Wilfrid Laurier University

Scholars Commons @ Laurier

Theses and Dissertations (Comprehensive)

1998

Evaluating elaborative interrogation's efficacy with expository text

Rhonda Leah Boudreau
Wilfrid Laurier University

Follow this and additional works at: https://scholars.wlu.ca/etd

 Part of the Cognitive Psychology Commons

Recommended Citation

Boudreau, Rhonda Leah, "Evaluating elaborative interrogation's efficacy with expository text" (1998). *Theses and Dissertations (Comprehensive)*. 664.
https://scholars.wlu.ca/etd/664

This Thesis is brought to you for free and open access by Scholars Commons @ Laurier. It has been accepted for inclusion in Theses and Dissertations (Comprehensive) by an authorized administrator of Scholars Commons @ Laurier. For more information, please contact scholarscommons@wlu.ca.

INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

UMI

A Bell & Howell Information Company
300 North Zeeb Road, Ann Arbor MI 48106-1346 USA
313/761-4700 800/521-0600

Evaluating Elaborative Interrogation's Efficacy with Expository Text

by

Rhonda L. Boudreau

Bachelor of Arts, Mount Allison University, 1995

THESIS

Submitted to the Department of Psychology

in partial fulfillment

of the requirements for the degree of

Master of Arts

Wilfrid Laurier University

Waterloo, Canada

1998

© Rhonda L. Boudreau, 1998

Bibliographic Services
395 Wellington Street
Ottawa ON K1A 0N4
Canada

Services bibliographiques
395, rue Wellington
Ottawa ON K1A 0N4
Canada

Your file Votre référence

Our file Notre référence

The author has granted a non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of this thesis in microform, paper or electronic formats.

L'auteur a accordé une licence non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de cette thèse sous la forme de microfiche/film, de reproduction sur papier ou sur format électronique.

The author retains ownership of the copyright in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.

L'auteur conserve la propriété du droit d'auteur qui protège cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

0-612-30247-4

Canada

This study investigated whether elaborative interrogation would be an effective learning strategy with lengthy expository text. One hundred undergraduates (65 females and 35 males) comprised the study's 5 groups: a) naturalistic elaborative interrogation, b) self-study, c) repetition, d) elaborative interrogation with pre-underlined main ideas; and, e) elaborative interrogation with pre-underlined main ideas plus structured "why" questions. The expectation was that elaborative interrogation would prove to be a potent learning strategy relative to lower-order strategies (e.g., repetition); and that, when using expository text, students may require some supports to maximize the strategy's gains. All students read an eight page passage on childhood education from a university textbook, studied main ideas (pre-identified or not), and completed a free recall and multiple choice task. As was expected, Bonferroni t's ($p < .05$) revealed that elaborative interrogation exceeded repetition's performance on the total free recall score; and, the naturalistic group had fewer correct multiple choice responses for main ideas, and wrote down fewer main ideas on the free recall measure than the other two elaborative interrogation groups. However, the self-study group engaged mainly in lower-order strategies and was not outperformed by the naturalistic elaborative interrogation group. In addition, this study's data revealed that undergraduates have limited abilities in recognizing main ideas within a textbook passage.

I would like to thank my advisor Eileen Wood and my committee members Mike Pratt and Philip Servos for their advice and support during this thesis.

Thanks to my friends in the department who have helped me through these past two years.

I would also like to thank my mom, dad, and sister as they have always been supportive in my endeavors and have now helped me through two degrees, which means two theses!!

I would also like to thank Jeff who has taught me that writing a thesis isn't the most important thing in the world.

with expository text

To succeed academically, it is imperative to be skilled at the difficult task of learning text material. Students engage in many memory strategies (e.g., repetition and imagery) to aid in acquiring information from texts (e.g., McDermott, 1992; Willoughby, Wood, & Khan, 1994; Woloshyn, Willoughby, Wood, & Pressley, 1990). Some of these memory strategies are more effective for text learning than others. Recently, a great deal of emphasis has been directed toward teaching students to use a verbal memory strategy called elaborative interrogation. Elaborative interrogation involves answering "why" questions (e.g., "Why would that fact be true?") that encourage the learner to draw on previous knowledge when learning new factual material. When the learner answers the "why" question, the generated elaboration associates the to-be-learned material with existing knowledge; this provides an advantage at retrieval (e.g., Pressley, McDaniel, Turnure, Wood, & Ahmad, 1987). The effects of elaborative interrogation are most dramatic when the to-be-learned material is familiar, presumably because students can more readily draw upon existing knowledge to help them generate meaningful and rich elaborations, which leads to better memory (e.g., Pressley et al., 1987; Wood, Pressley, & Winne, 1990).

Advancing research in strategy use follows from past research (e.g., Garner, 1990) which provided evidence that, even when learners (both adult and children) possess strategic knowledge, they often fail to use effective strategies

when studying from text material when left on their own

students "...exhibit highly inefficient, strategically naive approaches to learning from text." with many students relying on rote strategies such as repetition (Garner, 1987, p 309). Even when explicitly instructed to use sophisticated strategies such as summarization, undergraduates often fail to fully execute the strategy (Kaspar, 1996). It seems that learners require both explicit instructions and prompting to use more complex strategies. This could be due to the cumbersome effort of knowing when and how to use the unfamiliar, complex strategy.

However, if a complex strategy containing both familiar demands and specific instances of use can be introduced that facilitates the learning of factual content, then perhaps there would be a greater possibility of inducing the use of that strategy. Elaborative interrogation could be this strategy as it focuses on the asking and answering of questions (familiar classroom activities) and can be used for learning unrelated facts, related facts, and perhaps text learning. In addition, previous studies have shown this strategy to be effective after a short training period (e.g., Kaspar, 1996; Pressley et al., 1987). With these three attributes, elaborative interrogation could prove to be an effective study technique within our classrooms. Recent research on elaborative interrogation has systematically examined both instructional and material manipulations in order to enhance the strategy's application to learning from expository text, which accounts for much classroom learning.

Earlier studies on elaborative interrogation focused on examining the overall impact of this learning strategy relative to other learning strategies. Some comparisons demonstrated a noticeable advantage relative to repetition (e.g., Pressley et al., 1987). Later studies also showed learning gains for self-generated elaborations rather than provided elaborations (e.g., Wood et al., 1990). In addition, research has shown the benefits of elaborative interrogation to be at least equal to other associative strategies such as mnemonics (e.g., Willoughby, Waller, Wood, & MacKinnon, 1993), and some self-study techniques such as imagery (e.g., Wood & Hewitt, 1993).

One limitation of previous research is that the evaluation of elaborative interrogation's efficacy has been carried out almost exclusively with lists of facts rather than facts embedded within expository text, which constitutes most learning situations. For example, previous research materials have included randomly constructed "man sentences" such as, "The artistic man put down the brush." and "The sleepy man held the mug." with good elaborations being, "because he finished the painting." and "filled with coffee.", respectively (e.g., Wood, Fler, & Willoughby, 1992; Wood, Needham, Williams, Roberts, & Willoughby, 1994). Other studies have used topics that are more typically academic, such as province or gender facts (e.g., Pressley, Symons, McDaniel, Snyder, & Turnure, 1988). Isolated fact studies found that students who used elaborative interrogation on factual sentences performed better than students using repetition or reading to understand the factual content. Common memory

activity he performed; for example, "Which man held the mug?" with the "sleepy" man as the correct answer.

Later studies evaluated elaborative interrogation with highly descriptive prose. In fact, the paragraphs were essentially lists of associative facts presented in paragraph form. This material was also quite unrepresentative of most texts that students study. Two particular sets of experimental paragraphs described the attributes of different Canadian universities and of animals (e.g., Woloshyn et al., 1990; Wood, Willoughby, Reilley, Elliott, & DuCharme, 1995, respectively). For example, Wood et al., used 10 paragraphs, each referring to a different animal, with each paragraph containing 6 sentences. Each sentence referred to one aspect of the animal's life: geographical habitat, preferred living area, favourite food, social behaviour, sources of predation, and sleep behaviour. Sentences were presented sequentially, one at a time; however, the content in one sentence was not directly connected or in any way contingent on preceding or subsequent information. There were no transitions between paragraphs, nor were any elaborations or other embellishments provided. While this experimental material was in paragraph form, the paragraphs were highly contrived, resembled descriptive text, and failed to fully capture the construction and embellishment typically found in expository text.

Expository text differs from descriptive material. Expository text progresses through a "pyramid development" (Kieras, 1985, p. 144) in that the first paragraph gives an overall description of the topic elements, and subsequently,

paragraph, the first sentence presents the theme (i.e., topic element) of the paragraph while the remaining sentences connect with this theme. The material in the aforementioned elaborative interrogation studies (i.e., lists of facts presented in paragraph form) presented a collection of unrelated sentences within each paragraph. The sentences presented information in a uniform and highly structured format with an absence of secondary information. Expository text contains primary facts, peripheral information, as well as transitional words (e.g., in addition, furthermore) and connectives (e.g., but, however) to maintain a logical flow. Therefore, lists of facts presented in paragraph form fail to represent expository text learning situations, which is what learners face throughout most of their education (see Appendix A for an example of expository text).

Seifert (1993) and Kaspar (1996) have employed elaborative interrogation with the closest approximations of expository text. Seifert evaluated the benefits of elaborative interrogation using three sets of 6 linked paragraphs containing both primary and secondary information, with material appropriate for grade school children. Although Seifert's paragraphs paralleled expository text, they failed to resemble a fully developed expository text. For example, the first paragraph in Seifert's material did not provide an overall description of the topic elements to be pursued in subsequent paragraphs; therefore, no introduction to these paragraphs was provided. And, there was an absence of connectives or transitionals present in the text. The paragraphs, therefore, lacked the structure

used in Seifert's study:

> The nests of snowshoe hares are built under the thick branches of shrubs or bushes. The nests, which are called forms, can also be found in thickets or in the roots of tree stumps. The young are born in these nests but adult rabbits will also use them as resting spots during the daytime. Seldom do they dig burrows.

Kaspar's (1996) text materials more closely resembled adult expository text; however, the materials were also very descriptive and factually dense (i.e., for every main fact there were approximately two secondary facts instead of a paragraph which is typical of expository text). The materials consisted of 10 paragraphs (each describing attributes of one animal). While the paragraphs were easier to read, as connectives and transitionals were imbedded within the text, each paragraph contained several behaviours and characteristics of an animal. Once again, the materials lacked the format of expository text. The following is an example of Kaspar's material:

> Whales are fascinating creatures. Although there are many kinds of whales, the following information is about the Blue Whale. The Blue Whale lives in the arctic and Antarctic Oceans. Over the course of evolution, species adapt to certain external environments which become known as their habitats. A habitat is defined as the place where a species prefers to live. Most of the time, the Blue Whale prefers to be near the surface of the water. Whereas a habitat is a preferred place of living, a niche is defined as the animal's status in their community with respect to enemies and food. With regard to eating habits, the Blue Whale only eats about three months of the year. Due to the work of many scientists, we have information on the preferred diet of the Blue Whale. When the Blue Whale does eat, it likes ocean plants and small shrimp-like creatures. We tend to view whales as threatening animals. Perhaps their massive size contributes to such perceptions. In actuality, whales face many dangers, and the worst danger for the blue whale is being caught under the ice. There are some unusual characteristics about the Blue Whale. When oddities are discovered in a species, many scientists attempt to specify the evolutionary importance of

the Blue Whale sleeps by resting only half of its brain at a time.

Overall, the complexity of the materials used to demonstrate the advantages of using elaborative interrogation have been slowly increasing, with the most recent work (Seifert, 1993 and Kaspar, 1996) more closely paralleling expository text. Given that each of the previous studies have found significant learning gains when students are instructed to use elaborative interrogation, it can be expected that elaborative interrogation should also enhance students' memory performance when the material studied is complex, lengthy expository text. The present study examines the potency of elaborative interrogation when using actual expository text material.

Why elaborative interrogation promotes enhanced memory performance.

One explanation regarding elaborative interrogation's effect of enhancing memory is offered through Craik and Lockhart's (1972) model of levels of processing (Best, 1992). The levels of processing model explains why the processes involved in elaborative interrogation lead to increased memory relative to other learning strategies. Craik and colleagues proposed that processing information could be conducted along a continuum ranging from shallow to deep processing. Depth of processing is assessed with respect to the level of encoding, with greater manipulation and cognitive effort representing deeper semantic processing. For example, repetition would involve shallow processing because the level of manipulation at encoding is minimal - learners merely repeat the information. Elaborative interrogation is considered a deep

answers to the "why" questions) requires a great deal of cognitive effort; and two, the generated elaborations are associated with existing knowledge (which means semantic knowledge must also be accessed). This model predicts that memory for the information, when elaborative interrogation is employed, should be recalled with greater ease than memory for information merely repeated. In fact, several studies have shown this enhanced memory when elaborative interrogation is employed (e.g., Wood, et al., 1992; Wood et al., 1995).

However, merely generating elaborations does not guarantee improved memory for the associated facts. Moscovitch and Craik (1976) adapted the levels of processing model to incorporate the notion of distinctiveness; that is, making the to-be-learned material distinctive from other material. Or, in other words, causing the memory code for the to-be-learned information to be unique relative to other stored memory codes (Moscovitch & Craik, 1976). Willoughby et al. (1993) demonstrated that when students performed elaborative interrogation for facts about unfamiliar animals there were no increased performance levels over repetition, in contrast to what was seen when the same students performed elaborative interrogation for facts about familiar animals. Willoughby et al. explained this difference as a function of the distinctiveness of the elaborations for the animal facts. That is, the elaborations for the unfamiliar animals were not specific enough to cause the animals to be distinctive (i.e., unique) from other animals at the time of testing. Therefore, the distinctiveness of self-generated elaborations also plays a role in the learning of information.

expository text.

