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ABSTRACT

The effect of same sex and cross sex experimenters on the attentive behaviors and learning of 64 educable mentally retarded children were examined under two conditions: experimenter not present; and experimenter present and providing cues relevant to task mastery. Female Ss were found to perform significantly better with male experimenters than with females, while male Ss performed significantly better with female experimenters than with males. Ss in the experimenter present condition showed slightly, but not significantly, better learning and exhibited significantly greater numbers of nontask orienting responses than Ss in the experimenter not present condition. Reversal trials showed greater glancing and superior reversal learning when experimenters were present and providing relevant cues. Response latency data was included in the description of differential response characteristics of learners and nonlearners in the study. (Author/GW)

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RESEARCH REPORT #31

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OUTERDIRECTEDNESS IN MENTALLY RETARDED CHILDREN AS A FUNCTION OF SEX OF EXPERIMENTER AND SEX OF SUBJECT[1]

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Research, Development and Demonstration
Center in Education of Handicapped Children
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Department of Health, Education and Welfare

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RESEARCH AND DEVELOPMENT CENTER
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The University of Minnesota Research, Development and Demonstration Center in Education of Handicapped Children has been established to concentrate on intervention strategies and materials which develop and improve language and communication skills in young handicapped children.

The long term objective of the Center is to improve the language and communication abilities of handicapped children by means of identification of linguistically and potentially linguistically handicapped children, development and evaluation of intervention strategies with young handicapped children and dissemination of findings and products of benefit to young handicapped children.

Abstract

The effects of same and cross-sex experimenters on the attentive behaviors and learning of 64 educable mentally retarded children were examined in two conditions: Experimenter not present, or Experimenter present and providing cues relevant to task mastery. A significant Sex of E x Sex of S interaction was found in the learning data, with girl subjects performing significantly better with male Es than with females, and with boy subjects showing the reverse pattern. Significantly greater numbers of non-task orienting responses were observed in the Experimenter present condition, and subjects in this condition showed slightly, but not significantly, better learning. Reversal trials similarly showed greater glancing and superior reversal learning with the experimenter present and providing relevent cues. Response latency data added further breadth to the description of differential response characteristics of learners and non-learners in the study. Recommendations for further increasing the precision of future research are offered.

Outerdirectedness in Mentally Retarded Children

As a Function of Sex of Experimenter and Sex of Subject[1]

James E. Turnure and Sharon N. Larsen
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Several studies by Turnure (Turnure, 1970b; Turnure & Larsen, 1971; Turnure & Zigler, 1964) on the distractibility or non-orienting behavior of mentally retarded children have concluded that their non-orienting behavior in a learning situation reflects an information-seeking strategy, and not just a vacuous orienting to a salient extraneous stimulus. Two of Turnure's most recent studies (Turnure, 1970b; Turnure & Larsen 1971) examined the differential glancing of mentally retarded subjects when an adult was present in the learning situation, providing relevant or irrelevant cues as to the correct choice on the task the child is performing. Data from both of the aforementioned studies showed increases in learning and glancing or non-orienting behavior, in general, when the experimenter was present over when he was not. In addition, a trend of increased learning and glancing when the experimenter was giving relevant cues over when he was present but giving irrelevant cues appeared (Turnure, 1970b). These findings provided at least a partial basis for developing an information-seeking explanation of the apparent distractibility of the retarded in the classroom (cf. Turnure, 1970b for additional discussion of the information-seeking hypothesis).

In the earlier of these two investigations (Turnure,1970b) increases in learning in the relevant cue condition corresponded nicely with increases in glancing. The second study (Turnure & Larsen, 1971), undertaken to explore this relationship further, increased the sample size, eliminated the problem of subjects' previous experience with the task, which was present in one study of the previous investigation (Turnure, 1970b, Study II), and also moved from using a population of institutionalized retarded children to a group of educable retarded children in a public school. This latter change resulted in a subject group with MA's comparable to those of the subjects in the first study, but having somewhat higher IQ's and lower CA's. The findings of the second study, while demonstrating the same trends of more glancing and more learning with the adult experimenter present and providing relevant cues, were considerably more complex. Subject sex differences emerged, with the boys showing significant increases in learning in the relevant cue condition, although their glancing did not correspondingly increase. Further, it was the girls, for whom learning varied little across conditions, who showed the greatest percentage of time glancing in the relevant cue condition.

However, it was noted in this study that the large amount of variability among the subjects within conditions, particularly on the glancing measure, virtually prohibited statistical analysis of the mean trends from reaching acceptable levels of statistical significance. Thus, the observations reported above were interpreted as indicating that personality variables along the lines of same and cross-sex emotional dependencies possibly needed to be explicitly controlled in future research (Turnure & Larsen, 1971).

The present study was undertaken in order to explore further the effects of the adult in the learning situation, particularly with regards to possible sex differences in learning and glancing evident in the last study. The experimenters employed in all of Turnure's studies to this point had been male. The large body of literature on social reinforcement (cf. Parke, 1969; Stevenson, 1965, for reviews of this work) suggests that experimenter sex may be an important variable resulting in differential performances of male and female subjects. One of the most consistent findings in the complex and confusing social reinforcement area is the cross-sex effect, whereby boys respond more readily to female attention and approval, while girls respond more readily to male experimenters (cf. Parke, 1969, p. 119; Stevenson, 1965, pp. 101-102). The cross-sex effect has also been reported for boys and girls tested by their parents (Patterson, Littman & Hinsey, 1964) and so appears to be of wide generality. In the most recent of Turnure's studies (Turnure & Larsen, 1971), girls showed great interest in the male experimenter, and exceeded boys on several indices of such interest as indicated by their glancing at him more often or for longer periods in different conditions, although none of these differences was statistically significant, as mentioned above. But it was the boys in the study who showed the hypothesized effects of the different conditions on the learning data, thus complicating any possible interpretations of the overall results of the study which might be based on straightforward applications from the social reinforcement literature. Consequently, in the present investigation the cross-sex interaction was explored empirically, and male and female experimenters tested both male and female subjects in two experimental treatments: experimenter not present and experimenter present, and providing relevant cues. But because of the complex factors described above, no firm hypotheses were developed nor predictions made concerning possible data outcomes.

