	.516	.519
3	.15			.087	.291	.300
2	.11				.206	.219
1	.01					.019
4	.00					

*Significant at the $p < .05$ level (1.96)

For correlations between the I-E Scale total score and reading comprehension improvement on the Robinson-Hall tests (Table 4.11a):

<u>Pairs of Groups</u>	<u>Null Hypothesis Rejected</u>	<u>Null Hypothesis Not Rejected</u>
1&2		X
1&3		X
1&4		X
1&5		X
2&3		X
2&4		X
2&5		X
3&4		X
4&5		X

For correlations between I-E subscale L and reading comprehension improvement on the Robinson-Hall tests (Table 4.11b):

<u>Pairs of Groups</u>	<u>Null Hypothesis Rejected</u>	<u>Null Hypothesis Not Rejected</u>
1&2		X
1&3		X
1&4		X
1&5		X
2&3		X
2&4		X
2&5		X
3&4		X
3&5		X
4&5		X

For correlations between I-E subscale 2 and reading comprehension improvement on the Robinson-Hall tests (Table 4.11c):

<u>Pairs of Groups</u>	<u>Null Hypothesis Rejected</u>	<u>Null Hypothesis Not Rejected</u>
1&2		X
1&3		X
1&4		X
1&5		X
2&3		X
2&4		X
2&5		X
3&4		X
3&5		X
4&5		X

None of the above null hypotheses was rejected. The correlations of I-E Scale total score, subscale 1, and subscale 2, with the change in reading comprehension on the Robinson-Hall reading tests were not significantly different for any of the four experimental groups and the control group.

Improvement in Reading Comprehension on the Nelson-Denny Reading Tests

This section presents results of the tests of the hypothesis H_4 based on data from forms A and B of the Nelson-Denny reading tests. Improvement in reading comprehension on the Nelson-Denny was correlated with each measure of the I_p-E_p dimension. Results are shown in Tables 4.12a, 4.12b, and 4.12c. Hypothesis H_{4b} is presented below. The results of comparisons between each pair of the five groups for correlation coefficients between each measure of the I_p-E_p dimension and improvement in reading comprehension on the Nelson-Denny tests are summarized following the hypothesis.

H_{4b} : Differences between the correlation coefficients of the I_p-E_p dimension with improvement in reading comprehension on the Nelson-Denny reading tests for each possible pair of groups are equal to zero.

TABLE 4.12a: FISHER'S z TRANSFORMATION TESTS OF DIFFERENCES BETWEEN CORRELATION COEFFICIENTS FOR I-E TOTAL SCORE AND COMPREHENSION CHANGE ON THE NELSON-DENNY READING TESTS.

Groups		1	4	3	2	5
	Correlation Coefficients	.03	.03	-.19	-.40	-.78
1	.03		0.000	.458	.936	2.079*
4	.03			.441	.903	2.013*
3	-.19				.493	1.696
2	-.40					1.235
5	-.78					

TABLE 4.12b: FISHER'S z TRANSFORMATION TESTS OF DIFFERENCES BETWEEN CORRELATION COEFFICIENTS FOR I-E SUBSCALE 1 AND COMPREHENSION CHANGE ON THE NELSON-DENNY READING TESTS.

Groups		1	4	2	3	5
	Correlation Coefficients	.18	-.02	-.38	-.38	-.58
1	.18		.391	1.200	1.200	1.632
4	-.02			.755	.755	1.202
2	-.38				.000	.521
3	-.38					.521
5	-.58					

TABLE 4.12c: FISHER'S z TRANSFORMATION TESTS OF DIFFERENCES BETWEEN CORRELATION COEFFICIENTS FOR I-E SUBSCALE 2 AND COMPREHENSION CHANGE ON THE NELSON-DENNY READING TESTS.

Groups		3	4	1	2	5
	Correlation Coefficients	.29	.27	.01	-.16	-.61
3	.29		.044	.596	.977	2.004*
4	.27			.516	.871	1.846
1	.01				.353	1.352
2	-.16					1.089
5	-.61					

*Significant at the $p < .05$ level (1.96)

For correlations between the I-E Scale total score and improvement in reading comprehension on the Nelson-Denny tests (Table 4.12a):

<u>Pairs of Groups</u>	<u>Null Hypothesis Rejected</u>	<u>Null Hypothesis Not Rejected</u>
1&2		X
1&3		X
1&4		X
1&5	X	
2&3		X
2&4		X
2&5		X
3&4		X
3&5		X
4&5	X	

For correlations between the I-E subscale 1 and improvement in reading comprehension on the Nelson-Denny tests (Table 4.12b):

<u>Pairs of Groups</u>	<u>Null Hypothesis Rejected</u>	<u>Null Hypothesis Not Rejected</u>
1&2		X
1&3		X
1&4		X
1&5		X
2&3		X
2&4		X
2&5		X
3&4		X
3&5		X
4&5		X

For correlations between I-E subscale 2 and improvement in reading comprehension on the Nelson-Denny tests (Table 4.12c):

<u>Pairs of Groups</u>	<u>Null Hypothesis Rejected</u>	<u>Null Hypothesis Not Rejected</u>
1&2		X
1&3		X
1&4		X
1&5		X
2&3		X
2&4		X
2&5		X
3&4		X
3&5	X	
4&5		X

Groups 1 and 4, which were administered the externally oriented instruction program (Reading Program I) by instructors A and B, obtained significantly different correlations between the I-E Scale total score and improvement in reading comprehension on the Nelson-Denny tests, compared to the control group. In groups 1 and 4, externally oriented subjects (E_p 's) tended slightly to increase their reading comprehension more than internally oriented subjects (I_p 's). In the control group, I_p 's tended to increase their reading comprehension more than E_p 's.

No significant differences between correlation coefficients of I-E subscale 1 with improvement in reading comprehension on the Nelson-Denny tests were observed for any of the pairs of groups.

Subjects who were administered the internally oriented reading program (Reading Program II) from instructor B (group 3) obtained significantly different correlations between I-E subscale 2 and improvement in reading comprehension on the Nelson-Denny reading tests, compared to subjects in the control group (group 5).

Summary of the Correlational Analysis Results

The most striking results from the correlational data discussed in this section were the correlation coefficients obtained by the control group between I-E Scale total score, I-E subscale 1, and I-E subscale 2, and rate and comprehension change on the Nelson-Denny reading tests (see Table 4.8). Experimental groups 1, 2, 3, and 4, generally, did not obtain as striking correlations for these or other variables. Most of the significant differences between

correlation coefficients discussed in this section involved a comparison between an experimental group and the control group. The control group's high correlations between variables of the I_p-E_p dimension and rate and comprehension change on the Nelson-Denny reading tests account for most of the significant differences that were obtained. The implications of these results will be discussed in the final chapter.

Significant differences ($p < .05$) in Pearson r correlation coefficients for measures of the I_p-E_p dimension with improvement in reading rate and comprehension were observed between several pairs of the experimental and control groups. Table 4.13 summarizes the results for each possible pair of groups, and for each correlation coefficient. An (X) in the table indicates a significant difference in correlation coefficients between the two groups compared.

The most striking result shown in Table 4.13 is that only correlations with rate and comprehension on the Nelson-Denny tests yielded significant differences. Group 1, which received the externally oriented reading instruction from instructor A, and group 3, which received the internally oriented instruction from instructor B, obtained significantly different correlation coefficients of both I-E Scale total score and I-E subscale 2 (Political Control) with improvement in reading rate on the Nelson-Denny tests. Group 2, which received the internally oriented instruction from instructor A, and the control group (group 5) obtained a significant difference in correlation coefficients between I-E subscale 1 (Personal Causation)

TABLE 4.13: SUMMARY OF FISHER'S z TRANSFORMATION TESTS OF DIFFERENCES BETWEEN CORRELATION COEFFICIENTS FOR ALL POSSIBLE PAIRS OF GROUPS.

Pairs of Groups	Improvement in Reading Rate (R-H) ^a with:			Improvement in Reading Rate (N-D) ^b with:			Improvement in Reading Comprehension (R-H) ^a with:			Improvement in Reading Comprehension (N-D) ^b with:		
	I-E Scale total score	I-E subscale 1 (Personal Causation)	I-E subscale 2 (Political Control)	I-E Scale total score	I-E subscale 1 (Personal Causation)	I-E subscale 2 (Political Control)	I-E Scale total score	I-E subscale 1 (Personal Causation)	I-E subscale 2 (Political Control)	I-E Scale total score	I-E subscale 1 (Personal Causation)	I-E subscale 2 (Political Control)
1&2	-	-	-	-	-	-	-	-	-	-	-	-
1&3	-	-	-	X	-	X	-	-	-	-	-	-
1&4	-	-	-	-	-	-	-	-	-	-	-	-
1&5	-	-	-	-	-	-	-	-	-	X	-	-
2&3	-	-	-	-	-	-	-	-	-	-	-	-
2&4	-	-	-	-	-	-	-	-	-	-	-	-
2&5	-	-	-	-	X	-	-	-	-	-	-	-
3&4	-	-	-	-	-	-	-	-	-	-	-	-
3&5	-	-	-	X	X	X	-	-	-	-	X	-
4&5	-	-	-	-	-	X	-	-	-	X	-	-

X indicates that the difference between the correlation coefficients for that pair of groups is significantly ($p < .05$) different from zero.

Group	Instruction	Instructor
1	External (Controlled)	A
2	Internal (Motivated)	A
3	Internal (Motivated)	B
4	External (Controlled)	B
5	Delayed Treatment Control Group	

a--Robinson-Hall Reading Test Series

b--Nelson-Denny Reading Tests

and improvement in reading rate on the Nelson-Denny tests. Groups 3 and 5 differed significantly on correlations between all the measures of the I_p-E_p dimension with rate improvement on the Nelson-Denny reading tests. The correlation coefficients between I-E subscale 2 (Political Control) and rate improvement on the Nelson-Denny tests were significantly different for group 4, which received the externally oriented instruction from instructor B, and group 5, the control group.

