THE RELATIONSHIP BETWEEN ANXIETY, READING ABILITY, TIME TAKEN IN LEARNING, AND SUBSEQUENT PERFORMANCE

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An Abstract

Presented to

the Graduate Council of

Austin Peay State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts in Psychology

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by

Sonja Guy Thompson

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ABSTRACT

Two groups of college students, 29 in Program #1 and 23 in Program #2 served as subjects in a correlational study of anxiety and reading ability as related to time spent in reading and subsequent performance. All subjects were given the A-Trait section of the State-Trait Anxiety Inventory, The Anxiety Questionnaire, and the Nelson-Denny Reading Test. Program #1 subjects read a reading selection dealing with unfamiliar subject matter. Program #2 subjects read a reading selection dealing with familiar subject matter. The subjects elected the amount of time they spent in reading. This time was recorded by the experimenter. Immediately following their reading the subjects were given a posttest, then asked to reread the selection and complete the post-test again. No significant correlations were obtained between the anxiety measures, time, and subsequent performance. However, the correlations between time and reading, vocabulary plus comprehension, scores was significant (Program #1, $r = -.343$, $r = -.369$; Program #2, $r = -.387$, $r = -.603$). Also the correlation between performance and reading (v+c) was significant (Program #1, $r = .336$; Program #2, $r = .667$, $r = .601$). It was concluded that there is, indeed, a relationship between reading, and subsequent performance. This could be used

as an aid in deciding the amount of time a teacher should allocate for students to read.

THE RELATIONSHIP BETWEEN ANXIETY, READING ABILITY, TIME TAKEN IN LEARNING, AND SUBSEQUENT PERFORMANCE

A Thesis

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Master of Arts in Psychology

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by

Sonja Guy Thompson

June 1977

To the Graduate Council:

I am submitting herewith a Thesis written by Sonja G. Thompson entitled "The Relationship Between Anxiety, Reading Ability, Time Taken in Learning, and Subsequent Performance." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Psychology.

Darland E. Blair
Major Professor

We have read this thesis and
recommend its acceptance:

John D. Martin
Minor Professor

Elizabeth H. Stokes
Third Committee Member

Accepted for the Council:

Wayne E. Stacy
Dean of the Graduate School

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CHAPTER I

INTRODUCTION

Carroll (1963) has proposed a model of school learning which emphasizes time as an important variable. His model specifies that the degree of learning for an individual on a specific task is a function of the ratio of time a learner actually spends on a learning task to the total amount of time he needs.

$$\text{Degree of learning} = f\left(\frac{\text{time actually spent}}{\text{time needed}}\right)$$

The time actually spent on a learning task is determined by the amount of time which is available and the perseverance of the learner. In school settings the available time is usually the amount of time allowed by the teacher, and perseverance is the amount of time the student is willing to spend in learning the task.

The time needed is a function of the aptitude for learning a task, the ability to understand the material, and the quality of the instruction. Aptitude for learning a task is measured in time--the shorter the time needed for learning the higher the aptitude. Also the measure of aptitude is specific to the task under consideration. Ability to understand instructions can be measured as some

combination of "general intelligence" and "verbal ability." Quality of instruction applies to the performance of the teacher as well as to the characteristics of textbooks, workbooks, films, teaching-machine programs, and other instructional media.

The present study was designed to investigate the relationships between two characteristics of students (anxiety and reading ability), time actually spent on a reading task, and performance on a test of the reading material. Specifically, the relationship between anxiety and the time actually spent in reading and subsequent performance was investigated. Also, the relationship between reading ability, time spent in reading, and subsequent performance was investigated.

It would be very helpful to the teacher in planning instruction to identify student characteristics which influence the amount of time a student is likely to spend on instruction and the amount of time the student really needs to master the material. The present study was designed to investigate the relationship between two such variables, time and level of performance.

The relationship between anxiety and performance on learning tasks has been the subject of a great deal of research. Spielberger, Gorsuch, and Lushene (1970) define trait anxiety as relatively stable individual differences in anxiety proneness, that is, differences between people

in the tendency to respond to situations perceived as threatening with elevations in state anxiety. Trait anxiety appeared to be quite stable across changes in academic stress whereas state anxiety seemed moderately sensitive to such changes (Martuza and Kallstrom, 1974). When making decisions as to how much time should be given in a learning situation a stable characteristic of the student would be of far greater value than one that continually fluctuates. Such is the case of trait anxiety, a relatively stable condition.

Meyers and Martin (1974) investigated both trait and state anxiety. Subjects from an introductory educational psychology class were randomly assigned to either a high-or-low ego involving instructions group. All subjects performed extradimensional-shift concept-learning tasks. The results were that the performance of high state anxiety subjects was significantly inferior to that of low state anxiety subjects, but there was no dfiference in performance between high-and-low trait anxiety subjects.

