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READERS' KNOWLEDGE OF FUNCTIONAL DEVICES

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ABSTRACT OF THESIS

READERS' KNOWLEDGE OF FUNCTIONAL DEVICES

Various writing devices are designed to serve specialized purposes or "functions" to aid readers in their processing of a text. For example, an index lists important topics in the book and allows the readers to quickly locate the pages relevant to a particular topic. The purpose of this study was to learn what mature readers know about various functional devices. Two experiments were conducted to learn what readers know about functional devices in texts. Experiment 1 investigated readers' knowledge about functional writing devices and Experiment 2 examined readers' beliefs about the relevance of functional writing devices in various reading situations. At the end of the experiments, a list of functional writing devices and their respective usage was created from the results of Experiment 1 & 2. The information obtained could be useful for education purposes and also future studies on the effects of function identifying signals on cognition.
KEYWORDS: reading, functional writing devices, signals, cognition, education

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July 12, 2011

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July 12, 2011

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THESIS

Hung-Tao Chen

The Graduate School

University of Kentucky

2011

READERS' KNOWLEDGE OF
FUNCTIONAL DEVICES

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THESIS

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A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Science in the
College of Arts & Science at the University of Kentucky

By

Hung-Tao Chen

Lexington, Kentucky

Director: D r .   Robert F. Lorch, Ph.D., Professor of Psychology

Lexington, Kentucky

2011

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Section One

Review of Literature

<u>Introduction</u>

Reading is a difficult task that requires much cognitive processing from a reader. Take studying for example. In order to successfully apply any knowledge acquired from reading a textbook, the reader would need to extract meaning and ideas from the words, organize these ideas into more complex thoughts, and link these ideas to relevant tasks (Collins & Loftus, 1975; Kintsch 1988). The process of gathering and organizing ideas from reading differ among individual readers and could also be affected by the particular reading task (Lorch, Lorch & Klusewitz, 1993). For example, most readers would read a novel from cover to cover in a linear fashion; however, sometimes readers may choose to skip ahead and get to the climax of the story without plodding through all the details. In order to assist the readers in forming and organizing their own ideas based on individual habits or purposes, authors often include devices such as summary, table of contents, preface, or discussion. The purpose and properties of each of these devices is generally the same regardless of the content. For example, a summary paragraph in a textbook and a summary paragraph in a magazine article both highlight the main points in the text even though their contents may be quite different. These writing devices could therefore be classified as "functional devices" since they serve certain functions regardless of their contents.

It is possible that mature readers have developed some type of knowledge and expectation about functional devices through years of reading experience. For example, most mature readers know that the table of contents lists all the main topics in a book; therefore, readers have implicit (or explicit) knowledge about functional devices. Also, mature readers should know when and how to apply this knowledge to suite their reading objectives. For example, if a reader wants to find out whether a topic of interest is covered in a book, he or she could use the table of contents and see if the topic is there. The purpose of this study is to

examine readers' knowledge on these functional devices and the ways in which readers claim to use these functional devices in different reading situations.

Signals

Scientific journal articles typically contain an abstract section at the beginning. The content of the abstract section varies greatly from one article to the next. However, the particular section always has the universal label of *Abstract* and serves to summarize the main logic and findings in the study. *Abstract*, therefore, "signals" the presence of the functional device. In other words, a mature reader only has to see the label *Abstract* and should already have an idea of what to expect from that section of the text.

