

Chapter 7

Importance of Text Structure in Everyday Reading

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For a moment, think about the last novel which you read. Now, consider the latest newspaper article you read. Both of these pieces of texts involved similar comprehension tasks—the reader wanted to understand what ideas the author of the text was communicating. So it is somewhat unusual that the way in which you read the two pieces was very different in each case. For example, most people read the headline and first paragraph of a news article and then skim the rest unless they are especially interested in the subject matter. On the other hand, one tends to read a novel in a different fashion. Chapters provide convenient boundaries for the reading process, with the text within each chapter assumed to be fairly independent. The organization is less defined than in a news article, so while skimming may occur, it is not following the rule of skimming every paragraph after the first. Contrast both of these examples with reading a journal article. This requires yet another style of reader interaction. Here the experienced reader of journal articles knows exactly which part of the article to read for which purposes by utilizing the well-structured sections focusing on the problem, method, findings, and discussion.

Many of the chapters of this book discuss various computational models of the reading process. Unfortunately, few reading models are at the level of complexity that enables them to read more than one genre of text. As a result the kinds of decisions driven by text structure as just described are either not made by the systems or are implicitly made in that the system is capable of reading one style of text well while ignoring all others. For computational models of reading to become more reflective of the human reading process, this awareness of the role that text structure plays in human reading must be better understood (e.g., Carpenter and Alterman 1993; Mandler and Johnson 1977; Meyer 1975).

The purpose of this chapter is to focus on the role of text structure in reading and remembering text. What is the importance of text structure and how does it relate to other factors that influence reading and understanding texts? The chapter examines reasoning about text structure, genre information, and the intent of an author within

the context of communication between author and reader during the reading of everyday texts under various task conditions. In this chapter I will examine how readers across the life span can use text structure to identify the main ideas an author is trying to communicate to them.

7.1 Interaction among Strategy, Task, Text, and Reader Characteristics in Reading

The communication between an author and a reader depends on interaction among strategy, task, text, and reader characteristics. The characteristics of texts produced by authors are as variable as the characteristics of readers. Predicting understanding and performance from reading is thus extremely complicated. The individual characteristics of people, such as purposes, strategies, interest, and prior knowledge, interact with characteristics of texts, such as topic, structure, and emphasis. To complicate the situation further, task characteristics interact with these reader, strategy, and text characteristics as depicted in figure 7.1 (Jenkins 1978; Meyer and Rice 1989).

7.2 Strategies

This chapter primarily examines only one of the strategies listed in figure 7.1, the structure or plan strategy. This strategy is discussed in detail because it is a strategy that focuses on and uses text structure. Over the last twenty years my colleagues and I (e.g., Bartlett 1978; Meyer, Young, and Bartlett 1989; Meyer, Talbot, and Poon 1995) have been training readers to identify the structure in text to aid their understanding and memory of their reading. We have been able to double the amount of information readers can recall by teaching them what we call the plan strategy. Our strategy involves two steps. In reading, we find the plan the writer used and the main idea organized by that plan. In recalling, we use the same organization. This is a strategy to improve memory. A key motto of the training program is "choose it, use it, or lose it."

We explain to our participants learning the plan strategy that we know five facts about reading for information as seen in figure 7.2. First, the writer wants to tell you something. Second, you must be told in writing. Third, there are only a small number of broad and basic plans in which to organize information about a topic. Fourth, the writer should organize his or her main ideas about a topic with a plan. Fifth, to find this organizational plan is the key to getting the writer's main ideas or message. We explain that this strategy is a good one to use under certain conditions, but not others. Participants are encouraged to use it when they want to know what a writer is trying to tell them. In addition they are encouraged to use the recall step of

Reader Variables

Verbal Ability, Education, Age, World Knowledge,
Perspective, Values, Norms, Reading Expertise,
Interest, Working Memory Capacity, Styles, etc.



Strategy Variables

Structure (Plan) Strategy, Default-List
Strategy, Rereading, Asking Why
Questions, etc.

Task Variables

Presentation
Mode or Rate,
Response Mode,
Task Requirements,
Type & Setting
of Task, etc.

Text Variables

Text Structure, Topic Content, Signaling (explicit emphasis cues),
Cohesion, Number of Levels in Structure, Amount and Type of Details,
Left-branching Sentences, Genre, etc.

Figure 7.1

Reader, strategy, text, and task variables that influence the communication between readers and authors (adapted from Meyer and Rice 1983).



Writer



Text



Reader

- (1) The writer wants to tell you something.
- (2) You must be told in writing.
- (3) There are only a small number of possible plans in which to organize information about a topic.
- (4) The writer should organize the topic with a plan.

(5) To find this organizational plan

is the key to getting the writer's main idea or message.

Figure 7.2

The organizational plan is a key to finding the writer's message (adapted from Meyer, Young, and Bartlett 1989).

the strategy when they want to tell someone or write them a letter about what they read in an article. We explain that the plan strategy is not a good strategy to follow if they are just reading to find out a particular detail, such as the date trout fishing begins, and don't have any interest in the point the writer is trying to make. We also explain that the strategy is not as useful for reading information about a very familiar topic (Meyer 1984, 1987; Voss and Silfies 1996).