Method

Subjects and design

Sixty-four children (32 boys, 32 girls) were selected from a population of educable mentally retarded public school children. Subjects were assigned randomly to one of the two treatments and to either a male or female experimenter. (Two male and two female experimenters were employed to control for possible individual experimenter differences; in addition, one male and one female experimenter were inexperienced experimenters.) Equal numbers of boys and girls were assigned to each treatment and each experimenter, resulting in eight subjects of each sex being tested by each experimenter sex (combining across the two male and the two female experimenters), and thus 16 subjects of each sex were tested in each experimental treatment. The mean CA's, MA's and IQ's by sex for the two experimental treatments are presented in Table 1. A Subject sex x Condition analysis of variance of means was performed for all three variables and no significant differences emerged in

Table 1

Mean CA's, MA's, in months, and IQ's and

their Standard Deviations

Subjects		CA Not In	CA Rel.Cue	MA Not In	MA Rel.Cue	IQ Not In	IQ Rel.Cue
Boys	$\bar{X}$	112.9	121.0	72.9	78.3	63.8	64.6
	SD	11.74	11.2	9.8	9.9	7.1	6.8
Girls	$\bar{X}$	123.9	122.2	77.3	79.7	62.4	65.3
	SD	14.6	21.6	14.9	16.9	8.5	8.3

any case. It is important to point out that all of the subjects came from a single public school, devoted exclusively to EMR children. While many of the pupils in the school were assigned there as a function of their residence in the neighborhood, the majority were there due to their inability to profit from the curriculum offered in special classrooms in schools spread across the city. This school is notable for the relatively high proportion of male special education teachers assigned to it (5/14 = 28% male teachers). Unfortunately, it was not possible to select balanced numbers of boys and girls from the classrooms of men and women teachers, whereby to precisely control amount of pre-experimental cross-sex interaction for subjects (cf. Stevenson & Knight, 1962).

Apparatus

The apparatus was similar to that employed by Turnure (1970a, 1970b, 1971). A lightproof booth housed the response recording equipment, the projector which presented the learning problem stimuli, and observers who could closely and unobtrusively observe the subjects through a one-way vision mirror. An 8 x 45 inch base board provided a locus for the 7 1/2 x 11 inch stimulus presentation, response, and reward panel which fitted in just below the one-way window. This panel consisted of three movable plastic windows, designed to trip microswitches when pressed, so that responses were recorded, and feedback for a correct response was dispensed. Feedback was the illumination of a red reward light located above each window.

Stimuli were projected from the rear onto the plastic windows by a Kodak Carousel 800, which allowed for automatic projection of stimuli according to a fixed schedule established by the experimenter (4 second on, with an inter-trial interval of 1 second). A remote control device allowed the experimenter [illegible] the booth to project training stimuli. The six stimuli -- circle, square, triangle, cross, octagon, and  -- appeared as black figures in the illuminated windows.

A twenty-pen Esterline-Angus event recorder was wired to the equipment described above in such a way that there was continuous and simultaneous recording of the correct stimulus window, the subject's response, and the observer's judgment regarding the subject's incidence and duration of glance behavior (recorded during both trial and inter-trial periods). A glance was recorded each time a subject's eyes left the stimulus panel.

Procedure

Each subject was brought from his classroom to the experimental room by his experimenter and seated before the apparatus. The experimenter took a seat to the right and spent a minute checking the child's name, class etc., and then gave instructions and two training trials. During this initial period the experimenter was careful never to look toward the mirror. The instructions were standard and very similar to those used in prior studies (Turnure, 1966, 1970a, 1970b; Turnure & Larsen, 1971).

The task presented the children was an oddity problem as modified by Moon and Harlow (1955). The subject had to select the odd one of three stimuli in order to be reinforced by the red reward

ht. The odd figure appeared in either the right or left stimulus-response window but never in the center, a procedure which has been found to facilitate learning, presumably by reducing relevant response alternatives (cf. Moon & Harlow, 1955; Ellis, Hawkins, Pryer & Jones, 1963). The stimuli were selected randomly for presentation on the left or right according to a Gellerman series, which is designed to control for the possibility of inflated number of correct responses due to fortuitous response preferences by the subject.

Not In Condition: After completion of the instructions and training trials, the experimenter rose and entered the rear of the booth. With the presentation of the first slide, the observer began recording the subject's glances. Each subject was given 60 trials of original learning, and then 18 further trials of reversal learning (cf. Turnure & Larsen, 1971). The task was terminated then and the experimenter returned to the child's side, praised him for his performance, made a few inquiries concerning the game, and returned the child to his classroom.

Relevant Cue Condition: Upon completion of the instructions and training trials, the experimenter did <u>not</u> rise and enter the rear of the booth. Rather, he slid his chair from the side of the subject a foot or two to the rear. The experimenter could then be seen in the mirror, and also directly by a minimal head turn of the subject. The subject was then told that the experimenter was "going to start all the pictures coming," and while the experimenter juggled the remote control switch, the observer switched the projector to automatic advance.