The possibility of an additive effect of state and trait anxiety was explored by Ward and Salter (1974). Subjects were chosen from psychology classes on the basis of high and low IPAT Anxiety Scale Questionnaire scores. The subjects were given German sentences to decode using an alphabetically arranged German-English key. The experimenters found that anxiety can interfere with a

complex verbal learning task of the kind encountered in modern educational institutions. Analysis of variance did not confirm that trait anxiety had an overall detrimental effect on learning, but the t-test for the same data revealed that trait anxiety did impair learning in the low state anxiety situation.

Leherissey, O'Neil, Heinrich, and Hansen (1973) investigated anxiety in a computer-assisted instruction setting and found a) students who were high in trait anxiety responded to the learning task and posttest with higher levels of state anxiety than did low trait anxiety students and b) higher levels of state anxiety were evoked by the more difficult technical materials than by the easier familiar materials.

Johnsen, Hohn, and Dunbar (1973) investigated difficulty level of a task and trait anxiety. The results of the analysis indicated that trait anxiety scores did not have the expected main effect on performance scores, nor did trait anxiety scores interact with difficulty level of the learning task to facilitate or depress performance.

Determining the relationship between trait anxiety and time actually spent will indicate if being aware of trait anxiety can in fact aid the teacher in planning time for instruction. Since only a long-term characteristic of the student would be useful for a teacher in planning instruction, test anxiety may also be helpful in

determining the structuring of the lesson. Osterhouse (1975) provided support for the position that the relationship between test anxiety and examination performance is linear--a highly significant linear trend was found between subject's test anxiety level and examination performance when differences in classroom anxiety level were not considered. The teacher may use this information and attempt to lower test anxiety significantly. There are several methods available to lower test anxiety, but it is not the purpose of this paper to discuss these methods.

As stated earlier, time actually needed by the student is a function of the aptitude for learning a task, the ability to understand the material, and the quality of instruction. Much learning is assumed to take place in reading contexts with no feedback supplied. In these learning situations the reading ability of the student will greatly affect the time he actually needs to spend on a task as well as how much time he does spend. The Nelson-Denny Reading Test (Brown, Nelson, & Denny, 1963) shows a close relationship between reading scores and scholastic achievement. This reading test measures reading rate as well as vocabulary and comprehension. Reading rate should be an accurate predictor of the amount of time needed to learn a specific task, but may not be related to final performance on a task in which the student controls the

time. Reading vocabulary and comprehension should be highly related to final performance and, possibly, to time.

Since only long-term characteristics of the student would be useful for a teacher in planning instruction, the effects of trait anxiety, test anxiety, and reading ability on time spent and subsequent performance were investigated. If there is indeed a relationship between these measures the teacher will be greatly facilitated in planning time for instruction.

CHAPTER II

METHOD

Subjects

Subjects for Program #1 were obtained from an educational psychology class (Austin Peay State University) comprised primarily of juniors and seniors. A total of 36 subjects volunteered, 29 of whom completed the experiment (M = 13, F = 16). Subjects had a choice of volunteering for the experiment or writing an educational unit.

Subjects for Program #2 were obtained from a child development class (Austin Peay State University) comprised primarily of sophomores. A total of 29 subjects volunteered, 23 of whom completed the experiment (M = 5, F = 18). Subjects were given extra credit for participating in the experiment.

Apparatus

The Nelson-Denny Reading Test (Form C) was administered to determine reading rate, vocabulary and comprehension measures. The equivalent forms method was used to determine the reliability of the Nelson-Denny. Reading vocabulary plus comprehension scores reliability coefficients ranged from .82 to .91. The reliability coefficients for reading rate ranged from .54 to .69. Test-retest reliability for the vocabulary plus comprehension scores

ranged from .885 to .952, for reading rate the coefficients ranged from .315 to .483. Correlation coefficients ranged from .33 to .397 between the Nelson-Denny (Brown, et al., 1963) and overall GPA.

The A-Trait section of the State-Trait Anxiety Scale (Spielberger, Gorsuch, and Lushene, 1970) was used to determine subject's level of trait anxiety which refers to relatively stable individual differences in anxiety proneness, that is, to differences between people in the tendency to respond to situations perceived as threatening with elevations in A-State intensity. Test-retest reliability for A-Trait ranged from .73 to .86. Validity measures are relatively high for this type of measure.

The Anxiety Questionnaire, a debilitating scale which measures how anxiety interferes with test performance, adapted from the Achievement Anxiety Test developed by Alpert and Haber (1960) was used in this study. No reliability or validity data, other than face value validity, are available for this measure at the present time.