For correlation coefficients between improvement in reading comprehension and measures of the I_p-E_p dimension, three pairs of groups differed significantly. Two pairs of groups, 1 and 5; and 4 and 5, obtained significant differences for correlation coefficients between the I-E Scale total score and improvement in reading comprehension on the Nelson-Denny tests. Groups 3 and 5 differed significantly for correlations between I-E subscale 2 (Political Control) and improvement in reading comprehension on the Nelson-Denny tests.

Both groups which received the internally oriented reading instruction (2 and 3) differed from the control group (group 5) for correlations between the Personal Causation dimension (subscale 1) of Rotter's I-E Scale and improvement in reading rate. The only suggestions of differences between the groups receiving the internally oriented instruction (2 and 3) and the externally oriented instruction (1 and 4) were the significant differences between groups 1 and 3 for correlations of both I-E Scale total score and I-E subscale 2 (Political Control) with improvement in reading rate on the Nelson-Denny tests.

Both of instructor B's groups (3 and 4) obtained significantly

different correlation coefficients from the control group for correlations between I-E subscale 2 and improvement in reading rate on the Nelson-Denny tests.

Both groups which received the externally oriented reading treatment (groups 1 and 4) differed significantly from the control group (group 5) for correlations between I-E Scale total score and improvement in reading comprehension on the Nelson-Denny tests.

The Intercorrelation and Multiple Correlation of Variables

In addition to the possibility of violating the assumption of linearity of regression when interpreting a correlation coefficient, another potential problem is that variables in a correlation coefficient may correlate significantly because both are correlated with one or more other variables. The first of these possibilities was examined by inspection of the bivariate frequency tables of the variables in the computed correlation coefficients. No gross departures from the assumption of linearity could be detected. The correlation coefficients were assumed to not be obscuring any curvilinear relation of the variables.

The second possibility, that variables may correlate because both are correlated with one or more other variables, was studied by two procedures. First, two principal components factor analyses with Varimax rotations were computed on fourteen variables for subjects participating in the externally oriented reading instruction (groups 1 and 4) and the internally oriented reading instruction (groups 2 and 3). For both groups, subjects' scores on the variables were intercorrelated and the

resulting matrices (Tables 4.14 and 4.15) were factor analyzed by the principal components method, with a limit of seven components for computation. From examination of trial analyses of the data, fewer than seven components resulted in the grouping of variables into factors that were difficult to interpret. Squared multiple correlations were entered in the diagonals and the components rotated to orthogonal simple structure by means of Kaiser's (1958) Varimax method.

The factor coefficients for each of the variables are listed in Tables 4.16 and 4.17. The minimum factor coefficient for including a variable in any factor was .45. Some variables appeared in more than one factor.

The conceptual interpretations of the factors are as follows:

Externally Oriented Reading Instruction (Reading Program I)

Factor I, Reading Aptitude: ability to learn from reading material;

Factor II, Personal Causation: concerns the inclination to assign greater or lesser importance to ability and hard work than to luck as influences which determine personally relevant outcomes;

Factor III, Sex: sex of subjects in the experiment;

Factor IV, Reading Rate: the level of reading rate as measured by reading ability tests before instruction;

Factor V, Political Control: concerns the acceptance or rejection of the idea that a citizen can exert some control over political and world affairs;

Factor VI, Age: chronological age of the subjects at the time of the experiment;

Factor VII, Academic Progress: degree of accumulated academic credit from course work in higher education.

TABLE 4.14: CORRELATION MATRIX OF FOURTEEN VARIABLES FOR SUBJECTS RECEIVING THE EXTERNALLY ORIENTED INSTRUCTION.

	Sex	Instructor	Year in College	Age	Otis I.Q.	I-E total score	I-E subscale 1	I-E subscale 2	Initial Rate (R-H) _a	Initial Comprehension (R-H) _a	Initial Rate (N-D) _b	Initial Comprehension (N-D) _b	Slope of Rate Scores Over Practice Sessions	Slope of Comprehension Scores Over Practice Sessions
Sex		.31	.11	-.02	-.21	.03	.10	-.13	.14	-.06	.29	.18	-.24	-.03
Instructor			.41	.22	.01	-.25	.28	.10	.14	.31	.57	.44	-.10	-.18
Year in College				.40	.44	-.23	-.14	.01	.30	.29	.61	.46	.28	-.32
Age					.51	-.43	-.20	-.12	.34	.06	.22	.46	.11	-.20
Otis I.Q.						-.39	-.25	-.03	.45	.38	.30	.73	.56	-.32
I-E total score							.83	.55	.03	-.50	-.15	-.48	-.23	-.07
I-E subscale 1								.20	.13	-.45	-.10	-.29	-.15	-.18
I-E subscale 2									.17	-.25	.06	-.22	.10	-.42
Initial Rate (R-H) _a										.07	.67	.37	.06	-.25
Initial Comprehension (R-H) _a											-.35	.65	.39	.04
Initial Rate (N-D) _b												.56	.19	-.19
Initial Comprehension (N-D) _b													.49	-.20
Slope of Rate Scores Over Practice Sessions														-.20
Slope of Comprehension Over Practice Sessions														

a--Robinson-Hall Reading Test Series

b--Nelson-Denny Reading Tests

TABLE 4.15: CORRELATION MATRIX OF FOURTEEN VARIABLES FOR SUBJECTS RECEIVING THE INTERNALLY ORIENTED INSTRUCTION.

	Sex	Instructor	Year in College	Age	Otis I.Q.	I-E total score	I-E subscale 1	I-E subscale 2	Initial Rate (R-H) _a	Initial Comprehension (R-H) _a	Initial Rate (N-D) _b	Initial Comprehension (N-D) _b	Slope of Rate Scores Over Practice Sessions	Slope of Comprehension Scores Over Practice Sessions
Sex		.28	-.18	.21	-.41	-.01	-.22	.19	-.21	-.43	.04	-.35	.01	-.30
Instructor			.17	.13	.08	.20	.14	.06	.11	.13	-.10	-.07	.00	-.02
Year in College				.11	.61	.25	.43	-.23	.40	.64	-.33	.46	-.21	.06
Age					.02	-.07	-.17	.16	.11	.29	-.25	-.12	.02	-.47
Otis I.Q.						-.11	.15	.36	.30	.62	.33	.77	-.07	.43
I-E total score							.82	.63	-.09	-.02	.03	-.03	-.32	-.04
I-E subscale 1								.23	.07	.33	.25	.21	-.44	-.03
I-E subscale 2									-.24	-.29	-.32	-.34	.08	-.11
Initial Rate (R-H) _a										.38	.51	.38	.01	.12
Initial Comprehension (R-H) _a											.12	.45	-.23	.14
Initial Rate (N-D) _b												.56	.10	.10
Initial Comprehension (N-D) _b													-.09	.26
Slope of Rate Scores Over Practice Sessions														.12
Slope of Comprehension Scores Over Practice Sessions														

a--Robinson-Hall Reading Test Series

b--Nelson-Denny Reading Tests

TABLE 4.16: ORTHOGONALLY ROTATED FACTOR COEFFICIENTS OF FOURTEEN VARIABLES FOR SUBJECTS WHO RECEIVED THE EXTERNALLY ORIENTED INSTRUCTION.

VARIABLES	FACTORS						
	I	II	III	IV	V	VI	VII
Slope of Rate Scores Over Practice Sessions	<u>.84</u>	-.02	-.23	-.04	.14	.01	.12
Initial Comprehension (N-D) _a	<u>.74</u>	-.24	.34	.30	-.09	.30	.16
Otis I.Q.	<u>.68</u>	-.14	-.18	.31	.08	.51	.07
Initial Comprehension (R-H) _b	<u>.64</u>	-.48	.11	.12	-.19	-.22	.19
I-E subscale 1	-.10	<u>.95</u>	.03	.04	.06	-.07	-.02
I-E total score	-.26	<u>.78</u>	.06	.07	.32	-.36	-.07
Initial Comprehension (R-H) _b	.64	<u>-.48</u>	.11	.12	-.19	-.22	.19
Sex	-.09	.15	<u>.91</u>	.08	-.13	.00	-.01
Initial Rate (R-H) _b	.10	.12	.05	<u>.92</u>	.10	.25	.05
Initial Rate (N-D) _a	.21	-.11	.33	<u>.69</u>	.05	-.04	.52
I-E subscale 2	-.09	.13	-.10	.16	<u>.90</u>	-.20	-.02
Slope of Comprehension Scores Over Practice Sessions	-.24	-.18	-.12	.05	<u>-.71</u>	-.37	-.17
Age	.05	-.19	.02	.19	-.02	<u>.85</u>	.19
Year in College	.23	-.06	.10	.16	.07	.25	<u>-.89</u>
Instructor	-.01	-.29	.25	.14	.23	.00	<u>.75</u>
Initial Rate (N-D) _a	.21	-.11	.33	.69	.05	-.04	<u>.52</u>

Underlined factor coefficients indicate the variables with coefficients greater than .45 for the factor examined in that column.

a--Nelson-Denny Reading Tests

b--Robinson-Hall Reading Test Series

TABLE 4.17: ORTHOGONALLY ROTATED FACTOR COEFFICIENTS OF FOURTEEN VARIABLES FOR SUBJECTS WHO RECEIVED THE INTERNALLY ORIENTED INSTRUCTION.

