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Elaborative Interrogation Applied to Small and Large Group Contexts

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SUMMARY

The present study examined the application of elaborative interrogation (EI), a questioning strategy, to ecologically valid classroom contexts. Instruction was provided to individuals, small groups of five, and large groups of 20. Recall performance did not differ as a function of group size. For individuals, small and large groups, EI subjects outperformed repetition control subjects.

Acquiring facts is an important but often difficult educational requirement, one made easier by a verbal learning strategy called elaborative interrogation [(EI)—e.g., Pressley, McDaniel, Turnure, Wood and Ahmad, 1987; Pressley, Symons, McDaniel, Snyder and Turnure, 1988]. This elaboration strategy involves 'why' questions that encourage learners to draw upon available prior knowledge to try to understand to-be-learned facts. In attempting to answer the 'why' questions, the learner generates an elaboration that makes the facts more sensible. Memory improves, probably because attempting to answer 'why' questions orients learners to prior knowledge consistent with the to-be-learned facts, knowledge that the learner would not activate in the absence of the 'why' question (see Martin and Pressley, 1991).

In general, the research to date has supported the potency of EI for fact learning for both adult and grade-school populations (Woloshyn, Willoughby, Wood, and Pressley, 1990; Wood, Pressley and Winne, 1990). For example, Pressley *et al.* (1987) presented undergraduates with sentences describing different types of men engaged in various activities. Two conditions were compared: a base control condition where the type of men and action pairings were arbitrary (e.g. 'The hungry man got into the car') and an EI condition where the base sentences were followed by 'why' questions (e.g. 'Why did that particular man do that?'). Half of the subjects were aware of the upcoming recall task (intentional learning) and half were instructed to rate how easy the sentences were to understand (incidental learning). The effects of providing precise elaborations were moderate and confined to subjects receiving incidental learning instructions. Subjects asked to generate answers to the 'why'

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questions demonstrated much greater recall than either subjects provided precise elaborations or the base sentences. This was true for both intentional and incidental learning.

More recently, Woloshyn *et al.* (1990) compared EI with another sophisticated elaboration strategy, imagery (where subjects constructed interactive images). Recall of facts was better in the EI and imagery conditions relative to a reading control condition, with performance in the EI and imagery conditions not differing.

The present study addressed two issues not previously considered in EI research. First, in all previous studies of EI, subjects were seen individually. In the study reported here, two-thirds of the participants studied in small groups of five or larger groups of 20, more consistent with how learning might occur in an actual school setting. This test of EI was considered important since elaboration strategies validated in the laboratory have not always produced corresponding effects in classrooms. For example, Levin, Pressley, McCormick, Miller, and Shriberg (1979) investigated the use of the keyword strategy with high-school and grade-school children placed in group settings (small vs. large). Typically, the keyword method produces dramatic gains in recall when subjects are tested individually (McDaniel, Pressley and Dunay, 1987). However, when the high-school students were tested in groups, Levin *et al.* found no differences in recall as a function of strategy use (keyword vs. control). More positively, both small and large groups of elementary school children recalled more when exposed to the keyword strategy than control procedures.

Levin *et al.* (1979) suggested that one possible problem when using larger groups was the inability of the experimenter to monitor what strategy was being used by the subjects during study. Thus, in the present study, individuals and groups of EI and repetition subjects were required to record their study responses so that adherence to strategy instructions could be monitored.

This also permitted evaluation of the potency of the EI strategy as a function of whether participants spontaneously engaged in other strategies during study. The possible use of imagery in reaction to EI instructions was of special interest given the efficacy of imagery relative to EI in Woloshyn *et al.* (1990), as well as their anecdotal reports of imagery use in the EI conditions.

METHOD

Subjects

The 120 introductory psychology students were randomly assigned to one of three study contexts: individuals (40 participants), small groups (eight groups of five participants), and large groups (two groups of 20 participants). Half of the participants in each study context (20) were assigned to the EI condition and the other half to a repetition control condition. Equal proportions of males and females were represented in each condition.

Materials and procedure

Two sets of 33 slides containing one 'man' sentence per slide were constructed, consistent with Pressley *et al.*'s (1987) materials. Each sentence described one type of man engaged in one type of activity. For example,

The artistic man put down the knife.
The religious man used the saw.

One set was used for the EI condition; the other set was used for the repetition control condition. In each set, three slides were for practice and the remaining 30 were for study. All students were aware that they would later be given a recall test. All students were given a booklet to record their study and recall responses.

Participants were instructed in one of the strategies and were given practice and feedback with three sample sentences. In the EI condition, feedback was provided for the quality of the response. Participants were prompted to generate a precise answer (i.e. consistent with the definition of Bransford, Stein, Vye, Franks, Auble, Mezyaski, and Perfetto *et al.* 1982) that clarified the significance of the particular type of man engaging in the specified action. For example,

The artistic man put down the knife after finishing the sculpture.
The religious man used the saw to build a church.

If precise answers were not given, an experimenter-generated precise answer was provided as an example. In the repetition condition the experimenter ensured that the participants wrote the facts neatly and carefully. After studying the practice items, participants were given two sample recall tests that were representative of items on the post-tests following presentation of the study sentences. Both recall tests contained blank spaces followed by a description of the activity of each type of man. For the generated version of the practice test, subjects were given only the sentences with the blanks, and were required to complete them. In the matching test a list of the types of men was provided, with subjects selecting the appropriate answer for each sentence.

