Selective Attention and Locus of Control in Learning Disabled and Normal Children

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A growing body of literature clearly shows typical LD children have trouble directing their attention to the central features of an externally-provided task. Further, LD children perceive the consequences surrounding their behavior to be more externally-controlled than does the average learner. This inactive, externally-controlled learning style is well documented. Further research needs now to isolate the subgroups which may exist within the broader characterization and examine the effectiveness of remedial techniques with the various subgroups. — G.M.S.

A group of learning disabled (28) and a matched normal group (28) of teenagers were studied in order to examine variables associated with motivation and learning. Hagen's central-incidental learning task, a test of selective attention, the Intellectual Achievement Responsibility Questionnaire (IAR), and the Nowicki-Strickland Scale (N-S) locus of control measures were administered to the subjects. A deficiency in selective attention differentiated the LD subjects from their normal peers. Results support previous research while expanding the use of the selective attention measure from an individual to a group procedure. Nonsignificant correlations between the IAR and N-S verified the separate orientations of the two instruments while demonstrating the overall external beliefs of LD subjects. An unexpected finding is that internal locus of control and selective attention were negatively related within the normal group.

Internal-external locus of control and selective attention are two variables associated with motivation and learning. Research has shown these factors to be relevant in determining the

way an individual behaves in a given situation. A high external locus of control and the inability to attend are often associated with failure.

LOCUS OF CONTROL

Rotter, Seeman, and Leverant (1962) define persons possessing an internal locus of control as believing that what has happened, is happening, or will happen is related to what they themselves have done, are doing, or will do. Internal persons believe that good things happen to them because they worked hard and skillfully to make them happen. They are also responsible for undesirable events because they either did not try hard enough, or were not skillful enough in their efforts. On the other hand, the persons with an external control of reinforcement believe that what happens to them is unrelated to what they do. Positive and negative events happen because of luck, fate, involvement of other persons, or as "just one of those things."

Internal control has been shown to be: (1) more characteristic of persons who have experienced frequent success (Bialer 1961), (2) more likely to occur among middle-class than lower-class persons (Battle & Rotter 1963, Lefcourt & Ladwig 1965), (3) positively related to intellectual striving and expectancy of success (Crandall, Katkovsky, & Preston 1962), and (4) positively related to children's academic performance (McGhee 1968, Shaw & Uhl 1971).

The task frequently used in research to determine selective attention was devised by Hagen (1967) and includes the components of central and incidental recall. Cards illustrating animals and household items are presented to the child in a series. The subject is instructed to remember the serial position of the animals only. The number of correct trials in which the child can name the position of the covered animals constitutes central recall performance. Subsequently, the subject is asked to match the animals with the household items each had appeared with. The correct number of pairings is termed incidental recall in that the child had not been originally instructed to pay attention to these pairings; in fact, he had been told to pay attention only to the animals.

Research on the selective attention variable has shown that: (1) attention of normal children to central information increases developmentally (Druker & Hagen 1969, Hagen 1967, Hagen & Sabo 1967, Hallahan, Kauffman, & Ball 1974, Maccoby & Hagen 1965), (2) between the ages of 12 and 13 years central attention continues to increase while incidental attention declines, and (3) learning disabled (LD) students are deficient in selective attention efficiency. Selective attention has been defined as the relatively better recall of central compared to incidental recall. A measure that has been frequently used to express this relationship is the proportion of central correct minus the proportion of incidental correct (Hallahan 1975, Hallahan, Kauffman, & Ball 1973, Hallahan, Tarver, Kauffman, & Graybeal, in press, Tarver, Hallahan, Kauffman, & Ball 1976).

OBJECTIVES AND SUBJECTS

The general objectives of the present study were to: (1) compare LD and normal students with respect to differences in selective attention and locus of control (IE), (2) test the feasibility of group measurement of selective attention, (3) determine whether selective attention and locus of control are related, and (4) compare two measures of locus of control. Specifically, the purpose was to investigate whether the Intellectual Achievement Responsibility Questionnaire (IAR) (Crandall, Katkovsky, & Crandall 1965), which is oriented to academic situations, would discriminate LDs from normals more readily than would the Nowicki-Strickland Scale (N-S) (Nowicki & Strickland 1973), which is oriented to general situations.

Twenty-eight junior high students identified as LD and receiving special services were selected for study from a southwest Virginia city school system. The children were in the average range of ability, as measured by the WISC, and

Table I. Mean and SD: IQ, MA, and CA.

