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ABSTRACT

Investigating the selective attention strategy, a study examined the type of attention allocated to important information by good and poor readers. Also tested was the methodological validity of using a conceptual (word recognition) perceptual (tachistoscopic word flash) task as a means of investigating the types of information processing that may occur during reading. Based on the Nelson-Denny Reading Test, Scholastic Achievement Test scores, and teacher rating, subjects--75 tenth grade students--were assigned to average or below average reading ability groups. In the first of two experiments, 43 students read an experimental passage and were then given a perceptual identification task to perform on selected words from the story. In the second experiment, 32 different students read the same passage and were given a conceptual recognition task to perform on the same list of words. Before reading the passage, each subject was assigned the perspective of either a home buyer or a burglar, and told to rate the relative importance of each story segment according to their perspective. Results indicated that both good and poor readers spent more time on text items that were important to their assigned perspective than on unimportant items. Poor readers consistently outperformed good readers on the perceptual identification task, and good readers outperformed poor readers on the conceptual identification task. These results supported the hypothesis that good readers outperform poor readers on selective attention tasks primarily because they employ a greater degree of conceptual attention. (Four tables of data are included, and 20 references are appended.) (MM)

Conceptual Versus Perceptual Text Processing Strategies: Differences between Good and Poor Readers

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Introduction

One of the most enduring findings from research on prose comprehension is that information which is important in a text is better learned and recalled than information which is less important (Johnson, 1970; Reynolds & Shirey, in press). The primary explanation for this "importance" effect is the selective attention hypothesis (Reynolds, Standiford, & Anderson, 1979). The idea is that important information is better learned because readers allocate extra attention to it. Anderson (1982) characterized a simple version of the selective attention hypothesis as follows:

1. Text elements are initially processed to some minimal degree and graded for importance.
2. Extra attention is devoted to elements in proportion to their importance.
3. Because of the extra attention, or a process supported by the extra attention, important text elements are learned better than other elements.

Attention has been measured in two ways: reading time has been used to reflect attention duration and secondary probe reaction time has been used as a measure of attention intensity. The secondary task methodology works on the principle of distractibility. Subjects are given two tasks: a primary task and a secondary task. In most studies, the primary task is for subjects to read and learn text material and the secondary task is having the students respond as quickly as possible to a tone that is sounded occasionally as they read. The assumption is that if subjects are intensely involved in the primary task, they will take longer to respond to the tone. If they are not intensely involved, they should respond relatively more quickly.

A number of researchers (Cirilo & Foss, 1980; Goetz, Schallert, Reynolds & Radin, 1983; Reynolds & Anderson, 1982) have produced data that supports the selective attention hypothesis. A study typical of this genre was conducted by Reynolds, Standiford, and Anderson (1979). Students were asked to read a long passage from a computer screen and were told that they would be tested on the contents when they had finished. Students' perceptions of the importance of text elements were manipulated by using the inserted-question paradigm (Rothkopf, 1966). This involved asking subjects to answer questions inserted into the text at intervals and was designed to direct students' attention toward particular types of information such as proper names or technical terms. The passage was divided into segments that contained information which was either related or unrelated to the questions the students were asked. The results showed that students learned the information made important by the questions better than the control information. Also, students took longer to read text segments containing question-relevant information than text segments that contained control information. These results were seen as supporting the selective attention strategy, at least as far as attention duration was concerned, since the students spent more time reading the information on which they demonstrated better learning and recall.

Similar results were obtained for the attention intensity notion in several studies using the secondary task methodology (Britton, Piha, Davis, & Wehausen, 1978; Reynolds & Anderson, 1982; Reynolds & Shirey, in press; Rothkopf & Billington, 1979). Subjects' reaction times indicated that they were more intensely involved when they read important rather than unimportant information; subjects also learned and recalled important information better than unimportant information.

There seems to be one major limitation in the methodology used to date in all of the selective attention studies. Reading times and secondary task reaction times reflect the amount of attention focused on different categories of text information but give no indication as to the type of attention being focused. For example, Reynolds, Goetz, Lapan, & Kreek (1988) have shown that both good and poor readers use the selective attention strategy when they try to learn text material. In their study, both good and poor 10th graders read the same long prose passage. Reading times and probe reaction times were recorded for both groups. The results showed that both groups allocated more attention to important text items than to unimportant items; however, on the recall test, the good readers remembered significantly more important information that did the poor readers. One possible explanation for the result is that good readers and poor readers allocated different types of attention to the material.

