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Interactions Among Elaborative Interrogation, Knowledge, and Interest in the Process of Constructing Knowledge From Text

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The authors examined the impact of elaborative interrogation on knowledge construction during expository text reading, specifically, the interactions among elaborative interrogation, knowledge, and interest. Three measures of learning were taken: recall, inference, and coherence. Elaborative interrogation affected all aspects of learning measured, with a significant interaction between elaborative interrogation and interest with regard to inference. The experimental effect on the measure of inference was larger for the students who had less interest than for the students who had more interest. There was also an interaction effect between knowledge and elaborative interrogation for coherence. The experimental effect on coherence was higher for students who had less knowledge than students who had more knowledge.

Investigation of strategic processes in reading has constituted an important area in the field of educational and cognitive research. This research has yielded numerous strategies that facilitate the acquisition of knowledge from text. One is elaborative interrogation, which is described as “a higher-order questioning strategy that uses ‘why’ questions (e.g., ‘Why would that fact be true?’) in order to encourage students to connect new information in their own richly developed knowledge base” (Willoughby & Wood, 1994, p. 139; Pressley et al., 1992). Indeed, elaborative interrogation is expected to improve learning by enabling the reader to anchor new and prior knowledge (Martin & Presley, 1991; Pressley et al., 1992). However, much of the research on the effect of elaborative interrogation has focused on its impact on retention of factual sentences.

Although this research has generally reported positive effects of elaborative interrogation on memory of facts, few studies have related elaborative interrogation to indicators of complex learning. Relatively little is known about the effect of elaborative interrogation on higher order learning processes such as inference generation, integration of content, and construction of a coherent mental representation of the text. That said, might elaborative interrogation increase inferential learning from complex texts by leading students to build multiple links among text segments as well as activating previous knowledge (Martin & Pressley, 1991; Willoughby, Wood, & Khan, 1994)? Because inference-making abilities largely depend on a rich knowledge structure (Trabasso & Magliano, 1996), inducing the activation of old knowledge and integrating it with new information should help inferential learning and organization of knowledge.

Two previous studies assessed influences of elaborative interrogation on inferential processes. Seifert (1993), using one measure of inference, reported no improvement of students’ inferential learning as a result of receiving the elaborative interrogation condition. In contrast, McDaniel and Donnelly (1996), using two measures, reported that an elaborative interrogation group outperformed control groups in inferential learning. In this study, we used a greater variety of measures to create the support of elaborative interrogation on inference.

To evaluate knowledge structuring as a result of learning from text, we produced one form of inference, a coherence score, by using the Pathfinder scaling algorithm (Schvaneveldt, 1990), which captures the degree to which readers’ representations of text are well structured in memory (Goldsmith, Johnson, & Acton, 1991), that is, the degree to which each complex idea unit, principle, or concept in a text is connected in a consistent, meaningful way in the reader’s mental representation of the text. To the extent that a reader’s mental representation is coherent, the reader is likely to have a good understanding of the concept within a domain in a way that is integrated in memory as a meaningful unit. Likewise, an inference is described as any valid piece of information that is not explicitly stated in the text and can be generated only by connecting different pieces of text together (Royer, Carlo, Dufresne, & Mestre, 1996). To measure this form of inference, we used the inference verification technique (IVT; Royer et al., 1996).

Research on text learning with elaborative interrogation has been limited mostly to short, proselike paragraphs or to paragraphs consisting of factual statements (Boudreau, Wood, Willoughby, & Specht, 1999). To better assess the value of using elaborative interrogation with expository texts, we used a long expository text in this study. Some modifications in the nature of *why* questioning were made to accommodate the requirements of expository text reading. For instance, it was not possible to ask *why* questions for each sentence. Only one question was asked for each paragraph. Second, elaborative interrogation was given for some, but not for all paragraphs.

An extensive amount of research supports the theoretical premise that prior knowledge facilitates learning at all levels, including acquisition of new knowledge (Garner & Gillingham,

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1991), inferential processing (Rumelhart & Ortony, 1977), and integration of old and new knowledge (Kintsch, 1988). With respect to fact learning, in the majority of studies to date evaluating elaborative interrogation effects as a function of learner's knowledge, elaborative interrogation benefits have been greater when the readers were knowledgeable about the topic (see, e.g., Willoughby et al., 1994; Willoughby & Wood, 1994; Woloshyn, Pressley, & Schneider, 1992).