7.2.1 Communication between the Author and the Reader

First, I am assuming that most writers are trying to communicate something to their readers (e.g., Flower and Hayes 1984; Grice 1975). Constructivists (e.g., Goetz and Armbruster 1980; Spiro 1980) have argued strongly against any idea of "meaning-in-the-text" arguing for meaning as constructed by the reader of the text. Certainly both the writer and the reader contribute to the understanding constructed by a particular reader (e.g., Kintsch 1988). The more ambiguous the text (e.g., Dooling and Lachman 1971; Bransford and Johnson 1972) and the less skilled the reader (e.g., Meyer et al. 1989), the greater the contribution of the reader to this construction of meaning and the less likely the agreement between the coherence of ideas identified by the reader and those identified by the writer. It appears that it is an author's job, as composition teachers can explain, to use linguistic and stylistic devices in the text such as signals (e.g., Lorch and Lorch 1995; Meyer 1975, 1985a), repetition (e.g., Britton and Gulgoz 1991), sequencing of sentences (e.g., Keiras 1980), and headings (e.g., Hartley 1994), to try to help the reader arrive at an interpretation of the text similar to the meaning the author intended.

Writers attempt to interrelate their ideas while producing a coherent text, and readers attempt to construct a coherent representation of the information. A writer gives guidance for a reader to form a similar coherent representation of the information by anticipating some characteristics of their audience of readers and using linguistic devices. However, a portion of readers will not form similar coherent representations due to varying purposes, backgrounds, and skills from those anticipated by the author. Readers intent on understanding a writer's message pay attention to guidance provided by an author, form a similar coherent representation, and often argue back with this representation and modify it to fit their own views. One characteristic of expert readers across the life span is that they describe one of their frequently used reading strategies as "arguing back with what they read" (Meyer and Rice 1983).

Writer's goals have been categorized according to communicative intent to (1) inform, (2) entertain, (3) persuade, and (4) provide an aesthetic experience (Brewer 1980). In my laboratory we have studied the first three categories and students have

successfully employed the plan strategy with these types of texts and purposes of authors.

The second point in figure 7.2 focuses on the limitation of writing. Writers have to leave their message in writing and cannot rephrase segments when they detect misunderstandings by their readers. Good communication is difficult between individuals even when dialogue is possible. It is possible that readers sometimes have a false sense of communicating with the ideas of an author; if feedback were possible, readers might be quite surprised to see the difference in their understanding and that of the author.

The third point explains that there are a limited number of ways in which to organize information about a topic. Although there appear to be a limited number of plans, there is not universal agreement about exactly how they should be described or to what degree of specification (e.g., D'Angelo 1979; Hobbs 1990; Mann and Thompson 1988; Meyer 1985b; Sander, Spooren, and Noordman 1992, 1993). Table 7.1 describes the plans understood and used effectively by participants across the life span from our training programs.

The fourth point stresses that it would be ideal if writers organized texts with plans that were readily identifiable. In the first sessions of our training programs, we employ everyday text from advertisements, magazine articles, books, and newspapers that can be clearly classified into one of the five plans identified in table 7.1. It is not a difficult task to find such materials, and our participants appear to easily find examples from their everyday reading to bring into the classroom. In later sessions of our training program, we help readers clarify and reorganize muddled text (session 4, Meyer et al. 1989). For example, a newspaper article with the title formatted as a question asked if molecules could be ambidextrous. The format of the question might cause the reader to expect the question/answer (form of problem/solution) plan shown in table 7.1. However, the text of the article did not answer this question, so a problem/solution plan would not be effective for encoding and retrieval of the most important information in the newspaper article. In addition "ambidextrous" in the title could bring to the readers' minds an incorrect analogy to apply to the text. The body of the text drew an analogy between hand preference in humans and a mirror image phenomena in the molecules of blood pressure medication with one form being more powerful than another. Since ambidextrous refers to using both hands equally well and one form of the medication is 100 times more potent than the other, the author is setting the reader up for some added confusion. For this muddled text, we teach readers to relate the ideas together with the comparison plan seen in table 7.1 and compare the two forms of blood pressure medication with the aid of the hand preference analogy rather than attending to the author's title with its misleading question/answer format and inappropriate use of "ambidextrous."

Table 7.1

Five basic writing plans and signals that cue readers to these plans

Writing plan	Definition	Signals
Description	Descriptive ideas that give attributes, specifics, or setting information about a topic. The main idea is that attributes of a topic are discussed.	for example; such as; for instance e.g., a newspaper article describing who, where, when, and how
Sequence	Ideas grouped on the basis of order or time. The main idea is the procedure or history related.	to begin with; as time passed; later e.g., recipe procedures, history of Civil War battles, growth from birth to 12
Causation	Presents causal or cause and effect relationships between ideas. The main ideas are organized into cause and effect parts. The effect comes before the reason (cause) in explanations.	because; so; caused; reasons; if . . . , then . . . e.g., directions: if you want to take good pictures, then you must . . . ; explanations
Problem/solution	The main ideas are organized into two parts: a <i>problem</i> part and a <i>solution</i> part that responds to the problem by trying to eliminate it, or a <i>question</i> part and an <i>answer</i> part that responds to the question by trying to answer it.	need to prevent; problem; solution; question; answer e.g., scientific articles often first raise a question or problem and then seek to give an answer or solution
Comparison	Relates ideas on the basis of differences and similarities. The main idea is organized in parts that provide a comparison, contrast, or alternative perspective on a topic.	instead; on the other hand; however; in contrast e.g., political speeches, particularly where one view is clearly favored over the other

Source: From Meyer, Young, and Bartlett (1989).