VARIABLES	FACTORS						
	I	II	III	IV	V	VI	VII
Otis I.Q.	<u>.92</u>	-.11	.09	-.13	.04	.14	.02
Year in College	<u>.74</u>	.17	.28	.14	-.22	-.02	.20
Initial Comprehension (R-H) _a	<u>.72</u>	-.02	.08	.30	-.22	.42	.06
Initial Comprehension (N-D) _b	<u>.72</u>	-.04	.39	-.20	-.02	.10	-.17
I-E total score	.01	<u>.95</u>	.01	-.06	-.21	-.04	.12
I-E subscale 1	.22	<u>.79</u>	.21	-.11	-.47	.13	.07
I-E subscale 2	-.28	<u>.75</u>	-.28	.17	.32	-.06	-.04
Initial Rate (N-D) _b	.27	.02	<u>.85</u>	-.23	.01	-.23	-.09
Initial Rate (R-H) _a	.22	-.07	<u>.77</u>	-.19	.10	.32	.09
Age	.15	-.03	-.13	<u>.93</u>	.12	-.06	.06
Slope of Comprehension Scores Over Practice Sessions	.39	-.02	-.14	<u>-.67</u>	.32	.23	-.01
Slope of Rate Scores Over Practice Sessions	-.12	-.15	.11	-.03	<u>.88</u>	-.03	.03
I-E subscale 1	.22	.79	.21	-.11	<u>-.47</u>	.13	.07
Sex	-.23	.00	-.03	.21	.02	<u>-.89</u>	-.10
Instructor	.05	.10	-.01	.05	.02	.10	<u>.97</u>

Underlined factor coefficients indicate the variables with coefficients greater than .45 for the factor examined in that column.

a-- Robinson-Hall Reading Test Series

b-- Nelson-Denny Reading Tests

Internally Oriented Reading Instruction (Reading Program II)

Factor I, Reading Aptitude: ability to learn from reading material;

Factor II, I_p - E_p Dimension: the degree to which the individual perceives that events follow from, or are contingent upon, his own behavior or attributes versus the degree to which he feels events are controlled by forces outside of himself;

Factor III, Reading Rate: the level of reading rate as measured by reading ability tests before instruction;

Factor IV, Age: chronological age of the subjects at the time of the experiment;

Factor V, Reading Rate Improvement: slope of rate scores over practice sessions on non-standardized reading selections;

Factor VI, Sex: sex of subjects in the experiment;

Factor VII, Instructor: instructor who administered the reading improvement treatment.

Several of the factors computed for these two groups of subjects appear similar. A reading aptitude factor occurred in both analyses. Reading rate, sex, and age factors also occurred in both principal components analyses.

The I_p - E_p dimension differs in the two groups, however. In the externally oriented instruction groups (groups 1 and 4) the distinction between the personal causation and political control dimensions suggested by Mirels (1970) was confirmed by the occurrence of separate components for these factors. In the internally oriented reading instruction groups (groups 2 and 3) the distinction did not occur. For the analysis for this group, the variables which define the personal causation (I-E subscale 1) and political control (I-E subscale 2) dimensions were grouped in the same factor, with the dominant variable in the factor being the

I-E Scale total score. With the above distinction, the I_p-E_p dimension as a personality construct did, however, occur as a dimension independent from the other variables studied.

An academic progress factor appeared for subjects who received the externally oriented instruction but not for those who received the internally oriented instruction. Also, a reading rate improvement factor and an instructor factor appeared for the internal instruction groups but not for the external instruction groups. Little can be made of these differences other than the observation that for the external instruction groups the variables Year in College and Instructor were included in Factor VII. This suggested that for the external instruction groups, those subjects further along in academic progress seemed to have been associated with instructor B more than with instructor A. This reflects the bias that occurred in assignment of subjects to experimental groups as discussed in Chapter III.

A second procedure to explore the relation of the variables in the preceding factor analyses with the variables measuring reading improvement and subjects' evaluations of the experience was a stepwise multiple correlation analysis. This procedure used the seven components computed in the previous analyses to study the degree of relation of factor or factors with each of the reading improvement and subjects' evaluation variables individually. Two analyses were computed, one for the subjects that received the externally oriented reading instruction and one for those that received the internally oriented reading instruction. The correlation matrices of the seven factors and the reading improvement

and subjects' evaluation variables are presented in Tables 4.18 and 4.19. Results of the stepwise multiple correlation computations are presented in Tables 4.20 and 4.21. The F level to include a factor was F 4.0 and the F level to remove a factor was F 4.0.

The procedure for the computation of a stepwise multiple correlation on orthogonally rotated principal components is as follows:

- (1) For each subject, factor scores are computed for each orthogonally rotated component from factor coefficients.
- (2) Multiple correlation coefficients are then computed between factor scores and scores on the reading rate and comprehension improvement variables and subjects' evaluation variables.

Results of the stepwise multiple correlation analysis on orthogonally rotated components for subjects who received the externally oriented reading instruction indicated that significant correlations were obtained between the Reading Rate factor (Factor VI, see Table 4.20) and both measures of Rate Change from the Robinson-Hall and Nelson-Denny reading tests. A significant multiple correlation was obtained between the independent factors of Reading Rate (Factor VI) and Personal Causation (Factor II) and improvement in reading rate on the Nelson-Denny reading tests. The Personal Causation Factor acted to significantly increase the multiple correlation coefficient.

Results of the stepwise multiple correlation analysis on orthogonally rotated components for subjects who received the internally oriented instruction are presented in Table 4.21. Significant correlation coefficients were obtained between the Sex factor (Factor III) and Comprehension Change on the Robinson-Hall reading tests. Factor VII, the

TABLE 4.18: CORRELATION MATRIX OF THE SEVEN ORTHOGONALLY ROTATED PRINCIPAL COMPONENTS AND THE IMPROVEMENT IN READING ABILITY AND SUBJECTS' EVALUATION VARIABLES FOR THE EXTERNALLY ORIENTED INSTRUCTION.

Reading Aptitude	Personal Causation	Sex	Reading Rate	Political Control	Age	Academic Progress	Rate Change (R-H) ^a	Comprehension Change (R-H) ^a	Rate Change (N-D) ^b	Comprehension Change (N-D) ^b	Attendance	Level of Difficulty	Memory vs. Thinking	Instruction	General Evaluation
Reading Aptitude	-.52	.52	.29	.74	.43	.70	-.05	.09	.00	-.19	.07	.17	.13	.22	-.02
Personal Causation		.02	-.38	.02	.14	-.57	-.03	.15	.17	.36	-.33	-.04	-.10	-.10	.03
Sex			.62	-.21	.13	.24	-.31	-.05	-.35	-.06	.17	-.12	.09	-.21	-.04
Reading Rate				.35	.50	.85	-.51	-.05	-.46	-.31	.14	.05	.14	-.10	.02
Political Control					.84	.65	-.16	.33	-.05	.09	.03	.15	.18	.16	-.09
Age						.56	-.33	.37	.24	.05	.12	.12	.07	.09	-.03
Academic Progress							-.31	.05	-.26	-.28	.24	.10	.22	.06	-.05
Rate Change (R-H) ^a								.36	.61	.24	-.03	-.42	-.13	-.10	-.28
Comprehension Change (R-H) ^a									.27	.54	-.04	.02	-.07	.04	-.12
Rate Change (N-D) ^b										.20	-.27	-.14	.02	.06	.04
Comprehension Change (N-D) ^b											-.12	.11	-.22	-.37	-.46
Attendance												.05	.12	.10	.04
Level of Difficulty													.28	.50	.31
Memory vs. Thinking														.67	.43
Instruction															.60
General Evaluation															

a--Robinson-Hall Reading Test Series

b--Nelson-Denny Reading Tests

TABLE 4.19: CORRELATION MATRIX OF THE SEVEN ORTHOGONALLY ROTATED PRINCIPAL COMPONENTS AND THE IMPROVEMENT IN READING ABILITY AND SUBJECTS' EVALUATION VARIABLES FOR THE INTERNALLY ORIENTED INSTRUCTION.

Reading Aptitude	I _p -E _p Dimension	Reading Rate	Age	Reading Rate Improvement	Sex	Instructor	Rate Change (R-H) _a	Comprehension Change (R-H) _a	Rate Change (N-D) _b	Comprehension Change (N-D) _b	Attendance	Level of Difficulty	Memory vs. Thinking	Instruction	General Evaluation
Reading Aptitude	.33	.54	-.19	-.43	.60	.40	.28	-.48	-.17	-.09	.17	-.23	-.05	-.09	-.34
I _p -E _p Dimension		-.37	.32	-.97	.19	-.06	-.23	-.13	-.33	-.58	.25	.17	-.11	.22	-.36
Reading Rate			-.40	.32	.06	-.08	.11	-.11	-.17	.21	.00	-.11	-.11	-.09	-.12
Age				-.37	.26	.28	-.14	-.14	-.04	.19	.13	.30	.17	.39	.28
Reading Rate Improvement					-.32	.66	.18	.18	.30	.51	-.25	-.12	.10	-.21	.37
Sex						.22	.37	-.57	.15	.31	.15	-.27	.07	-.01	-.02
Instructor							.17	-.05	.38	.69	-.11	-.05	.25	.02	.56
Rate Change (R-H) _a								-.45	.24	.28	-.09	-.25	.07	-.01	.23
Comprehension Change (R-H) _a									-.24	-.12	-.36	.33	-.02	.01	.15
Rate Change (N-D) _b										.44	-.18	-.04	.38	-.05	.41
Comprehension Change (N-D) _b											-.12	-.07	.30	.04	.43
Attendance												-.36	-.32	-.07	-.23
Level of Difficulty													.20	.35	.23
Memory vs. Thinking														.18	.66
Instruction															.25
General Evaluation															

a--Robinson-Hall Reading Test Series

b-- Nelson-Denny Reading Tests

TABLE 4.20: STEPWISE MULTIPLE CORRELATION OF ORTHOGONALLY ROTATED COMPONENTS FOR SUBJECTS RECEIVING THE EXTERNALLY ORIENTED INSTRUCTION.