The present study is designed to investigate two sets of comparisons regarding elaborative interrogation with lengthy expository text. First, to determine whether elaborative interrogation can enhance memory performance over repetition, and exceed or match performance levels of students who select their own preferred study strategies. And second, to determine whether students using elaborative interrogation require certain supports when using the strategy with prose passages.

Previous research has found elaborative interrogation to bolster post-test performance over repetition groups (e.g., Willoughby et al.,1993; Willoughby et al., 1994). In addition, studies have compared elaborative interrogation to self-study groups (e.g., Wood & Hewitt, 1993; Wood et al., 1995). These studies have found that, generally, students engage in effective study strategies (e.g., imagery) and have enhanced performance over repetition and similar performance to elaborative interrogation. However, it is speculated that if students in the self-study group engage in lower-order strategies (e.g., repetition) then those using elaborative interrogation will outperform them on memory tests. Therefore, the present study compares elaborative interrogation's efficacy to both repetition and self-study groups in attempt to replicate previous findings; and, in an attempt to extend previous literature by having students use elaborative interrogation with expository text.

As the text in the present study represents naturalistic learning material,

strategy. That is, because the main ideas are deeply embedded within text containing peripheral information, there may be problems with identifying the main ideas on which to perform elaborative interrogation. To create a suitable environment for testing the efficacy of elaborative interrogation, students must first successfully identify the main ideas in the text before they can ask the "why" questions.

A pilot study highlighted this concern by demonstrating that undergraduates were identifying only one-third of the main facts within the text. This pilot study used an eight-page passage from a developmental psychology textbook (almost identical to the material for the present study) where 41 undergraduates were told to both identify the main ideas and to perform elaborative interrogation on the identified facts. Twenty students were cued with instructions to identify 21 main ideas as they studied the passage. The remaining 21 students were told to identify and perform elaborative interrogation for however many main points they thought there were in the passage. In addition to the finding concerning main idea identification, this pilot study also indicated that providing learners with specific instructions regarding the number of main points to be elaborated led to slightly enhanced performance ($p = .054$ for the recall test) over those students who were not informed of the specific number of main ideas present. Therefore, in the present study, participants are given the number of main ideas in the passage.

Upon re-examination of the pilot study, a few, potential methodological issues

been an artifact of the bias of the expert who identified the main ideas in a previous study. To address this possibility, five experts in the field of developmental psychology read the expository text. Three out of five experts had to identify an idea as a main idea before it was chosen for the present study.

A second concern was that some students in the pilot study had difficulty generating and answering "why" questions for the material they had indicated as important. That is, many responses did not answer why each specific fact would be true. For example, some students repeated the same elaboration for several of the facts. To remedy this problem, the presence of structured "why" questions was manipulated. Structured "why" questions precisely interrogate why that particular fact would be true. One elaborative interrogation group responded to structured "why" questions for each main idea in the passage and other elaborative interrogation groups responded to self-generated "why" questions.

Third, the finding that learners in the pilot study were only identifying one-third of the expert-identified main ideas could indicate that even first year university students have difficulty discriminating main ideas from secondary points when studying text. On the other hand, it could be that students are ignoring the instructions to identify only main ideas, as past test experiences prepare them to expect an equal emphasis on main and secondary information. Students, then, are studying in a way that has proven successful for them in the past. That is, previous multiple-choice or matching tests have included secondary information, and hence, they recognize it as important to study in

whether or not main ideas were highlighted for the students to employ elaborative interrogation. In addition, during instruction and practice of elaborative interrogation, students were aided in identifying main ideas and were instructed to study only the main ideas.

In summary, there were five study groups: naturalistic elaborative interrogation, self-study, repetition, elaborative interrogation with pre-identified main ideas, and elaborative interrogation with pre-identified main ideas plus structured "why" questions. The naturalistic elaborative interrogation group most closely resembled the naturalistic study setting of university students. These five groups allowed an examination across study strategies, and the level of scaffolding required to obtain optimal effects from elaborative interrogation when using text material. However, there are others factors which may affect elaborative interrogation's potency.

Research has provided evidence that a learner's verbal aptitude may mediate elaborative interrogation's efficacy as a learning strategy (e.g., Wood, Willoughby, Bolger, Younger, & Kaspar, 1993). Wood et al. (1993) found that average and high academic achievers (determined by standard achievement test scores from reading vocabulary, concept of number, and spelling scores) in the elaborative interrogation groups outperformed the repetition group; in contrast, the low achievers did not benefit from employing elaborative interrogation. This may be due to the fact that elaborative interrogation relies heavily on verbal skills for the generation of a response to the "why" question and for reading text

with higher verbal ability performed better when learning expository text than students classified as having low verbal ability, thus suggesting that learning from text requires higher verbal skills.

In addition to verbal differences possibly affecting elaborative interrogation performance, self-study performances can also be affected by verbal differences. Wood and Hewitt (1993) found no differences between elaborative interrogation and self-study groups with high achievers (as defined by standard achievement test scores on the reading vocabulary, reading comprehension, and spelling scores). High achievers spontaneously used higher-order learning strategies when instructed to study on their own. In fact, even students who used repetition as a strategy employed, on average, two sophisticated strategies in conjunction with it. Therefore, it seems that high achievers generate and use sophisticated learning strategies. Since verbal ability may potentially affect the present study's groups, verbal ability will be tested through the administration of the SAT-Verbal sub-test (see Appendix B).

The design of the present study allows for two global comparisons. First, there is the evaluation of the elaborative interrogation strategy relative to repetition and self-study groups. Second, there is the evaluation of elaborative interrogation's relative efficacy when the levels of support are manipulated (e.g., pre-highlighted main ideas versus no pre-highlighted main ideas) within expository text. Therefore, two sets of comparisons will be made within the five conditions of the present study (see Figure 1 for a pictorial depiction). The first

(elaborative interrogation, self-study, and repetition), and the second set will look among the three elaborative interrogation groups.

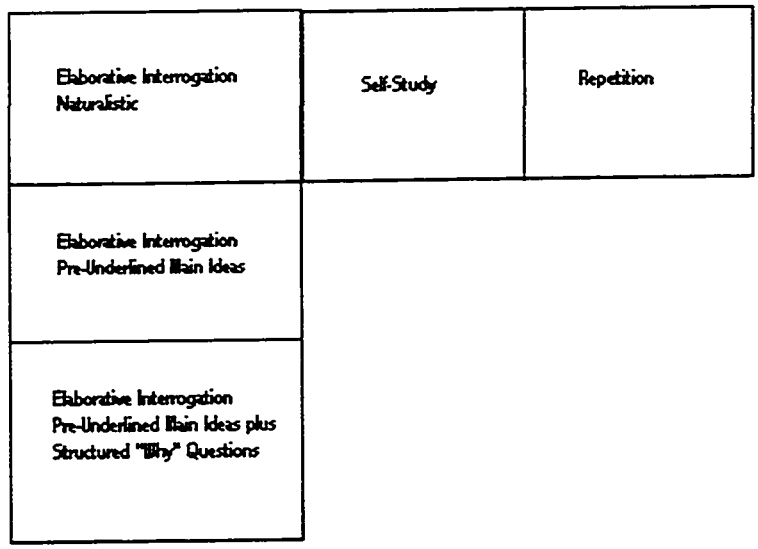


Figure 1. Pictorial depiction of the five groups

Hypotheses.

There are two hypotheses regarding comparisons across the naturalistic elaborative interrogation, self-study, and repetition groups. These are:

1) The naturalistic elaborative interrogation group will yield greater performance gains than the repetition group; and,
2) The naturalistic elaborative interrogation group will yield greater performance gains than the self-study group if lower-order strategies such as repetition are spontaneously employed. However, the naturalistic elaborative interrogation group will have similar performance gains if the self-study group uses higher-order strategies such as imagery.

naturalistic elaborative interrogation group will yield greater performance gains than the repetition group. This is consistent with a body of research in which elaborative interrogation and repetition are compared (e.g., Wood & Hewitt, 1994; Wood et al., 1995). Because elaborative interrogation encourages a more meaningful, "deeper" processing of the to-be-learned information, it should enhance memory performance over simply writing out information repeatedly. Predictions regarding the self-study group are contingent upon the self-study strategies that students elect to use. If students engage in higher-order elaborative, or organizational memory strategies (e.g., imagery), then their memory performance should parallel the elaborative interrogation group and should exceed the repetition condition. If students engage only in lower-order (e.g., reading to understand the material), or rote, strategies then their performance should be markedly lower than elaborative interrogation and approximate the repetition group.

There are three hypotheses regarding comparisons across the three elaborative interrogation groups - naturalistic, pre-underlined main ideas, and pre-underlined main ideas plus structured "why" questions. These are:

1) The naturalistic group, with no pre-highlighted ideas or structured "why" questions, will yield the lowest memory gains, on main ideas, if they are not highlighting correct main ideas;
2) The naturalistic group may have the highest memory performance for secondary ideas, if students are misidentifying secondary ideas as main

3) The pre-underlined ideas plus structured "why" questions group may demonstrate higher learning gains than the group receiving pre-underlined ideas with no structured "why" questions, if students are having difficulty in generating appropriate "why" questions.

Among the three elaborative interrogation groups, there are three different levels of support, ranging from no support, to pre-identified main ideas, to pre-identified main ideas plus structured "why" questions. It is expected that students studying without support will highlight at least some of the appropriate main ideas and will construct some appropriate elaborations. However, if students fail to highlight the correct main ideas and/or fail to generate appropriate elaborations (e.g., they are too general), then the elaborations performed will not aid students in the multiple choice items reflecting the main ideas in the text. Providing students with supports that clearly identify the critical content (i.e., main ideas) or providing students with identified main ideas plus appropriate "why" questions should facilitate performance. Therefore, it is expected that the elaborative interrogation group containing neither pre-highlighted main ideas nor structured "why" questions should be outperformed by the remaining two elaborative interrogation groups on the items reflecting main ideas within the text.

However, due to the fact that the naturalistic group will misidentify some secondary ideas as main ideas, thereby both attending to and performing elaborations on secondary information, it can be expected that the naturalistic

reflecting secondary ideas. Furthermore, if students are having difficulty generating appropriate "why" questions, then students in the elaborative interrogation group receiving the pre-highlighted ideas plus structured "why" questions may outperform students in the elaborative interrogation group receiving only pre-highlighted main ideas, as these latter students must generate and respond to their own "why" questions.

To sum, the comparisons in this study involve contrasting elaborative interrogation with other learning strategies, and contrasting unsupported "naturalistic" use of elaborative interrogation to other elaborative interrogation groups with varying levels of learning supports. The expectation is that, similar to previous research, elaborative interrogation should prove to be a potent strategy relative to other lower-order strategies when students study text material. However, students may require some supports to maximize the gains from this strategy for lengthy expository text.

Method

Participants

One hundred university students, 65 females and 35 males, enrolled in introductory psychology courses in a mid-sized Canadian city, participated in the study. Ages ranged from 18 to 48 (M = 19.99, SD = 4.11). Participation was voluntary and students received course credit (see Appendix C for consent form). In addition, students were debriefed via a feedback form which explained the research experiment (refer to Appendix D). Participants were randomly

passage, found main ideas, and responded to self-generated "why" questions, a second group received the same passage with main ideas underlined and were required to respond to self-generated "why" questions, a third group studied the underlined passage and responded to prepared, structured "why" questions, a fourth group read the non-underlined passage, found main ideas, and then studied them using their preferred study strategies, and a fifth group read the non-underlined passage, found main ideas, and wrote them out over and over until the allotted time elapsed. Equal proportions of males and females participated in each of the five groups.

Materials

Every student wrote the verbal component of a SAT test which consisted of 39 questions (see Appendix B): ten questions required participants to choose the word opposite in meaning to the one in the question, five questions required participants to chose the word that best fit the meaning of the sentence, nine questions required participants to choose the pair of words that best expressed the relationship found in the original pair, and fifteen questions required participants to answer reading comprehension questions based on four passages. The time limit of this verbal sub-test is 30 minutes.

All students read eight pages of prose passages taken from chapter 14 of Santrock and Yussen's (1992) textbook Childhood Development. The 3034 word passage was comprised of 23 paragraphs about early childhood education (refer to Appendix A for a sample passage with main ideas underlined).

First, a free recall task was given. Students responded to the following open-ended question, "Write down all the important information you can remember from the material you just read.". The second memory post-test was a twenty-eight-item matching task (based on Beuermann, 1994). It contained 17 multiple choice questions reflecting 17 of the 18 main ideas presented in the text, and 11 questions reflecting secondary points[1] (refer to Appendix E). These questions were based on main ideas chosen by three out of the five expert readers in the area of child development[2]. Each multiple choice question had four possible answers. All questions and correct answers were verbatim (not inferential) from the passage. These two post-tests have been used to evaluate elaborative interrogation in prior studies (e.g., Woloshyn et al., 1990). The multiple choice and free recall measures allow the assessment of elaborative interrogation with two levels of memory task difficulty. The free recall task is more demanding and allows more retrieval than the associative matching task, which prompts specific fact retrieval through recognition.

Following the memory tests, students were given the opportunity to evaluate the post-tests by answering one open-ended question, "If applicable, list the information that you feel is important but was not fully represented by the memory tests.". In addition to this question, students in the self-study strategy group answered the following question, "Write down all the ways you studied the paragraphs.".

