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Enhancing Learning through Strategy Instruction and Group Interaction: Is Active Generation of Elaborations Critical?

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SUMMARY

We examined strategic intervention when learners were actively engaged in group discussion to assess the impact of peer interaction. In addition, memory performance was compared between students who generated or evaluated elaborations when using the elaborative interrogation strategy, as well as between a supported strategy where learners were provided with explanatory elaborations and a self-study condition. Introductory psychology students ($N = 263$) in groups of 3 to 5 members studied sixty facts about familiar and unfamiliar animals. Overall, the potency of elaborative interrogation was confirmed regardless of whether students studied interactively or independently. The contribution of group members in facilitating knowledge when the group was able to share sophisticated strategic information also was highlighted. Most critically, when background knowledge was sufficient to promote connections between existing and new material, it was the active generation of elaborations that maximized learning.

Students of all ages are required to learn factual information throughout their years of schooling. To enhance students' acquisition of factual content, researchers and educators have changed classroom contexts (e.g. group study), initiated strategy instruction, and manipulated the presentation of materials from more simplistic to more complex text (e.g. see Pressley *et al.*, 1992). This study triangulates these three components in a single instruction session. Specifically, this study compares strategic intervention when students are actively engaged in group discussion in order to assess the impact of peer interaction. It also assesses the impact of generating versus actively evaluating elaborations when using an elaboration strategy called elaborative interrogation, relative to a supported strategy where learners are provided with explanatory elaborations and to strategies that students self-select. In addition, because connected prose is what students typically encounter in learning situations, we

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manipulated whether the study material was presented as complete prose passages or as independent facts.

Both educators and researchers have suggested that learners benefit from studying interactively with their peers (Cohen, 1994; Johnson and Johnson, 1985; Johnson *et al.*, 1981; Slavin, 1990). The opportunity to share knowledge and expand on each other's ideas is a noted advantage to group activity (e.g. King, 1990; Vygotsky, 1978; Webb, 1989). Many researchers have argued that sophisticated thinking is often a result of interactive discussion, sometimes called 'socially shared cognition' (see Resnick *et al.*, 1991). Given these advantages, interactive or cooperative learning has become a common instructional tool in today's classrooms.

One outcome of interactive learning also can be the sharing of strategic knowledge. Strategy use has consistently been a feature in the learning of academically successful students (e.g. Wood and Hewitt, 1993; Wood *et al.*, 1993), typically with more sophisticated strategies leading to enhanced performance. One sophisticated strategy that has recently received a lot of attention because of its adaptability to typical learning situations is elaborative interrogation. This strategy involves explicitly encouraging students to ask and answer 'why' questions, a strategy that all students are familiar with but do not always employ to the extent that they could (e.g. Garner, 1990; Pressley *et al.*, 1988; Woloshyn *et al.*, 1990).

Researchers investigating elaborative interrogation have focused mainly on individuals learning independently (e.g. Willoughby *et al.*, 1994; Wood *et al.*, 1993). A few studies have explored the use of elaborative interrogation in interactive settings. The findings, however, are inconsistent. For example, two studies explored the efficacy of elaborative interrogation when learners had the opportunity to study with one other peer (Wood *et al.*, 1995; see also Wood *et al.*, 1998). The results indicate that for university students, students studying in dyads demonstrated enhanced learning relative to those studying individually. Woloshyn and Stockley (1995), in contrast, found no performance differences with grade 6 and 7 students as a function of individual versus dyad learning.

In the only study investigating elaborative interrogation in a truly interactive group setting, Kahl and Woloshyn (1994) found that groups of sixth-grade children studying interactively (groups of four) had significant learning gains compared to students who learned and studied the new materials independently. The present study was designed to further explore the benefits of interactive learning with elaboration interrogation among adult learners by explicitly manipulating study format (i.e. comparing individual study to group interaction).