The reading selection for Program #1 was "Cerebral Dominance in Musicians and Nonmusicians", by Bever and Chiarello (1974). The article has a primary psychophysiology orientation and presents material not generally familiar to educational psychology students at the undergraduate level. The readability was judged to be high college level using Edward Fry's (1971) graph.

The reading selection for Program #2 was a discussion of Piaget's description of moral development, postulating that moral development is related to intellectual development, and Kohlberg's description of moral development, an elaboration of Piaget's theory. This selection presents material familiar to students in a child development class, but the subject matter had not been previously covered. The readability was also judged to be high college level using Fry's (1971) graph.

Procedure

Procedure for both program groups was identical. The subjects were administered the Nelson-Denny Reading Test (Form C) during regular class time. The subjects were then instructed to go to the Austin Peay State University psychology testing laboratory where a graduate assistant would administer the STAI and the Test Anxiety Scale. Subjects were cautioned not to complete these measures on a day they planned to take a test since this would give the experimenter a contaminated measure.

After having completed these preliminary measures, including a pre-test of the reading selection, subjects then made an appointment to participate in the experiment proper. Subjects were scheduled for one hour time periods.

Subjects were seated in a cubicle with a small viewing screen in front of them. At their disposal were five buttons which activated the projector, placed behind the

cubicle out of view of the subjects (rear screen projection was used). The subjects were told that they should press any button to activate the projector for the reading selection (15 slides for Program #1 and 12 slides for Program #2). For the posttest (10 multiple choice questions) they would press the appropriate button to answer the questions (choice 1, 2, 3, 4, or 5). The buttons were appropriately labeled. Subjects were also informed that if they missed any questions they would be asked to reread the selection and answer the questions again.

The experimenter sat behind a screen out of view of the subjects and recorded the time the subjects spent on each slide. A digital stop watch which was activated by presentation of the stimulus and stopped by subject's response was used to measure the time each subject spent on each slide. These times were then later accumulated to give total time spent in reading.

After reading the selection twice each subject was informed how he performed on the posttest, then told he had finished the experiment and could leave.

CHAPTER III

RESULTS

The means and standard deviations for trait anxiety, test anxiety, reading rate, reading vocabulary plus comprehension, reading time, and performance are recorded in Table 1. For Program #1 the STAI mean was 38.2 with a standard deviation of 11.7. The Anxiety Questionnaire had a mean of 27.5 with a standard deviation of 6.8. Reading rate mean was 11.6 with a standard deviation of 2.8. The mean for reading (v+c) was 13.7 with a standard deviation of 1.5. For Program #2 the STAI mean was 40.9 with a standard deviation of 10.9. The Anxiety Questionnaire had a mean of 28.7 with a standard deviation of 6.8. Reading rate mean was 8.2 with a standard deviation of 2.5. Reading (v+c) mean was 12.4 with a standard deviation of 2.5.

A Pearson Product Moment (r) was computed between the anxiety measures, trait and test; the reading measures, (v+c) and rate; the times spent in learning, time $_1$ and time $_2$; and the subsequent performance, performance $_1$ and performance $_2$.

Table 2 shows the resultant correlations for Program #1. The significance test performed on the correlations indicate that the correlation between time $_2$ and

performance $_2$ were significant ($p < .05$, 27df). Also the correlations between time $_1$, time $_2$, and reading (v+c) were significant ($p < .05$, 27df). This relationship was negative - the higher the reading (v+c) score the less time the student spent in reading the material. Reading rate correlated significantly with time $_2$ ($p < .05$, 27df), but not with time $_1$. Reading rate also correlated significantly with performance $_1$ and performance $_2$ ($p < .05$, 27df). These were again negative relationships - the higher the reading rate the less time spent and lower the performance.

Reading (v+c) correlated with performance $_1$ was significant ($p < .05$, 27df), but reading (v+c) correlated with performance $_2$ was not significant. Reading (v+c) also correlated significantly with reading rate ($p < .01$, 27df). Correlating trait anxiety with test anxiety proved to be highly significant ($p < .005$, 27df). Trait anxiety also correlated significantly with reading rate ($p < .01$, 27df).

Correlations between trait anxiety, time spent, and subsequent performance proved not to be significant. Also correlations between test anxiety, time spent, and subsequent performance were found to be non-significant.

Table 3 shows the resultant correlations for Program #2. Reading (v+c) correlated significantly both with time $_1$ and time $_2$ ($p < .05$, 21df and $p < .005$, 21df). This relationship was negative - the higher the reading (v+c) score the less time the student spent in reading.

Reading (v+c) also correlated significantly with performance $_1$ and performance $_2$ ($p < .005$, 21df).

There were no other correlations that were significant. Reading rate did not correlate significantly with time nor performance. Both trait and test anxiety did not correlate significantly with either time or performance.