The experimenter sat with his head oriented down toward a clipboard, which held cues as to whether the left or right stimulus window was correct. When each slide came on the experimenter lifted his head sharply, and tilted his head to the left or right and looked at the correct stimulus. This procedure was followed during original learning and reversal. Following the 78 trials, the experimenter praised the child for his performance, made a few inquiries concerning the game and returned the child to his classroom.

Results

Learning data

Means and standard deviations of the number correct for all experimental groups are shown in Table 2. A Sex of E (same sex experimenters were combined in this analysis and all subsequent analyses) x Sex of S x Condition analysis of variance was computed for these data. The only significant finding was for the Sex of E x Sex of S interaction ($F = 4.50$; $df = 1, 56$; $p < .05$). All other F's were < 1. A simple effects analysis was then made in order to determine the source of this interaction, and the results are shown in Table 3. This analysis showed that for the male experimenters, the female subjects obtained significantly more correct responses than did the male subjects (see Figure 1).

A similar analysis of variance was undertaken for the trials to criterion data (criterion = six consecutive correct responses),

Table 2

Means and Standard Deviations of the Number

Correct for All Experimental Groups

Subject Sex		Experimenter Sex: Male		Experimenter Sex: Female	
		Not In	Rel. Cue	Not In	Rel. Cue
Male	$\bar{X}$	28.4	25.1	33.4	32.8
	SD	10.3	15.2	17.6	16.0
Female	$\bar{X}$	38.4	39.6	24.9	32.4
	SD	17.7	13.7	18.3	15.4

Table 3

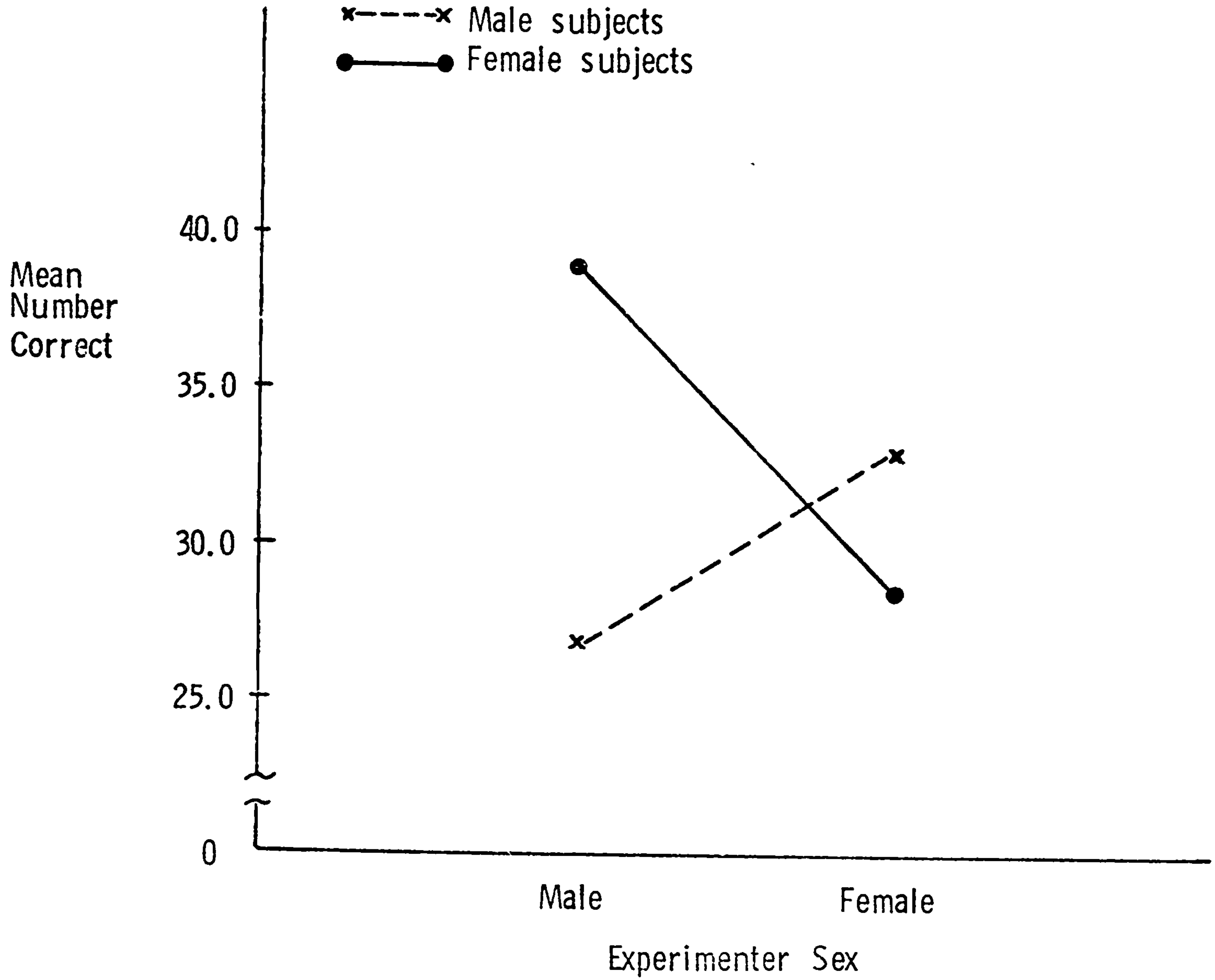
Source Table for Simple Effects Analysis

of Number Correct

Source	SS	df	MS	F	p
Subject Sex for:					
Male experimenters	1200.50	1	1200.50	4.85	.05
Female experimenters	157.53	1	157.53	<1	n.s.
Within cell	13856.59	56	247.44		
Experimenter Sex for:					
Male Subjects	318.78	1	318.78	1.29	n.s.
Female Subjects	861.12	1	861.12	3.48	n.s.
Within call	13856.59	56	247.44		

Figure 1

Mean Number Correct Responses by Male and Female Subjects as a Function of Experimenter Sex



and again the only significant finding was for the Sex of E x Sex of S interaction ($F = 4.44$, $df = 1, 56$; $p<.05$). A simple effects analysis of this interaction indicated, consistent with the above findings, that the female subjects took significantly fewer trials to reach criterion than did the male subjects, for the male experimenters only.