Typically, information that learners are assigned is given in a textual form; that is, it involves reading a number of paragraphs. Most elaborative interrogation research, in contrast, has relied on material presented one sentence at a time (e.g. Willoughby *et al.*, 1994; Wood *et al.*, 1990). An additional purpose of the current study was to explore strategy benefits when the study materials better approximated typical text format. Hence, a comparison was made between material presented in paragraphs and in sentence format.

Elaborative interrogation appears to facilitate performance because learners are encouraged to generate elaborations that are consistent with their own knowledge base (see Pressley *et al.*, 1992, and Woloshyn *et al.*, 1993, for a review). In fact, although there were some suggestions that learners using elaborative interrogation may have greater arousal or engage in more effortful processing than students in

control groups, the connections made to the learner's knowledge base seems to be the most common explanation for elaborative interrogation's effectiveness (e.g. Schneider and Pressley, 1997; Willoughby *et al*., 1993). For example, elaborative interrogation is less beneficial when learners do not have access to a well-developed knowledge base (Willoughby *et al*., 1994). One concern with interactive learning situations, however, is that not every student may have the opportunity to generate their own elaborations. If the critical component is creating links to one's own knowledge base, students may be at a disadvantage if they are not themselves generating elaborations even though they are actively participating in the group. To test this hypothesis, we compared learning in an interactive group situation between students who generated answers to the 'why' questions and students who were instructed to actively participate in the group by evaluating their peers' answers (i.e. elaborative interrogation–judgment condition). If prior knowledge is indeed the key element in elaborative interrogation's effectiveness, generators should outperform evaluators in memory performance.

Given that elaborative interrogation's effectiveness is less robust when learners have limited background knowledge to apply to the new information (Martin and Pressley, 1991, Willoughby *et al*. 1994), students may require the support of provided elaborations to enhance memory performance when to-be-learned information is less familiar. Although generating answers appears to enhance learning to a greater extent than the more passive activity of being provided with elaborations (Wood *et al*., 1994), this support may be particularly necessary when students lack the knowledge base to create connections. To test this hypothesis, we also included a condition where students were provided with elaborations that answered the 'why' questions (i.e. provided elaboration condition). Specifically, familiarity of the study material was manipulated with students presented facts about both familiar and unfamiliar animals, and a study condition where students were provided with elaborations was compared to the elaborative interrogation condition where students generated their own elaborations.

In addition, experiments exploring elaborative interrogation typically include a control group (e.g. repetition) which may not be representative of students' natural study behavior. Therefore, a self-study control group was included here to investigate students' self-selected strategy use. Previous research investigating students' self-selected strategy use has been limited to individual and dyad learning situations and has found some support for a developmental increase in level of sophistication of strategy use (e.g. Woloshyn and Stockley, 1995; Wood *et al*., 1998). However, even university students are found to predominately resort to less sophisticated strategies such as repetition (Garner, 1990). Of interest in this study was whether the opportunity of studying with a number of students in a group setting would encourage sophisticated strategic processing and allow these students to be as effective in learning new material as their elaborative interrogation peers.

In summary, the main purposes of this study were to (1) compare elaborative interrogation in group settings to the more traditional individual learning paradigm with material presented in prose form or sentence-by-sentence, (2) compare performance of generators versus evaluators of answers to the 'why' questions in the elaborative interrogation condition, (3) compare memory performance when elaborations were provided versus generated, and (4) compare performance for elaborative interrogation versus self-study and provided elaboration conditions.

METHOD

Participants and design

The 263 participants were drawn from first-year introductory psychology courses at a Canadian university located in a mid-sized city. Participants included 100 males and 163 females (mean age = 20 years and 3 months, SD = 3 years and 6 months) assigned to groups ranging in size from 3 to 5 members. Altogether there were 7 groups with 3 members, 23 groups with 4 members, and 30 groups with 5 members. Groups were then assigned randomly to one of six conditions: elaborative interrogation–individual–sentence, elaborative interrogation–group–sentence, elaborative interrogation–group–paragraph, elaborative interrogation–judgment–group–sentence, provided elaboration–group–paragraph, and self–study–group–paragraph. Group size and the number of males and females assigned to each group and condition were kept proportionally equal where possible.