Even so, in this study of learning from a longer text, we felt elaborative interrogation might affect learning for students with low prior knowledge for two reasons. First, elaborative interrogation permits readers to direct their attention to crucial segments of the text rather than to insignificant information. Second, elaborative interrogation functions as a comprehension monitoring tool and encourages readers to work on incomplete or misunderstood pieces of the text to answer elaborative questions. Glaser (1989) stated that one criterion for distinguishing poor and good readers is the number of inferences they produce. Glaser pointed out that poor readers do not realize their breakdowns in comprehension. Whereas good readers produce more inferences to rebuild comprehension breaks, poor readers simply paraphrase the text. Therefore, to the extent that elaborative interrogation helps students to detect their comprehension failures, they should be able to produce more inferences to rebuild a coherent representation of the text.

Active knowledge construction requires more than a knowledge base and strategic processing. Within the past few decades, articulation of affective factors such as interest to induce knowledge construction has been widespread (Hidi & Baird, 1986; Wade, 1992). A number of studies have demonstrated the positive effects of interest on knowledge acquisition (see, e.g., Krapp, 1999; Schiefele, 1991, 1996). Students with low interest in a text, however, may not process the text efficiently, although not many studies have been conducted to assess the interrelationships between interest and strategy use in the processing of a text (see, e.g., Krapp, 1999).

The effect of interest on learning may be especially apparent when students are asked to use elaborative interrogation because the implementation of elaborative interrogation is an effortful and demanding process that requires extra attention. If interest matters in motivating full execution of a strategy—and it might (Pintrich & Garcia, 1991; Schiefele & Krapp, 1996)—there could be an interaction between elaborative interrogation strategy use and interest. Elaborative interrogation might result in higher benefits for individuals who are interested in the material.

There is a huge challenge in studying interest and knowledge in the same investigation (Tobias, 1995). The estimated common variance between these two variables seems to be around 20% (Tobias, 1992). Thus, when evaluating interest, there needs to be statistical control of knowledge and, when evaluating knowledge, statistical control of interest (Tobias, 1992). In this study, both occurred.

To reiterate, the purposes of the present study were twofold: (a) to determine the effect of elaborative interrogation on different aspects of learning from expository text and (b) to investigate the effects of students' knowledge of and interest in elaborative interrogation on knowledge construction from text.

Method

Participants

Students. Participants were recruited from educational psychology, biology, and general psychology courses at the University of Maryland at College Park. Individuals received either cash ($20) or extra credit for their participation. One hundred nineteen students participated (79 women and 40 men, mean age = 21 years). There were 83 European Americans, 14 African Americans, 3 Hispanic Americans, and 17 other racial–ethnic groups (2 participants did not indicate their races).

Experts. Two experts in neuropsychology rated the relatedness of main concepts in the passage that students read, which was about a neuropsychological phenomenon. These ratings were used by the Pathfinder algorithm to create a measure of the experts' mental structures of the text. To facilitate the analysis, Pathfinder produced an averaged structure of two experts' ratings, and this structure was used as referent measure. This representation of experts was contrasted with the measure of students' mental representations.

Design

The design was an experimental factorial design. There were two experimental conditions: treatment (answering elaborative interrogation questions) versus control (reading the passage twice for understanding). Students were randomly assigned to condition. A mean split of the scores on the prior knowledge scale was used to create a factor that reflected the level of prior knowledge to be used in descriptive analysis. Participants whose scores fell in the upper range of the distribution were classified as *more prior knowledge*, whereas those participants whose scores fell in the lower half of the distribution were classified as *less prior knowledge.* The dichotomous values were used only in descriptive analysis; all regression analyses were run with continuous values.

The same criterion was used to distinguish the interest levels of the students. A mean split of scores on the interest test was used to create a factor that reflected level of topic interest to be used in descriptive analysis. The group with more interest included those students with a score above the mean, and the group with less interest was composed of students with a score below the mean of the interest measure.

Materials

Text. The passage, "Phantom Pain" (Melzack, 1992), addressed the common accounts of phantom pain and postulated a theoretical explanation of the phenomenon. It was taken from *Scientific American* magazine and was modified slightly to accommodate the study's time limits. These modifications consisted of deleting text segments that were not critical to understanding the core issues and adding a few sentences to increase the coherence of the text. The text read by students had 1,481 words.

