

Mediational styles: An individual difference variable in children's learning ability

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A mediational production task was developed whereby Ss' reported mediators to a PA list were scaled along a dimension of mediational complexity. Three groups of 5th-grade children were identified: complex mediational producers, simple mediational producers, and variable producers. Each group then learned another PA list. In addition, Ss in each group were supplied with complex mediators, simple mediators, or no mediators. The results indicated that complex and variable producers learned at significantly faster rates than did simple producers. Regardless of mediational style, complex E-supplied mediators facilitated learning.

An important body of research has indicated that paired-associate (PA) learning can be facilitated by providing Ss with mediating phrases or mnemonic devices. Spiker (1960) has demonstrated that the teaching of mnemonic devices in a PA task can lead to positive transfer on a second task. Jensen & Rohwer (1963) provided mediating verbalizations upon presentation of PA pictures and found that retarded adults made fewer errors during acquisition. Davidson (1964) has also shown that the introduction of a "minimal language cue" can facilitate learning.

Little research, however, has been concerned with differences among children that may contribute to the efficient use of mediators in learning. An important question is whether or not children of the same age differ in the types of mediators they habitually produce and utilize and whether or not these possible differences in "style" of mediator production are important in E-aided PA learning. It may be that the mediational style of the individual learner predisposes him to utilize only those E-supplied mediators that most closely approximate his own attempts at mediation.

A classification scheme, devised by Martin, Boersma, & Cox (1965) for the purpose of classifying Ss' reported mediators, is useful in determining individual mediational styles. A central feature of this classification scheme was the identification of seven types of associative strategies reported by Ss.

Strategies were ordered along an apparent continuum of mediational complexity. The least complex strategies involved simple repetition of the pairs or the use of letter identities. These simpler strategies were in contrast to more complex strategies that involved either discovering higher-order relationships between individual pairs or embedding the pair in a syntactical unit such as a phrase, clause, or sentence. These higher-level strategies were found to be more effective associative mnemonics than were lower-level strategies.

One purpose of this study was to determine if Ss who differ in type of strategy reported on a PA-production task differed in the rate at which they learned a second PA task. A second purpose was to determine if the complexity of E-supplied mediators would differentially affect the learning rates of these Ss.

MATERIALS

Two PA lists were employed in this study. Twenty disyllabic pairs composed the production list. The stimulus items were low m paralogos, and the response items were familiar words: DAVIT-VILLAGE, CARATCH-CAPTAIN, KAYSEN-HEAVEN, etc. Items composing these pairs were selected from Noble's list (1952) or Cieutat's association index (1963). These pairs had been found to elicit low-level strategies (no reported strategy or repetition), strategies of intermediate complexity (letter cues and word formation), and more complex strategies (superordinate and syntactical) with equal probability in a pilot study. They also had been previously shown to differentiate between Ss producing high strategies and those Ss producing low-level strategies. The criterion list consisted of 14 disyllabic pairs that also met both criteria: STANDAGE-SALUTE, MEARDON-ARMY, DELPIN-INSECT, for example.

SUBJECTS

One hundred sixty-two 5th-grade children participated in this study. Their responses to the production list served as a basis for assigning them to one of three groups: high-strategy producers, low-strategy producers, or variable-strategy producers (no predominant pattern of strategy production). After being identified on the basis of strategy-production patterns, Ss were assigned randomly to a complex mediation treatment, a simple mediation treatment, or a control treatment (no mediational aid).

PROCEDURE

The twenty production pairs were presented to Ss in booklet form, one PA to a page. The E first described the seven associative strategy categories by means of a sample PA. The different strategy categories were introduced as "tricks," and Ss were asked to tell which trick they would use if they had to learn what "new word" (the stimulus term) went with the "old word" (response term). Ss were allowed 60 sec to write down their tricks for each pair.

After Ss' production patterns were determined, each S was assigned to a treatment condition, and the criterion task was presented. Criterion pairs and stimulus items were presented on slides. During the learning trials, each of the 14 PAs was presented at a 5-sec exposure rate, with a 10-sec intertrial interval. On the first three learning trials, Ss were supplied complex, simple, or no mediators. The E repeated the pair, then supplied the strategy. For the control (no-strategy) condition, E repeated the pair twice. Learning and test trials were presented alternately. The exposure time for each test stimulus was 10 sec. Ss were tested until a criterion of two successive, errorless trials was attained. After completion of the criterion task, Ss were reminded of the various strategies and were asked which ones they used to learn the pairs. The PAs were presented again, and Ss reported orally the strategies they employed.

RESULTS AND DISCUSSION

The ages, IQs, grade-achievement levels, and reading-achievement levels for Ss in the nine subgroups were compared by means of analysis of variance. No significant differences among the groups in age ($F = 1.48$, $df = 8/153$), IQ ($F = .30$, $df = 8/153$), grade achievement ($F = 1.13$, $df = 8/153$), and reading achievement ($F = .56$, $df = 8/153$) were revealed.