Jacoby (1983a; 1983b) has found that readers are capable of allocating two qualitatively different types of attention while reading: perceptual attention and conceptual attention. Readers use perceptual attention primarily to accurately decode words that occur in a text. Conceptual attention, on the other hand, is used to understand the information conveyed by those words. In general, the allocation of perceptual attention is most likely to increase when words are structurally incorrect or irrelevant to the meaning of the text. The greater the allocation of perceptual attention at encoding, the more likely we are to recognize the form and distinguishing features of the word such as length or misspellings. Conversely, increases in conceptual attention improve our chances of recognizing the meaning of words regardless of recognition for perceptual features. The assumption is that when a word is processed conceptually, that processing compensates for information that would otherwise be gained perceptually. It is further assumed that context can prime readers for certain information and, thereby, make them less reliant on visual information. In other words, conceptual attention is allocated to familiar information that is compatible with our prior knowledge and expectations and, in turn, enables us to focus the bulk of our total attention on meaningful relationships rather than on the physical aspects of the text.

Of particular importance to this study is the assumption that the relative balance of perceptual and conceptual attention allocated during reading provides an excellent picture of the type of strategy used at encoding. In most cases, highly efficient reading is characterized by a large ratio of conceptual to perceptual attention. Inefficient reading results when perceptual processing increases while conceptual processing decreases or remains the same. Depending on this ratio, the pattern of attention allocated during reading affects both the overall amount of effort at encoding and the type and the amount of information that is likely to be remembered.

Up to this point, however, trying to measure these two processes simultaneously has been impossible because the memory underlying perceptual processing and that underlying conceptual processing of text have been treated in very different manners and viewed as distinctly different. Performance on tests of conceptual memory has typically been treated as relying on memory for a particular prior exposure to text while perceptual memory has been seen as drawing on more general, abstract memory which is not necessarily text related. In other words, the assumption has been that these two types of processing rely on different memory systems - systems that differ in origin as well as usefulness (Craik & Tulving, 1975; McClelland & Rumelhart, 1981; Ehrlich & Rayner, 1981). The problem created by this view is that it is almost impossible to measure these processes in any consistent way. Because of the "different memory" theory, trying to measure for conceptual processing and perceptual processing has almost been like trying to compare apples and oranges.

However, recent studies (Jacoby & Dallas, 1981; Carroll & Kirsner, 1982) have found support for the idea that both perceptual and conceptual word identification rely on the same memory. In these studies the subjects were required to identify words either perceptually or conceptually from the following three conditions: 1) words that had previously been processed perceptually — for example, read in a list without context, 2) words that had previously been processed conceptually — for example, generated from a list of antonyms, and 3) new words which had not been previously processed. Hence, the subjects' reliance on perceptual rather than conceptual processing of a word was changed by varying the context in which the word was read. Results indicated that manipulations which increased data-driven processing of a word facilitated later perceptual identification of that word. Conversely, an increase in meaning-driven processing of that same word resulted in increased conceptual recognition and less perceptual identification. Furthermore, all words appeared in both conditions; however, they were not used in both conditions simultaneously. For example, if the subjects saw the word "hot" in the perceptual condition, they would not see it again in the conceptual condition. Similarly, if the word "hot" was used in the conceptual condition, it would not be used with the same subject in the perceptual condition. In other words, each word was viewed by each subject under different conditions.

This procedure assured two things: 1) no systematic differences would be found because of word difference and 2) no systematic difference would be related to differences between subjects. These concepts are of particular interest to our study since analyses from experiment 1 and experiment 2 are presented together. This approach is slightly unorthodox because we will be comparing different sets of subjects performing different tasks. We realize the methodological risk of this approach even granting the extreme care that was used in ensuring that subjects in the two experiments were as similar as possible. However, we believe that Jacoby's findings alleviate this problem and add validity to the approach. Furthermore, it is necessary to use a procedure of this type if one attempts to look at two different types of attention used in text processing. If the two tasks were to be presented to the same subjects, the results would be confounded due to the additional exposure to the word that would accrue.

