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ABSTRACT

The paper reports on two experiments in Braille learning which compared blind and sighted subjects on the immediate recall of haptically-examined Braille symbols. In the first study, sighted subjects (N=64) haptically examined each of a set of Braille symbols with their preferred or nonpreferred hand and immediately recalled the symbol by drawing it or calling out the number of each dot present. Neither the effect of hand used, response type, nor their interaction were significant. In the second study each of 16 subjects (all of whom were legally blind) examined the symbols with the preferred hand and orally reported the number of each dot present. Comparison with the previous experiment found a high degree of similarity between the two groups in number correct, type of error, and relationship between item difficulty and number of dots. Findings indicate the same processes are operative in this task performance for both blind and sighted persons suggesting that research in perceptual, learning, and memory tasks with sighted subjects may be applicable to the visually impaired. (DB)

Immediate Memory for Haptically-Examined Braille Symbols by Blind and Sighted Subjects

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Results from previous research suggest that (1) the processes involved in paired-associate learning may be the same for blind and for sighted subjects (Jonides, Kahn and Rozin, 1975) and that (2) the processes involved in judging dot numerosity in braille symbols may also be the same for blind and for sighted subjects (Newman, Craig and Hall, 1987). In the research reported here the performance of blind and sighted subjects was compared on a third task, the immediate recall of haptically-examined braille symbols. In the first study, sighted subjects haptically examined each of a set of braille symbols with their preferred or nonpreferred hand and immediately recalled the symbol by drawing it (with pencil on paper) or by calling out the number of each dot that was present (see Figure 1). Neither the effect of hand used, response type, nor their interaction were significant. In the second study each subject (all of whom were legally blind) examined the symbols with the preferred hand and orally reported the number of each dot that was present. The results for these subjects were then compared with those from the first study who had used the preferred hand and had recalled the items orally.

Experiment 1

Previous research (Harris, 1980; Hermelin and O'Connor, 1971; Millar, 1984, Experiment 1; Rudel, Denckla and Spalten, 1974) has shown that under some conditions, performance on tasks in which braille symbols are employed is affected by the hand used in exploring the symbols. Thus, one purpose of this study was to determine whether immediate recall of braille symbols is a function of the hand used in examining the symbols.

In a previous experiment (Newman, Hall and Gupta, 1983, November) using an immediate memory task, subjects drew the symbols they remembered with pencil on paper. Since this procedure did not seem likely to be feasible with the blind subjects who would be serving in our second experiment, we designed a procedure in which for each symbol the subject would respond with the number of each dot that was present.

Thus, a second purpose of this study was to determine whether performance would differ for these two types of responding.

Method

Subjects (N=64) were sighted students enrolled in the introductory psychology course at our university. All were right-handed and had had no previous experience with braille. All subjects were given 10 seconds to examine haptically each of 32 braille symbols and were then given another 10 seconds to report immediately which dots were present. Half of the subjects examined the symbols with the right (preferred) hand and the rest with the left (nonpreferred) hand. Half of the subjects in each of these groups drew the symbol (with pencil on paper) in a 2 x 3 dot matrix; the rest of the subjects called out the dot numbers (see Figure 1) for those dots that were present.

Results

Means for number correct for the four groups are presented in Table 1. A 2 (hand) x 2 (response type) analysis of variance of these data gave no significant effects ($p > .05$). Thus, performance on this task was affected neither by the hand used nor the type of response in recall.

Experiment 2

In this study, subjects (10 males and 6 females) were all legally blind adult students enrolled for summer training (in 1986 or 1987) at the State Rehabilitation Center for the Blind. They were a heterogeneous group differing in nature and severity of visual impairment, age (17 - 61 years, median = 27), length of time they had been visually impaired (8 months - 27 years, median = 2.5 years) and amount of prior experience with Braille (none - 25 years, median = 8.5 months). They performed the same task as those in Experiment 1. All used the preferred hand and responded orally with the dot numbers.