---

1 The researcher accidentally omitted a main idea question.

(Seifert, 1993). The following passage consists of two of Seifert's paragraphs describing the snowshoe hare. The paragraphs paralleled material that each group would expect to find in the experimental text (see Appendix F). For example, the elaborative interrogation group with the pre-underlined main ideas would have the main ideas in the sample paragraphs underlined. The paragraphs for the groups who had to identify the main ideas were:

> One of the most common forest animals in Canada is the snowshoe hare. It can be found in most parts of Canada and in some parts of the northwest U.S. Introduced into Newfoundland from Europe in the 1870's, it ranges from the East Coast to the West Coast, and north to the Arctic Ocean. The only place it can't be found is in the tundra regions of the far north.
>
> The snowshoe hare, which has sensitive hearing, has large upright ears. Typically, the ears are larger than the head and are covered in fur in the winter. Although the ears are larger than those of ordinary rabbits, they are smaller than those of the jackrabbit.

After the study strategy (i.e., elaborative interrogation, self-study, or repetition) was performed on each main idea, a two-item matched memory test was administered. Participants chose the correct answer from a choice of four answers. The memory questions were: "The snowshoe hare is most commonly found in: a) Canadian forests, b) Canadian mountains, c) Tundra regions, or d) North American Prairies; and, The snowshoe hare has what type of ears?: a) Large upright, b) Medium upright, c) Small floppy, or d) None of the above" .

---

2 Experts highlighted main ideas and identified possible multiple choice questions.

Students worked individually; however, they studied, received instruction, and were tested in groups up to ten. There were two sessions in the experiment. First, the SAT-Verbal sub-test was administered, which took approximately 30 minutes. Second, the practice session, studying, and testing occurred.

All students in the elaborative interrogation groups were instructed that they would be using a questioning strategy to study text material. Students were made aware that after they used the questioning strategy to study, a memory test would be given about the material. Students were introduced to the task as follows:

> "I am looking at how well people can learn text material when they use a specific study strategy. I am going to teach you how to use one study strategy. It is a questioning strategy and I would like you to use this strategy when you study part of a chapter from a psychology textbook. The section of the chapter is about early childhood education. Please do your best because when you have finished studying, I will check to see how much you remember.".

Participants in the first elaborative interrogation group (no pre-underlined ideas or structured "why" questions) were then given study instructions describing the procedures for reading the text.

> "You will have 50 minutes to read the material and use this new memory strategy. You will want to do two things. First, you will want to underline and number 18 facts that you feel are most important. Second, you will answer the question, "Why would this fact be true?" for every underlined idea. When you write down your answer, make sure you write down the number that corresponds to the fact you already numbered. It is important that I know which answer goes with which fact. For each underlined fact you will answer the same question, "Why would this fact be true?". It is very important that you try to answer this question for every fact, even if you are unsure about the answer. You will have 50 minutes to finish this task."

with no structured "why" questions) were then given study instructions describing the procedures for reading the text.

> "You will have 50 minutes to read the material and use this new memory strategy. You will want to do two things. First, you will want to take note of the 18 underlined facts, as these are the main ideas of the passage. Second, you will answer the question, "Why would this fact be true?" for every underlined idea. When you write down your answer, make sure you write down the number that corresponds to the underlined fact. It is important that I know which answer goes with which fact. For each underlined fact you will answer the same question, "Why would this fact be true?". It is very important that you try to answer this question for every fact, even if you are unsure about the answer. You will have 50 minutes to finish this task.".

Participants in the third elaborative interrogation group (pre-underlined main ideas plus structured "why" questions) were then given study instructions describing the procedures for reading the text.

> "You will have 50 minutes to read the material and use this new memory strategy. You will want to do two things. First, you will want take note of the 18 underlined facts, as these are the main ideas of the passage. Second, you will answer the structured "why" question that corresponds to that particular fact. When you write down your answer, make sure you write down the number that corresponds to the underlined fact. It is important that I know which answer goes with which fact. For each underlined fact you will answer the "why" question for that fact. It is very important that you try to answer each unique question for every fact, even if you are unsure about the answer. You will have 50 minutes to finish this task.".

Participants in the elaborative interrogation group with no pre-highlighted main ideas or structured "why" questions then received instruction and practice about how to perform elaborative interrogation.

> "A good answer explains why that fact would be true and it should be specific to that fact rather than answering a general question. This should be accomplished when you answer the "why" questions for the main ideas. When you explain why that fact would be true it will help you to remember it for later on when I check to see how much you can remember. Sometimes it

you understand what a good answer is, we're going to try a practice passage. The practice passage is about the snowshoe hare. First, we'll read the passage. Second, we'll decide what the two main ideas are. Last, we'll answer the "Why would this be true?" question for the two main ideas. Answering this question requires that you explain why that particular fact is true. Your answer needs to be specific to each of the two facts. After you have answered the question about each main idea, I will check to see what you can remember with a short multiple choice test. Let's try the passage and I'll help you by giving you feedback about what the main ideas are and your answers to each of the two "why" questions.".

Participants in the elaborative interrogation group with pre-highlighted main ideas but no structured "why" questions then received instruction and practice about how to perform elaborative interrogation.

"A good answer explains why that fact would be true and it should be specific to that fact rather than answering a general question. This should be accomplished when you answer the "why" questions for the underlined main ideas. When you explain why that fact would be true it will help you to remember it for later on when I check to see how much you can remember. Sometimes it is hard to know what a good answer to the "why" question would be. To help you understand what a good answer is, we're going to try a practice passage. The practice passage is about the snowshoe hare. First, we'll read the passage with the two main ideas underlined and numbered. Then, we'll answer the "Why would this be true?" question for the two main ideas. Answering this question requires that you explain why that particular fact is true. Your answer needs to be specific to each of the two facts. After you have answered the question about each main idea, I will check to see what you can remember with a short multiple choice test. Let's try the passage and I'll help you by giving you feedback about your answers to each of the two "why" questions.".

Participants in the elaborative interrogation group with pre-highlighted main ideas plus structured "why" questions then received instruction and practice about how to perform elaborative interrogation.

"A good answer explains why that fact would be true and it should be specific to that fact rather than answering a general question. This should be accomplished when you answer the "why" questions for the underlined main ideas. When you explain why that fact would be true it will help you to

> Sometimes it is hard to know what a good answer to the "why" question would be. To help you understand a good answer, we're going to try a practice passage. The practice passage is about the snowshoe hare. First, we'll read the passage with the two main ideas underlined and numbered. Then, we'll answer each "why" questions corresponding to each main idea. Answering this question requires that you explain why that particular fact is true. Your answer needs to be specific to each of the two facts. After you have answered the question about each main idea, I will check to see what you can remember with a short multiple choice test. Let's try the passage and I'll help you by giving you feedback about your answers to each of the two "why" questions.".

Students were presented the two-paragraph passage about the snowshoe hare, as was mentioned in the materials section, via overhead transparencies. Students in the naturalistic group were aided in finding the correct main ideas, and the other two elaborative interrogation groups had the main ideas pre-underlined. After each paragraph, participants were asked to answer the question, "Why would that fact be true?" for the main idea (students in the elaborative interrogation group with pre-underlined main ideas plus structured "why" questions had the specific questions presented to them, whereas the other two groups generated their own "why" questions). Students were prompted to generate an adequate elaboration regarding the specific fact. Students were given 30 seconds to generate an elaboration for each sentence. They were assisted in the production of a good answer.

After performing two adequate elaborations, students were given the practice, two-item multiple choice task. Students were given the correct responses, as feedback, as they progressed through the memory test.

After the practice session, the experimental material was introduced with a

(no pre-highlighted ideas or structured "why" questions) were then told:

> "Now I'm going to give you the text. Remember, you will have 50 minutes to answer the "Why would this fact be true?" question for each of the 18 main ideas you underlined, so work as quickly as you can.".

Students in the second elaborative interrogation group (pre-highlighted ideas but no structured "why" questions) were then told:

> "Now I'm going to give you the text. Remember, you will have 50 minutes to answer the "Why would this fact be true?" question for each of the 18 underlined main ideas, so work as quickly as you can.".

Students in the third elaborative interrogation group (pre-highlighted ideas plus structured "why" questions) were then told:

> "Now I'm going to give you the text. Remember, you will have 50 minutes to answer the structured "why" question for each of the 18 main ideas underlined, so work as quickly as you can.".

The students in all three elaborative interrogation conditions were then told:

> "If you are unsure about the answer to the "why" question, that's okay, just take your best guess. It is really important that you try to answer the question even if you are not sure about the answer. After you have answered all of the questions, I will check to see what you can remember. Do you have any questions?".

All students were also given a 25-minute time reminder:

> "Your time is now half over. You have 25 minutes left to work on the text material.".

Participants in the self-study strategy group were instructed to study the material using their preferred study behaviours. They were also made aware that a memory test would be given about the material. Students were introduced to the task as follows:

own study strategies. I would like you to study part of a chapter from a psychology textbook. The section of the chapter is about early childhood education. Please do your best because when you have finished studying, I will check to see how much you remember.".

Participants in the self-study strategy group then received study instructions describing the procedures for reading the text.

"The following reading material contains 18 main ideas that you should underline. You will be allowed 50 minutes to study the material however you would normally study. It is important that you try your best to study the information as I will check to see how much you remember later on.".

Participants in the self-study group then received a practice session. Students were presented the two-paragraph passage about the snowshoe hare, as was mentioned in the materials section, via overhead transparencies. After each paragraph, participants were asked and aided in identifying the main fact. They were then given 30 seconds to study each fact however they wished.

After studying the two main ideas, students were given the practice two-item multiple choice task. Students were given the correct responses, as feedback, as they progressed through the memory test.

After the practice session, the experimental material was introduced with a quick reminder of the task.

"Now I'm going to give you the text with 18 main ideas. Remember, you have 50 minutes to underline the main ideas and study them, so work as quickly as you can.".

The students in the self-study condition were then told:

"It is really important that you try to study the material to the best of your abilities. After you have finished studying, I will check to see what you can remember. Do you have any questions?".

"Your time is now half over. You have 25 minutes left to work on the text material.".

Participants in the repetition group were instructed to study the material by writing out the important information over and over. They were also made aware that a memory test would be given about the material. Students were introduced to the task as follows:

"I am looking at how well people can learn text material when they use a study strategy called repetition. This means that I want you to write down information over and over until the given time is completed. I would like you to use repetition to study part of a chapter from a psychology textbook. The section of the chapter is about early childhood education. Please do your best because when you have finished studying, I will check to see how much you remember.".

Participants in the repetition group then received study instructions describing the procedures for reading the text.

"The following reading material contains 18 main facts. You will read the passage, chose 18 of the most important ideas and then write out the 18 important ideas over and over until 50 minutes has elapsed. It is important that you use repetition for the full time. I will check to see how much you remember later on.".

Students in the repetition group then received a practice session. They were presented the passage about the snowshoe hare, as mentioned in the materials section, via overhead transparencies. After each paragraph, participants were asked and aided in identifying the main fact. They were then asked to write out each of the underlined sentences for 30 seconds.

After studying the two main ideas, students were given the practice two-item multiple choice task. Students were given the correct responses, as feedback, as they progressed through the memory test.

quick reminder of the task.

"Now I'm going to give you the text with 18 main ideas. Remember, you are going to read the text material, determine 18 main ideas and then write out the 18 points you feel are important over and over until 50 minutes has elapsed.".

Students in the repetition conditions were then told:

"It is really important that you use repetition for the reading material. After you have finished studying, I will check to see what you can remember. Do you have any questions?".

Students were also given a 25-minute time reminder:

"Your time is now half over. You have 25 minutes left to work on the text material.".

After the 50 minute testing session, students in all five conditions were asked to put the text material aside and were given the free recall task. When the free recall test was completed, the 28-item multiple choice test was administered, followed by the evaluation question(s). The entire research session, including post-tests and the SAT-verbal test, was completed in approximately 120 minutes.

Results

Five components of the data were analyzed: SAT-verbal scores, underlined ideas matching expert-identified ideas (with the three unsupported groups), memory performance, generated elaborations (with the elaborative interrogation groups), and the learning techniques employed in the self-study group. Two sets of analyses were used to analyze the memory components. The first set of analyses compared the naturalistic elaborative interrogation, self-study, and

scores across the five groups. No differences were found, F (4, 94) = 1.14, p = .344. In addition, regression analyses were performed to determine how verbal ability was affecting the performances. Verbal ability affected performance on the multiple choice test main ideas, main ideas written down on the free recall task, and the total free recall scores (F Change p values = .000, .008, and .048, respectively). Regression analyses also determined no differences between groups and no interactions (see Appendix I).

Idea Selection.

The means and standard deviations for the underlined information matching main and secondary ideas are presented in Table 1. A 3 (group) X 2 (test-item) repeated measures analysis of variance was performed across the three study groups on the number of selected ideas matching expert-identified main and secondary ideas. This repeated measures of analysis yielded a main effect for group membership, F (2, 57) = 5.23, p = .008, with Bonferroni t's (critical t (2, 57) = 2.72, $p < .05$) indicating that the self-study group found a higher percentage of more ideas than the elaborative interrogation group (M = .39, SD = .08; and, M = .30, SD = .08, respectively). As well, there was a main effect for test-item, F (1, 57) = 46.13, $p < .001$, with matched main ideas exceeding secondary ideas (M = .36, SD = .15; and, M = .21, SD = .08, respectively). This was qualified by an interaction, F (2, 57) = 4.52, p = .015. Bonferroni t's (critical t (2, 57) = 2.72, $p <$ .05) indicated that the elaborative interrogation group located fewer correct main ideas than the self-study group (M = .29, SD = .11; and, M = .44, SD = .13,

---

3 Analyses of all 5 groups together are presented in Appendix G.

57) = 46.13, $p < .001$, with matched main ideas exceeding secondary ideas (M = .36, SD = .15; and, M = .21, SD = .08, respectively). This was qualified by an interaction, F (2, 57) = 4.52, p = .015. Bonferroni t's (critical t (2, 57) = 2.72, p < .05) indicated that the elaborative interrogation group located fewer correct main ideas than the self-study group (M = .29, SD = .11; and, M = .44, SD = .13, respectively).