Prior knowledge test. Prior to reading the passage, students responded to a 12-item test consisting of 5 open-ended and 7 matching questions that tapped the prior knowledge of the students for the passage. Students were told to write everything they knew about the questions. Answers were coded with a rating procedure that involved identifying each idea unit. Following Pichert and Anderson (1977), each idea unit was described as roughly representing a subordinate clause or phrase conveying a complex thought. Each idea unit was marked as a proposition. All items were scored with the following criterion: one proposition = one point. Therefore, the number of points for each student on an item was an exact match to the number of propositions in the answer. The total score for each participant was determined by tallying the number of points received for all questions. The scale had an alpha coefficient of .80.

Interest test. Prior to reading the passage, students also were asked to indicate how much they were interested in the seven topics covered in the passage. These seven topics were the same topics used in measuring students' prior knowledge. Students responded to a 7-item Likert-type scale, ranging from *not very interested* (1) to *very interested* (7). Internal consistency score for the interest scale was .89.

Recall. A 15-item recall test consisted of 9 short-answer questions and 6 matching tasks measuring the students' memory of the passages. To facilitate analysis and interpretations, a single score was generated by tallying the scores for the 15 questions. Three questions were dropped from the final tally to improve the reliability of the measure. The remaining 12-item scale had an internal consistency of .70.

The coding criterion for open-ended items in the recall test was similar to the coding criterion used for the prior knowledge test. Students' responses were analyzed for the idea units, with each idea unit representing one proposition and being scored as one point.

Inference. Using the IVT (Royer et al., 1996), we wrote 20 inferential statements based on the passage. Of these inferences, 9 were true inferences, and the remaining 11 items were false inferences. Readers were asked to judge whether each statement was a true inference that could be drawn from the passage or not. Royer et al. (1996) had shown construct validity of the instrument, and this instrument has been used in the literature by others (e.g., Wiley & Voss, 1999).

Coherence. Coherence scores were computed by the Pathfinder scaling algorithm. The Pathfinder scaling algorithm transforms the proximity matrix into a network structure in which each concept is represented as a node and the relatedness between objects is depicted by how closely they are linked. The coherence method is a measure of the internal consistency of an individual's data obtained from the rating task. The coherence statistic is based on the assumption that relatedness between a pair of items can be predicted by the relatedness of the items to other items in the set. For example, given that A and B are related and that B and C are related, it can be assumed that A and C are related to each other because they both share some commonalities with B. For each pair of concepts, Pathfinder determines a measure of relatedness by calculating a correlation coefficient of ratings provided by the participants between the columns of n number of paired concepts. Then, it computes averaged overall coherence, which is inferred by the indirect relationships among the items in the data. The coherence score range falls between 0 to 1. Higher coherence is evaluated as better expertise.

To capture the coherence scores of readers, our first procedure was to choose the most important terms within the passage. Therefore, 11 key concepts were identified by Sevgi Ozgungor and the experts to capture the mental representations of the readers for the passage. Then, all possible pairs of these concepts—$\{[n(n-1)]/2\}$—were formed for presentation in the rating task. This resulted in 55 pairs of concepts. On the basis of this construction, each participant was asked to rate each pair for relatedness on a 9-point scale. These ratings represented the quantitative representation of the participant's ideas about the relationships among the most important terms. Because one of the primary concerns of the study was to evaluate the structural representation of a specific knowledge domain as a function of the elaborative interrogation treatment, relatedness ratings were also collected from the experts to provide a referent structure against which to compare the students. The shapes of the participants' mental representations were compared against the shape of the experts' representations. The degree of correspondence was evaluated by checking the visual depiction of the participants' mental representations of the text in memory against the visual depiction of the experts' averaged mental representation of the text.

Although there is no reliability information provided for the coherence scores produced by Pathfinder algorithm, a variety of studies have documented that the Pathfinder algorithm successfully distinguishes experts and novices (see, e.g., Goldsmith et al., 1991; Gonzalvo, Canas, & Bajo, 1994). Others have found consistent experimental effects with the Pathfinder algorithm (see, e.g., Britton & Gulgoz, 1991; Wilson, 1994).

Procedure

Each participant engaged in the tasks individually in small groups ranging in size from 2 to 7 participants. Each participant was randomly assigned to either the control group or the experimental group. After distribution of the consent forms and some written instructions on the purpose of the study, the individual task was administered. Prior to the assigned task, all participants were administered the interest test followed by the prior knowledge test. Then, all participants were asked to read the passage at their own pace.