<u>Dependent Variable:</u> Rate Change (R-H) _a			
<u>factor entered</u>	Multiple R	F level	DF
IV Reading Rate	.51	6.82	19
<u>Dependent Variable:</u> Comprehension Change (R-H)			
<u>factor entered</u>	Multiple R	F level	DF
none			
<u>Dependent Variable:</u> Rate Change (N-D) _b			
<u>factor entered</u>	Multiple R	F level	DF
IV Reading Rate	.46	5.08	19
II Personal Causation	.59	6.78	18
<u>Dependent Variable:</u> Comprehension Change (N-D) _b			
<u>factor entered</u>	Multiple R	F level	DF
none			
<u>Dependent Variable:</u> Attendance			
<u>factor entered</u>	Multiple R	F level	DF
none			
<u>Dependent Variable:</u> Level of Difficulty			
<u>factor entered</u>	Multiple R	F level	DF
none			
<u>Dependent Variable:</u> Memory vs. Thinking			
<u>factor entered</u>	Multiple R	F level	DF
none			
<u>Dependent Variable:</u> Instruction			
<u>factor entered</u>	Multiple R	F level	DF
none			
<u>Dependent Variable:</u> General Evaluation			
<u>factor entered</u>	Multiple R	F level	DF
none			

F level to include a factor, 4.0

F level to remove a factor, 4.0

a--Robinson-Hall Reading Test Series

b--Nelson-Denny Reading Tests

TABLE 4.21: STEPWISE MULTIPLE CORRELATION OF ORTHOGONALLY ROTATED COMPONENTS FOR SUBJECTS RECEIVING THE INTERNALLY ORIENTED INSTRUCTION.

<u>Dependent Variable:</u>	Rate Change (R-H) _a		
factor entered	Multiple R	F level	DF
none			
<u>Dependent Variable:</u>	Comprehension Change (R-H) _a		
factor entered	Multiple R	F level	DF
VI Sex	.57	10.49	22
<u>Dependent Variable:</u>	Rate Change (N-D) _b		
factor entered	Multiple R	F level	DF
none			
<u>Dependent Variable:</u>	Comprehension Change (N-D) _b		
factor entered	Multiple R	F level	DF
VII Instructor	.69	19.68	22
<u>Dependent Variable:</u>	Attendance		
factor entered	Multiple R	F level	DF
none			
<u>Dependent Variable:</u>	Level of Difficulty		
factor entered	Multiple R	F level	DF
none			
<u>Dependent Variable:</u>	Memory vs. Thinking		
factor entered	Multiple R	F level	DF
none			
<u>Dependent Variable:</u>	Instruction		
factor entered	Multiple R	F level	DF
none			
<u>Dependent Variable:</u>	General Evaluation		
factor entered	Multiple R	F level	DF
VII Instructor	.56	9.81	22

F level to include a factor, 4.0

F level to remove a factor, 4.0

a-- Robinson-Hall Reading Test Series

b-- Nelson-Denny Reading Tests

Instructor factor, correlated significantly with Comprehension Change on the Nelson-Denny reading tests, and with the General Evaluation variable from the Modified Course Evaluation Form.

Summary and Discussion

Significant differences in improvement of reading rate on two measures of reading ability were observed between subjects who received the externally oriented instruction, the internally oriented instruction and the control group. Subjects receiving the internal reading instruction obtained significantly greater increases in reading rate as measured by two pre- and post-treatment standardized reading tests compared to subjects receiving the external reading instruction, and the control group. The effects of instructor variables and time of day the classes were held were not as important in determining improvement as was the reading instruction subjects received. No significant differences were observed between subjects who received the externally oriented reading instruction and the control group. Also, no significant differences were obtained between any of the experimental and control groups regarding change in reading comprehension.

The four experimental groups and the control group also differed significantly in the magnitude and direction of correlation between measures of the I_p-E_p dimension and measures of improvement in reading ability. Caution was emphasized in the interpretation of the results of differences between Pearson r correlation coefficients for pairs of experimental and control groups. From Table 4.8, the control group

was observed to obtain high positive and negative correlations between variables of the I_p - E_p dimension and reading rate and comprehension change on the Nelson-Denny reading tests. Correlations obtained by the experimental groups were not as impressively high. The correlation coefficients from the control group account for most of the significant differences obtained between correlation coefficients for pairs of experimental and control groups compared in the second section of this chapter.

The null hypotheses concerning the differences of correlation coefficients between the I_p - E_p dimension and improvement in reading rate for subjects in the experimental and the control groups (H_{3a} and H_{3b}) were partially rejected. Significantly different correlation coefficients were obtained between subjects receiving the internally oriented instruction (groups 2 and 3) and the control group for the Personal Causation (I-E subscale 1) variable with improvement in reading rate assessed by the Nelson-Denny reading tests. This difference from the control group was observed for two experimental groups which were administered by different instructors, at different times of the day, on different days of the week. I-E subscale 1 was highly correlated with rate improvement for the control group (.77), but the correlations with rate improvement for experimental groups 2 and 3 were low and negative (-.32 and -.35 respectively). In the control group, E_p 's on I-E subscale 1 tended to improve their reading rate more than I_p 's. Among subjects in the internal reading instruction (groups 2 and 3), however, there was only a slight tendency for I_p 's to

improve their reading rate more than E_p 's.

Less consistent differences were observed between differences of correlations of the I-E Scale total score with improvement in reading rate on the Nelson-Denny tests for subjects in experimental groups 1 (.40) and 3 (-.57). Group 1 received the external reading instruction and group 3 received the internal reading instruction. Both groups were also administered by different instructors. The differences between the other externally and internally oriented instruction groups (groups 2 and 4) were not consistent with this difference. Therefore it is unclear if the difference was due to the type of instruction, the instructor, an interaction of these two variables, or to another variable. Group 3 also obtained a significantly different correlation coefficient (-.57) from the control group (.65) on the same variables. Again, subjects in the other internally oriented learning situation (group 2) did not significantly differ from the control group for this correlation of variables (-.12). The I-E Scale total score was positively correlated with rate improvement for experimental group 1 (.40) and the control group (.65), and negatively correlated for experimental group 3 (-.57). E_p 's on the I-E Scale total score tended to improve their reading rate more than I_p 's to a greater degree in group 1 (external) and the control group than in group 3 (internal), where I_p 's tended to improve their reading rate more than E_p 's.

Subjects that received reading instruction from instructor B (groups 3 and 4) obtained significantly different correlations between the Political Control (I-E subscale 2) variable and improvement in

reading rate assessed by the Nelson-Denny tests than subjects in the control group. I-E subscale 2 was negatively correlated with rate improvement for experimental group 3 (-.45) and group 4 (-.45), and positively correlated for the control group (.68). In classes administered by instructor B, I_p 's on I-E subscale 2 (Political Control) tended slightly to improve their reading rates more than E_p 's, while E_p 's tended to improve their reading rates more than I_p 's in the control group.

A significant difference was also obtained between groups 1 and 3 for correlation coefficients between I-E subscale 2 (Political Control) and rate improvement on the Nelson-Denny tests. Group 1 received the external reading instruction from instructor A; group 3 received the internal reading instruction from instructor B. In group 1, E_p 's on I-E subscale 2 tended to increase their reading rates more than I_p 's (.46), and for group 3, I_p 's tended to increase their reading rates more than E_p 's (-.45).

Differences between experimental and control groups in correlations of measures of the I_p - E_p dimension with improvement in reading comprehension lead to the following interpretations. Subjects administered the externally oriented instruction (groups 1 and 4) obtained significantly different correlations between I-E Scale total score and comprehension change on the Nelson-Denny tests than subjects in the control group. For groups 1 and 4 the variables correlated near zero (.03 and .03 respectively); for the control group the variables correlated highly, in a negative direction (-.78). For groups 1 and 4 the

tendencies for I_p 's on the I-E Scale total score to increase their reading comprehension more than E_p 's are near zero. For the control group E_p 's tended to increase their reading comprehension more than I_p 's.

A significant difference in Pearson r correlation coefficients was also observed between experimental group 3 (internal) and the control group for correlations between the Political Control (I-E subscale 2) variable and improvement in reading comprehension assessed by the Nelson-Denny tests. A low positive correlation was obtained by group 3 (.29) and a negative correlation was obtained by the control group (-.61). E_p 's on I-E subscale 2 tended to increase in reading comprehension more than I_p 's in group 3, to an extent significantly different from the control group. In the control group I_p 's tended to increase in reading comprehension more than E_p 's.

Sex differences, instructor variables, age, intelligence, initial reading abilities, and progress in the reading program were other variables which were perceived by the experimenter to be potential determiners of reading improvement. These variables were examined by factor analytic and multiple correlation procedures to determine if any of these variables correlated significantly with I-E Scale total score, I-E subscale 1, or I-E subscale 2. Results of the factor analytic procedures suggested that the I_p - E_p dimension can be viewed as relatively independent of the variables mentioned in the first sentence of this paragraph. In both factor analyses, the variables of the I_p - E_p dimension: I-E Scale total score, I-E subscale 1, and I-E subscale 2,

were assumed to not be significantly related to any of the following variables: sex, instructor, age, intelligence, initial reading abilities, and progress in the reading program.

From the stepwise multiple correlation analysis on seven orthogonally rotated principal components for the subjects who received external reading instruction, the following factors were significantly related to measures of reading improvement and subjects' evaluations from the Modified Course Assessment Form. Factor IV, Reading Rate, was significantly correlated with rate improvement on both the Robinson-Hall and Nelson-Denny reading tests. Also, for rate improvement on the Nelson-Denny tests, adding Factor II, Personal Causation, in a multiple correlation with Factor IV significantly increased the correlation coefficient. These results suggested that variables which may have influenced improvement in reading rate in the externally oriented instruction were initial reading rate and the tendency to interpret rewards in one's life as due to one's own efforts. Improvement in reading rate on the Nelson-Denny tests was related to the interaction of low initial rate and a tendency to assign lesser importance to personal ability and hard work as determinants of personally relevant outcomes.

For the internally oriented learning situation, Factor VI, Sex, correlated significantly with improvement in reading comprehension as assessed by the Robinson-Hall tests. Also, Factor VII, Instructor, correlated significantly with improvement in reading comprehension as assessed by the Nelson-Denny tests. Female subjects tended to improve

their reading comprehension more than male subjects, and subjects instructed by instructor B (male) tended to improve their reading comprehension more than subjects instructed by instructor A in the internally oriented learning situations.