Memory Performance.

Two aspects of memory performance were assessed, multiple choice scores and free recall. All post hoc analyses were carried out with Bonferroni t's, critical t (2, 57) = 2.72, $p < .05$.

Multiple Choice Test.

The means and standard deviations for the multiple choice scores are presented in Table 2. Memory performance was compared for the correct multiple choice items reflecting main ideas, and correct multiple choice items reflecting secondary ideas.

Across naturalistic elaborative interrogation, self-study, and repetition groups.

A 3 (group) X 2 (test-item) repeated measures analysis of variance was performed to test the scores on multiple choice items reflecting the main and secondary ideas. This repeated measures analysis of variance yielded a non-significant main effect for group, F (2, 57) = 1.41, p = .141. There was a significant main effect for test-item, F (1, 57) = 4.44, p = .04, with more correct main ideas remembered than secondary ideas (M = .77, SD = .12; and, M = .69,

.488.

Among the three elaborative interrogation groups. A 3 (group) X 2 (test-item) repeated measures analysis of variance was performed to test the scores on multiple choice items reflecting the main and secondary ideas. This repeated measures analysis of variance yielded a non-significant main effect for group, F (2, 57) = 1.96, p = .150. There was a main effect for test-item, F (1, 57) = 48.13, p < .001, with more main ideas being correctly identified than secondary ideas (M = .78, SD = .11; and, M = .63, SD = .15, respectively). However, the main effect was qualified by a significant interaction of test-item with group, F (2, 57) = 6.15, p = .004. Post hoc Bonferroni t's indicated that the naturalistic elaborative interrogation group recalled fewer main ideas than the two other elaborative interrogation groups (underlined main ideas and underlined main ideas plus structured "why" questions). However, Bonferroni t's did not yield enhanced performance for multiple choice questions reflecting secondary ideas for the naturalistic group. And, there was no difference between the elaborative interrogation group receiving underlined main ideas and the elaborative interrogation group receiving underlined main ideas plus structured "why" questions.

Free Recall Test.

The means and standard deviations for the free recall scores are presented in Table 3. Three scores were tallied for the free recall: the total number of points written down, the points matching expert-identified main ideas, and the

all information written down, regardless of whether or not the ideas reflected the multiple choice items, one-way analyses of variance were performed on these data. Two raters scored twenty-five percent of the free recall data for the number of free recall points written down, and whether or not each point reflected a main idea or secondary idea. The reliability was 97%, with the discrepancies resolved through discussion. The remainder of the free recall tests were scored by one of the two raters who performed the reliability.

Across the naturalistic elaborative interrogation, self-study, and repetition groups. A one-way of analysis of variance was conducted to compare the total free recall score across the groups. A 3 (group) X 2 (test-item) repeated measures analysis of variance was performed on the recall of main and secondary ideas. The one-way analysis of variance yielded a significant main effect, F (2, 57) = 3.46, p = .038. Bonferroni t's indicated that the naturalistic elaborative interrogation group wrote down more ideas than the repetition group. The repeated measures analysis of variance yielded a non-significant main effect for group, F (2, 57) = 2.08, p = .135. However, there was a main effect for test-item, F (1,57) = 17.38, p < .001, with more main ideas written down than secondary ideas (M = .18, SD = .10; and, M = .10, SD =.12, respectively). There was no significant interaction between test-item and group, F (2, 57) = 2.0, p = .145.

Among the three elaborative interrogation groups. A one-way analysis of variance was conducted on total free recall points written down across the three

analysis of variance was performed on the recall of main and secondary ideas. The one-way analysis of variance did not reveal a significant main effect for total free recall score, F (2, 57) = 2.24, p = .115. The repeated measures analysis of variance yielded a non-significant main effect for group F (2, 57) = 2.08, p = .135. There was a main effect for test-item, F (1,57) = 17.38, p < .001, with more main ideas being recalled than secondary ideas (M = .24, SD = .16; and, M = .04, SD = .05, respectively). However, the main effect for recall was qualified by an interaction between group and test-item, F (2, 57) = 14.42, p < .001. Post hoc Bonferroni t's indicated that the naturalistic group recalled fewer main ideas than the group receiving pre-underlined main ideas plus "why" questions. And, when Bonferroni t's compared performance for the number of secondary ideas written down, the naturalistic group outperformed both the group receiving underlined main ideas and the group receiving both underlined main ideas plus structured "why" questions. The two latter groups did not differ.

Quality of Elaborations.

Each elaboration in the three elaborative interrogation groups was coded into one of four categories that reflected the quality of the response. The categories ranged from precise responses (i.e., a logical explanation that addresses why the fact would be true), to a no response categorization (i.e., failure to respond, answering "don't know," or providing an incomplete answer). The remaining two categories were pat (i.e., explanation was too general but did address the "why" question), or inadequate (i.e., non-explanatory elaboration

with those used in prior research (e.g., Wood & Hewitt, 1993). Specific examples of precise, pat, and inadequate answers for the first main idea of the reading passage, "In child-centred kindergarten, education involves the whole child and includes concern for the child's physical, cognitive, and social development." include:

A) Precise elaboration: "*It involves the whole child because the child learns to do things physically (e.g., tying their shoes, and learning motor skills) and socially (making new friends) and mentally (they are taught to start thinking about why things are the way they are and they explore their world that they live in).*".

B) Pat elaboration: "*because this makes the child develop completely in all areas of life.*".

C) Inadequate elaboration: "*unique developmental pattern for learning.*".

Two raters scored twenty-seven percent of the responses with 89% agreement. Differences were resolved through discussion. The remainder of the material was scored by one of the raters who had performed the reliability. Table 4 provides the means and standard deviations of the categorizations given to the elaborations.

Three one-way analyses of variance compared the amount of precise, pat, and inadequate elaborations across the three elaborative interrogation groups. The "no response" category was not used due to extremely low numbers. Only elaborations matching the expert-identified main ideas were coded, therefore proportions were used. No differences were found: $F(2, 57) = 2.67$, $p = .078$, for precise; $F(2, 57) = 1.13$, $p = .331$, for pat; and, $F(2, 57) = 2.46$, $p = .095$, for inadequate.

The quality of each elaboration was assessed to see whether subsequent performance on the multiple choice test was affected by the adequacy of each response. In general, there were six steps in calculating the conditional probabilities. First, each generated elaboration was coded as precise, pat, inadequate, or no response. Second, each generated elaboration was matched to the corresponding memory test question. Third, each corresponding multiple choice question was coded as correct or incorrect. Fourth, the original four elaboration codings were extended to include whether or not the corresponding multiple choice question was correct or incorrect (e.g., precise elaboration with a correct response, precise elaboration with an incorrect response). Fifth, the mean probability of a correct score following a precise, pat, or inadequate elaboration was then calculated for each elaborative interrogation group. The "no response" category was discarded for the analyses, due to extremely low numbers. And sixth, nine paired-samples t-tests, alpha level .05, were used for the analyses. More specifically, three paired-samples t-tests compared precise elaborations with correct responses versus pat elaborations with correct responses; precise elaborations with correct responses versus inadequate elaborations with correct responses; and, pat elaborations with correct responses versus inadequate elaborations with correct responses, for each elaborative interrogation group.

The t-tests revealed that participants across all elaborative interrogation groups were more likely to answer the multiple choice questions correctly when

elaboration: t (19) = 3.25, p = .004, for the naturalistic condition; t (19) = 2.84, p = .01, for the pre-underlined condition; and t (19) = 7.21, p < .001, for the pre-underlined plus structured "why" question group. The same pattern resulted when comparing precise elaborations to pat elaborations: t (19) = 2.08, p = .05, for the naturalistic group; t (19) = 4.10, p = .001, for the pre-underlined group; and t (18) = 7.13, p < .001, for the pre-underlined plus "why" question condition. However, when pat elaborations were compared to inadequate elaborations, no differences emerged in any of the three elaborative interrogation groups (refer to Table 5 for a summary of all the t scores).

Self-Study Behaviour.

Strategies were coded based on the responses that students wrote down during the study session and from a question presented in the test booklet asking the participants to write down all the techniques they used to study the paragraphs. The study techniques were coded according to Wood and Hewitt (1993) with the addition of two categories. Wood and Hewitt categorized study strategies into four general groupings:

1) Verbal Strategies. These included elaborations, questioning, rhymes, or letter or keyword mnemonics;
2) Imagery. That is, creating a mental picture;
3) Prior Knowledge. This referred to using knowledge from past experiences or from a stated source; and,
4) Repetition. This classification included repeating the fact verbatim,

The two additional categories were:

5) Highlighting ideas within the reading passage; and,

6) A combination of repetition and summarizing. That is, copying facts and placing them into a new organizational structure.

Table 6 presents a summary of the employed study techniques.

In the present study, ninety-five percent (19 out of 20) of the participants highlighted ideas they felt were important in the passage, as per strategy instructions. Ninety-five percent (19 out of 20) performed at least one additional study technique. Seventy-four percent of these students (14 out of 19) used only repetition as their additional study technique. Of the remaining twenty-six percent (5 out of 19): one participant used repetition, prior knowledge, and imagery (5.3%); and, the remaining four students (21.0%) used a strategy that combined elements of repetition with summarization.

Discussion

Previous research found that when undergraduates were asked to recall a narrative, ideas rated as important were recalled more than those rated as less important (Brown & Smiley, 1977; Moore & O'Driscoll, 1983). In support of this literature, a general finding emerged both across the study groups and among the three elaborative interrogation strategy groups; specifically, main ideas were recalled more than secondary ideas, on both multiple choice and free recall measures. This suggests that students in all five groups were remembering the gist of each paragraph. However, even though the proportion of main ideas

ideas was poor for the students in the present study (the highest proportion was 44%, for the self-study group). This difficulty in extracting main ideas was also found by Kaspar (1996). Kaspar found that when students studied material paralleling expository text, they failed to properly identify approximately 20% of the main ideas. The greater inefficiency in identifying main ideas in the present study is most likely due to the higher complexity and greater length of expository text. So, even though students were not identifying a majority of the correct main ideas, they still recalled more main ideas than secondary ideas. This may indicate that, regardless of whether learners underline and study the appropriate main ideas, they still understand and remember them. Brown and Smiley (1977) support this notion, stating "...we spontaneously abstract the main ideas...even when no deliberate attempt to do so is instigated." (p.7).

It was hypothesized that if the self-study group chose to use lower-order strategies, the elaborative interrogation group would perform better; but, if the self-study group chose to use higher-order strategies, then performance would be similar to the elaborative interrogation group. However, even though most students used only highlighting and repetition, the post-test scores did not differ between these groups. The fact that undergraduates used these strategies was not surprising; in fact, this lends support to Garner's (1987) assertion that, when left on their own to study, students who possess strategic knowledge often "fall back to lower-order strategies". However, the lack of performance differences between the two groups was unexpected. The finding that students in the self-

elaborative interrogation group may be a function of the elaborative interrogation group's inability to identify the main ideas. It was found that the self-study group identified a significantly higher percentage (44%) of the expert-identified main ideas compared to the naturalistic elaborative interrogation group (29%). Such low levels of identification in the elaborative interrogation group suggest that their poor performance may be an artifact of the content they were focused on at study. That is, if the self-study group was familiar with more of the test content, even through highlighting and repetition, then there would be a higher probability of correctly answering questions related to that content. In contrast, the elaborative interrogation participants may have been attending to information that was not tested at recall.

One explanation for the discrepancy between the self-study and the elaborative interrogation group in the number of located main ideas may be a product of the complex nature of using elaborative interrogation, for the first time, without any supports. That is, the self-study group may have had more time to focus on locating the main ideas than the elaborative interrogation group. This would be a result of the self-study group being more familiar and expedient in use of their study methods because these techniques are routine and executed automatically (and most required minimal effort). For the elaborative interrogation group, on the other hand, the demands of generating and responding to self-generated "why" questions are novel, more time-consuming, and complex. It is important to remember that both groups had the same total

students in the elaborative interrogation group, because they were using an unfamiliar strategy, may have devoted more resources to executing the strategy and less time to identifying the main ideas.

However, difficulty in identifying main ideas within expository text may only be part of the reason why the naturalistic elaborative interrogation scores did not differ from self-study, and repetition (as was hypothesized), on post-tests evaluating the knowledge of main and some secondary ideas. Expository text's content and structure may be contributing to the similar performances across study strategies. Seifert (1993) proposed that the peripheral information, which qualifies and exemplifies the main idea in prose passages, may in fact be providing elaborations to the main idea. And, therefore, the paragraph surrounding the main idea could activate prior knowledge, an event which would normally not occur when using repetition-based strategies (Woloshyn, Pressley, & Schneider, 1992). It is possible, then, that the structure of the materials provided sufficient elaboration to enhance learning even in groups where students were using lower-order strategies, like repetition. Although Seifert reported enhanced performance for students instructed to use elaborative interrogation over those instructed to simply underline main ideas, he also reported smaller effect sizes for descriptive prose, compared to lists of facts, and paragraphs containing only main ideas.