Materials and procedure

In the study session, students were given instructions and practice, presented with the study materials and then given a memory test on the study materials. The study stimulus materials consisted of three statements for the practice component and ten stories for the study component. Each story was composed of six factual statements about one animal. The six facts for each animal described information about the animals, such as their diet, sleep habits, preferred living environment, and major source of predation (e.g. The Townsend Mole especially likes to live in warm, humid areas). The practice and study sentences (63 sentences) were taken from Willoughby *et al*. (1993).

Five of the animals were judged to be familiar to students (e.g. Swift Fox, House Mouse, Little Brown Bat, Townsend Mole, and Western Spotted Skunk) and five were judged to be unfamiliar (e.g. Pronghorn, Coati, Chickaree, American Pika, and Collared Peccary). Familiarity was determined through pretesting of an equivalent population (Willoughby *et al*., 1993).

Groups of students were randomly assigned to one of six study conditions. Four study conditions involved instruction in the elaborative interrogation strategy. One involved provision of provided elaborations and one encouraged self-selected strategy use. All students were told that they would be shown true facts about animals and that they would be asked to remember that information. Three groups were presented the facts in sentence format and the other three groups viewed the information as intact stories presented in paragraphs. Students in the sentence conditions were presented one fact as a time followed by an 18-second interval. Each statement was typed on a separate 12 by 17 cm card. Students in the paragraph conditions, in contrast, were presented all of the facts for one animal together and were given 108 seconds (6×18 seconds) to study.

The following is an example of a statement for the elaborative interrogation–sentence–groups:

> The Swift Fox's favourite place to find a home is near grassy areas.
> Why would this fact be true?

The following is an example of a paragraph for the elaborative interrogation–group–paragraph:

> The Swift Fox's favourite place to find a home is near grassy areas. When hungry, the Swift Fox eats rabbits, squirrels, or mice. The Swift Fox is in danger from coyotes. The Swift Fox usually lives by itself. The Swift Fox probably mates for life.
> Why would these facts be true?

The specific instructions that were given to the participants varied as a function of condition. In the elaborative interrogation conditions, students were instructed to generate an answer to the 'why' question ('why' would that fact be true?) either independently (in the individual condition) or interactively. Although students in the individual condition were placed in a group situation, they studied the information independently by writing down their answers. All elaborative interrogation students were required to provide an answer that clearly explained why that animal rather than any other similar animal would engage in that particular activity. Groups of students in the provided elaboration condition were instructed to discuss whether the provided elaboration for each fact was a good or poor elaboration. Groups of students in the self-study condition were told to study the way they would normally but to work together. No explicit instructions were given regarding strategy use. Recordings were made of each group's interaction. The transcription of the audiotapes confirmed that all groups complied with instructions. For example, during study, groups using elaborative interrogation answered why each fact was true, self-study groups were able to verbalize how they were learning the new material, and so on.

Students were given practice with study procedures and a memory test to ensure that they understood the strategy instructions. Students worked on the three practice sentences after which they were provided with a list of the three animal names (in a random order) and were given three statements for which they each had to identify the correct animal. For example, for the response 'walrus', the question was 'which animal eats clams and other shelled sea creatures?' After practice, students were reminded of their strategy instructions and then were presented with the 60 study sentences about the 10 different animals followed by the 60-item memory test. Students were asked to match each fact to the appropriate animal from a list of the 10 animal names. Questions were posed orally by the researcher in a random order (1–60), and each student marked their response on their own answer sheet.