Glance data

Table 4 presents means and standard deviation for total number and time glancing, as well as pre-criterion number and time glancing scores for all groups. A Sex of E x Sex of S x Condition analysis of variance of the total number of glances revealed a significant difference for the condition variable ($F = 4.05$; $df = 1, 56$: $p<.05$), with greater glancing obvious in the Relevant Cue condition, where an experimenter was present during the task. A similar analysis for total time spent glancing, however, revealed no significant differences. As in previous studies (Turnure, 1970a, 1970b, 1971; Turnure & Larsen, 1971) precriterion number and time glance scores were computed. Scores were obtained by dividing the number or time spent glancing to criterion by the number of trials to criterion. Total number and time glancing divided by 60 trials composed the scores for subjects not reaching criterion. Sex of E x Sex of S x Condition analyses of variance of these scores paralleled the findings for total number and time glancing. Only a significant conditions effect was found for the precriterion number glance scores ($F = 5.10$; $df = 1, 56$; $p<.05$); no significant differences

Table 4

Means and Standard Deviations for Total Number and Time Glancing, and Precriterion Number and Time Glancing Scores for all Experimental Groups

	Subject Sex		Experimenter Sex: Male				Experimenter Sex: Female			
			Tot. No.	Tot. Time	Pre-No.	Pre-Time	Tot. No.	Tot. Time	Pre-No.	Pre-Time
Not In	Male	$\bar{X}$	20.3	20.8	.311	.320	16.3	13.3	.209	.184
		SD	13.7	20.8	.233	.363	11.9	9.0	.225	.176
	Female	$\bar{X}$	26.9	26.5	.361	.360	19.1	20.8	.265	.305
		SD	18.6	22.1	.350	.401	11.3	19.3	.203	.340
Relevant Cue	Male	$\bar{X}$	19.6	16.3	.328	.286	29.1	32.0	.414	.416
		SD	12.8	11.8	.279	.267	19.1	29.4	.285	.397
	Female	$\bar{X}$	32.3	25.6	.463	.309	33.0	31.6	.528	.559
		SD	22.2	16.6	.259	.201	11.6	12.9	.218	.298

emerged for precriterion time glance scores.

It might be noted that for both precriterion and total time glancing the only variable to approach significance was the Sex of E x Condition interaction (p's $<.10$ in both cases). Observation of Table 4 suggests that greater amounts of glancing occurred in the Not in condition with male experimenters, but that in the Relevant cue condition, greater glancing occurred when the female experimenters were present. For both precriterion and total time glancing, however, the trend of greater glancing in the Relevant cue condition is clearly present although the differences were not statistically significant as they had been for number of glances.

One further point should be made at this time. Looking again at Table 4, and also at Table 2, it can be seen that the variance about each mean is extremely high. In many cases the standard deviations approach, and in some cases exceed, the value of the mean. Perhaps the most outstanding characteristic of both the learning and glancing data is this wide individual variability, and it seems clear that this great individual variability is a major factor in the failure to find group differences by means of traditional statistical tests.

Total time glancing was converted to percentages by dividing each subject's time glancing by total time available. These percentages are presented in Table 5, and appear to hold the same order of relation as the mean scores for total time glancing, as would be expected. These data are presented in order to show that

Table 5

Percentage of Total and Precriterion Times Spent Glancing

	Experimenter Sex			
	Male		Female	
Subject Sex	Total	Pre-crit.	Total	Pre-crit.
Male Not In	6.9	6.4	4.5	3.7
Rel. Cue	5.5	5.7	10.7	8.3
Female Not In	8.8	7.2	6.9	6.1
Rel. Cue	8.5	6.2	10.5	11.2
Combined Not In	7.9	6.8	5.7	4.9
Rel. Cue	7.0	6.0	10.6	9.8

the subjects in this study were generally similar to those in previous Turnure studies (Turnure, 1970b; Turnure & Larsen, 1971), i.e., they were spending a relatively small percentage of the total time looking about (largest group percentage of time glancing = 10.7). In the present study, collapsing across experimenter and subject sex, it can be seen, as was found in a previous Turnure study (Turnure & Larsen, 1971), that those subjects in the Relevant cue condition spend the greater amount of time glancing; and collapsing across experimenters, that the girls spend the greatest percentage of time looking away from the task. However, when experimenter sex is noted the findings are not so clear. Whereas for the female experimenters the percentage of time glancing by the subjects of both sexes is greater in the Relevant cue condition than in the Not in condition, the opposite is the case with male experimenters, again for both subject sexes.

Pearson product-moment correlations of pre-criterion time and number glance scores with total number correct were computed and are shown in Table 6. From this table it can be seen that the only significant correlations appear in the Not in condition.