The fifth point in figure 7.2 states that finding the organizational plan enables readers to understand the writer's main ideas or message. We have found that using the organizational plan in text through the plan strategy helps readers remember more of what they read (e.g., Meyer, Brandt, and Bluth 1980), remember more of the important information in what they read (e.g., Meyer et al. 1989), and remember this information longer (Meyer et al. 1989). Due to the limited processing capacity of readers, they cannot learn and remember everything in a text, so some information

must be selected for deeper encoding, more cycles of processing or elaboration than other information. The overall structure or plan of the text can help readers select the most important information for thorough encoding. In addition the structure can help the reader retrieve this information from memory over time.

In our training program we stress the organizational components of various text types for aiding retrieval from memory. For example, the comparison plan often falls under the writer's goals of persuasion particularly for political articles and speeches. The contrastive pattern of the comparison plan is that different points of view are shown in different parts of the passage. It may be that one view tells what did happen and the other tells what did not happen; or, one might tell what exists and the other what does not exist; or, each part might tell opposing arguments. Often when opposing views are compared, they are compared on many of the same issues; for example, one political candidate's views on abortion, taxes, government spending, and defense, and then the other candidate's views on these same issues. Memory will be improved by remembering that a comparison plan was used and the number and name of the issues compared; for the above example remember that the candidates were compared on four issues: abortion, taxes, government spending, and defense.

We also emphasize the usefulness of the structure in a problem/solution text to aid encoding and retrieval. As shown in table 7.1 this plan is often used in scientific articles and frequently for the writer's goal of persuasion. The pattern of the problem/solution plan is that there is part of the passage that tells about a problem (question, puzzle, concern) and another that tells about its solution (answer, reply). In the question/answer version the answer must deal with the ideas discussed in the question and provide some answer. In the problem/solution version often the causes and effects of the problem are discussed first; then, a solution follows that should attempt to block or eliminate at least one of the causes of the problem. When reading a problem/solution text, we encourage readers to look for possible causes of the problems and descriptions of the effects of these causes, the problem itself. Then readers are encouraged to look for a posited solution or solutions that would refer back and eliminate causes of the problem. When recalling the text, the readers are encouraged to write problem/solution at the top of their recall sheet and then a main idea sentence that incorporates both the problem part and solution part of the text. Next, the learners organize their written or oral recall using the problem/solution plan. First, they start off a paragraph with signaling stating that "the problem is. . . ." Then, they write a paragraph(s) about the problem or group of problems remembering to include any causes, effects, or descriptions of the problem. After recalling everything they can remember about what the author stated about the problem, they explicitly signal the solution stating that "the solution is. . . ." Paragraphs about the solution include a description of the solution and an explanation of how it gets rid of

causes of the problem or tries to eliminate a cause. Finally, readers check to be sure they have used the plan to organize their recall that they identified in reading and listed at the top of their recall sheet, and then they add anything else they remember.

Through our strategy training program we have been able to increase the communication between an author and a reader by helping readers follow overall text structure or, as Grimes (1975) phrased it, the thread of discourse. Once the readers understand the main points of what the author is trying to tell them, we ask them to evaluate this message. For example, one advertisement used in the first session of a six-session training program has the boldfaced caption, **CLUB MED SHOULD FEEL THIS FREE. HEDONISM II. CLUB MED SHOULD BE THIS GOOD.** The text reads: "In a nutshell, Club Med is *almost* an all-inclusive holiday. But you still have to buy beads to pay for drinks and cigarettes. At Hedonism II, we do things differently. *Everything* is included. Drinks at the bar. Cigarettes. No beads. No membership. No nothing. Like Club Med, we offer all food, wine, entertainment, sailing, tennis, snorkeling, scuba—also included. But the real magic is this: When you need no money for *anything*, you have total freedom to enjoy. And we know that total freedom is the only thing that can be better than Club Med." The plan used is comparison. Hedonism II and Club Med are compared and Hedonism II is favored. The plan strategy focuses on the plan the author used to write the advertisement. Once the reader figures out what the author is communicating then he or she needs to evaluate the message. For example, for the Hedonism II advertisement if I don't smoke or drink, then Hedonism II may be a bad choice for me because I will end up paying for the "free cigarettes and drinks" of the other vacationers. I would need to check and see if Hedonism II is more expensive than Club Med.

Another example of working to understand what an author is trying to communicate and then evaluating this communication comes from the sixth session of the training program (during 1996 we added the sixth session to promote use of the plan strategy to take brief notes in everyday reading). We explain to young and older readers that the plan strategy can be helpful in taking notes about articles related to health issues and then using these notes when visiting a doctor or others in a search to gather more information about a health issue. One article utilized to teach this skill appeared in the November 6, 1995, issue of *U.S. News & World Report* and was entitled "A drug for fragile bones." Participants were encouraged to organize their notes by using a problem/solution plan, a common plan used in health-related materials. The goal of the author appeared to be to persuade readers to be aware of the problem of osteoporosis and alternative solutions to eliminate the problem with an emphasis on a new possible solution, the drug Fosamax. The desirability of each of the alternative solutions depended on the characteristics of the reader in need of such information. Participants made notes, discussed them with a partner, and then

examined the structure shown in figure 7.3. We explained that once they understood the information an author was trying to communicate, readers could use this information to make decisions. After finding out the information about osteoporosis and Fosamax shown in figure 7.3 and verifying it through other sources, they could use this information to make a wise health decision. For example, if a reader had been previously diagnosed with breast cancer, she might decide to use Fosamax instead of estrogen; this would protect her from osteoporosis without the danger related to reoccurring breast cancer. However, if a reader had no personal or family history of breast cancer, but a strong family history of heart disease and osteoporosis she might want to take estrogen in order to protect herself from both diseases.