The procedure was identical for participants in both the experimental and the control groups with one exception. Specifically, participants in the experimental group were asked to provide answers for the elaborative questions embedded within the essay, whereas participants in the control group were instructed to read the essay twice at a rate that allowed them to understand the passage. After reading the passage, each participant received three learning measures: the inference test, the recall test, and a rating task to create coherence scores.

Rating tasks were administered by computer. Students rated each pair of concepts using a 9-point scale, ranging from 1 (*very distantly related*) to 9 (*very closely related*). Participants were reminded to use the full range of the scale in making their ratings. On average, students took 15 min to complete the rating task. The experts performed the rating task in the same manner as the students. The entire experiment lasted approximate 80 min.

Results

Two sets of analyses were conducted to assess the relationships between predictor variables (i.e., condition, prior knowledge, and topic interest) and criterion variables. In the first set of analyses, hierarchical multiple regression procedures were used to investigate the strength of each explanatory variable controlling all other explanatory variables in the model. The second set of analyses assessed the differences in the readers' mental representations of the passage on the basis of the visual networks provided by the Pathfinder algorithm.

Regression Analysis Plan

Hierarchical regression analyses were used to examine the variables predicting students' recall, inference, and coherence. Three separate regression analyses for each reading measure were carried out to examine how much additional variance in each measure of learning was explained by incrementally adding each of the predictor variables. In the regression analyses, topic interest was entered into the equation first. As the second step of the regression analysis, knowledge was added. The variable of condition was entered into the regression equation at the third step to determine if it explained a significant amount of variability in the learning measures beyond those explained by topic interest and prior knowledge. Interaction terms were added last.

To assess the hypothesis that prior knowledge and topic interest would moderate the impact of elaborative interrogation on criteria variables, we created two interaction terms. The first interaction term was a cross-product term computed with condition and topic interest. The second interaction term was a cross-product term computed with condition and prior knowledge. The scores that related to the Interest × Condition and the Knowledge × Condition interaction terms were entered last to assess the unique contribution of each of the interaction terms to the variance in the measures. Results are organized around the following variables:

(a) regression analysis of recall, (b) regression analysis of inference, and (c) regression analysis of coherence. Tables 1, 2, and 3 portray the results of the hierarchical regression analysis for each criterion variable. For each statistically significant effect, the effect sizes were also computed. Effect sizes were computed by using pooled standard deviation of two groups. To compute the effect size of the interaction terms, the effect sizes of subgroups in the interaction term were computed. For instance, to estimate the effect size of Knowledge × Condition interaction on coherence, the effect size of condition for less knowledgeable readers was given along with the effect size of condition for more knowledgeable readers.

Regression Analysis of Recall

When all variables were in the model, recall was explained by prior knowledge, $F_{change}(1, 116) = 74$, $p < .001$. At the third step, condition was not significant. However, the final β for condition was significant ($p < .05$). The effect sizes for knowledge and condition were 1.33 and 0.31, respectively. The mean score of the more knowledge group ($M = 14.23$) was significantly higher than the mean score of the less knowledge group ($M = 9.3$) for recall. The mean score for the experimental group for recall ($M = 12.1$) was significantly higher than the mean score of the control group for the same variable ($M = 10.7$). The full model explained 42% of the total variance in recall. The results are shown in Table 1.

Regression Analysis of Inference

When all variables were in the model, interest, $F_{change}(1, 117) = 5.77$, $p < .001$; prior knowledge, $F_{change}(1, 116) = 8.02$, $p < .001$; condition, $F_{change}(1, 115) = 7.94$, $p < .01$; and the interaction term of Interest × Condition, $F_{change}(1, 114) = 5.60$, $p < .01$, explained variances in inference measure. The effect sizes for topic interest, knowledge, and condition were 0.38, 0.37, and 0.67, respectively. With regard to the interaction term, the effect size for the Interest × Condition interaction was 0.90 when students had less interest in the topic. The effect size was 0.36 when students had more interest in the topic.

For the Interest × Condition interaction for inference, the more interest students ($M = 11.21$) scored significantly higher than the less interest students ($M = 10.37$) on the inference measure. Students in the experimental group ($M = 11.50$) scored significantly higher than students in the control group ($M = 10.10$). However, the mean difference between students in the experimental group ($M = 11.48$) and those in the control group ($M = 9.50$) when they had less interest was higher than the mean difference between the experimental group ($M = 11.51$) and the control group ($M = 10.81$) when they had more interest in the topics of the passage. The full model explained 21% of the total variance in inference. The results are presented in Table 2.