Finally, based on this sensitivity to the task manipulation, Jacoby (1983) draws the following conclusions:

1. Contrary to previous belief, perceptual as well as conceptual text processing relies on memory of prior exposure to the text. Thus, they can both be described within the confines of a single model.

2. Perceptual and conceptual identification use different forms of information but do not reflect different memory systems.

3. The effect of task manipulation on perceptual identification reflects memory for the type of processing that occurred and is, therefore, useful for analyzing type of textual processing.

While this technique has expanded our view of textual processing, its usefulness is limited because it has only been tested using simple word lists.

In order to benefit research concerned with prose learning, the idea must be used in longer discourse.

The purpose of the current study is to delve more deeply into the selective attention strategy and attempt to determine the type of attention allocated to important information by good and poor readers. Also, we intend to test the methodological validity of using a conceptual (word recognition)/perceptual (tachistoscopic word flash) task as means of investigating the types of information processing that may occur during reading. Our expectation is that good readers will allocate relatively more conceptual attention to important text elements while poor readers will allocate relatively more perceptual attention. We hypothesize that this difference in the type of attention allocated is one of the reasons why good readers retain more important text information than poor readers even though both groups increase the amount of attention paid to those text items.

Two experiments were conducted. In the first, a group of subjects read the experimental passage and then were given a perceptual identification task to perform on selected words from the story. In the second experiment, a different though similar group of subjects read the experimental passage and were given a conceptual recognition task to perform on the same list of words used in Experiment 1.

Method

Design. A 2 x 2 x 4 mixed factorial design was used in both experiments with two between variables and one within. The between variables included reader ability (at grade level versus below grade level) and assigned perspective (burglar versus home buyer). The within variable was word type (burglar words, home buyer words, filler words, and new words). The dependent measures were reading times and probe response times which represented amount and intensity of textual processing, and scores from the perceptual identification task for Experiment 1 and from the conceptual recognition task for Experiment 2 which gave an estimation of the types of attention allocated to the target words.

Subjects. The subjects were two groups of 10th-grade students who voluntarily participated in the study in return for extra credit in their English class. Forty three subjects participated in Experiment 1—23 were males and 20 were females—and 32 subjects participated in Experiment 2—17 girls and 15 boys.

Materials. The text was the same for both experiments. It was a revised version of a story about two boys skipping school which was originally used in a study investigating the effects of assigned perspective on learning and recall (Pichert & Anderson, 1977). The story was divided into 83 segments and edited so that each segment contained only one type of information—that which would be relevant to a home buyer, that which would be relevant to a burglar, or that which contained no task relevant material (a filler segment). In order to insure that each segment contained only one type of relevant information, the text was normed by sixty 10th-grade students from another high school and by forty-eight adults in a university teacher education class.

In the norming procedure, the experimenter explained that when someone reads a story, some parts seem more important than others. The raters were told that their job was to rate the relative importance of each segment in the story. Each was then randomly assigned the perspective of either a home buyer or a burglar. The instructions were presented on the cover of the rating booklet followed by a segmented copy of the text. Below each segment was a 5-

point rating scale. The scale ranged from very unimportant—1—to very important—5. The raters worked at their own pace and were free to refer back to any portion of the text they wished to review.

The results of the rating procedure were as follows: The mean rating of home buyer segments by those assigned the home buyer perspective was 4.30; the mean rating of all other segments was 1.17. The mean rating of burglar segments by those assigned the burglar perspective was 4.66; the mean rating of all other segments was 1.22. These findings indicate that the appropriate segments were considered highly relevant to their related perspective. They further show that reader perspective is a powerful determinant of textual importance.

Two word lists were used for the perceptual identification task. List 1 was composed of sixty words that were not related to nor used in the reading material. This list was administered at the beginning of the perceptual task in order to establish each subject's individual perceptual threshold, to familiarize the subject with the task requirements, and to serve as an interpolated task. List 2 contained 64 words - 16 drawn one each from 16 different home buyer segments and rated as most salient to the home buyer perspective, 16 drawn one each from 16 different burglar segments and rated as most salient to the burglar perspective, 16 drawn one each from 16 different filler segments and rated as not important to either perspective, and 16 new words which were not used in nor related to the story.