We encourage participants in our training studies to use the plan strategy when they want to know what the author said and remember this information. They are told that they probably would not use the plan strategy when casually looking over the newspaper for enjoyment.

7.2.2 How Successful Is the Communication between Reader and Author?

Brewer (1980) operationalized text type or genre as the writer's communicative goal. Expressive, informative, and persuasive are three types identified. In expressive text the writer's goal is to express feelings and attitudes. For example, in the Aesop fable "Mercury and the Woodsman" (text structure analysis of a version adapted for children in Meyer et al. 1980) the attitude to be conveyed is explicitly signaled by the author with the moral, "honesty is the best policy." The story exemplifies this moral by relating the rewards given to an honest lumberjack versus the punishment given to a scheming, dishonest lumberjack. The communication of this attitude to readers could be assessed with various tasks ranging from recognition of the moral to its application in the everyday life.

For informative texts the writer's goal is to inform the reader about something. Common texts of this type can be found in the encyclopedia. These types of texts focus on relaying semantic information with ideas related on the basis of further specification and description, cause and effects relationships, and contrastive relationships.

For persuasive texts the writer's goal is to persuade the reader of something. Advertisements are common persuasive texts. These texts contain semantic information but also pragmatic problem/solution type information where the writer tries to convince the reader to buy a product or idea for a certain problematic situation.

A good deal of my research has focused on how well readers have been informed or persuaded by expository text. One persuasive text taken from *Scientific American* magazine (Seaborg and Bloom 1970) allots two paragraphs for explaining the problems of meeting demands for electrical energy while at the same time protecting the

Problem/Solution

Problem

Osteoporosis
= brittle bones

Causation/caused by:

Osteoclasts breakdown
bone faster than osteoblasts
replace it

Description

Can check for problem in own bone density
through a quick, painless bone density scan
(cost \$125.–\$350.; Medicare covers after 65
years; call National Osteoporosis Foundation
for Bone-scanning centers 800-464-6700)

Comparison of Solutions

(1) Fosamax

- Slows bone loss
- Restores some of lost bone
- Not increase risk for breast cancer (3 year trial indicated rare/mild side effects)
- Blocks osteoclasts from breaking down bone tissue

(2) Estrogen

- Protects women from bone loss
- Increases risk of breast and uterine cancer
- Relieves menopause symptoms
- Lowers risk of heart disease
- New studies add to confusion: one—decrease risk alzheimers, another—increase risk for asthma

(3) Fosamax and estrogen

- Unusual solution at this point

(4) Medication-free treatments

- Types of exercise and calcium: postmenopausal 1500 mg/day other adults 1000 mg
- Slow-release fluoride + calcium supplements indicated by study with osteoporosis patients
- Preventative for 50% of adolescents and young adults in bone-building years 1200–1500 mg/day

Figure 7.3

Notes taken using the plan strategy to understand the important information presented by an author in a current health-related article about osteoporosis and fosamax.

environment and finite resources. The next three paragraphs present the author's solution, the fast breeder reactor, and explanations for why it is a solution to these problems and how the breeder reactor works (for structural analysis see Meyer 1975, or Meyer, Young, and Bartlett 1989). A young woman recalled this 506-word text for us and her efforts showed little evidence for much communication between the author and reader. She was a high school graduate with average vocabulary and reading comprehension skills. The authors' goals to inform and persuade fell very short as can be seen by her recall reproduced below.

Breeder reactors are the fast growing ideas of how to carry fuel. It was talking about how important gas is becoming because we are getting low on it (Meyer et al. 1989).

The authors persuaded her to view breeder reactors as an up-and-coming idea, although she was confused about their purpose. Also she was informed or reminded about the finite supply of gas. This level of performance was typical of her understanding for this type of expository text. She recalled all the text we gave her (Meyer et al. 1989) regardless of its overall organization as a list of things she remembered without an attempt to interrelate ideas. She participated in one of our training programs and was taught to recognize and use the structure in text to aid her understanding and recall. After the training she was able to apply the strategy we offered and double the amount of information she could remember after reading. She was better able to grasp what an author was trying to tell her. The following is an example of her recall from a text with the same organization and length as the breeder reactor text; it presented problems associated with distributing wealth at one's death with and without a will. These problems included court costs and delays. Then a solution, a trust, was promoted and described (Meyer et al. 1989).

There is a problem about how to divide the money up when a person dies without having a will. If you go to probate court to try to settle it, it might take up to six years to get your money plus all the court costs.

A solution to this problem is to make a trust. This is a substitute for a will. It avoids going to court. Trusts can never die. The trustor can divide up his money the way he wants, and it will stay that way unless he changes his mind (Meyer et al. 1989).

As can be seen the reader shows evidence of being both persuaded and informed to a much greater extent than before the training. Of course more evidence for her persuasion could involve finding out if she asked her wealthy grandmother to look into trusts, but certainly from this recall it appears more likely that the author's goals for this communication were achieved to a greater extent than in the example from the reactor text. This reader learned to use the plan strategy to increase her ability to communicate with authors. She reported greater interest and enjoyment from her reading after participating in the training. An unsolicited call several years after

completion of the program revealed that this learner attributed her willingness to go back to school to train as a paraprofessional to her success in our training program.

