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ABSTRACT

Eighty-eight first graders (53 boys and 35 girls) were observed to determine whether attentiveness (visual orienting behavior, or direction of gaze) was related to reading achievement prior to the effects of long-term success-failure school experiences and whether the expected superior reading achievement of girls was related to observed attentiveness in the classroom. An observer was assigned to each of the four classrooms to record the attentional behaviors of the pupils during the reading hour; 15 visits were made over the course of a month. Positive attentiveness included task relevant behaviors, whereas non-task orienting behavior was scored negatively. Results indicated that girls were significantly more attentive than boys and achieved higher word recognition scores. Word recognition was found to be significantly related to attentiveness for the group as a whole, with reading readiness controlled in a covariance analysis. It was concluded that overt, task relevant, orienting behavior was related to scholastic achievement and was acquired in beginning reading, before a long history of academic success-failure had been established. (Author/HS)

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ATTENTION AND READING ACHIEVEMENT IN FIRST GRADE BOYS AND GIRLS[1]

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15. D. Krus & W. Bart. An ordering-theoretic method of multidimensional scaling of items. Research Report #33. March 1972.

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Department of Health, Education and Welfare
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Attention and Reading Achievement in First Grade Boys and Girls

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Abstract

A behavior observation schedule was utilized to investigate sex differences in classroom attentiveness, and the relationship of such attentiveness to reading achievement among first-grade children, 74 boys and 58 girls. Girls were found to be significantly ($p < .01$) more attentive than boys, and to achieve higher word recognition scores ($p < .05$). Further, word recognition was found to be significantly ($p < .01$) related to attentiveness for the group as a whole, with reading readiness controlled in a covariance analysis. This latter finding replicates previous results with fourth and sixth grade pupils, but demonstrates that the relationship obtains with beginning readers, before a history of academic success - failure has been established.

ATTENTION AND READING ACHIEVEMENT IN FIRST GRADE BOYS AND GIRLS[1]

James E. Turnure and S. Jay Samuels
University of Minnesota

The purpose of this study was to determine whether there are sex differences in classroom attentiveness, and to determine if attention [i.e., visual orienting behavior, or direction of gaze (Turnure, 1970; 1971)] is related to reading achievement.

Numerous studies in reading have reported that, in naturalistic classroom settings, reading achievement of girls is superior to boys (Dykstra, 1967; Gates, 1961). However, in the laboratory, where attentional behavior of the subject is more easily controlled, sex differences in reading-analogous paired-associate learning are not found (Jeffrey & Samuels, 1967; Peterson, 1972). There have been some demonstrations that the performance of boys is superior to girls on a reading type task under certain classroom conditions (McNeil, 1964); in this latter study, orienting behavior was controlled through placing students in cubicles and utilizing headphones for audio input.

When asked why students succeed in a particular subject matter, teachers tend to attribute success to teacher-controlled variables such as methodology. On the other hand, academic failure is generally explained by reference to intra-student variables, such as lack of intelligence, readiness, motivation, or attention (Baldwin, Johnson & Wiley, 1970).

A recent study by Lahaderne (1968) reported that school achievement at grade six was related to attention. A similar finding was reported by Cobb (1972) for fourth grade pupils. However, when measurements come this late in the child's academic career, one cannot be sure if inattentiveness may not represent avoidance behavior resulting from academic failure (i.e., lack of school success may lead to inattentiveness rather than the reverse, since lack of reinforcement in school settings generally leads to extinction of task relevant behaviors).

By replicating Lahaderne's study in grade one, we hoped to determine whether attentiveness was related to academic achievement (i.e., reading) prior to the effects of long-term success-failure school experiences. In addition, the study was designed to determine if the expected superior reading achievement of girls was related to observed attentiveness in the classroom.

Method

Subjects

Eighty-eight first graders, 53 boys and 35 girls, were observed. The subjects were obtained from four classrooms in two middle-class schools in the Minneapolis school system. The teachers in these schools used traditional three group reading methods and basal reader materials.

Procedure

An observer was assigned to each of the four classrooms to record the attentional behaviors of the pupils during the reading

hour. Attention was defined and measured in a manner similar to that reported by Lahuderne (1968). Task relevant behaviors (i.e., eyes oriented to text or teacher, working on reading follow-up exercises, observing chalkboard or overhead projection, or otherwise following the instructional directions of the teacher) were scored as positive instances of attentiveness. Negative attentiveness consisted of non-task orienting behavior, such as: failure to follow instructional directions, closed eyes, working or playing with non-assigned materials, etc.

Attentive and inattentive behaviors were recorded on a scoring sheet that listed the children's names according to their reading groups. Each child was observed in sequence in accordance with his listing on the scoring sheet. A six second scoring method was used. A child was observed for four seconds, and in the next two seconds a plus (+) or minus (-) was entered on the scoring sheet representing the observer's judgment of task attentiveness or inattentiveness, respectively. Question marks signified ambiguous instances where it was uncertain to the observer whether or not the pupil was attentive. It was possible to record 600 observations during each reading hour. Observers made fifteen visits to each classroom over the course of a month. The attentional data used for analysis was a proportion score comprised of the number of positive instances divided by the total number of both positive and negative instances; question marks were excluded.