Response latency data

The means and standard deviations of response latencies for each group, averaged over the 60 oddity trials, are shown in Table 7. As can be seen from this table overall mean latencies appear very similar for all groups, and a Sex of E x Sex of S x Condition analysis of variance confirmed this. As in previous studies (Turnure,

Table 6

Pearson Product-Moment Correlations of Pre-criterion Number and Time Glance Scores with Total Number Correct

	Pre-criterion Number			Pre-criterion Time		
	r	n	p	r	n	p
Overall						
Not In	-.48	32	.01	-.46	32	.01
Relevant Cue	.13	32	n.s.	.01	32	n.s.
Experimenter Sex						
Not In						
Male	-.60	16	.02	-.59	16	.02
Female	-.48	16	n.s.	-.41	16	n.s.
Relevant Cue						
Male	.16	16	n.s.	-.08	16	n.s.
Female	.08	16	n.s.	.07	16	n.s.
Subject Sex						
Not In						
Male	-.39	16	n.s.	-.34	16	n.s.
Female	-.55	16	.05	-.55	16	.05
Relevant Cue						
Male	.18	16	n.s.	.24	16	n.s.
Female	-.06	16	n.s.	-.36	16	n.s.

Table 7

Overall Mean Response Latencies (Averaged Over 60 Trials) for Each Experimental Condition

	Experimenter Sex			
	Male		Female	
Subject Sex	Not In	Rel. Cue	Not In	Rel. Cue
Male $\bar{X}$	1.5	1.7	1.6	1.6
SD	.3	.5	.6	.4
Female $\bar{X}$	1.7	1.7	1.6	1.5
SD	.5	.3	.6	.5

1971: Turnure & Larsen, 1971) response latencies were further analyzed to show their relation to actual acquisition of the correct response. For these analyses subjects were classified as criterion or non-criterion depending on whether they made six consecutive correct responses. The means and standard deviations of criterion subjects' response latencies, separately for pre- and post-criterion, or through 60 trials for non-criterion subjects in each condition are presented in Table 8.

To determine if separation of response latency scores of criterion subjects into pre- and post-criterion components was justifiable in this study, direct difference *t* tests of these scores were performed within each condition (experimenter and subject sex were collapsed). For both conditions the mean pre-criterion response latency was significantly slower than the post-criterion latency (Not in: $t = 5.83$, $df = 10$, $p < .001$; Relevant cue: $t = 4.09$, $df = 15$, $p < .001$). The differences between pre-criterion response latencies for criterion and non-criterion subjects within each condition were also analyzed by means of simple *t* tests. A highly significant difference was found for the Not in condition ($t = 4.05$; $df = 30$; $p < .001$), but a marginally significant difference was obtained for the Relevant cue condition ($t = 1.91$; $df = 30$; $p < .10$). Simple *t* tests of pre-criterion latencies in the two experimental conditions were then carried out for criterion and non-criterion subjects independently, and the resultant *t*'s were non-significant (Crit *Ss* $t = 1.31$, $df = 25$; Non-crit *Ss* $t = -1.05$, $df = 35$).

Table 8

Pre-criterion Response Latencies for Criterion and Non-criterion Subjects

	Condition			
	Not In		Relevant Cue	
Criterion Ss	pre	post	pre	post
$\bar{X}$	2.8	1.5	2.3	1.3
SD	1.0	.2	.9	.2
n	11	11	16	16
Non-criterion Ss				
$\bar{X}$	1.6	---	1.8	---
SD	.6	---	.5	---
n	21	---	16	---

The relationship between response latencies and learning of the discrimination problem was explored by a series of correlational analyses. Pearson product-moment correlations of the total number of correct responses made by each subject with mean response latencies to criterion (or through 60 trials for non-criterion subjects) were computed. Table 9 presents these correlations for experimental conditions, and by experimenter sex and subject sex within each condition. Similar correlations are also presented for precriterion response latencies with trials to criterion. In both cases, significant correlations are found for both experimental conditions.

The correlations of number correct with pre-criterion response latency and amount of pre-criterion time glancing for each experimental condition were entered into a series of multiple correlations, both with and without age partialled out. This was done in order to determine the merit of combining response latency and pre-criterion glancing into a unitary predictor of learning for these data, as had been done in an earlier study (Turnure & Larsen, 1971). All correlations necessary for computation of these $\underline{R}$'s as well as the $\underline{R}$'s themselves are shown in Table 10. The resultant $\underline{R}$'s indicate that in both conditions combining response latency and glancing into a unitary predictor of learning results in an increased amount of variance accounted for by $\underline{R}$ (Not in: $\underline{R} = .64$, $\underline{R}^2 = 41\%$; Relevant cue: $\underline{R} = .59$, $\underline{R}^2 = 35\%$) over that accounted for by the largest of the individual $\underline{r}$'s (Not in: $\underline{r} = .56$, $\underline{r}^2 = 31\%$; Relevant cue: $\underline{r} = .53$, $\underline{r}^2 = 28\%$).

Table 9

Pearson Product-Moment Correlations of Pre-criterion Response Latencies with Total Number Correct and Trials to Criterion

	Total Number Correct			Trials to Criterion		
	r	n	p	r	n	p
Overall						
Not In	.56	32	.001	-.75	32	.001
Relevant Cue	.53	32	.01	-.58	32	.001
Experimenter Sex						
Not In						
Male	.48	16	n.s.	-.66	16	.01
Female	.65	16	.01	-.86	16	.001
Relevant Cue						
Male	.54	16	.05	-.55	16	.05
Female	.60	16	.02	-.60	16	.02
Subject Sex						
Not In						
Male	.77	16	.001	-.86	16	.001
Female	.38	16	n.s.	-.65	16	.01
Relevant Cue						
Male	.30	16	n.s.	-.45	16	n.s.
Female	.68	16	.01	-.58	16	.02

Table 10

Pearson Product-Moment Correlations of Number Correct, Pre-criterion Response Latencies, Pre-criterion Time Glancing and their Multiple Correlation, With and Without Age Partialled Out, for Each Experimental Condition