These examples of author and reader communication came from a reader with average abilities and skills. What about a reader with exceptional abilities? Could we aid such a reader with our training program focusing on helping readers communicate with author's by identifying the overall structures in text? The following looks at the performance of such an individual who recently participated in a six-session version of the training program. He read and recalled the trust passage on a pretest and over two months later on a post-test. This reader was a young man with 20 years of education who was completing his dissertation in the physical sciences; he scored one standard deviation above our sample mean for young adults on a measure of working memory span and approximately three standard deviations above the means on multiple choice tests of vocabulary and reading comprehension. Many of our young and old participants with such extremely high reading comprehension test scores showed evidence of using the plan strategy prior to instruction, but this individual was particularly interesting because he did not use the strategy prior to instruction as evidenced in his recalls and by his own report. He involved himself wholeheartedly in the training and went beyond the requirements of simply identifying the overall plan in the training materials; in addition he diagrammed the overall structure of each text and produced figures similar to figure 7.2 to show how main sections of texts were interrelated. He reported that he had changed his way of looking at text by learning the plan strategy. His recall performance on the trust text jumped from a good recall of 40 ideas to an unusually excellent recall of 103 ideas, and the way he structured his recall changed so that it better matched the structure used by the author. Without using the plan strategy, he was informed and perhaps persuaded by the text, but clearly the author's goals were achieved to a greater degree when this reader learned to employ the plan strategy. His recall protocols produced before and after instruction are shown below.

On the pretest he used a plan to organize the information, but it was a different plan from that employed by the author. Contrary to the example of the average reader's performance prior to training where ideas were simply listed without any organizing plan, this more expert reader organized the information with a different plan, a comparison: adversative plan, where the advantages of trusts are favored and emphasized over an alternative vehicle for distributing wealth, a will. This plan is compatible with the author's goal of persuasion even though it is not the plan originally employed. Below is the pretest protocol; it contains three confusions about ideas in the text (e.g., forming a trust gives the legal ownership to the trustee, not the person forming the trust) and two confusions from incorrectly integrating the information with some prior knowledge (e.g., a living will deals with a legal document

directing that measures of life support not be employed for a signer with an incurable condition; it does not deal with a trust).

A will can involve lengthy probate court time and costs to distribute your property to your heirs after your death while court proceedings go on, your survivors and heirs cannot enjoy the property in the will. Also, this involves paying gift and estate taxes.

A trust is a good alternative. A trust bypasses court time and costs. When you form a trust for a property, you have legal ownership. You may designate a beneficiary for what is called beneficial ownership. The trust is managed by a trustee, an entity like a bank, in accordance with the will of you, the trustor.

The beneficiary may enjoy use and income from the property as specified by the trustor. The trustor, through a living will, can control the conditions under which the property is enjoyed. The trustor/trustee may also change beneficial ownership through will clauses.

These are the advantages of trusts and this is why people like Pep Jackson and Lee Copenhagen promote them.

Compare the pretest to the post-test reproduced below. In the post-test the reader is now following the plan strategy by organizing the information with the same problem/solution plan as used by the author of the text. The coherence of the protocol is higher, and there are no apparent misconceptions. In addition more information has been conveyed, and again we have some evidence that the reader may have been persuaded by the text.

The problem is how to distribute your property as you wish after death, while avoiding the costs of probate courts. If you die intestate (without a will), court delays and management, along with equitable inheritance laws, can be obstacles to your chosen beneficiaries enjoying your estate. Wills to distribute property after death have drawbacks, such as probate court costs or delays.

One solution is to place your property in a trust. Trusts completely avoid probate courts, with their costs and delays. U.S. gift and inheritance taxes are also avoided. Using a trust with a revocable will, you can control your property after your death, e.g., a trust has no life span.

How do trusts do this? The property in question, called the corpus, is placed by you the trustor, in care of the trustee—say your bank. The trustee has legal ownership of the corpus. The beneficiary ownership of the corpus allows you to enjoy the corpus in life. After your death, the trustee transfers beneficiary ownership to your chosen heirs. The transfer may be revoked or changed by provisions set by you in your trust control document.

By dividing the legal and beneficiary ownerships of property, trusts provide a good inheritance mechanism. Some people are promoting trusts. Trusts are a solution that help you control property in life and after death.

Significantly more of our young and old adults receiving instruction with the plan strategy report that they remember more from their everyday reading after instruction than do comparable groups of people involved in alternative instruction with the same texts, but without the plan strategy or a no contact control group. They also report more changes in the type of information they attend to and remember when

reading in the laboratory and in everyday life. It appears to be a strategy that can be taught to people with a wide range of abilities with the result of greater communication between authors and readers. For readers it would appear to be an important strategy in their repertoire of reading strategies to use when they desire to really understand an author's viewpoint and message.