Reliability.

A video tape was made of first grade children grouped around a table doing reading follow-up work. A 15 minute segment of the film was selected for training purposes, and a two minute segment not previously exposed was retained for the test of inter-rater reliability.

Using the six-second scoring method described earlier, observer reliability was calculated by dividing the total number of agreements by the total number of recorded behaviors. This resulted in a reliability of 89%, which is similar to that reported by Cobb (1972; 83%) and Lahaderne (1968; 83%-100%).

Reading Achievement Measure.

Reading achievement was measured by presenting 45 words, randomly selected from the Dolch list of basic sight-words, for recognition. Each of these words was typed onto a 3"x 5" card, with a primary typewriter. The words were presented individually and the student was given up to six seconds to respond. The experimenter recorded all correct responses on a score sheet. No feedback was given on the test.

Data Analysis. Reading readiness scores were available and were used as a covariate in the analysis of word recognition. These readiness scores were also used in analyzing the data by means of partial correlations. Attention scores were placed in four quartiles: Q_1 = .68 and below; Q_2 = .69 - .80; Q_3 = .81; Q_4 = .88 and above.

A subject, for example, was placed in quartile Q_1 if he was attentive 68% of the time or less. Attention and sex served as the two independent variables in the ANCOVA of word recognition scores.

Results

Sex differences in reading readiness & attention. The mean reading readiness score for the boys was 67.43 (SD = 18.14) and the mean for the girls was 64.34 (SD = 27.18). Comparing these two means by t-tests indicated that the difference was not significant ($t < 1$, df = 86, NS).

Comparing the two sexes on attention indicated that the mean attention score for the boys was .76 (SD = .13) and the mean for the girls was .84 (SD = .10). This difference in attention was significant in favor of girls ($t = 3.08$, df = 86, $P < .01$).

Attention & reading achievement. Table one shows the mean word recognition scores for each of the attention categories and for the two sexes. Inspection of the table indicates that as attention increases, there is a corresponding increase in word recognition. Also, the females have a higher recognition score in comparison to males. A Sex X Attention ANCOVA of these scores, using reading readiness as the covariate, found the following: a significant main effect for attention ($F = 8.46$, df = 3,79, $P < .001$); and a significant main effect for sex ($F = 3.96$, df = 1,79, $P < .05$). The Sex X Attention interaction was not significant ($F<1$).

Newman - Keuls tests were computed to determine which of the word recognition scores were significantly different from each other for

each of the four attention categories. The following was found: All comparisons were significantly different from each other at the $P < .05$ level or better, with the exception of Q_2 and Q_3.

In order to facilitate comparability from the present study to the reports of Lahaderne (1968) and Cobb (1972), correlations between attention and word recognition were computed. A Pearson product-moment correlation of .44 was computed, which is significant at the $p < .01$ level. This correlation is close to the value found between attention and reading achievement by Cobb ($r = .45$) for the fourth grade and by Lahaderne ($r = .51$ to $.39$) for sixth graders. The partial correlation in this study, conducted between the variables of attention and word recognition and controlling for reading readiness, was .44.

Discussion

In this study, it was found that girls were significantly superior to boys in word recognition, as had been previously reported, and significantly superior in classroom attentiveness as well. We also found that increasing degrees of attention were related to superior word recognition. Thus, like Lahaderne, and more recently Cobb and Hops, we too found that overt, task relevant, orienting behavior was related to scholastic achievement; furthermore, this relationship was obtained in beginning reading, before a long history of academic failure had been established.

Environmental factors have an important effect on children's scholastic achievement. In Germany, where male teachers predominate, boys were found to be superior in reading achievement (Preston, 1962).

McNeil (1964) reported that in a reading-type task, boys learned more than girls when the learning situation was designed to approximate a mechanical manipulative activity, but there was a reversal in achievement when these children were taught reading in the classroom by women. Sex differences in verbal learning are not found in laboratory studies where attention is carefully controlled.

The educational implications of the present study, as well as those reported by Lahaderne (1968) and Cobb (1972), are that high and low reading achievement as well as sex differences appear to be related to attention. Behavior modification literature indicates that orienting behavior can be controlled by the teacher (Packard, 1970; Walker & Buckley, 1968), and that such control of attention can be conducive to higher academic achievement (Cobb & Hops, in press). Since the time of James (1890), psychologists have believed that attention is the sine qua non for learning. It should be pointed out to teachers that both high and low achievement appear to be related to attention. Instructional success clearly requires that teachers secure and maintain the attention of all their pupils. In light of the finding that teachers tend to attribute academic failure to intra-student variables, the viewpoint expressed by Goldiamond and Dyrud seems appropriate: "The performance of the student may be to a considerable extent a function of the procedures used to establish that behavior; we should look to deficits in our own procedures before ascribing deficits to the students or difficulty to the problem " (1966, p. 99).

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Footnote

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TABLE 1

Mean word recognition scores and standard deviations for attention categories and sex.

	Attention Category				Sex	
	Q_1	Q_2	Q_3	Q_4	Male	Female
$\bar{x}$ WORD RECOGNITION	16.18	25.05	26.83	33.87	22.68	30.03
SD	13.04	10.24	13.38	13.49	13.74	13.68

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