There was also a significant correlation for subjects in the internal instruction between Factor VII, Instructor, and the General Evaluation variable from the Modified Course Assessment Form. Subjects who were administered the internally oriented learning situation by instructor B tended to evaluate the experience more highly than subjects administered the internally oriented learning situation by instructor A.

A limitation of this study is that significant correlations or differences between correlations do not imply a cause and effect relationship between the variables. Keeping this limitation in mind, conclusions and implications based on the results of the analyses will be presented in the following chapter.

CHAPTER V

CONCLUSIONS

Research has suggested that an individual's perception of the locus of control in a learning situation will have an effect on his learning performance. The locus of control can be viewed as a trait factor of the individual (Rotter; 1966) or a characteristic of the learning situation (James; 1965). The interaction of these two dimensions, the I_p-E_p dimension and the I_t-E_t dimension, in influencing subjects' motivation in two learning situations, distinguished by their different positions along the I_t-E_t dimension, was the issue investigated in this study. The I_p-E_p dimension was operationally defined by scores on Rotter's I-E Scale total score and I-E subscales 1 and 2 (Appendix D). The results of this study provided partial support for the hypotheses presented in Chapter II.

Controlled vs. Motivated Reading Instruction

The internally oriented motivated reading program was found to be the more effective treatment for improvement in reading rate. This result has several implications for the field of reading instruction. The basic assumption of the motivated approach, that a major cause of slow reading is lack of motivation to improve speed, was confirmed in this study. The result contradicts some of the previous research regarding comparisons of the effectiveness of controlled versus motivated approaches cited in this thesis. Previous research found that there was

no consistent evidence to suggest that one approach was more effective than the other approach.

Early research in the study of the effect of expectancies on learning performance offers one approach for speculations concerning the difference in effectiveness of the two procedures. James (1957) presented an argument for the explanation of the results obtained in his study of the performance of subjects in skill and chance learning situations. James presented his subjects with a difficult line judging task described to the subjects as a "perceptual discrimination" task. One group of subjects received the instructions that success on the task was due to the skill of the subject. The other group was instructed that success was purely a chance matter since the task was so difficult. Results of these procedures were that the first group generalized their measured expectancies of success to a new but similar task to an extent significantly greater than subjects in the second group. James' explanation was that because the first group perceived that their success was due to their own efforts and abilities it was easier for them to generalize their expectancies to a new but similar situation. Subjects in the second group perceived the new situation as dissimilar to the original learning situation and therefore did not generalize their expectancies. A similar explanation might apply to the results of the controlled and motivated instruction. It is proposed that subjects receiving the internally oriented instruction perceived the final testing session as similar to their experience in the motivated reading program. Their generalized expectancies influenced their motivation during the post-

testing session and affect their performance. Subjects receiving the externally oriented instruction viewed the final testing session as dissimilar from their experience in the controlled reading program. They were not allowed to use the Reading Accelerator nor could they rely on the steps of the reading program as they had been encouraged to do during the reading instruction. The subjects might not have generalized their expectancies to the post-testing session because it was perceived as dissimilar. The subjects attributed their success in increasing their reading rate to the machine and the steps of the reading program; therefore, they had no basis to generalize their expectancies to the new situation.

I_p-E_p Dimension and Improvement in Reading Skills

The correlation analysis of the relation between the I_p-E_p dimension and improvement in reading abilities yielded equivocal support for the thesis of this study. Significantly different correlations were only obtained with scores on one of the reading tests used to assess reading ability, namely, forms A and B of the Nelson-Denny. This had implications for the type of reading behavior found to be associated with the I_p-E_p dimension. The behavior assessed by this test was reading rate during the first minute of reading, and reading comprehension based on only a few paragraphs with the material available for referral while answering questions.

Another attention arousing observation from the correlations between the I_p-E_p dimension and changes in reading rate and comprehension

on the Nelson-Denny tests was the high positive and negative correlations obtained by the control group (see Table 4.8). Most of the significant differences between correlation coefficients of experimental and control groups, summarized in Table 4.11, were obtained between low correlations achieved by experimental groups and high correlations achieved by the control group. Ducette and Wolk (1972) expressed one viewpoint which might explain the high correlations obtained by the control group, the low correlations obtained by the experimental groups, and the lack of consistently significant differences between correlation coefficients obtained by subjects in externally and internally oriented instruction groups. These researchers argued that any experimental procedure that allows subjects to develop specific expectancies* for a particular learning situation, either as a function of overstructuring the task or repeated exposure to the task, results in a lessening of the effect of subjects' generalized I-E expectancies on learning and performance. Since subjects were repeatedly exposed to learning situations in this study, they may have developed specific expectancies for the situation, independent of any generalized I-E expectancy. Through repeated exposure the specific expectancy may have increased in influence and the generalized expectancy, the I-E personality trait, decreased in importance. From this interpretation, significant differences between externally oriented instruction groups and the control group, and

*S₁ in the formula developed by Rotter (1972) discussed in Chapter II, p. 19.

between internally oriented groups and the control group were obtained because subjects in the control group were in a situation less conducive to the development of specific expectancies. The I-E personality variable, as a generalized expectancy, was therefore a more important factor in determining the performance of subjects in the control group. Such an explanation might account for the substantial correlations obtained by the control group between measures of the I_p - E_p dimension and measures of reading ability from the Nelson-Denny tests, and the generally smaller and frequently negligible correlations obtained by the four experimental groups. Also, the differential effects of externally and internally oriented instruction on externally and internally oriented subjects on a generalized I_p - E_p personality trait would not be predicted by this explanation.

The Control Group

Examination of the control group subject's individual data for reading rate and comprehension change on the Nelson-Denny tests and individual I-E Scale total score, I-E subscale 1 and I-E subscale 2 scores reveals several interesting observations. Considering the correlations between I-E subscale 1 (Personal Causation) with reading rate and comprehension change on the Nelson-Denny tests, I_p 's during the post-testing read more slowly than they did on the pre-testing, perhaps in order to answer comprehension questions more accurately. E_p 's increased their reading rate on the post-testing, but did so at the expense of their being able to answer comprehension questions

effectively. Looking at the individual responses of I_p 's and E_p 's from the Nelson-Denny pre- and post-testing sessions, E_p 's answered more test items in the post-testing session than in the pre-testing session. I_p 's generally answered about the same number or fewer items in the post-testing session than in the pre-testing session. However, I_p 's obtained a higher proportion of accurately answered items in the post-testing session than they did in the pre-testing session.

The same response pattern, though somewhat less striking, exists for I_p 's and E_p 's defined by the I-E Scale total score and I-E subscale 2.

Keeping Ducette and Wolk's explanation in mind, consistent differences between externally and internally oriented instruction groups were not observed for correlation coefficients between the measures of the I_p - E_p dimension and improvement in reading rate and comprehension. The only significant difference that was observed involved group 1 of the externally oriented instruction groups, and group 3 of the internally oriented instruction groups. These two groups differed for correlations of both the I-E Scale total score and the I-E subscale 2 (Political Control) with improvement in reading rate on the Nelson-Denny tests. Although there is evidence for a difference between these two groups involving correlations of the I_p - E_p dimension and improvement in reading rate, it is not clear if this difference can be attributed to interaction of the I_p - E_p dimension with different types of instruction, different instructors, or some other variable.

Consistent differences between internally oriented instruction

groups (2 and 3) and the control group were observed for correlation coefficients of the Personal Causation variable (I-E subscale 1) and improvement in reading rate on the Nelson-Denny tests. Correlations of I-E subscale 1 with improvement in reading rate were significantly different for both of the internally oriented instruction groups compared to the control group. These differences were in the hypothesized directions. I_p 's on I-E subscale 1 tended to improve their reading rate more than E_p 's in the internally oriented instruction. E_p 's tended to improve more than I_p 's in the control treatment.

Consistent differences were not obtained between externally oriented instruction groups (1 and 4) and the control group for correlations between variables of the I_p - E_p dimension and improvement in reading rate on the Nelson-Denny tests. The only significant difference that is observed is between group 4 and the control group for correlations between I-E subscale 2 (Political Control) and reading rate improvement on the Nelson-Denny tests. From this experimental design it is not clear if this difference is due to interaction of the I_p - E_p dimension with different types of instruction, the instructor variable, or some other variable. However, consistent differences were observed between the externally oriented instruction group (1 and 4) and the control group for correlations between I-E Scale total score and improvement in reading comprehension on the Nelson-Denny reading tests. Correlations of I-E Scale total score with improvement in reading comprehension were significantly different for both of the externally oriented instruction groups compared to the control group. Correlations between these variables for groups 1 and 4 were near zero (.03 and .03 respectively); the correlation

for the control group was high and negative ($-.78$).

The Instructor Variable

Significant differences were observed between the experimental groups instructed by instructor B (groups 3 and 4) and the control group for correlations between I-E subscale 2 (Political Control) and rate improvement on the Nelson-Denny reading tests. I_p 's on the Political Control subscale tended to improve more in reading rate than E_p 's in both the externally and internally oriented groups instructed by instructor B. In the control group E_p 's tended to improve more than I_p 's.

From the results of the stepwise multiple correlations for the subjects receiving the internally oriented instruction, the Instructor factor (Factor VII) correlated significantly with the General Evaluation dimension of the Modified Course Assessment Form. Subjects in the internal instruction group taught by instructor B (group 3) tended to evaluate their experience more highly than subjects in the internal instruction group taught by instructor A (group 2).

These two results suggest the influence of an instructor variable on the variables assessed in the above two paragraphs. Instructor B's subjects who believed that they could control and were responsible for the behavior of the government tended to improve more in reading rate than subjects who believed they had no such control. Also, for subjects receiving the internal instruction, instructor B was rated more highly than instructor A on the General Evaluation dimension of the Modified Course Assessment Form (instructor B: $M=6.13$, $SD=.84$; instructor A:

M=5.80, SD=.80). It is difficult to interpret these results without further information of the behavior of the instructors during the treatment sessions. However, these results do suggest areas for further research.