RESULTS

Our first analysis looked for global differences among the six groups as a function of the materials that they were exposed to during study. Specifically, a 2×6 omnibus ANOVA assessed memory performance across all six conditions as a function of familiarity. The within-subjects factor was level of familiarity (familiar, unfamiliar) and the between-subjects factor was strategy condition (elaborative interrogation–group–sentence, elaborative interrogation–group–paragraph, elaborative interrogation–individual–sentence, elaborative interrogation–group–judgement, self-study–group–paragraph, and provided elaboration–group–paragraph. Both main effects were significant, smallest $F(5,257) = 4.69$, $p < 0.05$ for strategy condition, but both

were qualified by a significant interaction, $F(5,257) = 3.88$, $p < 0.05$. Given the significant interaction, subsequent analyses were conducted to examine specific contrasts. All follow-up comparisons were conducted with the Tukey HSD procedure, unless otherwise stated.

Elaborative interrogation in traditional versus group settings

Our first analysis contrasted memory performance for the traditional elaborative interrogation condition where information was studied independently one sentence at a time with interactive group study and groups studying paragraphs. A repeated-measures ANOVA (3×2) was conducted on the memory performance data.[1] There was one between-subjects variable, study condition (elaborative interrogation–individual–sentence, elaborative interrogation–group–sentence, and elaborative interrogation–group–paragraph), and one within-subjects variable, familiarity of the animals (familiar and unfamiliar). The means and standard deviations are presented in Table 1.

Table 1. Mean memory performance for elaborative interrogation in traditional versus group settings

Group	*N*	Familiar	Unfamiliar
Elaborative interrogation–group–sentence	45	21.91 (4.49)	14.27 (4.84)
Elaborative interrogation–group–paragraph	43	21.63 (4.85)	14.47 (6.03)
Elaborative interrogation–individual–sentence	42	21.76 (5.20)	13.90 (6.99)

Note: Maximum score = 30.

Only the main effect for familiarity was significant, $F(1,127) = 298.21$, $p < 0.05$, with facts about familiar animals ($M = 21.77$, $SD = 4.81$) remembered more than facts about unfamiliar animals ($M = 14.22$, $SD = 5.95$). The main effect for study condition and the interaction between study condition and familiarity were not significant, smallest $F(2,127) = 0.03$, $p > 0.05$ for the study condition main effect. Overall, therefore, students who studied interactively, whether presented with material in sentence or prose form, performed as well as students in the more traditional condition where students studied independently.

Memory performance in the elaborative–interrogation–judgement condition

For students in the elaborative–interrogation–judgement condition, contrasts were made regarding memory performance between students who generated the answers to the 'why' questions and those who actively evaluated the quality of the elaborations. A repeated-measures ANOVA (2×2) was conducted with study behavior as the between-subjects variable (evaluation and generation), and familiarity as the within-subjects variable (familiar and unfamiliar animals).

The main effects for study behavior and familiarity were significant, smallest $F(1,45) = 4.39$, $p < 0.05$ for study behaviour. Overall, those who generated the

[1]Analyses were completed with both the individual and the group as the unit of analysis. Given that students completed the memory tests individually and the results did not significantly differ between the two units of analysis, the reported analyses used the individual as the unit of analysis.

elaborations ($M = 33.56$, $SD = 11.29$) remembered more information than those who evaluated ($M = 27.15$, $SD = 8.95$), and familiar animals facts ($M = 19.23$, $SD = 5.87$) were remembered more often than unfamiliar animal facts ($M = 11.60$, $SD = 5.81$). In addition, the interaction between study behaviour and familiarity was significant, $F(1,45) = 4.50$, $p < 0.05$. Simple effect analyses revealed that students who generated answers to the 'why' questions remembered more than those students who evaluated the responses only for the familiar animals, $F(1,45) = 8.11$, $p < 0.05$ [$M(SD)$ for familiar animals = 21.19 (5.24) for generators and 16.60 (5.74) for evaluators; for unfamiliar animals, 12.37 (6.88) for generators and 10.55 (3.89) for evaluators]. Students who are active but not themselves generating answers to the 'why' questions in a group situation, therefore, appear to be at a disadvantage when learning new information.