For Experiment 2, only List 2 list was used. List 1 was unnecessary since subjects in this experiment did not need to practice the perceptual identification task.

Procedure. One week prior to the experiment, all potential subjects were given Form F of the Nelson-Denny Reading Test. Based on these scores, scores from the reading and language portions of the S.A.T, and teacher rating, students were assigned to the average or the below average reading ability groups. They were then randomly assigned to either Experiment 1 or Experiment 2. Analysis of the combined test scores showed that there were no systematic differences between the perceptual and the conceptual groups but, that as anticipated, there were large differences between the good and the poor readers performance on these tests. For example, on the Nelson-Denny Comprehension test, conceptual good readers had a mean percentile score of 62; perceptual good readers had a mean percentile score of 61; conceptual poor readers had a mean percentile score of 16.5; perceptual poor readers had a mean percentile score of 17.6. There were no significant differences between the two good reader groups and the two poor reader groups.

The initial phases of Experiments 1 and 2 were identical. When the subjects arrived at the experimental area, they were seated at an Apple IIe microcomputer and told that the experiment was being done to see how students read and understood text from computers. Each subject was then directed to listen through the earphones and to press the space bar as quickly as possible when a soft beep was heard. Each subject responded to ten beeps before moving on to the practice passage. This procedure gave the experimenter an estimate of the subject's raw reaction time to the probe.

The practice passage was unrelated to the experimental passage and was used to familiarize the subject with the computerized text presentation which included reading from the computer screen, responding to the periodic beeps, and pressing the space bar in order to move through the text.

After completing the practice passage, the subjects were given instructions pertaining to their assigned perspectives. One-half of the subjects were instructed to take the home buyer perspective, and one-half were assigned the burglar perspective. Following the instructions, each subject was asked to tell the experimenter one or two things that he/she would look for given the assigned task and reminded to read the text very carefully because he/she would be tested on it later. It was emphasized that the most important thing was to read and understand the relevant material. The subject then read the experimental passage.

Each time a subject finished reading a segment of the text, he/she pushed the space bar to view the next segment. All segments were presented in the same location in the center of the screen. Periodically during the reading, subjects were required to respond to the beep by pressing the space bar. There were 9 beeps for each segment type. Beeps were randomly place in the text by the computer. After reading the final segment of the story, the subjects responded to ten more beeps. The time the subjects spent reading each text segment as well as the time it took each subject to respond to the periodic beeps was recorded by a Mountain Computer Microprocessor clock accurate to about 1 msec.

Procedures for Experiments 1, and 2 diverged once the subjects had completed reading the experimental passage. For Experiment 1, the subjects were escorted to another room and seated in front of another Apple IIe computer and asked to complete the perceptual identification task. An index of perceptual identification was established by employing a practice list of 60 words presented in 6 blocks of 10 words each. The sequence of events accompanying presentation of a word in the practice list were as follows:

First, the words "detection rate?____" would appear on the screen. At this point, the experimenter entered the rate at which the word would flash across the screen. The standard beginning rate was 35 msec. After the rate was entered, a mask (two dashes followed by ten asterisks and two more dashes) appeared on the screen in a horizontal line indicating the area in which the word would be presented. At the bottom of the screen were the words "press space bar when ready". At this point, the experimenter explained that each time the subject pressed the space bar the asterisks would disappear and a word would flash across the screen. The subject was asked to report each word immediately after its presentation and was encouraged to respond to each test item, even though he/she might feel as if he/she was guessing. The subject then proceeded with the practice task. As the space bar was pressed, the asterisks would leave the screen and the word would be presented between the dashes at the rate set by the experimenter. Immediately after the presentation of the word, the mask returned and remained on the screen until the subject again pressed the space bar. After ten words had flashed across the screen, the words "detection rate?____" would again appear on the screen and the experimenter would then readjust the word presentation rate. The first block of ten words was presented for 35 msec., a duration that allowed nearly all subjects to report the presented word. Words in later blocks were presented at either shorter or longer durations as required to obtain a duration that would produce a probability of .50 for a correct perceptual identification for each subject. This sequence of events was then repeated until the entire test list of 60 words had been presented. The presentation duration determined in the practice list was used for the later experimental list.