Communication between an author and reader involves a complex interaction of strategy, task, text, and reader variables as outlined in figure 7.1. Through this detailed discussion of the structure strategy, I have pointed out how this strategy interacts with different types of texts, such texts organized with varying structures, or even muddled texts. In addition I have pointed to individual differences in readers who learn the structure strategy and how these differences lead to differences in the amount of information remembered as well as the quality of recall. In the examples of the average and superior young adults on reading and vocabulary tests, we saw that both participants at least doubled their pretraining recall performance after instruction with the strategy. Mastery of the strategy did not equalize their performance, but their individual reader differences interacted with the strategy to yield their reading performance. The remainder of the chapter discusses some of the other task, text, and reading variables depicted in figure 7.1.

7.3 Task

As depicted in figure 7.1 task variables are important in understanding reading performance. Task characteristics relevant to the communication between an author and reader deal with how to present the text. Another important aspect of task is how to evaluate a reader's understanding and use of the information. These two aspects will be examined in this section of the chapter.

7.3.1 Mode and Rate of Text Presentation

Concerning presentation of text, computers are becoming an alternative mode to print for text presentation. Computers are now major conveyors of information to persons of all ages. Some recent research in my laboratory (Meyer and Poon 1997) indicated that presentation of information via computer does not handicap young adults' learning but tends to facilitate it, and even make it more efficient in computer-paced versions of presentation. However, this is not the case for older adults (65 years and older); they are more efficient when learning from the traditional media of the printed page. The most plausible explanation for this interaction of mode of presentation and age group is the greater familiarity and use of computers by young people (U.S. Census Bureau 1993), since we held contrast, font size and visual angle of

characters constant among the modes of presentation (Legge, Rubin, and Luebker 1987). Older learners are going to need some training and practice in communicating with authors via computers if they are expected to maintain the same level of understanding in reading that they have experienced through a lifetime of reading from the printed page.

Another recent study in my laboratory (Meyer, Talbot, and Poon 1995) combined reading strategy training with the research on reading speed and pointed to the same age by mode (computer or print) interaction. The goal of this study was to equate the recall strategy of young and old adults through training and then to test the limits of the strategy in minimizing age deficits. In order to do this, rates of text presentation were chosen so as to press the old adults' working memory capacity at one speed while allowing enough time for natural reading at another rate of text presentation. The young adults were predicted to show little speed effect because of their larger working memory capacities and higher normal reading rates. Previous research by Mandel and Johnson (1984) indicated no age difference at 102 wpm; however, other research using 120 wpm have found deficits. This suggested that in the range between 102 and 120 wpm lies the critical turning point between efficient discourse processing and deficits for old adults (Meyer and Rice 1989). Meyer and her colleagues (1989) found that in reading several expository texts from scientific magazines and history books that young adults read at an average pace of 144 wpm. In this same study old adults were found to be reading at an average pace of 121 wpm. The intended presentation pace of 130 wpm therefore seemed to be well within the grasp of most of the young, while it might push the limits of the old adults' processing capabilities.

A potential problem was encountered within the research literature on reading speed. Carver (1982) indicated that college students' optimal rate is approximately 300 words per minute when reading for the author's message, rather than recalling facts. Smith (1994) asserts that a reading rate that falls below 200 wpm would be deprived of coherence. The rationale follows that if the text is presented too slowly, the words would not remain in working memory long enough to provide for the organization and integration of ideas to occur. For this reason it was thought that younger adults might be impaired in discourse comprehension when given text at a slow rate.

Meyer, Talbot, and Florencio (in press) examined three rates of text presentation (90, 130, and 300 wpm) with college adults. In contrast to Smith's hypothesis, the fastest presentation rate yielded the poorest recall. Also measured was the participant's most comfortable presentation speed. Only 7 percent of the participants favored the "average" reading speed of 300 wpm, while 47 percent and 46 percent favored the 130 and 90 wpm, respectively. This finding demonstrated that the 90 and

130 wpm speeds were equally favorable to young participants. Contrary to expectations from the theory that limitations in working memory pose a lower limit to reading rate, Meyer, Talbot, and Florencio (in press) found better recall performances at the slowest reading rate.

Young and old adults were trained in the structure strategy (Meyer, Talbot, and Florencio, in press; Meyer et al. 1998), previously found to double recall from prose (e.g., Meyer, Young, and Bartlett 1989). After training these adults were asked to read and recall three passages. Our objective was to alter some parameters of text presentation so as to increase the cognitive load on readers and differentially disable older adults' ability to effectively use the structure strategy. The two variables manipulated in this study were pace (reading speed) and sentence context. The passages were presented on a computer screen one sentence at a time. In order to examine the first variable, pace, each participant received one problem-solution passage presented at 90 wpm and another at 130 wpm.

The second variable on which the presentation of the texts varied was context. The text was presented in one of two formats: sentences in isolation or sentences in context. In the first condition, isolation, each sentence was presented in the vertical center of the screen one sentence at a time. Therefore, each sentence replaced the sentence before it. In the second condition, context, the sentences appeared at the top of the screen with each successive sentence being added in its naturally occurring space. Each new sentence was presented with regular contrast; the old sentences in the context dimmed but were still visible on the screen. The bright displaying of the new sentences was intended to pace the reader's reading speed. The context was available to check in order to clarify comprehension or review if a participant had extra time after reading the highlighted new sentence. The presence of this context was expected to aid in the reading process by allowing the reader to review previous sentences if necessary. This was thought to lessen the working memory load compared to the isolated sentence presentation.