1 = Number correct

2 = Pre-criterion response latency

3 = Pre-criterion time glancing

4 = Age

	Not In	Relevant Cue
r_{12}	.56	.53
$r_{12.4}$	.56	.52
r_{13}	-.46	.01
$r_{13.4}$	-.47	.07
r_{23}	-.29	-.42
$r_{23.4}$	-.32	-.35
$R_{1.23}$	.64	.59
$R_{1.23(4)}$	.64	.58

Figure 2 graphs mean response latencies for reversal trials, as well as the pre- and post-criterion means for the preceding 60 oddity trials for both experimental conditions. Means for criterion and non-criterion subjects are shown separately, and condition means including all subjects are also shown. It can be seen that for criterion subjects reversal means are greater than post-criterion means, which dropped considerably from pre-criterion means, but are smaller than pre-criterion means in both conditions. For the not in condition criterion subjects had significantly shorter latencies in reversal (t = 3.52; df = 30; p <.01), as they had been for pre-criterion latencies, than did non-criterion subjects. However, in the relevant cue condition it is the non-criterion subjects who are taking longer on an average to respond. The actual values for this condition are very similar, however, and the difference is not a significant one (t = -1.21, df = 30).

Reversal trials

Table 11 presents the means and standard deviations for learning, glancing and response latencies for each experimental group averaged over the 18 reversal trials. A Sex of E x Sex of S x Condition analysis of variance of the number correct scores was carried out and a significant difference between conditions was found ($\bar{X}$ Not in = 6.5, $\bar{X}$ Relevant cue = 9.3; F = 7.58; df = 1, 56; p <.01). This was the only statistically significant difference found; however, both the Sex of S main effect and the Condition x Sex of S interaction were of marginal significance (p's <.10).

Figure 2

Mean Pre-criterion, Post-criterion and Reversal Response Latencies for Criterion, Non-criterion and All Subjects in Two Conditions

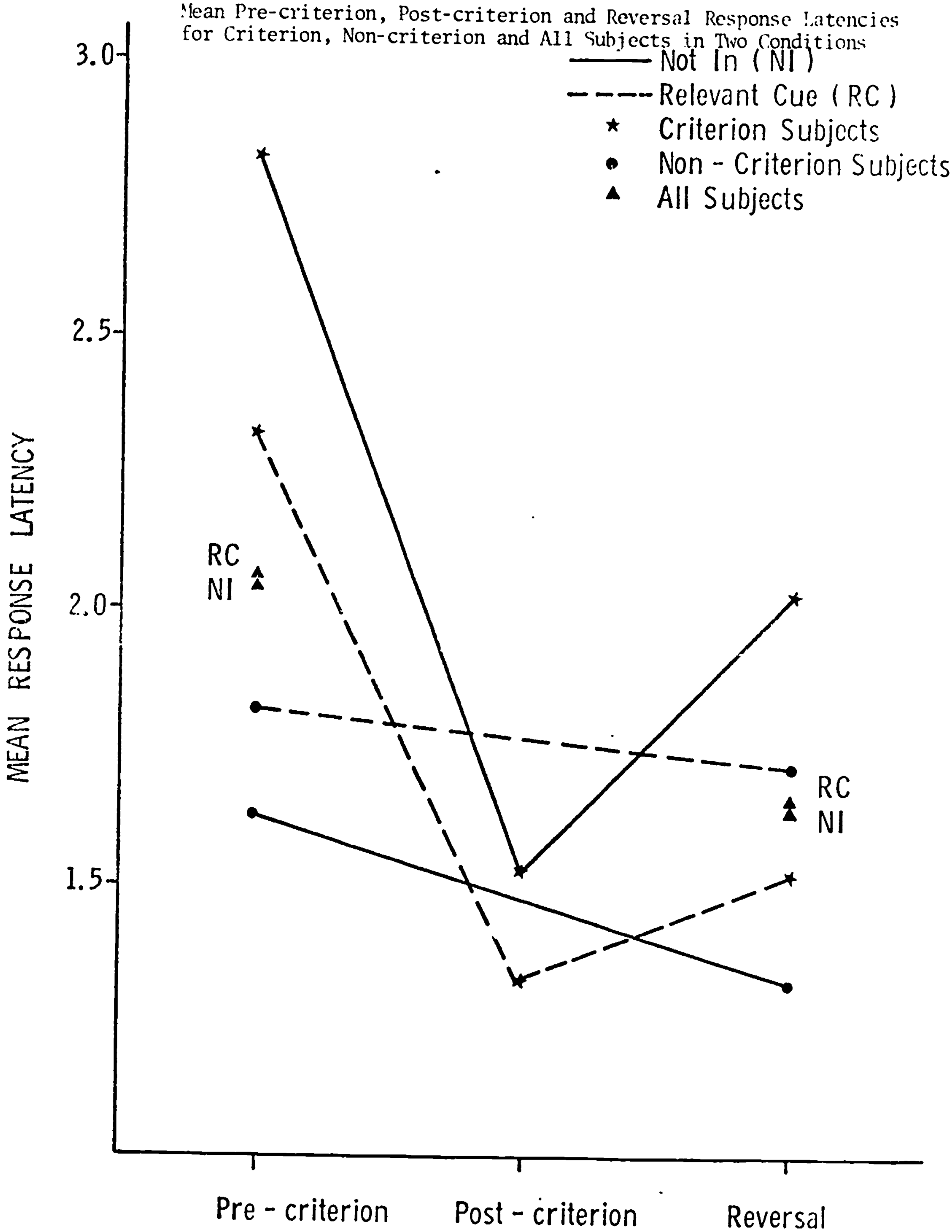


Table 11

Means and Standard Deviations of Learning, Amount of Time Glancing and Response Latencies on Reversal Trials