Misidentification of main ideas was most probably the reason why support was found for the hypothesis that the naturalistic elaborative interrogation group

ideas. And, since students in the naturalistic elaborative interrogation group were not studying the correct main ideas, the hypothesis that students in the naturalistic elaborative interrogation group would outperform the other two groups on secondary ideas was also supported. In fact, the naturalistic group only studied approximately one-third (29%) of expert-identified main ideas, suggesting that students are attending to different material. One possibility is that students are being distracted by more interesting detail in addition to, or because, of time constraints. This would support Garner, Alexander, Gillingham, Kulikowich, and, Brown (1991), who found that when students read scientific text, the interest level of information was a better predictor of recall than the importance of the information. Therefore, when students are not prompted in the identification of correct main ideas, they may be choosing more interesting information as their main ideas.

The fact that the elaborative interrogation groups who received pre-underlined main ideas performed better on main ideas than the naturalistic elaborative interrogation group indicates that underlining main ideas is helpful for undergraduates studying expository text. The second support of structured "why" questions, however, did not enhance student performance over having the main ideas pre-underlined. This may indicate that structured "why" questions are not required when undergraduates study lengthy expository text. These opinions were further supported when the quality of elaborations was examined. It was found that the support(s) in the elaborative interrogation groups did not

moreover, there were no differences across the three groups in generating pat or inadequate elaborations. Therefore, the performance differences between elaborative interrogation groups were not an artifact of the support(s) influencing the adequacy of generated elaborations but rather a function of main ideas being pre-underlined which allowed students to attend to (and therefore study) more critical information. Since providing structured "why" questions did not bolster performance over pre-underlining main ideas, and pre-underlining main ideas enhanced performance over the naturalistic group, it would appear that the most helpful scaffolding within expository text is the pre-identification of main ideas.

However, while quality of elaborations did not differ between groups, it is important to note that multiple choice performance was affected by the quality of elaborations provided at study. Students were more likely to answer a multiple choice memory question correctly if the elaboration given at study, for that item, was precise rather than pat or inadequate. This is in agreement with previous studies which have indicated that, typically, elaboration quality affects subsequent performance (Willoughby et al., 1993; Wood et al., 1994). Therefore, both the quality of elaborations and locating the expert-identified main ideas were important for performance on the multiple choice task.

It is important to note that individual differences, not group membership, may have caused differences in test performances and main idea identification. Prior studies suggest that verbal ability may affect learning from text (Beuermann,

strategies (Wood & Hewitt, 1993). If verbal ability can affect these factors, then subsequently, test scores would be affected. Therefore, differences in verbal ability across the five groups were tested. No differences were found. Thus, it can be assumed that verbal ability did not have any differential influence on any of the group's performance levels. For example, verbal ability was not the reason the naturalistic elaborative interrogation group failed to outperform the self-study and repetition groups. However, even though verbal ability did not differentially affect the groups, it is important to note that verbal ability did affect some post-test performances within the groups. That is, verbal ability affected post-test performances on main ideas and total free recall score in each of the five groups.

When the recall of all ideas, not just those matching the experts, were compared through the total free recall score, two interesting results emerged. First, total free recall scores did not differ among the three elaborative interrogation groups. This result is what would be expected, considering that all the groups were using the same strategy and that the same amount of information was being manipulated. Therefore, the similar total free recall scores are likely due to the fact that even though learners in the naturalistic group were not highlighting all of the correct main ideas, they were performing elaborations on the same amount of information as the remaining elaborative interrogation groups. However, not all of the information recalled in the naturalistic group was pertinent to the post-test; whereas, the remaining two

multiple choice test. And second, the result of the total free recall measure was the only score supporting the hypothesis that the elaborative interrogation group would outperform the repetition group. That is, the elaborative interrogation group wrote down more ideas than the repetition group. However, there were no further differences when the total free recall scores were divided into main and secondary ideas. Thus, the elaborative interrogation group was not remembering more of the targeted information within the text.

So, the total free recall score allowed a more global indicator of the information students were remembering. Overall, the naturalistic elaborative interrogation group recalled information which failed to match the multiple choice items but matched specific facts from the text (e.g., "Japanese schooling is far from bootcamp", and "children that are white tend to do better than children that are black"). A majority of these facts may have been of high interest value, which would support Garner et al.'s (1991) findings that interest level is positively related to recall probability.

The general lack of differences between elaborative interrogation and repetition (except for the total free recall score) may also reflect the complexity of the task of using elaborative interrogation with no supports. That is, it is possible that students using elaborative interrogation with expository text, for the first time, found the task overwhelming; and, therefore performed poorly. To investigate whether or not the naturalistic group's task was too labourious, a further manipulation was added to the existing study. A repetition group with

the elaborative interrogation group containing pre-underlined main ideas (more scaffolding, therefore less labourious), thereby providing a comparison between the two groups where strategy instruction was the only difference between them.

Participants for the post study test group were twenty undergraduates enrolled in the same psychology courses as the first participants. The students read the same passage, and had the main ideas pre-underlined. They were instructed in the same way as the previous repetition group, but in this case, were instructed to write out the underlined main ideas. They were given the same multiple choice test and free recall task as in the main study. For the multiple choice task, a 2 (group) X 2 (test-item) repeated measures analysis of variance was performed to test the scores on multiple choice items reflecting the main and secondary ideas. For the free recall task, a one-way analysis of variance was conducted for the total free recall score; and, a 2 (group) X 2 (test-item) repeated measures analysis of variance was performed to test the scores on the free recall test reflecting main and secondary ideas. The additional one-way analysis of variance for the total free recall score was included because this score included all ideas written down, not only those ideas matching the main and secondary ideas used on the multiple choice test.

The multiple choice, repeated measures analysis revealed better performance on main ideas over secondary ideas, a replication of the main study. The free recall repeated measures analysis also revealed better performances on main ideas over secondary ideas, another replication of the

six groups for the multiple choice test and free recall test, respectively). However, contrary to the main study, elaborative interrogation did not outperform repetition on the total free recall score, t (38) = .36, p = .721. And, a borderline difference was found on the multiple choice task; specifically, the elaborative interrogation group had a trend towards better performance on main ideas, t (38) = 1.88, p = .068, over the repetition group (M = .83, SD = .11; and, M = .75, SD = .15, respectively).

The two aforementioned results, which did not replicate the main study's findings, can be explained when it is taken into consideration that the total free recall score measured all information written down, and that the multiple choice score reflecting main ideas only measured memory for main ideas. So, when prompted through main idea selection, elaborative interrogation loses its advantage in remembering the less important information within the text, but gains advantage in remembering the main ideas which are reflected on the matching task. This indicates that the elaborative interrogation group is studying the appropriate information and is not being distracted by other, less important, information. These results lend evidence that elaborative interrogation can promote learning, over repetition, even with complex expository text.

Considering the findings of the present study, it would be fair to conclude that elaborative interrogation, within an ecologically valid context, still requires much manipulation in order to discover the optimal settings to produce systematically enhanced results. We know that elaborative interrogation has its merits when

remains unclear is whether this learning technique can be confidently used with expository text.

In support of elaborative interrogation being utilized with expository text, the present study found that the elaborative interrogation group outperformed the repetition group in the amount of total free recall points written down. It is important to remember that this measure included all information written down, not only main or secondary ideas reflected in the matching task. This indicates that students in the elaborative interrogation group retained more information than students in the repetition group. Unfortunately, students are usually graded on specific main and secondary facts within learning material, not the total amount of information remembered. However, when the repetition group with pre-underlined main ideas was compared to the elaborative interrogation group with pre-underlined main ideas, there was a trend towards the elaborative interrogation group outperforming the repetition group on main ideas in the multiple choice test. This may demonstrate that when studying material with identified main ideas, elaborative interrogation may enhance performance over repetition on associative matching tasks.

Another promising finding was that there were no differences in either memory test performance or quality of elaborations between the elaborative interrogation group with pre-underlined main ideas and self-generated "why" questions and the elaborative interrogation group with pre-underlined main ideas plus structured "why" questions. This indicates that the structured "why"

remembering the main ideas. Therefore, students can quickly learn how to generate a proper "why" question to help prompt a precise elaboration for each main idea.

An important difficulty for all students was locating main ideas. Even the self-study group, which located the most main ideas (versus the naturalistic elaborative interrogation group and the repetition group) found less than half of the important ideas. It appears, then, that undergraduates have problems identifying the main ideas of text passages. This identification problem is a crucial factor to overcome in order to facilitate elaborative interrogation's use with text material. Therefore, one of the most important venues for future research is to study why students experience difficulty in locating main ideas.

In addition to studying main idea identification, there are other possible directions for studying the use of elaborative interrogation with lengthy expository text. For example, evaluating elaborative interrogation's efficacy with expository text when the main ideas are pre-agreed upon by both students and experts. Also, it would be beneficial to study elaborative interrogation with different expository text (e.g., more science-based) to reveal a more accurate depiction of elaborative interrogation's potential as a learning technique within the classroom. If future studies can determine that elaborative interrogation is effective with expository text, then students will be able to add an effective learning technique to their existing strategy repertoire that can be used for much of their scholastic studies.

Best, J. B. (1992). Encoding, storing, and retrieval. In West Publishing (ed.). Cognitive Psychology, (chap. 5, pp. 164-218). St. Paul, MN, U.S.A

Beuermann, J. (1994). The effects of verbal aptitude on elaborative interrogation. Unpublished manuscript, University of Western Ontario.

Brown, A. L. & Smiley, S. S. (1977). Rating the importance of structural units of prose passages: A problem of metacognitive development. Child Development, 48, 1-8.

Garner, R. (1987). Strategies for reading and studying expository text. Educational Psychology, 54, 299-312.

Garner, R. (1990). When children and adults do not use learning strategies: toward a theory of settings. Review of Educational Research, 60, 517-529.

Garner, R., & Alexander, P. A., Gillingham, M. G., Kulikowich, J. M., & Brown, R. (1991). Interest and learning from text. American Educational Research Journal, 28, No. 3, 643-659.

Kaspar, V. (1996). Effects of summarization and elaboration on the acquisition of factual information. Unpublished manuscript, University of Waterloo.

Kieras, D. E. (1985). Thematic processes in the comprehension of technical prose. In B. K. Britton & J. B. Black (Eds), Understanding expository text: a theoretical and practical handbook for analyzing explanatory text, (pp.89-

McDermott, C. (1992). Evaluating developmental differences in learning strategies when peers study cooperatively. Unpublished Manuscript, University of Waterloo.

Moore, D. W. & O'Driscoll M. P. (1983). Strategies for studying text: a comparison of Papua New Guinean and American research findings. Journal of Educational Psychology, 75, 460-464.

Moscovitch, M. & Craik, F. I. M. (1976). Depth of processing, retrieval cues, and uniqueness of encoding as factors in recall. Journal of Verbal Learning and Verbal Behaviour, 15, 447-458.

Pressley, M., McDaniel, M. A., Turnure, J. E., Wood, E., & Ahmad, M. (1987). Generation and precision of elaboration: effects on intentional and incidental learning. Journal of Experimental Psychology: Learning, Memory and Cognition, 13, No. 2, 291-300

Pressley, M., Symons, S., McDaniel, M. A., Snyder, B. L., & Turnure, J. E. (1988). Elaborative interrogation facilitates acquisition of confusing facts. Journal of Educational Psychology, 80, No. 3, 268-278.

Seifert, T. L. (1993). Effects of elaborative interrogation with prose passages. Journal of Educational Psychology, 85, No.4, 642-651.

Willoughby, T., Waller, T. G., Wood, E., & MacKinnon, G. E., (1993). The effect of prior knowledge on an immediate and delayed associative learning task following elaborative interrogation. Contemporary Educational Psychology, 18,

Willoughby, T., Wood, E., & Khan, M. (1994). Isolating variables that impact on or detract from the effectiveness of elaboration strategies. Journal of Educational Psychology, 86, No. 2, 279-289.

Woloshyn, V.E., Willoughby, T., Wood, E., & Pressley, M. (1990). Elaborative interrogation facilitates adults learning of factual paragraphs. Journal of Educational Psychology, 82, No. 3, 513-524.

Woloshyn, V. E., Pressley, M., & Schneider, W. (1992). Elaborative interrogation and prior knowledge effects on learning facts. Journal of Educational Psychology, 84, No.1, 115-124.

Wood, E., Fler, C., & Willoughby, T. (1992). Elaborative interrogation applied to small and large group contexts. Applied Cognitive Psychology, 6, 361-366.

Wood, E., & Hewitt, K. L. (1993). Assessing the impact of elaborative strategy instruction relative to spontaneous strategy use in high achievers. Exceptionality, 4(2), 65-79.

(1994). Evaluating the quality and impact of mediators for learning when using associative memory strategies. Applied Cognitive Psychology, 8, 679-692.

Wood, E., Pressley, M., & Winne, P. H. (1990). Elaborative interrogation effects on children's learning of factual content. Journal of Educational Psychology, 82, No. 4, 741-748.

Wood, E., Willoughby, T., Bolger, a., Younger, J., & Kaspar, V. (1993). Effectiveness of elaboration strategies for grade school children as a function of academic achievement. Journal of Experimental Child Psychology, 56, 240-253.

Wood, E., Willoughby, T., Reilley, S., Elliott, S., & DuCharme, MJ. (1995). Evaluating students' acquisition of factual material when studying independently or with a partner. British Journal of Educational Psychology, 65, 237-247.

Table 1.

Means and Standard Deviations for Student-Selected Ideas Matching Multiple Choice Items

	Total Score		Main Ideas		Secondary Ideas	
Group	M	SD	M	SD	M	SD
Elaborative Interrogation, Naturalistic	8.45	2.35	4.90	1.94	3.55	1.32
Self-Study	10.85	2.23	7.50	2.36	3.35	1.27
Repetition	9.65	2.45	6.00	2.71	3.65	1.46

Table 2.