Comparing memory performance when elaborations are provided versus generated

A repeated-measures ANOVA (3×2) was conducted to examine whether groups of students who generated or evaluated elaborations in the elaborative interrogation–judgement–group condition remembered as many animal facts as students who were provided with the elaborations and students who were in the more traditional elaborative interrogation–group–sentence condition. Of interest was whether students who evaluated answers in the elaborative interrogation–judgement condition performed similarly to the students in the provided elaboration condition who also were more passive in their learning of the facts, and to students' performance in the elaborative interrogation–group–sentence condition. There was one between-subjects variable, study condition (elaborative interrogation–judgement–sentence-generated, elaborative interrogation–judgement–sentence-evaluated, provided elaborations–paragraph, elaborative interrogation–sentence), and one within-subjects variable, familiarity of the animals (familiar and unfamiliar). The means and standard deviations are presented in Table 2.

Only the main effects for familiarity and study condition were significant, smallest $F(3,130) = 7.59$, $p < 0.05$ for study condition. Familiar animals ($M = 19.70$, $SD = 5.31$) were remembered more than unfamiliar animals ($M = 12.34$, $SD = 5.20$). Students in the elaborative interrogation–sentence condition ($M = 36.18$, $SD = 7.64$) outperformed both students in the provided elaboration condition ($M = 28.98$, $SD = 7.53$) and students who evaluated elaborations in the elaborative interrogation–judgement condition ($M = 27.15$, $SD = 8.95$). Students who generated the elaborations in the elaborative interrogation–judgement condition ($M = 33.56$, $SD = 11.29$) also outperformed their peers who evaluated their elaborations. There were no other

Table 2. Mean memory performance when elaborations are provided versus generated

Group	*N*	Familiar	Unfamiliar
Elaborative interrogation–judgement evaluated	20	16.60 (5.74)	10.55 (3.89)
Elaborative interrogation–judgement generated	27	21.19 (5.24)	12.37 (6.88)
Elaborative interrogation–group–sentence	45	21.91 (4.49)	14.27 (4.84)
Provided elaboration–group–paragraph	42	17.86 (4.72)	11.12 (4.29)

Note: Maximum score = 30.

significant differences. Overall, therefore, it appears that it is the explicit generation of elaborations that is critical when studying new information.

Memory performance for groups using elaborative interrogation, self-study and provided elaborations

Memory performance was compared for the groups of students who used elaborative interrogation, were provided elaborations, or generated their own study strategies while studying. A repeated measures ANOVA (3×2) was conducted with study condition (elaborative interrogation–group–paragraph, provided elaborations–group–paragraph, self-study–group–paragraph) as the between-subjects variable and familiarity (familiar and unfamiliar animals) as the within-subjects variable. The means and standard deviations are presented in Table 3.

Table 3. Mean memory performance for groups using elaborative interrogation, self-study and provided elaborations

Group	*N*	Familiar	Unfamiliar
Elaborative interrogation–group–paragraph	43	21.63 (4.85)	14.47 (6.03)
Self-study–group–paragraph	44	19.66 (4.94)	15.61 (5.25)
Provided elaboration–group–paragraph	42	17.86 (4.72)	11.12 (4.29)

Note: Maximum score = 30.

Both the main effects of study condition and familiarity were significant, smallest $F(2,126) = 8.09$, $p < 0.05$, as well as the interaction between the two $F(2,126 = 5.58$, $p < 0.05$. Familiar animals ($M = 19.73$, $SD = 5.04$) were remembered more than unfamiliar animals ($M = 13.77$, $SD = 5.54$), and elaborative interrogation ($M = 36.09$, $SD = 9.83$) and self-study students ($M = 35.27$, $SD = 9.20$) remembered significantly more than students in the provided elaboration condition ($M = 28.98$, $SD = 7.53$). There was no significant difference between the elaborative interrogation and self-study conditions. For the interaction, only the elaborative interrogation group outperformed students in the provided elaboration condition regardless of familiarity. In contrast, students in the self-study condition outperformed students in the provided elaboration condition only with the facts for the unfamiliar animals. Again, there were no significant differences between the elaborative interrogation and self-study strategies, demonstrating that students at the university level can benefit from studying in a group situation.