The factor analyses of fourteen variables for subjects receiving the externally and internally oriented reading instruction revealed that the measures of the I-E dimension were independent of the other variables considered in this study. The I-E Scale total score, I-E subscale 1 and I-E subscale 2 were measuring other traits than intelligence, sex, year in college, reading ability, reaction to the instructor, and progress in the program. The I_p-E_p dimension was supported as an independent personality variable.

The view of the I-E construct as a unidimensional versus a multidimensional trait were argued in Chapter II. The results of the factor analyses revealed that in one group of subjects, those receiving the external instruction, the multidimensional view of the I-E construct was supported. I-E subscale 1 and I-E subscale 2 were found to constitute different factors. In the other group of subjects, those receiving the internal instruction, I-E Scale total score, I-E subscale 1 and I-E subscale 2 were included in one factor, supporting the view of the I-E construct as a unidimensional trait. No difference between these two groups on any of the variables studied could be suggested by the experimenter to explain this difference in responses.

Results of the stepwise multiple correlation analyses contained some evidence supporting the experimenter's thesis, and stimulated several hypotheses for further research. The results of the multiple correlation

of orthogonally rotated principal components for subjects in the external instruction groups (1 and 4) revealed a significant multiple correlation of Factor IV, Reading Rate, and Factor II, Personal Causation, with rate improvement. The externally oriented controlled reading instruction was more effective with externally oriented slow readers. The results indicated that externally oriented faster readers were not as greatly influenced by the external reading instruction as were externally oriented slower readers. This suggests further study of the interaction of three variables: the I_p-E_p dimension, the I_t-E_t dimension, and initial level of performance of subjects on the experimental task.

The results of the multiple correlation analyses of subjects receiving the internally oriented instruction suggested that the Instructor and Sex factors were variables potentially influencing subjects' comprehension scores. The internally oriented motivated reading instruction was more effective with females and when taught by instructor B (male). Subjects in instructor B's group also rated the internally oriented motivated reading improvement course more favorably than did subjects in instructor A's group. Further research is suggested for the differential effect of internally oriented motivated reading instruction on the different sexes. Also, more thorough study of instructor variables and their interaction with different types of instruction is proposed as an important area of research.

Summary of Conclusions

In an attempt to summarize the content of this chapter, the following

statements are generally seen as being supported by the results of this study:

1. The motivated internally oriented reading rate instruction was generally more effective in increasing reading rate than the controlled externally oriented reading rate instruction and the nonspecific treatment control group, even when administered by two different instructors.
2. The motivated internally oriented reading rate instruction, the controlled externally oriented reading rate instruction, and the nonspecific control reading rate treatment were not significantly different in their effect on reading comprehension, even when administered by two different instructors.
3. The generalized I_p-E_p expectancies as defined by Rotter (1966) and Mirels (1970) were not important dimensions for predicting the effect of externally and internally oriented reading rate instruction on college students.

Suggestions for Further Research

Several observations of the obtained results of this study suggest areas of further research.

1. The role of Specific Expectancies (Chapter II; p. 19) as opposed to Generalized Expectancies in determining the effect of learning situations on individual subjects (Ducette and Wolk; 1972).
2. The role of the instructor variable in determining the effect of internally and externally oriented learning situations on

internally and externally oriented subjects on a personality dimension.

3. The effect of the interaction of initial performance level, the I_p-E_p dimension, and the I_t-E_t dimension on learning performance.

A P P E N D I X

A

Name _____

Directions: Thinking about the reading program over the last four weeks, would you please rate your reaction to the experience as being one in which your improvement in reading rate was a result of your own efforts versus one in which reading rate improvement was determined by the application of the procedures outlined for you on your instructions sheet.

Circle or place an (X) on one of the numbers below. Do not circle or place an (X) between two numbers, you must choose for your answer only one of the numbers provided.

1.....2.....3.....4.....5.....6.....7.....8.....9

felt improvement of
reading rate was
result of your own
efforts

felt reading rate
improvement was due
somewhat to your own
efforts and somewhat
to application of
instructions

felt reading rate
improvement due to
application of the
instructions

A P P E N D I X

B

Name _____

Reading Program I

In the next ten sessions you will be exposed to a particular program designed to increase your reading rate. The basic assumption of this approach is that training your eyes in the most efficient eye movements for reading will result in the elimination of faulty reading habits which slow reading. In order to train your eye movements you will use a mechanical reading device called a Reading Accelerator. Instructions for using this device will follow. Once you have read the assigned article for each session you will take a short comprehension test over what you have just read.

Directions:

1. Record the number of the Reading Accelerator you are using _____. Always use this machine while you are practicing in class.
2. Your base line reading rate will be given to you. When you have this figure refer to the columns below to determine the proper setting for the Reading Accelerator.

words per minute	setting	words per minute	setting
100	21	300	63
110	23	310	65
120	25	320	68
130	27	330	70
140	30	340	72
150	32	350	74
160	34	360	75
170	36	370	78
180	38	380	80
190	40	390	82
200	42	400	85
210	44	410	86
220	46	420	88
230	48	430	90
240	50	440	92
250	53	450	94
260	55	460	95
270	57	470	97
280	59	480	99
290	61	490	100

3. For the first reading selection set the Reading Accelerator at the setting prescribed above for your base line reading rate. Read the material from the book The Normal Personality: Issues to Insights by Wrenn and Ruiz using the Reading Accelerator according to the schedule below.

testing	
"Neurotic Patterns in Family Relationships"	p. 174
"Sex on the College Campus"	p. 151
"Who Cares for the Aged"	p. 73
"Youth in Exploration of Man Emergent"	p. 189
"Draft Resister's Story"	p. 298
"The Young Divorcee"	p. 178
"Of Youth and the Time of Generations"	p. 93
"Communicating with One's Children"	p. 30
testing	

Using the Reading Accelerator

Set the rate controller of the Accelerator to the proper position. Place the Accelerator over the first page to be read so that the entire column of reading material lies within the frame of the plastic window. The Accelerator can be supported partially by the right or left hand during the reading of the page. Using the shutter thumb knob push the shutter to the top of the page and then bring the shutter to a position approximately one space above the first line of the material to be read. Begin reading by releasing the thumb knob. The shutter will descend at a uniform rate to the bottom of the frame, whereupon the next column can be read by sliding the Accelerator across the book toward the right or by lifting the Accelerator off the book to turn the page. Continue the process until the entire selection has been read.

4. After reading the selection, obtain the quiz and answer the questions.
5. Score your results with the key provided and compute the percentage of answers you had correct by dividing the number of questions into the number answered correctly.
6. If you scored equal to, or greater than 70% correct on the comprehension test, the next time you come to class increase the words per minutes that you are reading by approximately 15%. To compute the new rate multiply the previous words per minute by .15. Add the product of this computation to the previous rate. Using this new figure calculate the new setting for the Accelerator from the columns provided. Increase your words per minutes each time you score 70% or better on each comprehension test.

Continue this procedure for each class session.

Return these instructions to the instructor before leaving the class and pick them up when you come to class each time.

Name _____

Reading Program II

In the next ten sessions you will be exposed to a particular program designed to increase your reading rate. The basic assumptions of this approach are that the major causes of slow reading are lack of enough practice in reading easy, interesting material and lack of motivation to improve speed. This program attempts to increase motivation to improve reading rate using interesting easy to read material. Instructions for the program will follow.

Warm-up Exercises

Using the book The Normal Personality: Issues to Insights by Wrenn and Ruiz, turn to the warm-up reading selection according to the following schedule:

"The Split-Level American Family"	p. 56
"Confessions of a Middle-Aged Moralist"	p. 83
"Children of the Drug Age"	p. 113
"The Pill, the Sexual Revolution, and the Schools"	p. 138
"Some Factors in Successful Marriage"	p. 165
"Vocational Aspirations of Freshmen"	p. 196
"On War and Peace in Animals and Man"	p. 252
"White Skins, Dark Skins, Thin Skins"	p. 310

1. Using the warm-up reading for the appropriate date, at the instructors signal, begin reading at a normal pace.
2. At the end of the warm-up trial the instructor will signal to stop. Count the number of complete lines that you just read and place an (X) at the final line.
3. Add 20% to the number of lines read by multiplying the number of lines by .2 and adding the product to the same figure.
 Example: lines read = 15
 $15 \times .2 = 3.0$
 $15 + 3 = 18$
4. From the point where you left off reading, count down the number of lines that you have just computed (18 in the example above) and place an (X). You will now have a second trial in which you will attempt to read the new material which you just counted off. Adjust your reading rate so that you will have read the entire material in the same amount of time as the first trial. Do not worry about comprehending the material, read for speed only.

5. At the end of the trial the instructor will signal to stop. Add 20% to the lines computed in step 3 by multiplying the number of lines by .2 and adding the product to the same figure.

Example: lines read = 18 (from step 3)

$$18 \times .2 = 3.6$$

$$18 + 3.6 = 22$$

6. From the point where you placed the (X) in step 4, count down the number of lines that you have just computed in step 5 (22 in the above example) and place an (X). You will now have a third trial in which you will attempt to read the new material which you just counted off. Adjust your reading rate so that you will cover the entire material in the same amount of time. Repeat steps 3, 4, and 5 one more time for a fourth warm-up trial.
7. At the end of the last warm-up trial turn to the reading test material assigned for the appropriate date according to the schedule below:

testing

"Neurotic Patterns in Family Relationships" p. 174

"Sex on the College Campus" p. 151

"Who Cares for the Aged" p. 73

"Youth in Exploration of Man Emergent" p. 189

"Draft Resister's Story" p. 298

"The Young Divorcee" p. 178

"Of Youth and the Time of Generations" p. 93

"Communicating with One's Children" p. 30

testing

8. When the instructor signals to begin, read the entire selection, pushing yourself to read faster.
9. When you have finished the article raise your hand. The instructor will announce the number of minutes it took you to read the selection. Record the time on a piece of scratch paper.
10. Complete the comprehension test for the assigned selection. Score your answers and compute the comprehension percentage by dividing the number of correct answers by the total number of questions.
11. Compute your reading rate by dividing the number of words in the selection printed at the bottom of each page by the number of minutes it took you to read the selection.
12. Record your reading rate (words per minute) and the comprehension percentage on the graph provided.