The means and standard deviations of trials to criterion on the acquisition task for the nine subgroups are presented in Table 1. A Treatments by Levels analysis of variance revealed highly significant main effects. Multiple comparisons of the complex, control, and simple treatment conditions using the Tukey test revealed all three means to be significantly different from each other. The only significant difference among the level means was between the high- and low-strategy producers. The Treatments by Levels interaction was not statistically significant. These results indicate that the introduction of complex mediators leads to more rapid acquisition of a PA list than does a nonaided control condition. The control condition itself resulted in faster acquisition than did a simple mediation

Table 1
Means and Standard Deviations of the Number of Trials to Criterion on the Acquisition Task

Strategy Style		Treatment Condition			Style (N = 54)
		Complex	Simple	Control	
High Producers	\bar{X}	5.28	7.56	6.33	6.39
	SD	1.70	1.65	1.93	1.41
Variable Producers	\bar{X}	5.61	7.11	7.00	6.57
	SD	.98	1.84	1.68	1.67
Low Producers	\bar{X}	6.17	8.72	7.17	7.35
	SD	1.20	1.56	.88	1.62
Treatment (N = 54)	\bar{X}	5.68	7.80	6.85	
	SD	1.36	1.15	1.57	

condition. Moreover, high-level strategy producers reached criterion on the acquisition task significantly faster than did Ss producing low-level strategies.

The relationship between the number of trials to criterion and a strategy score based on the strategies Ss reported after acquisition was examined. For all 162 Ss, the resulting correlation was $-.66$ ($p < .01$), indicating that Ss with high strategy scores required fewer trials to reach criterion.

The median strategy scores for the high, variable, and low strategy producers assigned to the control treatment were 75, 56, and 52.5, respectively. Individual comparisons by means of the Mann-Whitney U test revealed that the high strategy producers were significantly different from both the variable and low producers ($p < .01$), but the variable and low strategy groups were not different from each other.

The results indicate that the complex E-supplied mediation treatment was the most facilitating. The control condition resulted in a significantly faster learning rate than did the simple mediation treatment condition. It appears that the introduction of less effective E-supplied mediators resulted in a tendency for Ss to abandon more effective associative strategies.

The mediational style of the learner proved to be an important variable in accounting for individual differences in rate of learning. It was demonstrated that Ss who were independently classified as high associative strategy producers (complex mediational style) learned at faster rates than did Ss identified as low-strategy producers (simple mediational style). These differences were obtained despite the fact that analyses of IQ and achievement scores for the nine subgroups revealed no significant differences among them. Mediational style is apparently not directly related to IQ and school achievement, yet it does differentiate between fast and slow learners. Moreover, differences on this dimension between high-strategy producers and low and

variable producers were found to remain consistent for nonaided Ss before and after acquisition.

The results revealed no interaction between mediational style and type of mediation treatment. Approximation of the mediation treatment to the mediational style of the learner proved not to be a factor in facilitating learning. Complex mediators, whether self-generated or E-supplied, apparently serve as better

storage devices than do simpler mediators. Although determination of S's mediational style may permit some accuracy in predicting efficient performance, the complexity of the E-supplied mediator remains the major variable in the effective facilitation of PA learning.

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Rapid shaping of fixed-interval verbal behavior

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Five undergraduate psychology majors and one high school student were trained to vocalize for point reinforcement. Once they did this regularly, they were trained to verbalize freely for points on fixed-interval schedules. Each of the Ss spoke at high rates with rare pauses until an SD for reinforcement was delivered contingent on responses in the latter portion of each interval. This procedure shaped up regular postreinforcement pauses and bursts of responses at high rate prior to each reinforcement within few sessions.

Several studies have reported difficulties in generating human behavior under the control of fixed-interval schedules of reinforcement. A large body of data collected with animals of many species, ranging from rats and pigeons (Ferster & Skinner, 1957) to monkeys (Fry et al, 1960), demonstrates that the expected behavior under fixed-interval schedules of reinforcement consists of pausing after each reinforcement and gradual acceleration in rate until the delivery of the next reinforcement. This topography or

pattern of response has been called "scaloping" (Ferster & Skinner, 1957).

Reports of scaloping behavior in humans have been rare, although patterns of high and low rates of response on FI schedules have been found (Blair, 1958; Lippman & Meyer, 1967; Weiner, 1962, 1964, 1969). Lippman & Meyer (1967), Blair (1958), and Weiner (1962) found high rates of response with very little pausing without specific manipulation. Lippman and Meyer used instructions regarding the contingency, while Weiner (1969) used histories of response cost and differential reinforcement of low rates (DRL) to shape pausing after reinforcement.

The current study was an attempt to develop a quicker method of generating scaloping behavior on fixed interval schedules of reinforcement. In addition, the response manipulated was free operant speech.

SUBJECTS

Five undergraduate psychology majors and one high school student volunteered to serve as Ss for an experiment in learning. They were told very little prior to the first session, except that they could earn money by participating. Each S was actually paid