The results indicated that there were no significant effects related to the presentation method: Isolation versus context. The data on the presentation speed indicated that both young and old adults were affected by the increase in pace. There were no age by pace interactions. However, the most important findings from this study indicated that the use of computers in the testing of older adults may have produced spurious effects. According to the recall results from a passage read on paper at each reader's own pace given prior to training, the young and old adults were not significantly different in their ability to read and recall information from text (Meyer et al. 1998). However, after training, the young adults showed a marked improvement in the amount of information recalled, while the old did not. In fact the old adults' recall decreased from the pre-training task to the 90 and 130 wpm conditions.

Almost all of the young and old participants showed signs of mastering the strategy when reading in the traditional manner from the printed page by the end of the last training session. However, while 95 percent of the young showed consistent use of the strategy for all three post-test texts read off a computer screen, only 44 percent of the old performed similarly. Even in considering only those 44 percent of old adults who consistently used the strategy, no training gains in overall recall are found for the old adults.

This finding leads to the explanation of computer interference in reading comprehension and recall. The young adults are very accustomed to the use of computers, but the same cannot be said of the old adults. Thus this research points to the interaction between the reader variables of age and computer knowledge and the task variable of mode of presentation. As depicted in figure 7.3 the communication between authors and readers can be impacted by learner variables interacting with task variables.

7.3.2 Ways of Evaluating Understanding

Another important task variable relates to how reading performance will be assessed. Although actors are no doubt interested in whether a learner can recite verbatim the lines of Shakespeare, few psychologists are interested in verbatim recall of the information to be communicated by a writer. Instead, they want to know if learners can paraphrase that information, answer questions about it, summarize it, or use it to complete a task, solve a problem, or make a decision. For example, Mayer and Gallini (1990) looked at different ways to communicate how a pump worked to students with high or low experience with mechanical systems. They were not interested in their ability to paraphrase this information, but whether they could use it to troubleshoot problems with pumps. One group (complete illustration group) received the information with illustrations that labeled critical parts of the pump and two views of the pump that showed what happened when the pump handle was moved up and down. Another group received only one view of the illustration without explicit labels about how the pump worked, and another group did not receive the illustration. All groups received an identical text about the working of pumps. For students who possessed prior knowledge about mechanical systems, all three groups did equally well on the troubleshooting task. They were also equivalent in performance to the low prior knowledge group who received the complete illustration and text. The complete illustration apparently helped mechanically naive readers create a mental model of the pumping system that could be used to solve pump problems. The high prior knowledge readers already possessed such models or could generate them on their own. Not only author-provided aids in the form of good illustrations but also

aids in the form of signals to text structure are particularly helpful to the naive learner in a field (e.g., Voss and Silfies 1996). While some have found such aids in text to help learners with low prior knowledge and not harm those with high knowledge, others have pointed to better learning for students with high prior knowledge when they have to expend more effort in generating these connections themselves (e.g., McNamar et al. 1996; Rabinowitz 1989).

Alexander and colleagues (1994) conducted an interesting study that looked at task in terms of the task created by classroom teachers for the evaluation of learning after middle school students read about Stephen Hawking and his work in physics. The students read the text, rated it on importance and interest, recalled it, and reported what questions they believed the teacher would ask them. Students were found to be quite aware of the information that their teachers would test, but this information was not necessarily the important information presented in a text. Better matches between children's appraisals of information to be tested and important information in the text only occurred in classrooms when a teacher possessed adequate knowledge in the physics domain as well as good pedagogical skills. Thus the learning environment created by a teacher in a classroom also affects how well an author can communicate an important message to children in the classroom.

Unlike writing down all the information one can remember from a text, making a decision based on a body of information does not require all of the information given to the participant to be used. Rather, as the information is read, participants choose which portions are important and which are not according to their own knowledge and biases as well as the emphasis given to the material by the author through text structure and signals.

Meyer, Russo, and Talbot (1995) reported that after having participants make a treatment decision regarding breast cancer, in which there was no significant differences in the decisions made by young and old women, the older adults provided less detailed explanations for their decisions than did younger women. The first study reported by Meyer et al. (1995) involved decisions about treatments for breast cancer in an unfolding hypothetical scenario, while the second study focused on data gathered from a questionnaire about decisions for the treatment of breast cancer given to patients who had actually experienced breast cancer. Similar findings were found for both studies in that older adults sought less information and made their treatment decision faster than younger women, but the types of decisions made did not significantly vary for the different age groups. These data seem to represent some difference in the manner in which young and old adults process information. It could be that old adults are, as Sinnott (1989) indicates, more likely to process the information and make a decision based on their prior knowledge and not on the information given them in the task.

In order to get a better idea about whether or not information attended to while reading affects subsequent decision making, Meyer et al. (1995, study 1) asked participants to underline the seven most important pieces of information given to them in text describing the contrasting treatment views of seven experts (e.g., oncologist, pathologist) and a summary of the research literature. There were numerous pieces of information that could be underlined from this text comprised of 12 paragraphs, but only 13 statements gave information for or against the six treatment options given to the women. After making a treatment decision, participants wrote down all they could recall about the views of the experts and research literature. Items that were underlined or recalled played an important role in the treatment option chosen by the young and old participants. For example, participants underlining statements against radiation were less likely to select the radiation treatment option and more likely to select either lumpectomy or do nothing but checkups every six months. In addition women who underlined "in situ cancer spreads faster under age 50" did not underline statements recommending participation in a national study where participants were randomly assigned to radiation or no treatment, but they did underline statements favoring mastectomy. These individuals were more likely to select a mastectomy as their choice of treatment options. Similarly, if women recalled the faster spread of in situ cancer in women under age 50, they did not select the treatment options of the national study nor radiation but tended to select mastectomy, lumpectomy, or just checkups. Participants who recalled promastectomy statements were more likely to have selected a mastectomy, whereas those who did not recall promastectomy ideas were more likely to select lumpectomy, radiation, or just checkups. In addition recall of one specific fact, near 100 percent cure with mastectomy for in situ cancer, related to a decision for mastectomy. Also analysis of prior knowledge statements provided some limited support for prior knowledge affecting underlining which also affected decision making.