The 30 study sentences were then presented for 15 seconds apiece in the same fixed random order in all three conditions, followed by a 3-second interval. During the interval, subjects identified the predominant strategy that they used to study the sentence by circling one of the following five strategy choices. If a second strategy was also used, participants indicated that choice with an 'X'.

1 Imagery (i.e. did you use a mental picture/image?)
2 Verbal (i.e. did you use mnemonics/rhymes/answer 'why' questions?)
3 Repetition (i.e. did you repeat the fact/write it as written?)
4 Other (specify if you used another strategy).
5 None.

Following study, the participants were given the generated recall and matching tests for the 30 sentences. These test items were presented in a fixed random order different than the presentation order.

RESULTS AND DISCUSSION

Recall

Generated recall responses were scored as correct if they were verbatim matches or synonymous with the descriptions of the men. Two raters scored 30 per cent of the data with at least 94 per cent reliability (disagreements resolved by discussion).

The overall recall means are recorded in Table 1. Two ANOVA analyses supported the effect for condition ($F(114) = 77.95$, $p < .001$ and $F(114) = 53.18$, $p < .001$ for both the generated and matching tests, respectively). Group size had no effect on either the generated or matching test measures ($F(114) = 0.14$, $p > .87$ and $F(114) = 0.24$, $p > .79$, respectively).

Table 1. Means and standard deviations of generated and matched recall stores as a function of group size and condition in phase 1

	Elaborative Interrogation		Control	
Group	Generated	Matched	Generated	Matched
Individual				
M	25.10	25.95	16.65	19.30
SD	4.55	6.93	6.14	6.96
Small				
M	26.50	28.55	16.50	18.30
SD	1.85	1.79	6.60	6.13
Large				
M	24.75	26.70	17.40	20.10
SD	3.75	3.01	7.16	7.83

Three pairwise Dunn–Bonferoni comparisons were carried out (overall Type 1 error rate is less than .05, $p < .017$ per comparison, cutoff $t = 2.43$). Each EI group was compared with its equivalent-sized group in the control condition. Consistent with earlier studies that employed the 'man' sentences (e.g., Pressley *et al.*, 1987), all three comparisons were statistically significant, with the EI condition exceeding the repetition control, smallest $t(114) = 5.02$ for the generated recall test in the large groups.

Strategy selection

Table 2 depicts the predominant strategies subjects identified while studying. In general, students in this study used their instructed strategy. However, of greater interest, the EI subjects consistently selected more of the 'imagery' and 'verbal' strategies than did the control subjects (smallest $t(38) = 2.02$, $p < .05$ for 'imagery' among the individuals). Also, the EI subjects never selected 'repetition' to the same extent as the control subjects, smallest $t(38) = 7.99$, $p < .001$. In the control condition, subjects used repetition almost exclusively.

Compound strategy use

Subjects were also asked to identify a second, less predominant strategy, if more than one was used at study (see Table 3). The most critical finding here was that the EI groups indicated a greater percentage of compound strategy use in comparison to the control group (82 vs. 32 percent). Specifically, EI subjects most often reported using both 'imagery' and 'verbal' strategies together. Subjects who were instructed to use 'repetition' *did not* engage in alternative strategies to any large extent. In the few cases where repetition subjects reported compound strategies, the second strategy was most often imagery. Given that repetition is used regularly by learners

Table 2. Mean proportions and standard deviations for the use of the three main strategies as a function of group and condition

Strategy and condition	Individual	Small	Large
Imagery			
Elaborative interrogation			
M	.501	.416	.730
SD	.414	.340	.287
Control			
M	.243	.157	.000
SD	.375	.343	.000
Verbal			
Elaborative interrogation			
M	.457	.529	.192
SD	.428	.350	.266
Control			
M	.005	.009	.000
SD	.022	.038	.000
Repetition			
Elaborative interrogation			
M	.038	.017	.065
SD	.125	.054	.087
Control			
M	.752	.800	1.000
SD	.379	.376	.000

Categories 'none' and 'other' were rarely selected, and hence were not included.

Table 3. Means and standard deviations for compound strategy use as a function of group size and condition

Conditon	IV	VI	VR	RV	RI	IR
EI						
Individual (n = 16)						
M	11.94	11.13	.88	0	0	0
SD	12.08	12.43	1.96			
Small (n = 19)						
M	12.94	11.56	1.50	0	0	0
SD	10.24	12.40	3.63			
Large (n = 14)						
M	17.74	2.32	.11	0	0	0
SD	12.56	4.67	.32			
Control						
Individual (n = 8)						
M	0	0	0	6.88	16.63	0
SD				12.80	12.39	
Small (n = 5)						
M	0	0	0	0	16.60	0
SD					12.32	
Large (n = 6)						
M	0	0	0	0	24.00	0
SD					8.94	0

of all ages to acquire novel information, it is a concern that the use of this strategy seems to prohibit spontaneous use of other more sophisticated procedures.

In summary, the effectiveness of EI was apparent regardless of group size. This increases confidence in the classroom applicability of the procedure. Another advantage for employing EI is that it may encourage learners to explore other sophisticated strategies to enhance learning rather than relying on a single mechanism.

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