Strategy use in the self-study condition

The next question was whether the self-study students were able to use sophisticated strategies while studying. Responses in the study sessions were coded into one of four categories: elaboration, low-level strategies, repetition, and no response. Responses that involved question answering (e.g. answering 'why'), verbal and visual associations, or analogy were scored as elaborations. Defining a strategy and vague verbal elaborations were scored as low-level strategies. Within each group, the highest level of strategy used was analyzed for each fact. A repeated measures ANOVA (4×2) was conducted on the quality of strategies. The two within-subjects variables were

Table 4. Quality of study in the self-study group paragraph condition as a function of familiarity

Strategy	Familiar	Unfamiliar
Elaboration	15.20 (6.56)	16.70 (5.76)
Low-level strategies	3.40 (3.03)	3.60 (3.10)
Repetition	6.70 (4.72)	5.80 (3.29)
No-response	4.70 (4.00)	3.90 (3.28)

Note: Maximum score = 30.

familiarity of the material (familiar and unfamiliar) and type of strategy (four strategies outlines above). The means and standard deviations are outlined in Table 4.

Only the main effect for strategy was significant, $F(3,27) = 15.03$, $p < 0.05$. In general, of the four strategies, groups used elaboration strategies significantly more often than other strategies, on average for 53 per cent of the facts. Repetition was used for approximately 21 per cent of the facts and low-level strategies 12 per cent. The groups as a whole failed to respond on average for 14 per cent of the facts. Although students remembered more facts about familiar animals, their study strategies did not significantly change depending on level of familiarity.

To assess the relation between strategy use and memory performance, a correlation analysis was conducted with each type of strategy and level of memory performance. A significant correlation was found with memory performance for familiar animals only with elaboration strategy use ($r = 0.71$, $p < 0.05$). With unfamiliar animals, the correlation also was positive but not significant ($r = 0.42$). An additional important finding was that low-level strategies, repetition, and failures to respond were almost always negatively correlated (5 of 6 correlations) with memory performance (r's ranging from 0.08 to -0.55). However, due to the small sample size (because the unit of analysis was the 10 groups in the self-study condition), these correlations were not significant.

Given the finding from the elaborative interrogation–judgement condition that performance was greatest for students who generated rather than evaluated responses, it was of interest to assess whether the students who generated elaborations in the self-study condition also would outperform their peers who did not respond. Because of the variability in the number of students generating elaborations, only a descriptive account of the results could be conducted. Students who generated elaborations outperformed their peers who did not respond for 83 per cent of the familiar animal facts and for 50 per cent of the unfamiliar animals facts. Clearly, similar to the finding with the elaborative interrogation judgement condition, generating an elaboration is critical when learners have the opportunity to create links with extensive prior knowledge.

Would students use their assigned strategy again?

Students were asked at the end of the experimental session whether they would use their assigned strategy again. Fifty-six per cent of students in the self-study condition indicated that they would study the same way again if they had a choice, while 49 per cent and 40 per cent of students in the elaborative interrogation–group–paragraph and elaborative interrogation–group–sentence conditions, respectively, indicated that they would use elaborative interrogation again. Students using elaborative

interrogation on their own (not interactively) were 34 per cent in favour of using the strategy again, with 28 per cent for elaborative interrogation–judgement (30 per cent for generators and 26 per cent for evaluators) and 29 per cent for provided elaborations.

DISCUSSION

This investigation clearly identifies elaborative interrogation as a potent memory strategy for individuals working independently as well as for groups working interactively. Previous research examining elaborative interrogation typically studied individual learners learning expository text presented one fact at a time. The present study systematically contrasted this individual condition with groups of individuals instructed to work interactively with single facts and also with interactive groups studying information presented in paragraphs. Performance in all three groups was equally strong. Elaborative interrogation, therefore, appears to be adaptable to individual and interactive study contexts, as well as for itemized and connected prose.