At the end of the practice list the words "Final Detection Rate?" appeared on the screen. At this time, the experimenter set the rate for which all 64 words on the experimental list would be presented. The mask then reappeared on the screen and the subject proceeded as in the practice session except that all 64 words were presented without interruption and all were presented at the final detection rate determined in the practice list.

For Experiment 2, subjects finished reading the experimental passage and then completed a five minute interpolated task consisting of the first 15 items from the Miller Analogies Test. The subjects were then given a typed copy of Word List 2 and were instructed to circle the words that they remembered seeing in the text. There was no time limit imposed on this task.

Finally, all subjects were given a debriefing questionnaire designed to ascertain whether or not they had remembered their perspective and to what extent they had kept it in mind while reading.

Results

Overview of Analyses

Four separate analyses will be discussed: (1) a reading time analysis using subjects from both experiments, (2) analysis of the correct responses on the perceptual task from Experiment 1, and (3) analysis of the correct responses on the recognition task from Experiment 2. As discussed in the introduction, the analyses are presented together because our intent is to compare the three sets of results. Consequently, in the fourth analysis, we will treat the mean number of correct responses on the conceptual and perceptual tasks as reflecting estimates of the entirety of the average text processing attention used by good and poor readers.

All of the analyses used the same basic design. All had three factors: assigned perspective (burglar or home buyer), ability (good readers vs poor readers) as between-subject factors, and segment type (burglar, home buyer or filler) as a within-subject factor. The segment type factor was expanded to include new words in both the perceptual and conceptual task analyses.

Reading Time Analysis. Significant main effects were found for ability, $F(1,63) = 11.58$, $p<.01$, and for segment type, $F(2, 126) = 1046.26$, $p<.01$. The ability effect was due to the good readers spending less time than the poor readers on all types of segments. The segment type main effect was due to home buyer segments being read significantly more slowly than burglar segments or filler segments. The perspective X segment type interaction was also significant, $F(2, 126) = 7.87$, $p< .01$. This was due to both good and poor readers focusing their reading time on those segments that contained information relevant to their assigned perspective (see Table 1).

Insert Table 1 about here

Perceptual Task Analysis. There was a significant effect for ability, $F(1, 33) = 6.28$, $p< .01$, and for segment type, $F(3, 99) = 14.59$, $p< .01$. The ability effect was due to the poor readers identifying significantly more words than the good readers. The segment type effect was due to home buyer items showing significantly fewer correct responses than the other three types of items. There were also two significant interactions: The perspective X segment type interaction, $F(3, 99) = 2.93$, $p< .05$, and the ability X segment type interaction, $F(3, 99) = 3.49$, $p< .05$. The perspective X segment type interaction was due to subjects getting more correct identifications on words that were relevant to their assigned perspective. The ability X segment type segment on non-target items, and about 25 seconds per segment on the target items. Note that as in previous studies, both groups selectively allocated their attention to the text items they considered important; however, there was a major difference between the two groups in terms of the type of attention they allocated. Good readers consistently allocated more conceptual attention to all types of items than did poor readers (see Table 4).

Insert Table 4 about here

Discussion

This study revealed several interesting findings. First, as expected from much of the previous selective attention research, both good and poor readers spent more time on text items that were important to their assigned perspective than on items that were not important. The good readers had a gain of 2.14 seconds per segment as they moved from reading control segments to target segments; poor reader had a nearly identical gain of 2.15 seconds per segment. Overall, poor readers read more slowly than good readers regardless of item type.

Second, poor readers consistently out performed good readers on the perceptual identification task. Over all of the types of items except new items, poor readers averaged 55% correct on the perceptual task while good readers averaged only 42% correct. New items were not included because they represent base-line data and consequently were identified at a much lower rate than were the other types of items. Also, the selective attention pattern holds up for the perceptual task. Good readers averaged about 39% correct on the control items and about 43% correct on the target items. Poor readers averaged about 52% and 56% over the same two sets of items.