Results and Discussion

The performance of these subjects was compared with that of the Preferred Hand-Oral Response subjects from Experiment 1. The means for both groups for number of correct responses and for errors are presented in Table 2. The three types of errors are underestimations (reporting fewer dots than were present), overestimations (reporting more dots than were present) and wrong dots (reporting the correct number of dots, but not all of the correct dots).

(1) Between-subjects comparisons - There were no significant differences between treatments on any of the four dependent variables ($p > .05$).

(2) Within-subjects comparisons - In both groups, subjects were more likely to underestimate than to overestimate the number of dots present ($p < .01$). Also, the rank order for the three types of errors was the same for both groups.

(3) Correlations - The number correct for each of the 32 symbols was determined for both the sighted subjects and the blind subjects. The correlation between the number of dots in a symbol and the number of correct responses was -.737 ($p < .001$) for the sighted subjects and -.703 ($p < .001$) for the blind subjects. The correlation for item difficulty for the blind and the sighted subjects was .503 ($p < .01$)

Correlations were also done between the number of correct responses and age (rho = -.202, $p > .05$), length of time they had been visually impaired (rho = -.475, $p < .05$) and amount of previous experience with Braille (rho = -.597, $p < .05$). The correlation between the latter two variables is .737 ($p < .01$).

The similarity in performance between these two groups in number correct, in type of error and in the relationship between item difficulty and number of dots suggests that the same processes are operative in the performance on this task for both the blind and sighted. One implication of these findings and of those from other studies in which the performance of blind and sighted subjects have been found to be comparable (e.g., Jonides, Kahn and Rozin, 1975; Newman, Craig & Hall, 1987) is that results from research in perceptual, learning and memory tasks in which subjects are sighted may prove helpful in understanding the processes which are operative when the same task is performed by the visually impaired. Further research comparing the sighted and the visually impaired on a number of other tasks seems indicated.

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Authors' Note

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Table 1

Mean Correct Responses for Each Treatment: Experiment 1

		Response Type	
		Drawing	Oral
Hand	Preferred	22.19	21.19
	Nonpreferred	22.44	21.75

Table 2

Mean Correct and Errors for Blind and Sighted Subjects

	Correct	Underestimations	Overestimations	Wrong Dots
Blind	18.19	6.69	1.18	5.25
Sighted	21.19	5.88	1.19	3.75

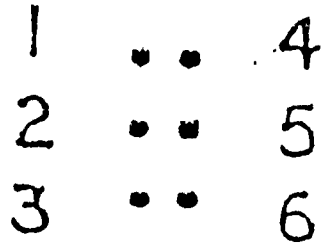

Figure 1. The Braille Cell And Its Dot-Position Numbers.

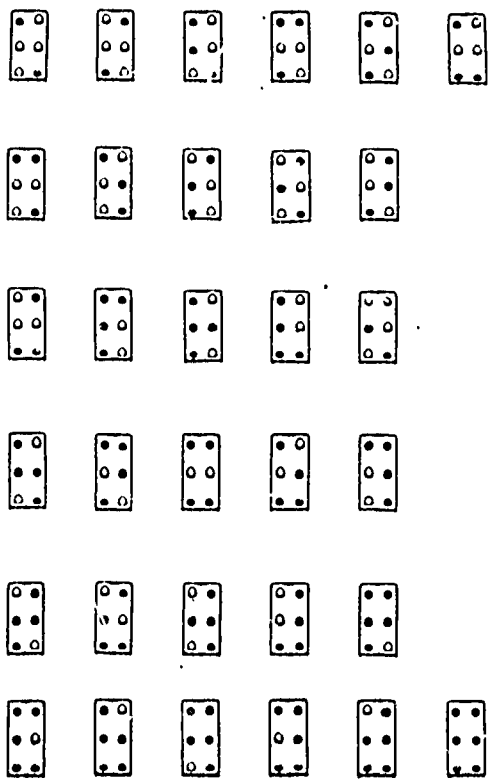

Figure 2. Braille Symbols Used in This Experiment.