Means and Standard Deviations of Multiple Choice Test Performance

	Total Score		Main Points		Secondary Points	
Group	M	SD	M	SD	M	SD
Elaborative Interrogation, Naturalistic	19.50	2.37	12.20	2.17	7.30	1.42
Elaborative Interrogation, with Underlines	21.35	2.80	14.15	1.87	7.20	1.58
Elaborative Interrogation, with Underlines and Why Questions	20.40	2.87	14.00	1.69	6.40	1.85
Self-Study	21.10	2.77	13.25	2.29	7.85	0.93
Repetition	19.75	2.88	12.05	2.21	7.70	1.22

Table 3.

Means and Standard Deviations For Free Recall Performance

Group	Total Score		Main Ideas		Secondary Ideas	
	M	SD	M	SD	M	SD
Elaborative Interrogation, Naturalistic	8.70	2.83	2.60	2.06	1.35	1.35
Elaborative Interrogation, with Underlines	6.95	2.61	4.20	2.26	0.10	0.31
Elaborative Interrogation, with Underlines and Why Questions	7.70	2.41	5.40	3.62	0.00	0.00
Self-Study	8.25	2.71	3.90	1.97	1.20	1.61
Repetition	6.75	1.97	2.60	1.27	0.80	0.89

Table 4.

Means and Standard Deviations for Elaboration Codings

Groups	Precise		Pat		Inadequate		No Response	
	M	SD	M	SD	M	SD	M	SD
Elaborative Interrogation, Naturalistic	4.00	2.64	2.15	1.18	2.10	1.80	0.10	0.45
Elaborative Interrogation, with Underlines	8.20	3.32	3.70	1.87	5.05	2.80	0.05	0.22
Elaborative Interrogation, with Underlines and Why Questions	10.05	2.34	3.90	1.45	3.00	1.84	0.05	0.22

Table 5.

Elaboration Quality and its Effect on Memory Performance (i.e., multiple choice task) as a Function of Group.

Group	DF	Precise versus Inadequate	Precise versus Pat	Pat versus Inadequate
Elaborative Interrogation, Naturalistic	19	-3.25**	-2.08*	-1.68
Elaborative Interrogation, with Underlines	19	-2.84*	-4.10***	.95
Elaborative Interrogation, with Underlines and Why Questions	19	-7.21***	-7.13***	-1.50

Note. *$p < .05$. **$p < .01$. ***$p < .001$.

Table 6.

Study Techniques Used in the Self-Study Group (presented in percentages)

Study Technique	Study Technique Percentage
Verbal Strategies	0.00
Imagery	5.30
Prior Knowledge	5.30
Repetition	73.70
Highlighting Main Ideas	95.00
Other	21.00

Reading Material (with pre-underlined main ideas)

Early Childhood Education

With an increased understanding of how young children develop and learn has come a greater emphasis on young children's education. We will explore the following questions about early childhood education: What is child-centered kindergarten? What are developmentally appropriate and inappropriate practices in programs for young children? Does it matter if children attend preschool before kindergarten? What are the effects of early childhood education? What is the nature of education for disadvantaged young children?

Child-Centered Kindergarten

Kindergarten programs vary a great deal. The Montessori approach described at the beginning of the chapter is one variation. Some approaches place more emphasis on young children's social development, others on their cognitive development. Some experts on early childhood education believe that the curricula of too many of today's kindergarten and preschool programs place too much emphasis on achievement and success, putting pressure on young children too early in their development (Bredekamp & Shepard, 1989; Burts & others, in press; Charlesworth, 1989; Elkind, 1987, 1988; Moyer, Egertson, & Isenberg, 1987). Placing such heavy emphasis on success is not what kindergartens were originally intended to do. In the 1840s, Friedrich Froebel's concern for high-quality education for young children led to the founding of kindergarten, literally "a garden for children." The founder of kindergarten understood that, like growing plants, children require careful nurturing. Unfortunately, too many of today's kindergartens have forgotten the importance of careful nurturing for our nation's young children.

involves the whole child in firsthand experiences with people and materials, such as the art experience of these children in an Oakland, California, kindergarten.

(1) In **child-centered kindergarten,** *education involve the whole child and includes concern for the child's physical, cognitive, and social development. Instruction is organized around the child's needs, interests, and learning styles. The process of learning, rather than the finished produc is emphasized.* Each child follows a unique developmental pattern, and young children learn best through firsthand experiences with people and materials, and play is extremely important in the child's total development. *Experimenting, exploring, discovering, trying out, restructuring, speaking,* and *listening* are all words that describe excellent kindergarten programs. Such programs are closely attuned to the developmental status of 4- and 5-year-old children. They are based on a state of *being,* not on a state of *becoming* (Ballenger, 1983).

Developmentally Appropriate and Inappropriate Practices in the Education of Young Children

It is time for number games in a kindergarten class at the Greenbrook School in South Brunswick, New Jersey. With little prodding from the teacher, twenty-three 5- and 6-year-old children pick up geometric puzzles, playing cards, and counting equipment from the shelves lining the room. At one round table, some young children fit together brightly colored shapes. One girl forms a hexagon out of triangles. Other children gather around her to count how many parts are needed to make the whole. After about half an hour, the children prepare for story time. They put away their counting equipment and sit in a circle around one young girl, who holds up a giant book about a character named Mrs. Wishywashy, who insists on giving farm animals a bath. The children recite the whimsical lines, clearly enjoying one of their favorite stories. The hallway outside the kindergarten is lined with drawings depicting the children's interpretations of the book. After the first reading, volunteers act out various parts of the book. There is not one bored face in the room (Kantrowitz & Wingert, 1989).

This is not reading, writing, and arithmetic the way most people remember it. (4) A growing number of educators and psychologists believe that preschool and young elementary school children learn best through active,

Children have to be educated, but they also have to be left to educate themselves.

—Ernest Di

hands-on teaching methods such as games and dramatic play. They know that children develop at varying rates and that schools need to allow for these individual differences. They also believe that schools should focus on improving children's social development as well as their cognitive development. Educators refer to this type of schooling as **developmentally appropriate practice**, *which is education based on knowledge of the typical development of children within an age span (age appropriateness) as well as the uniqueness of the child (individual appropriateness).* Developmentally appropriate practice contrasts with developmentally inappropriate practice, which ignores the concrete, hands-on approach to learning. Direct teaching largely through abstract, paper-and-pencil activities presented to large groups of young children is believed to be developmentally inappropriate.

One of the most comprehensive documents addressing the issue of developmentally appropriate practice in early childhood programs is the position statement by the National Association for the Education of Young Children (NAEYC) (Bredekamp, 1987; NAEYC, 1991). This document represents the expertise of many of the foremost experts in the field of early childhood education. By turning to table 14.1, you can examine some of the NAEYC recommendations for developmentally appropriate practice.

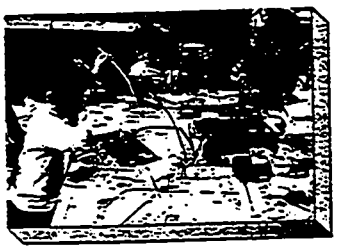
A special worry of early childhood educators is that the back-to-basics movement and its emphasis on academic rigor, which has characterized recent educational reform, is filtering down to kindergarten. Another worry is that many parents want their children to go to school earlier than kindergarten for the purpose of getting a "head start" in achievement.

Does It Matter If Children Attend Preschool Before Kindergarten?

According to child developmental education expert David Elkind (1987, 1988), parents who are exceptionally competent and dedicated and who have both the time and the energy can provide the basic ingredients of early childhood education in their home. If parents have the competence and resources to provide young children with a variety of learning experiences and exposure to other children and adults (possibly through neighborhood play groups), along with opportunities for extensive play, then home schooling may sufficiently educate young children. However, if parents do not have the commitment, time, energy, and resources to provide young children with an environment that approximates a good early childhood education program, then it *does* matter whether a child attends preschool. In this case, the issue is not whether preschool is important, but whether home schooling can duplicate what a competent preschool program can offer.

We should always keep in mind the unfortunate idea of early childhood education as an early start to ensure the participants will finish early or on top in an educational race. Elkind (1988) points out that perhaps the choice of the phrase "head start" for the education of disadvantaged children was a mistake. "Head Start" does not imply a race. Not surprisingly, when middle-class parents heard that low-income children were getting a "head start," they wanted a "head start" for their own young children. In some instances, starting children in formal academic training too early can produce more harm than good. In Denmark, where reading instruction follows a language experience approach and formal instruction is delayed until the age of 7, illiteracy is virtually nonexistent. By contrast, in France, where state-mandated formal instruction in reading begins at age 5, 30 percent of the children have reading problems. Education should not be stressful for young children. Early childhood education should not be solely an academic prep school.

Continued



Component	Appropriate practice	Inappropriate practice
Physical development	Children have daily opportunities to use large muscles, including running, jumping, and balancing. Outdoor activity is planned daily so children can freely express themselves. Children have daily opportunities to develop small muscle skills through play activities such as puzzles, painting, and cutting.	Opportunity for large muscle activity is limited. Outdoor time is limited because it is viewed as interfering with instructional time, rather than an integral part of children's learning environment. Small motor activity is limited to writing with pencils, coloring predrawn forms, or engaging in similar structured lessons.
Aesthetic development	Children have daily opportunities for aesthetic expression and appreciation through art and music. A variety of art media is available.	Art and music are given limited attention. Art consists of coloring predrawn forms or following adult-prescribed directions.
Motivation	Children's natural curiosity and desire to make sense of their world are used to motivate them to become involved in learning.	Children are required to participate in all activities to obtain the teacher's approval, to obtain extrinsic rewards such as stickers or privileges, or to avoid punishment.
Note: Other are	in which the NAEYC has made recommendations for	
appropriate pr	ice are parent-teacher relations, the assessment of children,	
program entry.	acher qualifications, and staffing.	

7

Preschool is rapidly becoming a norm in early c dhood education. Twenty-three states already have legislation pending to pr vide schooling for 4-year-old children, and there already are many private p eschool programs. The increase in public preschools underscores the growi belief that early childhood education should be a legitimate component c public education. There are dangers, though. According to Elkind (1988), arly childhood education is not well understood by many high-level educatic al administrators.

8

The danger is that public preschool education for 4-y old children will become little more than a downward extension of tradi al elementary education. This is already occurring in preschool programs in which testing, workbooks, and group drill are imposed on 4- and 5-year-old children.

Elkind believes that early childhood education should become a part of public education but on its own terms. Early childhood education has its own curriculum, its own methods of evaluation and classroom management, and its own teacher-training programs. There is some overlap of early childhood curricula, evaluation, classroom management, and teacher training with the upper levels of schooling, but they certainly are not identical.

The little ones leaped, and shouted, and
Laugh'd and all the hills echoed.

—William Blak

■ *Critical Thinking*

Most of you went to a preschool or kindergarten. Can you remember what it was like? In what ways could the kindergarten you attended have been improved? How can we make our nation's preschool education programs better?

increased academic pressure can bring to young children (Burts, Charlesworth, & Fleege, 1991; Burts & others, in press; Charlesworth & others, in press). In one recent investigation, Diane Burts and her colleagues (1989) compared developmentally appropriate instructional practices with developmentally inappropriate techniques, observing the frequencies of stress behaviors in young children. The children in the developmentally inappropriate classrooms exhibited more stress behaviors than the children in the developmentally appropriate classrooms. In another recent investigation, children in a high academically oriented early childhood education program were compared with children in a low academically oriented early childhood education program (Hirsch-Pasek & others, 1989). No benefits appeared for the children in the high academically oriented early childhood education program, and there were some possible harmful effects: higher test anxiety, less creativity, and a less positive attitude toward school.

One of the concerns of Americans is that our school children fare poorly when their achievement test scores in math and science are compared with the test scores of school children from many other industrialized nations, especially such Asian nations as Japan and China (McKnight & others, 1987). Many Americans attribute higher achievement scores to a rigid system that sets young children in a lock-step march from cradle to college. In fact, the early years of Japanese schooling are anything but a boot camp. To read further about the nature of early childhood education in Japan, turn to Cultural Worlds of Development 14.1.