Table 2
Summary of Hierarchical Regression Analysis for Variables Predicting Inference (N = 119)

Variable	*B*	*SEB*	β
Step 1: Interest	0.48	0.22	0.28*
Step 2: Knowledge	−0.09	0.04	0.32*
Step 3: Condition	4.05	1.25	0.93*
Step 4: Interest × Condition	−0.67	0.32	−0.73*
Step 5: Knowledge × Condition	−0.03	0.06	−0.47

Note. $R^2 = .05$ for Step 1; $\Delta R^2 = .06$ for Step 2; $\Delta R^2 = .06$ for Step 3; $\Delta R^2 = .04$ for Step 4; $\Delta R^2 = .00$ for Step 5.
* $p < .05$.

Regression Analysis of Coherence

When all the variables were in the model, coherence was explained by prior knowledge, $F_{change}(1, 117) = 4.07$, $p < .05$, and the Knowledge × Condition interaction term, $F_{change}(1, 113) = 4.29$, $p < .05$. The full model explained 33% of the total variance in coherence. The effect size for knowledge was 1.04. The effect size for the Knowledge × Condition interaction term was 0.30 when students had less knowledge. The effect size was 0.04 when students had more knowledge. The results are shown in Table 3.

For the Knowledge × Condition interaction for coherence, as expected, the more knowledgeable students had significantly higher scores ($M = .68$) than the less knowledgeable students ($M = .43$) on coherence. The experimental group ($M = .68$) did not produce higher scores than the control group ($M = .69$) when they had more knowledge, although students in the experimental group ($M = .47$) scored higher than the control group ($M = .39$) when they had less knowledge.

Graphical Representation of Knowledge Organization

A final method of analysis examined the differences in the visual depiction of the readers' mental representations of the

Table 1
Summary of Hierarchical Regression Analysis for Variables Predicting Recall (N = 119)

Variable	*B*	*SEB*	β
Step 1: Interest	−0.02	0.38	0.01
Step 2: Knowledge	0.49	0.08	0.81**
Step 3: Condition	4.42	2.23	0.50*
Step 4: Interest × Condition	−0.80	0.55	−0.43
Step 5: Knowledge × Condition	−0.12	0.01	−0.22

Note. $R^2 = .02$ for Step 1; $\Delta R^2 = .39$ for Step 2; $\Delta R^2 = .00$ for Step 3; $\Delta R^2 = .02$ for Step 4; $\Delta R^2 = .00$ for Step 5.
* $p < .05$. ** $p < .01$.

Table 3
Summary of Hierarchical Regression Analysis for Variables Predicting Coherence (N = 119)

Variable	*B*	*SEB*	β
Step 1: Interest	0.00	0.03	0.04
Step 2: Knowledge	0.03	0.01	0.79**
Step 3: Condition	0.20	0.15	0.37
Step 4: Interest × Condition	−0.20	0.04	−0.17
Step 5: Knowledge × Condition	−1.40	0.01	−0.41*

Note. $R^2 = .03$ for Step 1; $\Delta R^2 = .26$ for Step 2; $\Delta R^2 = .00$ for Step 3; $\Delta R^2 = .01$ for Step 4; $\Delta R^2 = .03$ for Step 5.
* $p < .05$. ** $p < .01$.

passage as a function of experimental condition. A feature of the Pathfinder algorithm is that it provides a graphic depiction of the individuals' representational network based on their proximity data aside from the numerical values to be used in quantitative analysis.

Figure 1 contains the Pathfinder solution based on the averaged proximity data of the experts. The resultant structure of the expert network has a coherence score of .84 and is easy to interpret. The principal concept, phantom pain, is located at the center of the overall structure with multiple links to other major concepts (e.g., neurosignature, emotion, and neuron). Each of these major concepts is in turn connected to the related concepts in its domain, creating meaningful subclusters of the terms. One such meaningful subcluster is organized around emotion (e.g., amygdala, adrenal glands, and energy).

Figure 2 shows the visual depictions of the mental representations of the passage based on averaged proximity data of the individuals who had less knowledge and received treatment. The coherence score for this network is .57. The mental representation derived from averaged proximity data of the individuals who had less knowledge and received no treatment is shown in Figure 3. The network derived from the averaged score of the control group who had less knowledge has a coherence score of .53.