Reading Graph

A P P E N D I X

C

INSTRUCTIONS FOR THE I-E SCALE

This is a questionnaire to find out the way in which certain important events in our society affect different people. Each item consists of a pair of alternatives lettered a or b. Please select the one statement of each pair (and only one) which you most strongly believe to be the case as far as you're concerned. Be sure to select the one you actually believe to be more true rather than the one you think you should choose or the one you would like to be true. This is a measure of personal belief: obviously there are no right or wrong answers.

Print your name at the top right hand corner of the answer sheet, then finish reading these instructions.

Please answer these items carefully but do not spend too much time on any one item. Be sure to find an answer to every choice. Find the number of the item on the answer sheet and circle the letter a or b which you choose as the statement more true.

In some instances you may discover that you believe both statements or neither one. In such cases, be sure to select the one you more strongly believe to be the case as far as you are concerned. Also try to respond to each item independently when making your choice; do not be influenced by your previous choices.

I-E

1. a. Children get into trouble because their parents punish them too much.
b. The trouble with most children nowadays is that their parents are too easy with them.
2. a. Many of the unhappy things in people's lives are partly due to bad luck.
b. People's misfortunes result from the mistakes they make.
3. a. One of the major reasons why we have wars is because people don't take enough interest in politics.
b. There will always be wars, no matter how hard people try to prevent them.
4. a. In the long run people get the respect they deserve in this world.
b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.
5. a. The idea that teachers are unfair to students is nonsense.
b. Most students don't realize the extent to which their grades are influenced by accidental happenings.
6. a. Without the right breaks one cannot be an effective leader.
b. Capable people who fail to become leaders have not taken advantage of their opportunities.
7. a. No matter how hard you try some people just don't like you.
b. People who can't get others to like them don't understand how to get along with others.
8. a. Heredity plays the major role in determining one's personality.
b. It is one's experiences in life which determine what they're like.
9. a. I have often found that what is going to happen will happen.
b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10. a. In the case of the well prepared student there is rarely if ever such a thing as an unfair test.
b. Many times exam questions tend to be so unrelated to course work than studying is really useless.
11. a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.
b. Getting a good job depends mainly on being in the right place at the right time.
12. a. The average citizen can have an influence in government decisions.
b. This world is run by the few people in power, and there is not much the little guy can do about it.
13. a. When I make plans, I am almost certain that I can make them work.
b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.
14. a. There are certain people who are just no good.
b. There is some good in everybody.
15. a. In my case getting what I want has little or nothing to do with luck.
b. Many times we might just as well decide what to do by flipping a coin.
16. a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.
b. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.
17. a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.
b. By taking an active part in political and social affairs the people can control world events.
18. a. Most people don't realize the extent to which their lives are controlled by accidental happenings.
b. There really is no such thing as "luck."

- 19. a. One should always be willing to admit mistakes.
b. It is usually best to cover up one's mistakes.
- 20. a. It is hard to know whether or not a person really likes you.
b. How many friends you have depends on how nice a person you are.
- 21. a. In the long run the bad things that happen to us are balanced by the good ones.
b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.
- 22. a. With enough effort we can wipe out political corruption.
b. It is difficult for people to have much control over the things politicians do in office.
- 23. a. Sometimes I can't understand how teachers arrive at the grades they give.
b. There is a direct connection between how hard I study and the grades I get.
- 24. a. A good leader expects people to decide for themselves what they should do.
b. A good leader makes it clear to everybody what their jobs are.
- 25. a. Many times I feel that I have little influence over the things that happen to me.
b. It is impossible for me to believe that chance or luck plays an important role in my life.
- 26. a. People are lonely because they don't try to be friendly.
b. There's not much use in trying too hard to please people, if they like you, they like you.
- 27. a. There is too much emphasis on athletics in high school.
b. Team sports are an excellent way to build character.
- 28. a. What happens to me is my own doing.
b. Sometimes I feel that I don't have enough control over the direction my life is taking.

29. a. Most of the time I can't understand why politicians behave the way they do.
- b. In the long run the people are responsible for bad government on a national as well as on a local level.

NAME _____

I-E SCALE ANSWER SHEET

1. (a) (b)	21. (a) (b)
2. (a) (b)	22. (a) (b)
3. (a) (b)	23. (a) (b)
4. (a) (b)	24. (a) (b)
5. (a) (b)	25. (a) (b)
6. (a) (b)	26. (a) (b)
7. (a) (b)	27. (a) (b)
8. (a) (b)	28. (a) (b)
9. (a) (b)	29. (a) (b)
10. (a) (b)	
11. (a) (b)	
12. (a) (b)	
13. (a) (b)	
14. (a) (b)	
15. (a) (b)	
16. (a) (b)	
17. (a) (b)	
18. (a) (b)	
19. (a) (b)	
20. (a) (b)	

A P P E N D I X

D

I-E Subscale 1: Personal Causation*

<u>Item</u>	<u>Factor I loading</u>	
	<u>Males</u>	<u>Females</u>
5.a.The idea that teachers are unfair to students is nonsense.	.38	.37
10.a.In the case of the well prepared student there is rarely if ever such a thing as an unfair test.	.33	.36
11.a.Becoming a success is a matter of hard work, luck has little or nothing to do with it.	.57	.60
15.a.In my case getting what I want has little or nothing to do with luck.	.60	.47
16.b.Getting people to do the right thing depends on ability, luck has little or nothing to do with it.	-.40	-.59
18.b.There is really no such thing as "luck."	-.48	-.43
23.b.There is a direct connection between how hard I study and the grades I get.	-.40	-.53
25.b.It is impossible for me to believe that chance or luck plays an important role in my life.	-.61	-.58
28.a.What happens to me is my own doing.	.37	.42

*from Mirels' (1970) principal components factor analysis with Varimax rotation of responses to Rotter's (1966) I-E Scale by 159 male and 157 female college students enrolled in an introductory psychology course at The Ohio State University.

I-E Subscale 2: Political Control*

<u>Item</u>	<u>Factor II loadings</u>	
	<u>Males</u>	<u>Females</u>
12.a.The average citizen can have an influence in government decisions.	.68	.49
17.b.By taking an active part in political and social affairs the people can control world events.	-.70	-.45
22.a.With enough effort we can wipe out political corruption.	.64	.60
29.b.In the long run people are responsible for bad government on a national as well as on a local level.	-.44	-.36

*from Mirels' (1970) principal components factor analysis with Varimax rotation of responses to Rotter's (1966) I-E Scale by 159 male and 157 female college students enrolled in an introductory psychology course at The Ohio State University.

A P P E N D I X

E

Modified Course Assessment Form

PLEASE PRINT NAME _____

LAST

FIRST

MIDDLE

INSTRUCTIONS

Make judgments on the basis of what this course meant to you. Statements at the ends of each scale have opposite meanings. Indicate the direction and intensity of your feelings for each scale as follows:

If your feelings are:

Very closely related to one end	(X)	(2)	(1)	(0)	(1)	(2)	(3)
Closely related to one end	(3)	(X)	(1)	(0)	(1)	(2)	(3)
Slightly related to one end	(3)	(2)	(X)	(0)	(1)	(2)	(3)
Neutral	(3)	(2)	(1)	(X)	(1)	(2)	(3)

Consider each scale as a separate judgment. Make one mark only for each scale. Mark every scale. Use pencil only.

Logical reasoning	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Ordinary retention
Time consuming	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Minimal studying
Unimaginative instructor	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Creative instructor
Recommend to others	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Will not recommend
Little effort required	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Extra effort required
Instructor above average	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Instructor below average
Pertinent to everyday life	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Little application
Stimulating instructor	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Unimpressive instructor
Leisurely course	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Strenuous course
Meaningful course	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Course lacks purpose
My toughest course	(3)	(2)	(1)	(0)	(1)	(2)	(3)	My easiest course
Stress on understanding	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Stress on memorizing
Unimportant course	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Significant course
Much work demanded	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Little work demanded
Rote memory	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Reflective consideration
Routine instruction	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Challenging instruction
Worthless course	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Valuable course
Memory emphasized	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Reasoning required
Poor instructor	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Excellent instructor
Eager for more	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Have had enough
Less studying than usual	(3)	(2)	(1)	(0)	(1)	(2)	(3)	More studying than usual
Mastery of ideas	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Retention of facts
Routine instruction	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Challenging Instruction
Waste of time	(3)	(2)	(1)	(0)	(1)	(2)	(3)	Worth taking