Third, good readers consistently out performed poor readers on the conceptual identification task. Over all types of items except new items, good readers averaged about 68% correct while poor readers averaged about 54% correct. The selective attention pattern also holds for the concepual task. Good readers averaged 61% correct on the control items and 73% correct on the target items. Poor readers averaged about 51% and 57% over the same two sets of items.

Finally, and perhaps most interesting, both good and poor readers increased the ratio of conceptual to perceptual attention allocation as they moved from control items to target items; however, the increase was much greater for good readers than for poor readers. For example, using the perceptual task as the baseline, good readers ratio of conceptual to perceptual attention on the control items was 1.55/1. On the targeted items the same ratio was 1.70/1. For the poor readers, the same two ratios were .98/1 and 1.03/1 respectively.

Selective Attention

The results of this study shed light on the nature of the attention allocated to important text elements by both good and poor readers. Good readers clearly increase the amount of conceptual attention in their reading when they encounter an item they think is important. Poor readers also increase their conceptual attention but not to the degree that the good readers do. Stated another way, both good and poor readers show about the same absolute increase of attention to important text segments. Good readers show an increase of 2.14 seconds per segment while poor readers show an increase of 2.15 seconds per segment. This represents an increase of 25% for good readers and an increase of 21% for poor readers. The real difference in the two groups becomes more apparent when one looks at the ratio of conceptual to perceptual attention contained in those reading time increases. Poor readers increased their perceptual attention about 5% and their conceptual attention about 10% from control to target segments. Good readers had similar increases of 10% and 20% for perceptual and conceptual attention respectively.

Data from this study suggest that our original hypothesis--that good readers out perform poor readers on selective attention tasks primarily because they employ a greater degree of conceptual attention--was correct but limited. Both good and poor readers increase both their perceptual and conceptual attention to target items; however, the good readers do so more strikingly where conceptual attention is concerned. They increase their conceptual attention almost twice as much as do poor readers.

These results seem to contradict some of the previous selective attention research. A number of researchers (Pelham & Ross, 1977; Ryan, 1980; Tarver, Hallahan, & Kauffman, 1976) suggest that poor readers lag behind in goal-oriented selective attention strategies and in the ability to identify important information. Our subjects were able to both identify important information and focus attention on it. What they could not do was learn the information as well as good readers. Our data suggest that the good readers advantage in learning came not from the amount of attention focused on target material but from the type of attention.

Reynolds, Wade, Trathen, and Lapan (1988) have suggested that there are three phases of the selective attention strategy: Task awareness, strategy awareness, and performance awareness. Task awareness means that subjects are metacognitively aware enough to identify those text elements important to meeting an assigned task. Strategy awareness suggests that subjects are able to focus their attention on those items once they are identified. Performance awareness implies that use of the selective attention strategy will be causally related to learning.

All of the subjects in this study showed evidence of both task and strategy awareness. All of our indicators showed that they were able to identify and attend to target items. The major difference between the two groups was the ability to focus conceptual attention toward target items. Given these results, it seems that performance awareness, the ability to learn the material on which you focus, is likely related to the ratio of conceptual to perceptual processing in the focused attention. Since conceptual attention allows readers to retain the meaning of what they read, it seems unlikely that poor readers will reach performance awareness until they are able to improve their conceptual/perceptual attention ratio—on target items and throughout the rest of the text as well.

Good vs Poor Readers Differences

Perhaps the most striking result of the study is that poor readers maintain very nearly a 1/1 ratio of conceptual to perceptual attention regardless of the type of information they are reading. For good readers, the ratio varied from 1.55/1 for control information to 1.70/1 for target information.

These results seem to have three implications for understanding the differences between good and poor readers: (1) poor readers definitely do spent a greater proportion of their cognitive resources on decoding words and attending to the surface features of the text; (2) good readers seems to pay less attention to decoding and more attention to the meaning of the text regardless of the type of item they are reading; (3) good readers are able to increase the conceptual/perceptual processing ratio when they attend to important information to a much greater degree than are poor readers.