In this study there was evidence that participants were attending to information presented by authors and not just relying on prior knowledge when making decisions. These findings point to the importance of communication between authors and readers on such important health care issues. Since signaling devices in text can emphasize certain ideas and make them more salient to readers (e.g., Lorch and Lorch 1995), a heavy burden is placed on authors to accurately report information as well as their biases to readers.

7.4 Text

Figure 7.1 lists some important text characteristics that influence comprehension from text. The hierarchical structure itself influences what people remember from text

(e.g., Meyer 1975). For example, Rice, Meyer, and Miller (1989) rewrote medical information to put important information from physicians' perspectives higher in a content structure analysis of text than originally placed in published medical information with a resultant boost in memory for this information by patients.

Meyer and Freedle (1984) reported superior recall of information presented in certain discourse structures or plans than others. For example, the plan of comparison was more memorable than a plan of description. Whether or not a topic adapts well into a causation plan versus another plan can depend on constraints of the topic (Calfee and Drum 1986). However, there are a number of topics that can be cast into either a description or a comparison plan, such as the Archaeopteryx fossil from the evolutionist perspective or the fossil from a creationist perspective compared to a creationist perspective. A topic can be described from one viewpoint, or it can be described and contrasted from two or more viewpoints. Salisbury (1996) recently found a strong effect for type of discourse structure when she examined college students' immediate and delayed test performance assessing knowledge about recent theories of motivation; students who read this information in a comparison structure that compared new views of motivation to old views of motivation performed better than students who read a description of the new views. Vincent's (1985) work indicated that adults across the life span with average vocabulary performance performed at equivalent levels on both structures in contrast to high average and high verbal adults who show facilitative effects with the comparison structure. However, training in the use of text structure might aid such learners. Without training there appears to be an interaction between discourse type and verbal ability.

As mentioned previously, text structure interacts with reading skill and domain knowledge (Voss and Silkies, 1995). In addition emphasis devices (e.g., signals and headings) can support or undermine the text structure and influence learning and memory. Some of the text variables can be seen interacting with capacity limitations of learners. For example, Kemper and colleagues (1989) found that sentences with long phrases coming before the verb (left-branching sentences) are more taxing for older adults presumably because of limitations in working memory capacity.

7.5 Reader

I have already mentioned numerous contributions of reader characteristics, such as domain knowledge and aging, listed in figure 7.1. There are large bodies of research on many of the individual differences listed under reader variables in figure 7.1. For example, there is an increasing body of research dealing with the influence of interest on learning from text (for reviews, see Alexander 1998; Hidi 1990; Schiefele 1992; Wade 1992). Both topic interest (enduring evaluative attitude toward a topic) and

text-based (situational, emotional state aroused by specific text features) have been found to relate to learning from text (e.g. Meyer et al. 1998; Schiefele 1991; Schiefele and Krapp 1966).

A recent study in my laboratory (Meyer and Poon 1996; Meyer and Talbot 1998) showed different reading strategies for adults with reduced processing resources. We found that readers who still have sufficient processing resources, either because they were young or highly verbal older adults, read with similar strategies. However, older adults who were both subject to declines in processing speed and showed little expertise in verbal ability spent a greater amount of time on the first two pages of a four page text presented in a self-paced condition on the computer. They apparently required more time for building a framework or structure (Gernsbacher 1996) to interpret the text; on the first two pages of the text taken from *Scientific American* magazine the problems were presented and the solution was introduced, and then the solution was further elaborated on pages three and four. Highly verbal older adults did not appear to allocate time differently than highly verbal young adults, while less verbal older adults may have been attempting to compensate for the processing declines by drastically slowing down their reading at the beginning of a text.

7.6 Conclusion

In this chapter we have seen that communication between readers and authors can be improved by strategy instruction, modifications of tasks, and text design. Reader limitations can often be mediated through strategy training or designing materials to compensate for some memory problem (e.g. help screens on computers) or modifying task constraints (e.g., giving extra time) or expectations (e.g., a reasonable decision versus detailed recall and rationale for a decision). This is extremely important because a good portion of the knowledge and wisdom a person acquires over the life span in a literate society comes from reading text. In addition many of the findings identified with text hold for television broadcasts, and the like. For example, we have found the plan strategy to work quite well for young and older adults watching a persuasive video about nutrition and fats (Meyer et al. 1997). Clear writing and strategic, skilled readers are vital for successful education.

Ram and Moorman in their overview chapter for this book describe various purposes for reading. In this chapter I have mainly dealt with the purpose of communication with an author and information seeking, rather than entertainment. In Ram's chapter of this volume he discusses the effects of purpose on the manner and depth to which text is processed in the context of computational reading systems. In this chapter I have shown how the reader can use the structure of text to support the comprehension of that text. In the future more computational reading systems may want to take advantage of the influence of text structure.

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