Table 1

Mean and Standard Deviation

of Anxiety, Reading, Time and Performance

Group	Tr_a	Ts_a	R_r	R_{v+c}	T_1	T_2	P_1	P_2
Program #1								
Mean	38.2	27.5	11.6	13.7	12.0	11.1	5.6	6.3
S.D.	11.7	6.8	2.8	1.5	3.6	4.3	1.7	1.9
Program #2								
Mean	40.9	28.7	8.2	12.4	8.8	7.7	6.4	7.6
S.D.	10.9	6.8	2.5	2.5	1.2	1.5	2.2	2.5

Table 2

Correlation Matrix

Program #1

	T_1	T_2	P_1	P_2	Tr_a	Ts_a	R_r	R_{v+c}
Time 1	—	—	-.182	—	.056	.180	-.240	-.343*
Time 2	—	—	—	.319*	-.061	.159	-.348*	-.360*
Performance 1	—	—	—	—	-.230	.014	-.363*	.336*
Performance 2	—	—	—	—	.095	.030	-.335*	.117
Trait Anxiety	—	—	—	—	—	.640***	-.467**	-.170
Test Anxiety	—	—	—	—	—	—	-.284	-.208
Reading Rate	—	—	—	—	—	—	—	.465**
Reading (V+C)	—	—	—	—	—	—	—	—

*$p < .05$

**$p < .01$

***$p < .005$

Table 3

Correlation Matrix

Program #2

	T_1	T_2	P_1	P_2	Tr_a	Ts_a	R_r	R_{v+c}
Time 1	—	—	-.091	—	.041	.240	-.033	-.387*
Time 2	—	—	—	-.199	-.198	.120	-.163	-.603**
Performance 1	—	—	—	—	-.044	-.049	-.047	.667**
Performance 2	—	—	—	—	.098	-.071	-.052	.601**
Trait Anxiety	—	—	—	—	—	.285	.101	.056
Test Anxiety	—	—	—	—	—	—	-.318	-.318
Reading Rate	—	—	—	—	—	—	—	.297
Reading (V+C)		—	—	—	—	—	—	—

*$p < .05$

**$p < .005$

CHAPTER IV

DISCUSSION

The statistical results of the present study suggest that there is a relationship between reading, vocabulary plus comprehension, scores and time spent in a learning situation. This relationship was negative - the higher the reading (v+c) score the less time a student spent reading. This relationship held for both programs. The relationship between reading rate and time was found significant only in one instance (Program #1, time $_2$) which indicates that reading (v+c) rather than reading rate is a better determinant of the time a student spends in reading. In planning for the amount of time that should be allocated, reading (v+c) then should be looked at rather than reading rate.

The correlations between reading rate and performance resulted in some conflicting findings. In Program #1 reading rate correlated significantly with time $_2$ and with performance. This relationship was negative - the faster the student read the lower his performance. Also, the faster the student read the less time he spent. It would seem to logically follow then that performance and time should be significantly correlated. This indeed was the case for performance $_2$ and time $_2$ - the longer the student

spent in reading the better the performance. This, however, was not the case for time $_1$ and performance $_1$. These conflicting results could lead to two conclusions: a) the significant correlation is in fact not significant due to a Type II beta, error; or b) after being told that he has failed the student uses his time more wisely; therefore, the correlation between time $_2$ and performance $_2$ would be significant. This relationship, significant correlation between reading rate and time, was not found in Program #2. Given the marginal significance in Program #1 and the lack of significance in Program #2, the writer tends to favor the possibility of a Type II error in accepting the significance of the correlation between time $_2$ and performance $_2$ in Program #1.

Reading (v+c) correlated significantly with performance $_1$ in Program #1, but not with performance $_2$. In Program #2, however, reading (v+c) correlated highly significantly ($p < .05$) with both performance $_1$ and performance $_2$. Yet there was no significant correlation between performance and time which seems would be indicated by the above findings. The correlation between reading rate and reading (v+c) was found to be significant in Program #1, but this was not confirmed in Program #2.

In addition to reading ability, the trait and test anxiety of the student may determine to some extent how much time the student should be given. Test and trait

anxiety correlated very significantly for Program #1 ($p < .005$), but no significant correlation was observed for Program #2. Trait anxiety also correlated significantly with reading rate in Program #1. This relationship was negative - the higher the trait anxiety the slower the reading rate. No conclusions can be drawn from this finding since there were no significant correlations between trait anxiety and time. Also this relationship was not found in Program #2.

In conclusion, long term characteristics of the student which would be useful for the teacher in planning instruction are reading (v+c) and to some extent reading rate. The relationship between trait anxiety and test anxiety and time proved to be inconclusive. Further investigation of these variables may yield data which could be helpful in planning instruction.

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