The Effects of Early Childhood Education

Because kindergarten and preschool programs are diverse, it is difficult to make overall conclusions about their effects on children's development. Nonetheless, in one review of early childhood education's influence (Clarke-Stewart & Fein, 1983), it was concluded that children who attend preschool or kindergarten:

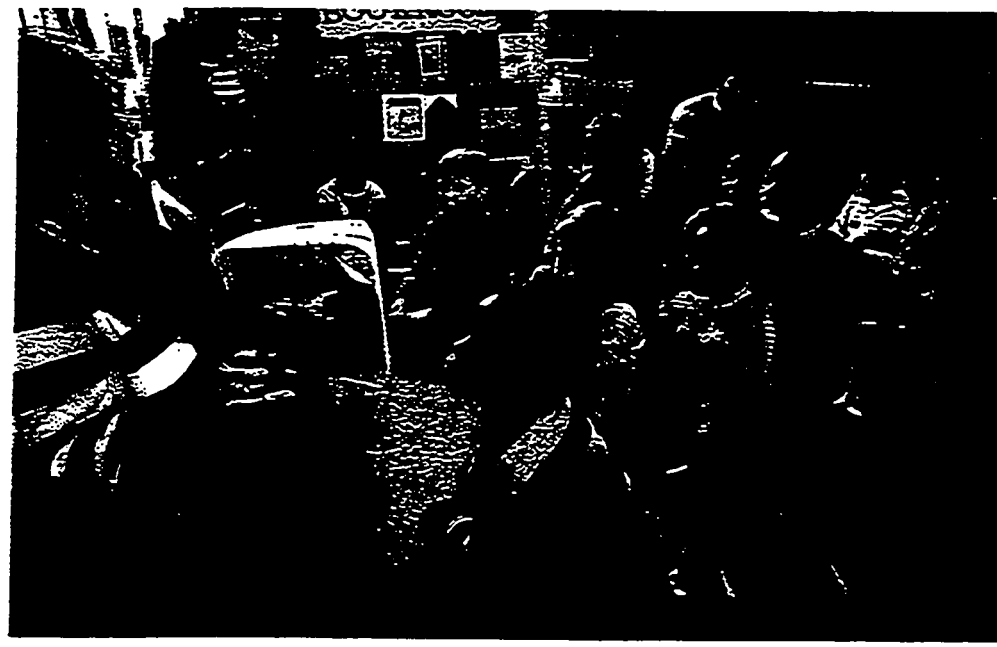
- Interact more with peers, both positively and negatively
- Are less cooperative with and responsive to adults than home-reared children
- Are more socially competent and mature in that they are more confident, extraverted, assertive, self-sufficient, independent, verbally expressive, knowledgeable about the social world, comfortable in social and stressful circumstances, and better adjusted when they go to school (exhibiting more task persistence, leadership, and goal direction, for example)
- Are less socially competent in that they are less polite, less compliant to teacher demands, louder, and more aggressive and bossy, especially if the school or family supports such behavior

In sum, early childhood education generally has a positive effect on children's development, since the behaviors just mentioned—although at times negative—seem to be in the direction of developmental maturity in that they increase as the child ages through the preschool years.

For many years, children from low-income families did not receive any education before they entered the first grade. In the 1960s, an effort was made to break the cycle of poverty and poor education for young children in the United States through compensatory education. **Project Head Start** *is a compensatory education program designed to give children from low-income families the opportunity to acquire the skills and experiences important for success in school.* Project Head Start began in the summer of 1965, funded by the Economic Opportunity Act, and it continues to serve disadvantaged children.

Project Head Start consists of many different types of preschool programs in different parts of the country. Initially, little effort was made to find out whether some programs worked better than others, but it became apparent that some programs did work better than others. **Project Follow Through** *was implemented in 1967 as an adjunct to Project Head Start. In Project Follow Through, different types of educational programs were devised to determine which were the most effective. In the Follow Through programs, the enriched planned variation was carried through the first few years of elementary school.* Were some Follow Through programs more effective than others? Many of the variations were able to produce the desired effects on children. For example, children in academically oriented, direct-instruction approaches did better on achievement tests and were more persistent on tasks than were children in the other approaches. Children in affective education approaches were absent from school less often and showed more independence than children in other approaches. Thus, Project Follow Through was important in demonstrating that variation in early childhood education does have significant effects in a wide range of social and cognitive areas (Stallings, 1975).

The effects of early childhood compensatory education continue to be studied, and recent evaluations support its positive influence on both the cognitive and social worlds of disadvantaged young children (Haskins, 1989; Kagan, 1988a; Lee, Brooks-Gunn, & Schnur, 1988; Raver & Zigler, 1991;



These preschool children are attending a Head Start program, a national effort to provide children from low-income families the opportunity to experience an enriched environment.

vention might produce. Model preschool programs lead to lower rates of placement in special education, of dropping out of school, of grade retention, of delinquency, and of the use of welfare programs. Such programs might also lead to higher rates of high school graduation and employment. For every dollar invested in high-quality, model preschool programs, taxpayers receive about $1.50 in return by the time the participants reach the age of 20 (Darlington, 1991; Haskins, 1989). The benefits include savings on public school education (such as special-education services), tax payments on additional earnings, reduced welfare payments, and savings in juvenile justice system costs. Predicted benefits over a lifetime are much greater to the taxpayer, a return of $5.73 on every dollar invested.

One long-term investigation of early childhood education was conducted by Irving Lazar, Richard Darlington, and their colleagues (1982). They pooled their resources into what they called a consortium for longitudinal studies, developed to share information about the long-term effects of preschool programs so that better designs and methods could be created. At the time the data from 11 different early education studies were analyzed together, the children ranged in age from 9 to 19 years. The early education models varied substantially, but all were carefully planned and executed by experts in early childhood education. Outcome measures included indicators of school competence (such as special education and grade retention), abilities (as measured by standardized intelligence and achievement tests), attitudes and values, and impact on the family. The results indicated substantial benefits of competent preschool education with low-income children on all four dimensions investigated. In sum, there is ample evidence that well-designed and well-implemented early childhood education programs with low-income children are successful (Haskins, 1989; Kagan, 1988a).

At this point, we have discussed a number of ideas about children's education and early childhood education. A summary of these ideas is presented in concept table 14.1. Next, we will turn our attention to the transition to elementary school.

The Transition to Elementary School

For most children, entering the first grade signals a change from being a "homechild" to being a "schoolchild"—new roles and obligations are being experienced. Children take up a new role (being a student), interact and develop relationships with new significant others, adopt new reference groups, and develop new standards by which to judge themselves. School provides children with a rich source of new ideas to shape their sense of self.

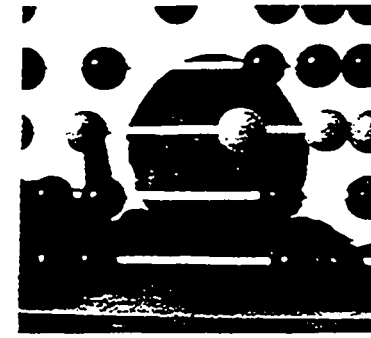
Knowledge which is acquired under compulsion obtains no hold on the min
—P

A special concern about children's early school experiences is emerging. Evidence is mounting that early schooling proceeds mainly on the basis of negative feedback. For example, children's self-esteem in the latter part of elementary school is lower than it is in the earlier part, and older children rate themselves as less smart, less good, and less hard-working than do younger ones (Blumenfeld & others, 1981). In one recent investigation, the first year of school was identified as a period of considerable importance in shaping achievement, especially for ethnic minority children (Alexander & Entwisle, 1988). Black and White children began school with similar achievement test scores, but, by the end of the first year, Black children's performance lagged noticeably behind that of the White children, and the gap widened over the second year of schooling. The grades that the teachers gave to Black children

in the first two grades of school also were lower than those they gave to White children.

In school, as well as out of school, children's learning, like children's development, is *integrated* (NAEYC, 1988). One of the main pressures on elementary teachers has been the need to "cover the curriculum." Frequently, teachers have tried to do so by tightly scheduling discrete time segments for each subject. This approach ignores the fact that children often do not need to distinguish learning by subject area. For example, they advance their knowledge of reading and writing when they work on social studies projects; they learn mathematical concepts through music and physical education (Katz & Chard, 1989; Van Deusen-Henkel & Argondizza, 1987). A curriculum can be facilitated by providing learning areas in which children plan and select their activities. For example, the classroom may include a fully equipped publishing center, complete with materials for writing, illustrating, typing, and binding student-made books; a science area with animals and plants for observation and books to study; and other similar areas (Van Deusen-Henkel & Argondizza, 1987). In this type of classroom, children learn reading as they discover information about science; they learn writing as they work together on interesting projects. Such classrooms also provide opportunities for spontaneous play, recognizing that elementary school children continue to learn in all areas through unstructured play, either alone or with other children.

Education experts Lillian Katz and Sylvia Chard (1989) recently described two elementary school classrooms. In one, children spent an entire morning making identical pictures of traffic lights. The teacher made no attempt to get the children to relate the pictures to anything else the class was doing. In the other class, children were investigating a school bus. They wrote to the district and asked if they could have a bus parked at their school for a few days. They studied the bus, discovered the functions of its parts, and discussed traffic rules. Then, in the classroom, they built their own bus out of cardboard. The children had fun, but they also practiced writing, problem solving, and even some arithmetic. When the class had their parents' night, the teacher was ready with reports on how each child was doing. However, all the parents wanted to see was the bus because their children had been coming home and talking about it for weeks. Many contemporary education experts believe that this is the kind of education all children deserve.



Children in the early elementary school years learn best through concrete, hands-on experience. For example, 6-year-olds can easily understand addition and subtraction if they have actual objects to count instead of a series of numbers written on a chalkboard. For the child shown here, the numbers don't seem so abstract and forbidding when he counts colored balls.

■ *Critical Thinking*

Why does early elementary school involve so much negative feedback? What aspects of our culture and the nature of education are responsible?

Appendix B

Example Questions for the SAT-Verbal Test

The overall instructions for the verbal portion of the SAT test were:

For each question in this section, choose the best answer and blacken the corresponding space on the answer sheet.

The instructions for questions 1-10 were:

Each question below consists of a word in capital letters, followed by five lettered words or phrases. Choose the word or phrase that is most nearly opposite in meaning to the word in capital letters. Since some of the questions require you to distinguish fine shades of meaning, consider all the choices before deciding which is best.

Example:

GOOD: (a) sour (b) bad (c) red (d) hot (e) ugly

Instructions for questions 11-15:

Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words that best fits the meaning of the meaning of the sentence as a whole.

Example:

Although its publicity has been —, the film itself is intelligent, well-acted, handsomely produced, and altogether—.

(a) tasteless. . respectable (b) extensive. .moderate

(c) sophisticated. .amateur (d) risque. .crude (e) perfect. .spectacular

Instructions for questions 16-24 were:

Each questions below consists of a related pair of words or phrases, followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that in the original pair.

Example:

YAWN : PAGES: (a) question :answers (b) anger :madness

(c) smile :amusement (d) face :expression (e) impatience :rebellion

Instructions for questions 25-39 were:

Each passage below is followed by questions based on its content. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Students had to read 3 separate passages and answer multiple choice questions on them. Each multiple choice questions had five possible answers.

Consent Form

Researcher: Rhonda Boudreau
Telephone: x2985
Supervisor: Dr. Eileen Wood
Telephone: x3738

The purpose of this study is to examine learning techniques that can assist students in their understanding and memory of factual information. Your participation in this study is voluntary and you are free to withdraw at any time (and still receive bonus credits). This study has been approved by the Departmental Ethics Committee. Your participation in this study is confidential and only group performance will be used to identify your materials. This study has two parts. First, you will write a verbal section of a standard achievement test (SAT-Verbal) which will take around half an hour. Second, you will study a textbook passage using an instructed learning technique and then complete two memory tests. This will take around an hour and a half.

I agree to participate in the research outlined above.

Student Signature	Age
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Feedback Form

Researcher - Rhonda Boudreau **Extension -** 2985

Fact learning is a requirement in educational settings. Often, these facts are only arbitrarily related to each other and are therefore difficult to learn. Accessing one's prior knowledge and associating new facts with information already known can make novel facts more meaningful and easier to remember. However, people do not often activate and use their prior knowledge to the extent they could. For example, one study demonstrated that when reading facts about Canadian provinces, Canadian adults failed to use their existing knowledge to help them learn the facts (Pressley, Symons, McDaniel, Snyder, & Turnure, 1988). Thus, it appears that people have to be prompted to use their prior knowledge. One strategy that promotes activation of prior knowledge is elaborative interrogation. This strategy employs "why" questions (e.g., Why would that fact be true?) to encourage learners to access available information. Elaborative interrogation is a long-term memory strategy and can be found in most introductory psychology text books under index topics such as memory (e.g., Carlson, N.R. Psychology, the science of behavior. 4th edition).

Many studies have demonstrated that elaborative interrogation facilitates retention of factual material when using lists of randomly ordered man sentences such as "The artistic man put down the brush." And "the sleepy man held the mug." With good elaborations being "...because he finished the painting." And "...filled with coffee." (e.g., Wood, Fler, & Willoughby, 1992). Other studies have used paragraphs consisting of facts, each describing an aspect of life such as habitat and geographical location (e.g., Woloshyn, Willoughby, Wood, & Pressley, 1990). However, what has not been studied is elaborative interrogation's efficacy when a lengthy text, which resembles material students must face during most of their education, is studied. This material has main facts but is supplemented with secondary information which embellishes the main idea. Investigating study strategies are useful in a real-world setting as this research involves finding ways to make studying both easier and more effective.

The proposed study intends to test whether elaborative interrogation will enhance memory over repetition and at least match performance of self-study when all three groups are placed in a naturalistic setting. These three groups will be informed that there are 18 main points in the text. The elaborative interrogation group will be instructed to generate and respond to "why" questions, the self-study group will be told to study however they wish, and the repetition group will be told to write out the main ideas until the allotted time is up. It is expected that elaborative interrogation will be a potent learning strategy

additional elaborative interrogation groups. One will receive pre-highlighted main ideas and structured "why" questions in which to respond and the second group will receive pre-highlighted ideas but will have to generate and respond to their own "why" questions. It is expected that the performances of the three elaborative interrogation groups will vary depending on which elaborative interrogation condition they are placed. For example, the elaborative interrogation group with the most scaffolding (pre-highlighted main ideas and structured "why" questions) will outperform the other two elaborative interrogation conditions. Two post-tests will be conducted after all five groups have completed the task, a free-recall test and a multiple choice test.