The study also indicates that the acquisition of information is best facilitated through the active execution of the elaborative interrogation strategy rather than active evaluation or passive study of generated elaborations. Even when students were actively involved in all the group activities except generating elaborations, mean performance was lower than for the students who generated the elaborations. It appears then that the learner's activation and association of new information to existing, personal prior knowledge is the key mechanism in ensuring maximal performance with elaborative interrogation. Students who generate their own elaborations have the opportunity to match that elaboration to their own knowledge base. In essence, they can generate an elaboration that makes the material distinct from other information and yet relate the information to appropriate personal information that will make the new information more memorable (Willoughby *et al.*, 1994). Evaluators of the information, on the other hand, compare whether the elaboration adequately distinguishes new information from other information and whether relations among new elaborations are consistent with existing knowledge, but they do not have the opportunity to make the information unique to their own knowledge. This poses some concerns for applying elaborative interrogation to the classroom. Clearly, involving all students in the generation process is necessary in order to maximize learning gains. Having only one student responding to the why questions while others listen, even if they are actively engaged, will not facilitate performance.

A second implication for classrooms concerns the familiarity of the materials that are being studied when elaborative interrogation is encouraged. Consistent with a series of studies, elaborative interrogation is best used with materials for which students have some familiarity (see Pressley *et al.*, 1992). Interestingly, the presentation of information as individual items or in the more familiar prose forms of paragraphs is equally potent for the elaborative interrogation strategy.

Previous research suggested that elaborative interrogation would lead to greater learning than studying provided elaborations with familiar materials (Wood *et al.*, 1994), but relative to self-selected strategies, the expectations were not as clear. Self-selected study behaviours equalled performance in the elaborative interrogation condition for both familiar and unfamiliar materials. In addition, self-study led to

higher performance than studying provided elaborations when materials were less familiar. Among our university population, then, there was sufficient sophisticated strategy use to facilitate learning relative to the more passive examination of provided prose. In contrast to our expectations, providing students with elaborations was not beneficial even when learners faced less familiar materials that presumably would be difficult to connect to existing knowledge. In normal prose learning, students often encounter elaborated text and it appears that they need to be instructed to use additional strategic behaviours (e.g., imagery, mnemonics) to enhance their acquisition of knowledge (Willoughby *et al*., 1994).

Although elaborative interrogation produced consistently higher performance than alternative study strategies, not all students endorsed its use. In fact, there was marked variability in students' indication that they would use their assigned strategy again. Of interest, more students who used elaborative interrogation interactively indicated their preference to use it than those who studied independently. In previous research (Pressley *et al*., 1984), participants often indicated a preference for using elaborative interrogation but they also were able to explicitly compare its effectiveness with other low-level imposed strategies such as repetition. Participants in the present study based their evaluation solely on the effectiveness of the one instructed strategy rather than contrasting strategies. Even students who used their own preferred strategies, however, did not provide high endorsements for the strategies they used, although the majority did indicate their willingness to use similar strategies again. Perhaps the higher rating for the self-study strategy reflects familiarity and comfort in using these techniques. Additionally, self-selected strategies would be automatic and hence, require fewer resources. Perhaps more experience with the elaborative interrogation strategy would lead to stronger endorsements of the strategy.

In summary, this study affords three broad conclusions. The first confirms the potency of elaborative interrogation as an effective strategy for acquiring factual information when learners study independently or with their peers. In addition, this study emphasizes the contributions of group members in facilitating knowledge when the group is able to share sophisticated strategic information. Finally, it is clear that when background knowledge is sufficient to promote connections between existing and new material, it is the active generation of elaborations that maximizes learning. The impetus for the classroom instructor, therefore, is to ensure that students have strategic knowledge and an opportunity to execute that knowledge.

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