	Subject Sex		Experimenter Sex: Male			Experimenter Sex: Female		
			Number Correct	Amount time glancing	Response Latencies	Number Correct	Amount time glancing	Response Latencies
Not In	Male	$\overline{X}$	7.13	6.91	1.52	5.75	3.70	1.63
		SD	2.70	7.33	.41	2.25	3.18	.71
	Female	$\overline{X}$	7.25	6.20	1.61	6.00	4.58	1.54
		SD	1.91	6.94	.53	2.62	6.35	.82
Relevant Cue	Male	$\overline{X}$	7.88	5.25	1.59	7.00	6.49	1.61
		SD	5.25	3.81	.53	4.21	4.40	.38
	Female	$\overline{X}$	11.25	7.84	1.75	11.00	6.95	1.45
		SD	5.34	10.58	.49	5.58	3.85	.47

Observation of Table 11 shows that in both conditions and for both experimenter sexes the female subjects had a larger mean number correct than did the male subjects. Further, in the relevant cue condition the subject sex differences were particularly noticable: the female subjects were averaging four more correct responses than the male subjects.

In the reversal trials there continues to be for the most part, greater glancing when the experimenter is present over wher he is not. The one exception is for male subjects with male experimenters (cf. Table 11). This is, however, still somewhat consistent with the 60 oddity trials data in which greater amounts of glancing occurred in the Not in condition for male experimenters. A Sex of E x Sex of S x Condition analysis of variance of the total amount of time glancing in reversal produced no significant differences. Correlations of number correct with total time glancing in reversal were all very small and were not significant for any group or condition (see Table 12).

Discussion

The clearest finding emerging from this investigation was the statistically significant Sex of E x Sex of S interaction, confirming the suggestion made by Turnure and Larsen (1971) that personality dynamics would influence the performance of EMR boys and girls in a standard discrimination learning situation. The pattern of results accruing to the present finding parallels the results typically found with young normal children (cf. Parke, 1969;

Table 12

Correlations of Number Correct with Amount of Time Glancing in Reversal

	r	n	p
Overall			
Not in	.20	32	n.s.
Relevant cue	.22	32	n.s.
Experimenter Sex			
Not in			
Male	.18	16	n.s.
Female	.12	16	n.s.
Relevant cue			
Male	.38	16	n.s.
Female	-.07	16	n.s.
Subject Sex			
Not in			
Male	.32	16	n.s.
Female	.08	16	n.s.
Relevant cue			
Male	.02	16	n.s.
Female	.27	16	n.s.

Stevenson, 1965), with boys responding more favorably when interacting with females, and the reverse for girls. The fact that subjects of both sex were recruited from classrooms having both male and female teachers probably assured this more typical pattern of results, as opposed to the finding of enhancement of learning by boys with a same-sex experimenter in a previous study (Turnure & Larsen, 1971). That study was conducted in neighborhood schools where all the special class teachers were female, and boys assigned to those classes had to cope with a lack of male models, which appeared to pose a distinct threat to them over and above the burden to self esteem they faced due to special class placement per se. The end result of these interpersonal pressures on the educable retarded male subjects was interpreted by Turnure and Larsen (1971) as being equivalent to conditions of same-sex social deprivation (cf. Gewirtz & Baer, 1958; see also, Stevenson & Knights, 1962).

The glancing data again confirmed that the presence of an adult in the learning situation produces significant increments in non-task orienting on the part of educable retarded subjects. Despite this appearance of "distractibility", however, the subjects performing with the experimenter present achieved a slightly higher overall mean number of correct responses (32.5) than did their "non-distracted" controls ($\bar{X}$ = 31.3), presumably through utilizing the relevant cues supplied by the experimenter. The reversal task provided further support for an outerdirectedness explanation of retarded children's extreme reliance on external cues for guidance in problem-solving situations. That is, with an adult present and providing cues directly relevant to the solution of the task, greater glancing and superior reversal learning were observed than when the adult was not present (Turnure & Larsen, 1971) or when the adult was present and providing cues irrelevant to the task solution (Turnure, 1970b; Turnure & Larsen, 1971).

In terms of the percentage of time that subjects were actually non-task oriented, it was again found that subjects were "off- target" only about 10% of the time on the average (see Turnure, 1970b; Turnure & Larsen, 1971). Again one must question the appropriateness of characterizing a type of subject as "distractible" when the behavior indexing the trait is exhibited so minimally. Of course, significantly greater non-task orienting may be found in other circumstances, such as classrooms, which usually contain far greater numbers or amounts of extraneous salient social or physical distractors (but see Cruse, 1961, for evidence that large numbers of physical "distractors" do not always distract retarded subjects.)

The response latency performance measure revealed a number of systematic differences similar to those reported in previous research (Turnure, in preparation; Turnure & Larsen, 1971). Subjects observed to reach a learning criterion indicating mastery of the task were found to have longer latencies than subjects not reaching criterion, and the criterion subjects also had significantly longer latencies during their pre-solution trials than subsequent to criterion. The longer latencies associated with the successful problem solvers efforts at task mastery convey the impression of deliberate consideration of stimulus and stimulus-response-reward relation by these subjects, an impression that is reminiscent of Kagan's dimension of cognitive analycity and reflection which appears to be positively related to positive performance across a range of tasks (cf. Kagan & Kogan, 1970;Kagan, Rosman, Day, Albert & Phillips, 1964). Of course, it would be expected that retarded children, in general, would tend more toward an impulsive tempo, but as Kagan and Kogan (1970) emphasize, there are large individual differences observed in most studies of cognitive style. Furthermore, Witkin, Faterson, Goodenough and Birnbaum (1966) have reported that some mentally retarded subjects are approximately equal to CA peers on the cognitive style variable of field-articulation, which would suggest that more research specifically designed to illuminate the cognitive capabilities of retarded individuals may uncover unanticipated intellectual strengths in the general population of retarded individuals, or, as in the case of the present research, in at least fairly large subgroups of the total, heterogeneous population.