	LD subjects	Normal subjects
Mean IQ	90.11	96.00
SD	10.97	9.43
Mean MA (yrs.)	12.87	13.41
SD	1.64	1.24
Mean CA (yrs.)	14.29	13.97
SD	1.19	1.01

were achieving two years or more below grade or chronological age level, or both.

The LD students were matched with 28 normal subjects attending the same schools on the criteria of sex, race, chronological age, grade level, and, as closely as possible, mental age as measured by the WISC and Short Test of Educational Achievement (STEA) scores on the SRA achievement printout. The STEA scores are used by the school system as indicators of student ability and are correlated with achievement test scores. Each group contained 24 boys and 4 girls, 9 blacks and 19 whites, and 15 seventh graders, 8 eighth graders, and 5 tenth graders. Pertinent statistics can be found in Table I.

The reading achievement of the LD group was 2.64 years (range 1.24 to 5.62 years) below expected grade level. The difference between reading achievement and reading expectancy was computed by taking each child's grade level score on a standardized reading test and subtracting it from his expected reading grade level. The expected reading grade level was defined as the mental age less 5.0 years.

PROCEDURE

Two group tests, IAR assessing a child's beliefs in reinforcement control in academic achievement situations and the N-S assessing a child's beliefs in reinforcement control in generalized situations, were administered before the attention task.

Selective attention was determined by a modified version of Hagen's task (1967) specifically adapted for a group testing procedure. The materials consisted of 18 (11-by-28-inch) posters containing seven paired household and animal line drawings (lamp-cat, TV-camel, cup-bird, chair-horse, book-monkey, clock-deer, table-dog) in random positions. Each poster was presented to a group of four to six subjects for a period of 12 seconds. Before the testing situation, the experimenter said:

> We are now going to work on a memory task to see how well you can remember what you see. On your desk is a booklet with seven paired boxes drawn on each page. I am going to show you a poster with seven paired pictures on the poster. (Demonstrate with practice poster.) I want you to remember the order in which you see the animals on the poster. Remember to pay attention only to the animals. Then, I will turn the poster over and show you a card with the picture of one of the animals. In your booklet starting on page one you will mark an X on the box in which you remember seeing the animal. Let's do several for practice.

After four practice posters were presented, 14 experimental trials were administered. The proportion of correct responses constituted a child's central recall score (%C). The incidental recall task was administered immediately following the central recall phase. The last page of the subject's booklet contained seven paired boxes with animals drawn across the bottom halves. Seven individual cards containing the household items were presented to the group. The subjects were asked to match the pictures of household items with those of animals (as they were paired on the posters) by writing in the name of the household item in the box over the animal. The proportion of correct pairings constituted a child's incidental recall score (%I).

RESULTS

The mean proportion of IAR internal responses was .65 (SD = .12) for the LDs and .75 (SD = .10) for the normals. The mean proportion of N-S

Table II. Proportion of recall responses on Hagen's task.

	Central Recall		Incidental Recall	
	LD	Normal	LD	Normal
Mean	.50	.72	.23	.18
SD	.15	.16	.21	.13
t	-5.16		.95	
Two-tailed probability	.001		.34	

Table III. Correlations (Pearson r) among %C, %I, %C-%I, IAR, N-S for LD subjects (N = 28) and normal subjects (N = 28).

LD Subjects

Variable	%C	%I	%C-%I	IAR	N-S
%C	1.00	.18	.47*	-.06	.16
%I		1.00	-.77*	-.03	-.15
%C-%I			1.00	.00	.24
IAR				1.00	-.09
N-S					1.00

Normal Subjects

Variable	%C	%I	%C-%I	IAR	N-S
%C	1.00	.07	.73*	-.55*	-.02
%I		1.00	-.61*	.05	.00
%C-%I			1.00	-.48*	-.02
IAR				1.00	.32
N-S					1.00

*$p<.01$

internal responses was .57 (SD = .09) for the LDs and .67 (SD = .09) for the normals. LD subjects differed significantly from normals on both locus of control measures (for the IAR, $t(54) = 3.20, p < .002$; for the N-S, $t(54) = 4.20, p < .001$) showing a greater degree of external control in both academic and generalized situations for the normals.