A comparison of the visual depictions derived from Pathfinder for the experimental and the control groups supports the regression analyses. The network derived from the treatment group displays a knowledge structure that is more coherent and more similar to that of the representation of the experts than the network constructed from the control group.

The mental representation of the individuals who were in the treatment group displays a relatively well-structured organization of the passage. As in the experts' representation, phantom pain forms the center of the network, with links to other major concepts in the passage. Again, semantically related concepts are linked together in a way that produces a structure very similar to the experts' network. It is organized around at least two important concepts introduced in the passage: emotion and neuron. The terms

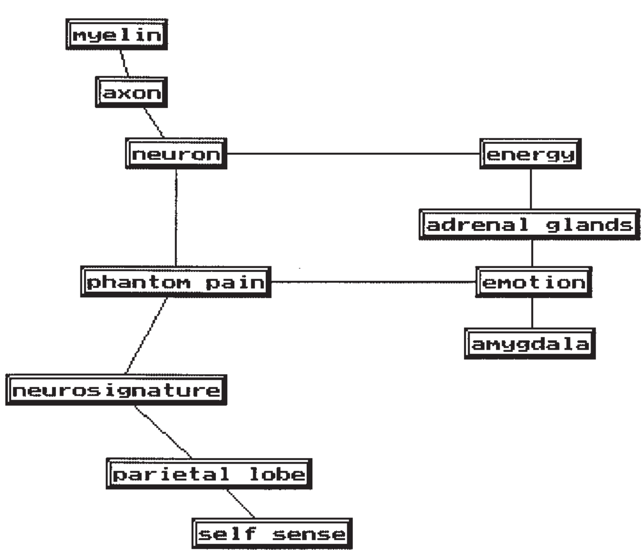

Figure 1. Pathfinder network of averaged experts' ratings.

on the right side of the network are related to emotion. The terms on the left side pertain to neuron.

The treatment group has an organized structure in the sense that semantically related concepts are placed mostly in appropriate domains, forming different clusters for each subcategory more frequently than did the control group. The existence of linkages from major concepts to the core terms of the passage, along with linkages from these concepts to their related subconcepts, further supports the meaningful organization of the topic. Although the treatment group did not link two important, semantically related concepts to each other (parietal lobe and neurosignature), they were able to perceive the relationships among main concepts. As seen in Figures 2 and 3, the relationships of concepts such as phantom pain to neurosignature have been correctly identified by the treatment group but not by the control group. On the other hand, in the concept map representing the knowledge structure of the control group, it is more difficult to detect organizational principles. Emotion, which had a relatively minor value in understanding the content, is located almost as centrally as phantom pain. The hierarchy among the concepts of neurosignature, self sense, and parietal lobe, is not evident in the control group. Likewise, the control group's organization of knowledge surrounding the concept of emotion is not as similar to the experts as that of the treatment group. Finally, the control group, on average, has linked entirely unrelated concepts to each other, as in neuron to neurosignature and self sense to neuron. The degree of consistency and the amount of structuring are lower in the control group than in the treatment group.

Discussion

In this study, we explored the contributions of elaborative interrogation, prior knowledge, and topic interest to learning from long expository texts. The college students who answered the elaborative interrogation questions while reading a long expository text recalled more information, identified more accurate inferences, and had more coherent mental representations than the college students who read the same passage twice for understanding. Elaborative interrogation remained a significant predictor for all three aspects of learning, after controlling the variations accounted for by prior knowledge and topic interest.

There was a significant interaction between prior knowledge and condition for coherence. The benefit of using elaborative interrogation was higher for students who had less knowledge than for students who had more knowledge. Similarly, a significant interaction between topic interest and condition was observed for inference. The benefit of the elaborative interrogation for inference was higher for students who had less interest than for students who had more interest.