A P P E N D I X

F

SUBJECTS

<u>Variable</u>	<u>Group 1 (Controlled)</u>										
	01	02	03	04	05	06	07	08	09	10	11
Sex	M	M	F	M	M	F	M	F	M	F	M
Instructor	A	A	A	A	A	A	A	A	A	A	A
Year in College	2	3	1	2	3	1	2	1	1	2	1
Age	26	26	19	21	23	21	20	19	20	19	19
Otis I.Q.	102	118	117	107	124	111	121	103	113	112	107
I-E Scale total score	6	13	12	10	8	10	3	13	4	8	16
I-E subscale 1	2	8	3	2	3	3	0	7	1	2	7
I-E subscale 2	1	2	3	4	2	2	0	1	0	0	4
Initial Reading Rate (R-H) _a	196	210	263	124	200	258	178	195	214	131	225
Initial Reading Comprehension (R-H) _a	59	44	80	60	70	42	65	55	75	56	33
Initial Reading Rate (N-D) _b	250	174	195	150	238	327	185	185	298	140	174
Initial Reading Comprehension (N-D) _b	28	38	42	26	66	40	42	38	44	34	20
Slope of Rate Scores Over Practice Sessions	92	200	354	433	704	43	98	109	575	204	140
Slope of Comprehension Over Practice Sessions	62	-20	46	-19	-11	49	44	-18	144	30	0
Attendance	8	3	7	8	7	8	7	8	7	7	5
Reading Rate Change (R-H) _a	4	8	57	31	-21	-14	0	16	19	34	2
Reading Comprehension (R-H) _a	12	2	-16	14	-8	-11	-2	9	-7	6	2
Reading Rate Change (N-D) _b	-24	30	31	107	7	-92	40	41	1	37	125
Reading Comprehension Change (N-D) _b	4	8	0	8	-4	-8	11	8	-2	-2	2
Level of Difficulty Evaluation	50	40	33	48	35	35	30	30	25	12	15
Memory vs. Thinking Evaluation	42	40	35	55	43	38	20	40	42	23	47
Instruction Evaluation	58	40	40	58	57	43	15	30	33	40	40
General Evaluation	68	40	68	62	57	52	30	65	53	55	70

a---Robinson and Hall Reading Tests

b---Nelson-Denny Reading Tests

SUBJECTS

<u>Variable</u>	<u>Group 2 (Motivated)</u>											
	01	02	03	04	05	06	07	08	09	10	11	12
Sex	M	F	M	M	M	M	F	M	F	F	M	M
Instructor	A	A	A	A	A	A	A	A	A	A	A	A
Year in College	4	3	1	3	1	1	1	4	3	2	4	1
Age	22	21	23	21	25	23	18	21	20	34	26	19
Otis I.Q.	116	111	83	119	121	113	102	127	94	104	125	104
I-E Scale total score	4	8	8	10	1	3	11	5	11	5	16	12
I-E subscale 1	3	4	2	2	0	0	3	2	2	0	7	5
I-E subscale 2	0	0	2	3	0	1	4	0	1	3	3	3
Initial Reading Rate (R-H) _a	177	190	210	158	176	180	108	251	135	177	285	115
Initial Reading Comprehension (R-H) _a	100	45	46	72	60	60	33	95	31	50	74	64
Initial Reading Rate (N-D) _b	140	327	226	161	275	226	216	298	226	129	275	185
Initial Reading Comprehension (N-D) _b	32	50	26	46	48	54	38	65	26	34	54	34
Slope of Rate Scores Over Practice Sessions	56	-4	46	69	270	633	116	-25	208	138	35	163
Slope of Comprehension Scores Over Practice Sessions	4	-13	-40	62	7	30	11	36	5	-41	25	0
Attendance	8	8	8	8	7	7	6	8	8	8	8	8
Reading Rate Change (R-H) _a	96	55	68	192	34	125	36	99	20	48	58	102
Reading Comprehension Change (R-H) _a	-42	20	10	-13	12	8	11	-8	16	19	-8	-6
Reading Rate Change (N-D) _b	293-122	142	230	134	193	163	190	312	128	81	134	
Reading Comprehension Change (N-D) _b	10	-10	14	10	10	20	-10	2	-2	4	8	-2
Level of Difficulty Evaluation	25	25	40	15	32	10	27	25	45	35	37	33
Memory vs. Thinking Evaluation	50	33	42	43	45	48	52	43	55	42	48	45
Instruction Evaluation	40	57	55	43	33	30	32	53	58	35	40	43
General Evaluation	57	48	62	55	42	70	57	53	67	65	60	60

a---Robinson and Hall Reading Tests

b---Nelson-Denny Reading Tests

SUBJECTS

<u>Variable</u>	<u>Group 3 (Motivated)</u>											
	01	02	03	04	05	06	07	08	09	10	11	12
Sex	M	M	M	F	M	F	M	M	F	M	M	F
Instructor	B	B	B	B	B	B	B	B	B	B	B	B
Year in College	4	2	3	4	4	2	1	4	2	4	2	1
Age	27	26	20	23	26	19	19	29	39	19	20	21
Otis I.Q.	112	106	120	116	129	101	97	115	104	120	125	96
I-E Scale total score	14	10	11	11	6	6	14	8	10	12	6	4
I-E subscale 1	5	2	6	5	3	1	6	3	2	4	0	0
I-E subscale 2	3	3	0	2	0	2	3	1	3	3	1	1
Initial Reading Rate (R-H) _a	187	110	171	238	193	214	152	177	189	215	182	246
Initial Reading Comprehension (R-H) _a	75	44	85	79	85	50	50	80	85	67	45	46
Initial Reading Rate (N-D) _b	185	115	207	318	250	250	185	216	185	287	185	161
Initial Reading Comprehension (N-D) _b	44	18	54	48	42	28	34	58	28	52	54	26
Slope of Rate Scores Over Practice Sessions	243	106-389	303	276	360	91	144	43	169	163	189	
Slope of Comprehension Scores Over Practice Sessions	-9	7	10	6	19	20	13	-25	-14	1	17	28
Attendance	8	7	8	6	8	8	7	5	8	8	6	6
Reading Rate Change (R-H) _a	85	45	70	80	109	104	23	174	47	93	86	63
Reading Comprehension Change (R-H) _a	-14	40	-13	1	-3	-9	14	-3	-10	4	26	17
Reading Rate Change (N-D) _b	50	86	20	181	238	69	94	187	124	12	142	172
Reading Comprehension Change (N-D) _b	4	4	12	14	6	0	0	6	16	2	6	8
Level of Difficulty Evaluation	35	43	23	40	10	30	35	52	27	27	48	20
Memory vs. Thinking Evaluation	40	57	47	53	57	47	37	60	70	52	58	47
Instruction Evaluation	57	52	35	38	37	45	40	60	67	33	40	50
General Evaluation	60	70	50	65	68	58	45	70	68	55	67	60

a---Robinson and Hall Reading Tests

b---Nelson-Denny Reading Tests

SUBJECTS

<u>Variable</u>	<u>Group 4 (Controlled)</u>									
	01	02	03	04	05	06	07	08	09	10
Sex	M	F	F	F	F	M	M	M	M	M
Instructor	B	B	B	B	B	B	B	B	B	B
Year in College	4	2	4	1	4	1	1	2	1	2
Age	33	22	25	26	21	19	18	19	26	19
Otis I.Q.	132	114	127	115	107	101	104	109	103	113
I-E Scale total score	4	8	6	0	12	7	14	6	8	9
I-E subscale 1	0	3	3	0	6	2	3	1	2	2
I-E subscale 2	3	1	2	0	1	2	4	3	1	3
Initial Reading Rate (R-H) _a	250	175	316	165	174	142	205	152	193	259
Initial Reading Comprehension (R-H) _a	62	85	82	67	60	65	40	61	60	88
Initial Reading Rate (N-D) _b	371	250	468	275	446	250	318	195	192	436
Initial Reading Comprehension (N-D) _b	66	60	62	54	50	38	30	42	38	52
Slope of Rate Scores Over Practice Sessions	405	205	508	250	302	153	133	350	130	110
Slope of Comprehension Scores Over Practice Sessions	-29	99	-81	-11	34	-10	40	-4	80	-23
Attendance	7	6	7	8	7	8	8	7	6	8
Reading Rate Change (R-H) _a	61	14	-51	3	49	96	-30	89	27	-55
Reading Comprehension Change (R-H) _a	19	-7	12	-10	0	9	-26	10	1	-3
Reading Rate Change (N-D) _b	39	3	-77	7	233	59	-65	19	39	191
Reading Comprehension Change (N-D) _b	-2	-6	0	-6	0	8	-6	6	0	6
Level of Difficulty Evaluation	10	30	42	35	25	15	15	10	18	25
Memory vs. Thinking Evaluation	37	48	43	65	45	45	42	37	45	47
Instruction Evaluation	40	45	37	70	40	33	28	30	40	35
General Evaluation	57	65	57	70	50	27	52	28	67	48

a---Robinson and Hall Reading Tests

b---Nelson-Denny Reading Tests

SUBJECTS

<u>Variable</u>	<u>Group 5 (Delayed Treatment Control Group)</u>									
	<u>01</u>	<u>02</u>	<u>03</u>	<u>04</u>	<u>05</u>	<u>06</u>	<u>07</u>	<u>08</u>	<u>09</u>	<u>10</u>
Sex	F	M	M	F	M	M	M	F	M	F
Instructor										
Year in College	4	2	2	3	3	1	4	4	1	2
Age	22	25	24	21	21	25	35	23	25	20
Otis I.Q.	124	121	117	109	119	121	100	107	99	129
I-E Scale total score	14	4	10	17	5	7	4	5	12	10
I-E subscale 1	4	2	5	6	2	2	1	1	6	5
I-E subscale 2	3	0	3	4	0	1	2	1	3	1
Initial Reading Rate (R-H) _a	152	179	188	250	163	144	157	201	179	199
Initial Reading Comprehension (R-H) _a	50	80	85	60	61	63	67	75	65	65
Initial Reading Rate (N-D) _b	250	250	174	216	262	174	200	298	185	275
Initial Reading Comprehension (N-D) _b	48	50	42	54	50	26	32	34	36	46
Slope of Rate Scores Over Practice Sessions										
Slope of Comprehension Scores Over Practice Sessions										
Attendance										
Reading Rate Change (R-H) _a	12	13	2	-9	15	-7	19	27	23	-3
Reading Comprehension Change (R-H) _a	6	-20	-2	6	18	4	10	-3	14	5
Reading Rate Change (N-D) _b	-24	-11	52	83	-17	-45	-5	-41	18	10
Reading Comprehension Change (N-D) _b	-20	2	8	-8	16	12	16	12	-2	8
Level of Difficulty Evaluation										
Memory vs. Thinking Evaluation										
Instruction Evaluation										
General Evaluation										

a---Robinson and Hall Reading Tests

b---Nelson-Denny Reading Tests

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