These results have implications for instructional strategies based on the selective attention strategy. Certainly, teaching poor readers to quickly identify important text elements and to allocate extra attention to those items they feel are important are useful strategies; however, it is doubtful that they will improve poor readers performance without equal care being given to helping poor readers decode information quickly and to relating that information to what they already know. In terms of this "great debate" that still rages in reading research circles, it seems our conclusions agree with those of Anderson et al. in Becoming a Nation of Readers. Poor readers need to improve both their decoding skills and their comprehension skills. More precisely, until they are able to change the ratio of conceptual/perceptual attention that they allocate to reading, it is unlikely that poor readers ability to learn and recall prose material will be dramatically increased.

Implications for Future Attentional Research

The results of this study clearly suggest that it is no longer adequate in selective attention studies to measure only the amount of attention allocated to particular items. It is likely more important to know the type of attention allocated as well as the amount of attention allocated. This is particularly true if the notions of limited, fixed cognitive capacity advocated by Kahneman (1973) and others are true.

The implication here is that we likely cannot increase a poor readers available cognitive capacity, what we must do is change the makeup of that capacity to allow for a higher ratio of conceptual to perceptual attention. The methodology developed here will be of some assistance to researchers attempting to understand the relationships between attention and learning but it does have limitations. A clear picture of how readers use and allocate attention to reading tasks will not likely obtain until we discover a way to measure the amount of attention, the type of attention and learning all on the same reader over the same task. Until that time, perceptual identification tasks and conceptual identification tasks can be used to provide partial, but nonetheless interesting, data on the attentional processes involved in reading.

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Table 1.
Reading times arrayed by reader ability, perspective , and segment type.

Segment Type	Ability			
	Good Readers		Poor Readers	
	Assigned Perspective			
	Home buyer	Burglar	Home buyer	Burglar
Home buyer				
M	12.35*	11.22	13.92*	13.63
SD	2.35	1.59	2.95	3.36
Burglar				
M	9.20	8.81*	10.89	11.40*
SD	2.12	1.71	3.04	3.43
Control				
M	8.75	8.07	10.11	10.74
SD	1.95	1.49	2.62	3.09

Note. All reading times represented in seconds per segment; * = segments that contain perspective relevant information.

Table 2.
Number of items correctly identified on the perceptual task arrayed by ability, perspective, and segment type.

Segment Type	Ability			
	Good Readers		Poor Readers	
	Assigned Perspective			
	Home buyer	Burglar	Home buyer	Burglar
Home buyer				
M	6.77*	5.80	7.55*	5.55
SD	2.48	1.87	2.96	2.55
Burglar				
M	7.33	7.00*	9.66	10.22*
SD	3.24	2.53	3.60	2.99
Control				
M	6.00	6.60	8.33	8.55
SD	2.91	2.63	1.50	3.24

Note: All scores represent number correct out of sixteen; * = words that are perspective relevant.

Table 3.
Number of items correctly identified on the conceptual task arrayed by ability, perspective, and segment type.

Segment Type	Ability			
	Good Readers		Poor Readers	
	Assigned Perspective			
	Home buyer	Burglar	Home buyer	Burglar
Home buyer				
M	12.33*	12.00	9.80*	8.60
SD	2.12	2.08	4.38	4.27
Burglar				
M	10.33	11.16*	8.60	8.60*
SD	2.12	1.58	3.91	4.39
Control				
M	8.88	10.58	7.80	8.60
SD	2.93	2.35	1.30	3.91

Note: All scores represent number correct out of sixteen; * = words that are perspective relevant.

Table 4.
Reading times, proportion of conceptual and perceptual attention arrayed by ability and type of segment.

	Good Readers		
	Types of Items		
	Targeted items	Non-targeted Items	Control Items
Attention Type			
Conceptual	.73	.69	.61
Perceptual	.43	.41	.39
Duration	10.55	10.20	8.43

	Poor Readers		
	Types of Items		
	Targeted items	Non-targeted Items	Control Items
Attention Type			
Conceptual	.57	.54	.51
Perceptual	.55	.47	.52
Duration	12.55	12.35	10.40

Note: Conceptual and perceptual categories reflect two different group averages; consequently, they do not add to 100%. Attention duration reflects the average reading times per segment of all subjects from both Experiments 1 and 2.