Previous research has provided some explanation as to why elaborative interrogation exerts a positive influence on inferential activity. According to Trabasso and Magliano (1996), one crucial element of inference generation is the availability of information in working memory. Trabasso and Magliano referred to three mental operations that help make information required for inferential processing in working memory available: (a) activation of prior knowledge, (b) conscious strategic processing to keep information in working memory, and (c) retrieval of text representation from

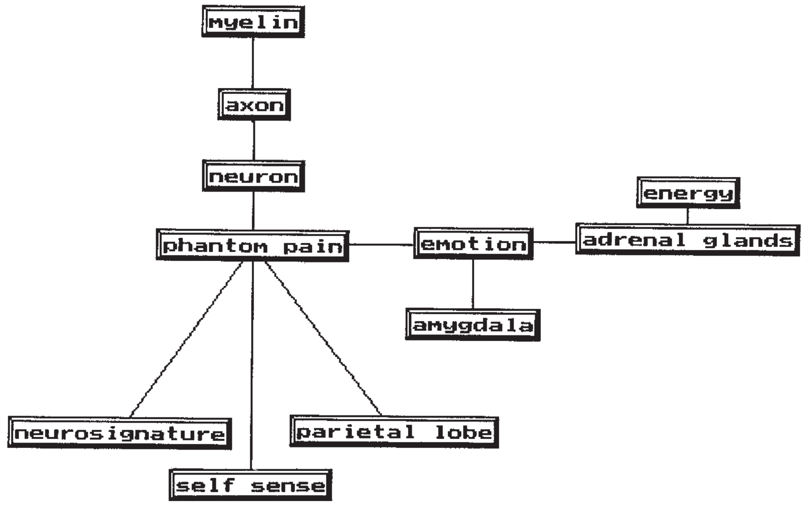

Figure 2. Pathfinder network of averaged ratings of individuals who received the treatment and had less knowledge.

long-term memory. Elaborative interrogation might help students' inferential thinking by supporting all these processes.

Similarly, a possible mechanism whereby elaborative interrogation exerts its impact on coherence could be through its effect on inferential processing. Van den Broek (1994) described inferential processing as the basis for construction of coherence.

The advantage of using elaborative interrogation was higher for less knowledgeable students than for students who possessed more knowledge for coherence. Knowledgeable students might already have had a coherent knowledge base or already have been using some elaborations that made use of elaborative interrogation unnecessary. By the same token, there was an interaction between interest and elaborative interrogation for inference. Students who had more interest in the topic might have used some elaboration strategies spontaneously in their attempts to understand the text. Schiefele and Krapp (1996) reported a high association between topic interest and elaboration strategies.

A limitation of the study concerns the significant differences allocated to time spent in the experimental task for the experimental and the control groups. Whereas students in the control group were asked to read twice to minimize the differences, students in the experimental group took longer to complete the task. Although a large portion of this difference was probably consumed in writing answers, the time spent in reading still remains a confound to the experimental effect on criteria variables.

Previous studies have suggested that when learners possess a rich knowledge base, elaborative interrogation prompts the integration of newly acquired factual information with the existing base, producing a coherent representation of learning material. The current study provides empirical evidence that this benefit is also applicable to less coherent, long expository passages, with the exception that this benefit is held even when students have little knowledge of the content. The implication of this study is that elaborative interrogation encourages students to generate infer-

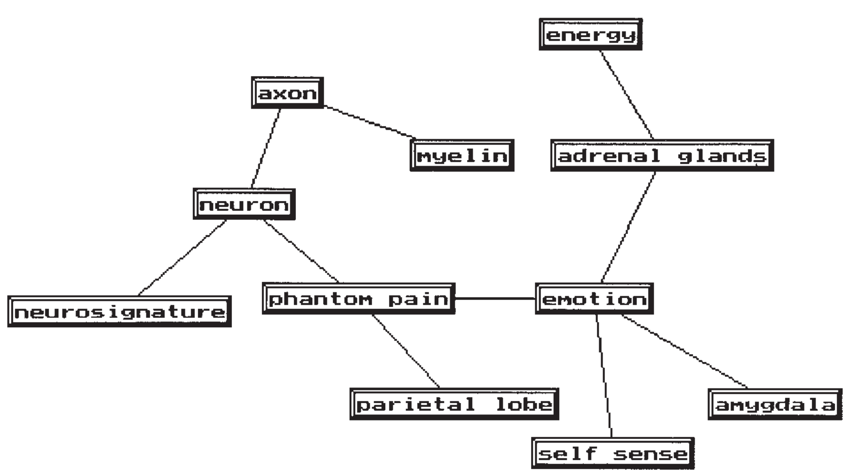

Figure 3. Pathfinder network of averaged ratings of individuals who were in the control group and had less knowledge.

ences to a greater degree than they would in the absence of the condition. These inferences help to rebuild coherence breaks in the passage and aid students in building a knowledge network that more closely resembles the experts' network. This benefit is even more evident for students who lack other mediums such as interest and knowledge to prompt learning.

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