Multiple Choice Task

Choose the best possible answer (correct answer in bold print)

1. Developmentally inappropriate practice is based on
   a) **abstract paper and pencil activities**
   b) cognitive age and social age
   c) individual differences
   d) large structured classrooms

2. In the child-centered kindergarten, education includes concern for the child's
   a) physical development
   b) cognitive development
   c) social development
   d) **all of the above**

3. Children from developmentally inappropriate classrooms exhibit
   a) abstract thought
   b) **stress behaviours**
   c) low-self esteem
   d) increased delinquent behaviours

4. A "garden for children" was the original philosophy of
   a) Montessori
   b) the open-classroom approach to education
   c) **kindergarten**
   d) the back-to-basics movement

5. Educators worry that the back-to-basics movement is
   a) too disciplined
   b) inhibiting the child's social development
   c) **filtering down to kindergarten**
   d) a movement based on rigorous training of intellectual and social skills

6. Which of the following is an alternative to preschool?
   a) Montessori program
   b) **home schooling**
   c) private daycare
   d) Head Start program

7. Experts believe that starting children in formal academic training too early
   a) can only benefit the child's cognitive and social development
   b) influences the child's literacy potential
   c) can inhibit the child's future peer relationships
   d) **can produce more harm than good**

8. What is the danger surrounding preschool education?
   a) **that it will become a downward extension of traditional elementary education**
   b) that it will have no long-term benefits for the child
   c) that early emphasis on academic achievement will lead to stress behaviours
   d) that it will not foster the kinds of social and cognitive skills necessary to adapt to kindergarten

9. A type of schooling that includes active, hands-on teaching methods and emphasizes individual differences in development is called
   a) back-to-basics
   b) child-centered kindergarten
   c) **developmentally appropriate practice**
   d) open education

10. Children from high academically oriented preschool programs
   a) **do not benefit from this kind of an environment**
   b) exhibit high anxiety
   c) benefit in the long run
   d) none of the above

11. Americans are concerned that our school children do not perform as well as children from Japan and China in
   a) social studies
   b) **math and science**
   c) a group setting
   d) the open classroom

12. For many years, children from low-income families did not
   a) go to school
   b) **go to kindergarten**
   c) take part in Project Head Start
   d) benefit from the direct teaching model

have

a) negative effects on social development
b) positive effects on academic performance
c) **positive effects on both cognitive and social development**
d) no long-term effects

14. The best way for children to learn is through

a) dramatic play
b) active hands-on teaching methods
c) games
d) **all of the above**

15. Model preschool programs lead to lower rates of

a) placement in special education
b) dropping out of school
c) use of welfare programs
d) **all of the above**

16. Well-designed and well-implemented early childhood education programs with low-income children

a) have no long-term benefits
b) **are successful**
c) have only short-term benefits
d) are no longer available

17. Children in academically oriented, direct-instruction approaches _____ than children form other approaches

a) do better on achievement tests and are more persistent on tasks
b) **display more stress behaviours**
c) are less disruptive in class
d) have more homework

18. Project Follow Through was developed

a) as a follow-up for the children in the Project Head Start determine its effectiveness
b) **to devise different types of educational programs to determine which programs were the most effective**
c) as a predecessor to Project head Start
d) as an alternative to Project Head Start

children's development
a) **a positive**
b) a negative
c) no
d) a nominal

20. Children who attend preschool or kindergarten
a) interact more positively with peers
b) interact more negatively with peers
c) **interact more positively and negatively with peers**
d) interact less with peers

21. Project Head Start was designed for
a) children who were physically handicapped
b) children who were mentally handicapped
c) **children from low-income families**
d) gifted children

22. Preschool is becoming
a) schooling only for upper class children
b) schooling only for lower class children
c) obsolete
d) **the norm**

23. Children who attend preschool or kindergarten are
a) more cooperative and more responsive to adults than home-reared children
b) **less cooperative and less responsive to adults than home-reared children**
c) more cooperative and less responsive to adults than home-reared children
d) less cooperative and more responsive to adults than home-reared children

24. Children who attend preschool or kindergarten are
a) **more confident and more verbally expressive**
b) less assertive and less extroverted
c) both a and b
d) none of the above

a) positive feedback
b) **negative feedback**
c) both negative and positive feedback
d) neutral feedback

26. Many teachers, when trying to "cover the curriculum" often
a) address the fact that children often do not need to distinguish learning by subject area
b) address the fact that children need to learn by distinguishing subject areas
c) **ignore the fact that children often do not need to distinguish learning by subject area**
d) ignore the fact that children often need to distinguish learning by subject

27. In child-centered kindergarten, instruction is organized around
a) the child's intellect
b) the child's interests
c) the child's learning styles
d) **b and c**

28. _____ is emphasized in child-centered kindergarten

a) The finished product
b) **The learning process**
c) The child's enjoyment
d) Increasing reading and reading comprehension ability

Sample Practice Paragraph for Elaborative Interrogation with Underlined Main Ideas and Elaborative Interrogation with Underlined Main Ideas and Structured "why" Questions.

Elaborative Interrogation with pre-underlined main ideas.

One of the most common forest animals in Canada is the snowshoe hare.[1] It can be found in most parts of Canada and in some parts of the northwest U.S. Introduced into Newfoundland from Europe in the 1870's, it ranges from the east coast to the west coast, and north to the Arctic Ocean. The only place it can't be found is in the tundra regions of the far north.

Why would that fact be true?

The snowshoe hare, which has sensitive hearing, has large upright ears.[2] Typically, the ears are larger than the head and are covered in fur in the winter. Although the ears are larger than those of ordinary rabbits, they are smaller than those of the jackrabbit.

Why would that fact be true?

Elaborative Interrogation with pre-underlined main ideas and structured "why" questions.

One of the most common forest animals in Canada is the snowshoe hare.[1] It can be found in most parts of Canada and in some parts of the northwest U.S. Introduced into Newfoundland from Europe in the 1870's, it ranges from the east coast to the west coast, and north to the Arctic Ocean. The only place it can't be found is in the tundra regions of the far north.

Why would the snowshoe hare be one of Canada's most common forest animals?

The snowshoe hare, which has sensitive hearing, has large upright ears.[2] Typically, the ears are larger than the head and are covered in fur in the winter. Although the ears are larger than those of ordinary rabbits, they are smaller than those of the jackrabbit.

Why would the snowshoe hare have large upright ears?

Table G1

5 X 1 ANOVA for Total Free Recall Score

Source	df	F
Between Groups	4	2.30
Error	95	

Table G2

5 X 2 Repeated Measures ANOVA for Multiple Choice Post-Test Scores

Source	df	F
	Between Subjects	
Group (G)	4	1.73
Error	95	
	Within Subjects	
Test-item (T)	1	46.32**
G X T	4	7.30**
Error	95	

Note. **$p < .01$

Table G3

5 X 2 Repeated Measures ANOVA for Free Recall Post-Test Scores

Source	df	F
	Between Subjects	
Group (G)	4	1.33
Error	95	
	Within Subjects	
Test-item (T)	1	99.61**
G X T	4	11.21**
Error	95	

Note. **$p < .01$

Appendix H

Table H1.

Means and Standard Deviations of Multiple Choice Test Performance

	Total Score		Main Points		Secondary Points	
Group	M	SD	M	SD	M	SD
Elaborative Interrogation, Naturalistic	19.50	2.37	12.20	2.17	7.30	1.42
Elaborative Interrogation, with Underlines	21.35	2.80	14.15	1.87	7.20	1.58
Elaborative Interrogation, with Underlines and Why Questions	20.40	2.87	14.00	1.69	6.20	1.85
Self-Study	21.10	2.77	13.25	2.29	7.85	0 .93
Repetition	19.75	2.88	12.05	2.21	7.70	1.22
Repetition, with Underlines	20.35	3.61	12.80	2.68	7.55	1.54

Table H2.

Means and Standard Deviations Free Recall Performance

Group	Total Score		Main Ideas		Secondary Ideas	
	M	SD	M	SD	M	SD
Elaborative Interrogation, Naturalistic	8.70	2.83	2.60	2.06	1.35	1.35
Elaborative Interrogation, with Underlines	6.95	2.61	4.20	2.26	0.10	0.31
Elaborative Interrogation, with Underlines and Why Questions	7.70	2.41	5.40	3.62	0.00	0.00
Self-Study	8.25	2.71	3.90	1.97	1.20	1.61
Repetition	6.75	1.97	2.60	1.27	0.80	0.89
Repetition, with Underlines	7.20	1.70	4.85	1.53	0.01	0.31

Appendix I

Table I1

Regression Analysis for Proportion of Correct Multiple Choice Items Reflecting Main Ideas

Predictors	R Square Change	F Change	df1	df2	Sig F Change
SAT-Verbal Score	0.17	20.02	1	97	0.00*
SAT-Verbal Score, Group Membership	0.02	1.71	1	96	0.19
SAT-Verbal Score, Group Membership, SAT X Group	0.00	0.14	1	95	0.71

Table I2

Regression Analysis for Proportion of Correct Multiple Choice Items Reflecting Secondary Ideas

Predictors	R Square Change	F Change	df1	df2	Sig F Change
SAT-Verbal Score	0.01	1.02	1	97	0.32
SAT-Verbal Score, Group Membership	0.04	1.06	1	96	0.31
SAT-Verbal Score, Group Membership, SAT X Group	0.00	0.00	1	95	0.99

Table I3

Regression Analysis for Free Recall Points Written Down

Predictors	R Square Change	F Change	df1	df2	Sig F Change
SAT-Verbal Score	0.04	4.02	1	97	0.05*
SAT-Verbal Score, Group Membership	0.02	2.44	1	96	0.12
SAT-Verbal Score, Group Membership, SAT X Group	0.00	0.38	1	95	0.54

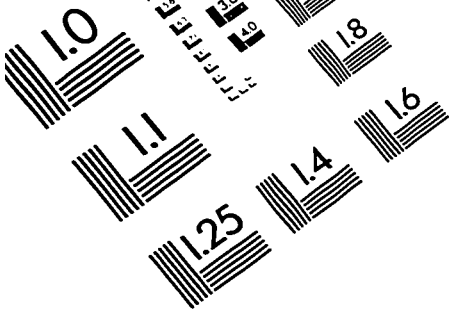
Table I4

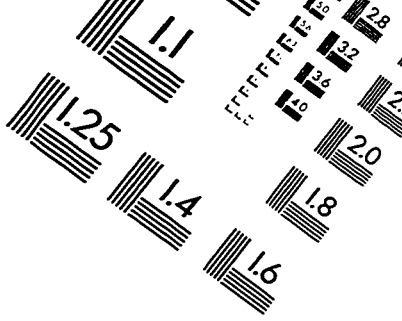
Regression Analysis for the Proportion of Free Recall Points Written Down Reflecting Main Ideas

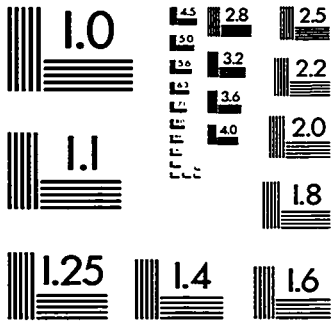
Predictors	R Square Change	F Change	df1	df2	Sig F Change
SAT-Verbal Score	0.04	4.02	1	97	0.05*
SAT-Verbal Score, Group Membership	0.02	2.44	1	96	0.12
SAT-Verbal Score, Group Membership, SAT X Group	0.00	0.38	1	95	0.54

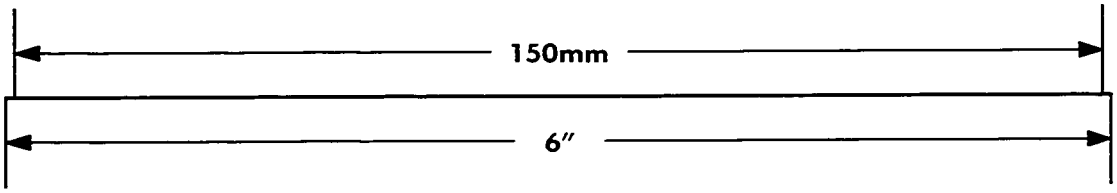
Table I5
Regression Analysis for the Proportion of Free Recall Points Written Down Reflecting Secondary Ideas

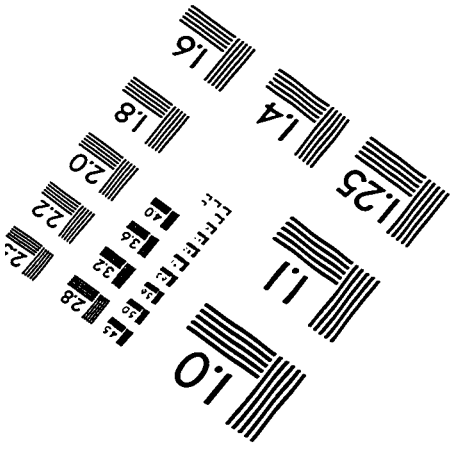
Predictors	R Square Change	F Change	df1	df2	Sig F Change
SAT-Verbal Score	0.00	0.13	1	97	0.72
SAT-Verbal Score, Group Membership	0.00	0.00	1	96	0.98
SAT-Verbal Score, Group Membership, SAT X Group	0.02	1.70	1	95	0.19

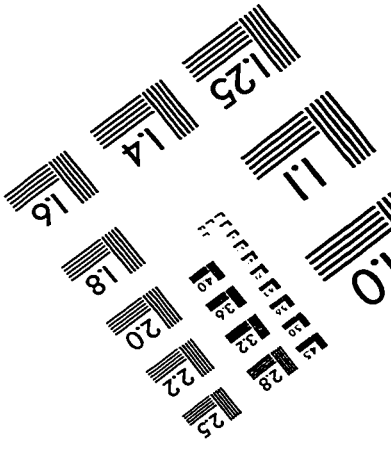












APPLIED IMAGE . Inc
1653 East Main Street
Rochester, NY 14609 USA
Phone: 716/482-0300
Fax: 716/288-5989

© 1993, Applied Image, Inc., All Rights Reserved