With respect to the selective attention variable, Table II shows that central recall for normal subjects was significantly greater than that of the learning disabled group ($t(54) = -5.16$, $p < .001$). Incidental recall for LD youngsters did not differ significantly from normal controls ($t(54) = .95, p < .345$). In addition, the proportion of central recall minus incidental recall (%C-%I) was significantly greater for normals than LD subjects ($t(54) = -4.32, p < .001$). These results are in agreement with the Hallahan (1975), Hallahan et al. (1973), and Tarver et al. (1976) experiments and indicate that LD students are deficient in selective attention on a group-administered central-incidental task as well as on an individually-administered one.

Table III shows Pearson correlations on relationships among %C, %I, %C-%I, IAR internal responses, and N-S internal responses for LD and normal subjects. Three interesting findings the correlations revealed were that: (1) There was no relationship between the two locus of control measures for either the LDs or the normals, (2) there was a significant, negative correlation between central recall and internal responses on the IAR for normal subjects ($r(26) = -.55, p < .01$), and (3) there was a significant, negative correlation between %C-%I and internal responses on the IAR for normal children ($r(26) = -.48, p < .01$).

DISCUSSION

LD children were significantly different from normals on the locus of control variable. They exhibited a greater degree of external control than normal subjects on both the academic (IAR) and nonacademic oriented (N-S) measurements. This result is in agreement with previous studies (Bialer 1961, Shaw & Uhl 1971) which indicated a relationship between underachievement (or failure) and external control.

A deficiency in selective attention for LD subjects, defined as having at least a reading disability in addition to other possible achievement deficits, replicated the results of the

Hallahan (1975), Hallahan et al. (1973), and Tarver et al. (1976) experiments using similar populations. As hypothesized, LD subjects showed significantly lower ability to recall central information than normal subjects. However, the groups did not differ significantly on incidental recall. With regard to the measure of selective attention efficiency (%C–%I), the normals were significantly better than the LD children. These results on the central-incidental task replicating previous studies support the feasibility of group testing of central-incidental learning.

The study failed to detect any significant discrepancy in test results between the IAR and N-S measures. Both measures differentiated significantly between normals and LD subjects. The results on the academically oriented IAR test did not differ significantly from the N-S instrument which is more general in content. The fact that the correlations between the IAR and N-S were not significant indicates, however, that the two instruments are in fact measuring different aspects of locus of control. Thus, the results suggest that the LD child's external locus of control pervades a broad range of beliefs rather than being specific to academic situations.

A surprising finding is that for the normals there was a significantly negative relationship between internal responses on the IAR and central recall (-.55) and the IAR and %C–%I (-.48). Since internality and selective attention were both better in the normal group as compared to the LD subjects, it would be expected that if these two variables were related at all, they would be related positively. A possible explanation for this occurrence with the IAR measure is that for the normal child the selective attention task, and more indirectly, the IAR both measure the child's ability to follow directions. In the case of the IAR, for example, normal children who believe they are externally controlled may have assumed a general response style of doing what they are told in order to cope with what they believe are forces outside their control. On the selective attention task, therefore, they would tend to follow the experimenter's instructions explicitly, i.e., pay attention *only* to the animals. On the other hand, LD children who are externally controlled may not have learned to adopt such an adaptive strategy.

In terms of educational implications, this study further supports the growing literature regarding the inability of some LD children to attend to the task at hand. Other studies have demonstrated that this inability to attend selectively can be largely overcome by the use of verbal rehearsal strategies (Tarver et al. 1976) and reinforcement (Hallahan et al. in press). In this latter study, it was shown that LD children do not need to be instructed directly in verbal rehearsal techniques, but providing them with reinforcement influenced them to use verbal rehearsal. The results of the present study are in accord with these studies in that they indicate that the learning disabled child is inefficient in using problem-solving strategies. Although it is impossible from the present study to determine whether a learning disability causes an external locus of control or vice versa, the teacher should be aware of the probability that the learning disabled child's external view of the world may hinder him from actively seeking appropriate learning strategies such as verbal rehearsal.

Finally, we should point out that the combined results of our studies on selective attention, the present one included, support the position of the learning disabled child as an inactive learner (Torgesen 1977). It may prove beneficial for teachers to use techniques such as reinforcement, direct teacher instructions, in modeling and self-instructional training (Meichenbaum 1977). A considerable body of literature is accumulating that such approaches can help make learning disabled children become more actively involved in using problem-solving strategies.

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