In general, there are a number of findings in the present investigation which replicate as well as systematically extend previous research, with most of these results generally derivable from the outerdirectedness formulation originally proposed by Turnure and Zigler (1964). However, as noted quite recently (Turnure & Larsen, 1971), attempts such as the present one, to systematically interrelate the attentive and learning performances of mentally retarded children to tasks as well as to task relevant or irrelevant behaviors of an adult authority figure, have been characterized by large amounts of variability among subjects on the dependent measures, particularly the glancing measure. Both experimental efficiency and experimenter certitude would undoubtably be enhanced by refining the procedures and the instruments to be utilized in future investigations of retarded children's strategies of problem solving. In particular, more precise assessment of the specific focus of subjects' orienting behaviors (glancing) would appear to be essential for clarifying the interrelationships referred to above.

A recent study by Ruble and Nakamura (1971: cited in Nakamura, 1972) is specifically illustrative of the preceding points. These investigators were interested in applying the concepts and some of the methods of the original Turnure and Zigler (1964) study to the assessment of normal children's predispositions to be <u>socially</u> oriented, <u>task</u> oriented, and self-assured. As Nakamura describes the study,

> "The Ss were 7 to 10 year old children in a largely middle to lower middle class public school in the West Los Angeles area. The study examined how <u>relevant</u> cues given by an E differentially affected performance of task vs. socially oriented children on two game-like tasks. One was an object assembly task (following Turnure & Zigler, 1964) and one a concept identification task [p. 11]."

Nakamura describes the nature of the eye-glancing behavior of his subjects as the finding of most interest:

> "On the Turnure and Zigler task situation in which the S worked on one puzzle while the E worked on another, it was expected that the S who looked away from his own puzzle and at the E working on her puzzle would do more poorly on his task than the S who did not look away. But when the S was next given the puzzle that E had worked on, the S who had looked at E's completed puzzle, which was shown several times, should do better on the second task relative to his performance on the first task; and better than the S who had not looked at E's word. The field-dependent Ss did glance more at the E, as expected, but contrary to expectation, they did not do better on the second task.
>
> On the other hand, in their performance on the concept identification task in which E gave relevant information by looking repeatedly at the correct choice, the field-dependent Ss did better than the field-independent Ss, as expected. This apparent discrepancy with the previous task was resolved by the examination of the glancing behavior of the Ss during the Turnure and Zigler puzzle tasks. Ratings had been obtained on the direction of glancing -- at E or at the task E was working on. The field dependent Ss were glancing predominately at E and not at the puzzle F was working on. Thus, the glancing was not calculated to gain relevant information about the puzzle. In contrast, on the concept identification task the relevant information was available by looking at the E's face and field dependent Ss benefitted from their socially oriented glancing [pp. 11-12]."

The implications from the work of Ruble and Nakamura (1971) appear to be that it may be beneficial to pretest retarded subjects as to their field-dependence or independence as a means of *a priori* operationalizing Turnure and Zigler's outerdirectedness characteristic, and, more importantly, to specify if the subjects are glancing at the experimenter or at the relevant behaviors (cues) he is manifesting, since these turned out to be such a crucial set of observations in the Ruble and Nakamura (1971) study. While no reliabilities were reported by Nakamura (1972) for the observers in the Ruble and Nakamura (1971) study, it is probably safe to assume that their data were reliable, and that observers can make the necessary discrimination between whether a subject is looking at a person (presumably his face) or whether the subject is observing the activities of the person's hands on a task in front of him. In previous research in the present series, reliabilities between independent observers of subjects' eye orientations toward two or three fields of vision have always been at least .89 (Turnure, 1970a, 1970b). Gibson and Pick (1963) report that observers can reliably determine when a person's gaze shifts to less than 2.9° of angular displacement from direct eye-to-eye contact.

While making the necessary observations of subjects' orienting behaviors obviously can be done by on the spot observers, there are further compelling reasons why in future research the subject's performance should be videotaped instead. Besides insuring that the data necessary for analysis will be readily available, they will remain available on videotape for re-scoring if extra or alternate indices are subsequently desired. A wider range of behavioral observations can be made as well, and illuminating observations my well emerge as subject performances are repeatedly scanned. In the context of present research, it would be extremely interesting to videotape subjects' pre-task behavior so as to determine if their orienting behavior on entering the novel experimental situation might not allow *a priori* behavioral classification. That is, when entering the experimental room subjects appear to differ in their reactions -- some orient to the experimenter, some to the task, some vacillate back and forth, others engage in widescale scanning around the whole room, and so forth, It would obviously be difficult for live observers to record all such orienting behavior. A technique devised by Haith (1966) allows for the efficient measurement and recording of sequential behavioral changes such as those just described, which also contributes to the feasability of such research.

Since Turnure and Zigler (196`` originally devised the notion of incorporating the study of retardates' attentive functioning and their learning the outerdirectedness formulation, considerable methodological sophistication and substantive enlightenment has accrued through their own continuing efforts (Achenbach & Zigler, 1968; Sanders, Zigler, & Butterfield, 1968; Turnure, 1966, 1970a, 1970b, 1971; Turnure & Larsen, 1971; Turnure & Zigler, 1964; Yando & Zigler, 1971), as well as the very valuable work of others who have become interested in the implications of that research (Drotar, 1968, 1970; Molloy, 1970; Paschke, Simon & Bell, 1967; Simon & Ditrichs, 1968). Further refinement of these research efforts, and the extension of them to the classroom appears now to depend on implementation of the advanced technology made available to researchers in the recent past.

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Footnote

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