Conventional signals could include a variety of writing devices such as bold font headings, white space, or a "summary" label. General research findings concerning types of signals would be discussed in this paper even though the focus would only be on one type of particular signal that includes labels such as *Abstract*. Signals allow the reader to create a mental outline of the text and increase the readers' understanding of the text (Meyer, 2003; Kintsch & van Dijk, 1978). In the example above, the label *Abstract* would be considered a signal and the actual section of the text would be the functional device which the label is signaling. Research with signaling devices has several relevant applications in the following areas: 1) understanding the effect of text structure on recall (Lorch & Lorch, 1985; Lorch & Chen 1986; Lorch & Lorch, 1995; Lorch & Lorch 1996a; Lorch et al., 1996b), 2) understanding the effects of headings on text processing strategies (Sanchez et al., 2001; Meyer, 2003), 3) understanding the effects of signals in a search task (Lorch, Lemarie, & Grant, 2011a; Lorch, Lemarie, & Grant, 2011b), and 4) developing reading instructions (Mayer, Dyck, & Cook, 1984; Meyer & Poon, 2001). Much of the research with signals evaluates how a category of signal affects reading. A typical research design would consist of two conditions—headings vs. no headings. The experiment would then evaluate participants' memory for the text in each condition with some type of recall task. The problem with asking "how do headings affect memory?" is that each heading could convey

several pieces of information. For example, a paragraph heading could indicate paragraph separation, introduce a new topic, or indicate the function of the paragraph without revealing its content. It is difficult to tell which type of information is affecting participants' memory. Therefore, the correct level of signal analysis should be focused on the particular information conveyed by a signal, because each type of signal information affects text processing differently (Lorch et al., 2011a, 2011b). In light of this problem with most signal research, a comprehensive theory on the various properties of signals has been developed that specifies all of the possible information that could be transmitted by signals. This theory is called SARA (**S**ignals make **A**vailable **R**elevant, **A**ccessible information) and it examines signals both from the reader's perspective and also from the author's perspective. One of SARA's most important features involves the identification of the seven distinct information functions that signals serve (Lemarie, Lorch, Eyrolle, & Virbel, 2008). These information functions provide a basis for research concerning signals.

One of the seven information functions points to the idea that signals communicate the purpose of a section of the text without revealing any information about its content. SARA states that "if the function of a section is identified before its content is processed, the reader is in a better position to understand the content…" (Lemarie et al., 2008). For example, the "Abstract" of this article highlights the main points for the entire text and summarizes the study in a concise manner. However, the label *Abstract* in itself does not tell the reader that this study is about signals; it only communicates to the reader that the particular section of the text will provide you with a brief summary of the entire experiment. Therefore, the reader is likely to have some expectations when they encounter the heading, "Abstract" and these expectations may cause the reader to pay more attention to the particular section of the text (Lemarie et al., 2008).

Before one examines the effects of the function identifying property of some signals, it is important to first find out what readers know about functional devices. A reader builds certain knowledge and expectations about functional devices from past reading experiences. This

knowledge about functional devices should be activated upon encountering the signal; the activation of knowledge may also be affected by the type of reading situation. Without knowing the exact knowledge being activated and how it is applied in a certain reading situation, one could not explain how and why functional signals facilitate reading or if they affect reading at all. Thus, the purpose of this study is to examine readers' knowledge about functional devices and how readers claim to use this knowledge in various reading situations. By gathering this information, we may be better able to explain the effects of function identifying signals during reading. The remainder of this paper is organized as follows. First, SARA theory will be elaborated with particular attention to the seven information functions that are central to SARA theory. Next, the information function called *Function Identification* will be closely examined, including how this particular information function might affect a reader's text processing strategy. Finally, Experiments 1 would examine readers' knowledge about 10 different functional devices, and Experiment 2 would examine readers' knowledge of the usefulness of the devices in different reading situations.

<div align="center">SARA Model</div>

Signals can be defined as the "realization of metasentences" in a text (Lemarie et al., 2008). A metasentence is a statement about the text itself and not its content or actual ideas or things in the world (Lemarie et al., 2008). For example, a metasentence might read as follows: "This paragraph is about signals." The realization of this metasentence may be a heading that reads "**SIGNALS**" at the beginning of the paragraph. A reader, upon seeing the heading "**SIGNALS**," should process this instruction and read the paragraph as a new subsection on the topic of signals.

The example about signals has two basic components—the instruction from the author and the subsequent processing of instruction by the reader; SARA therefore analyzes these two components separately, with the text-based analysis as the first component and the reader-based analysis as the second component. The text-based analysis concerns the information presented by

the signal—therefore, what is available to the reader. The reader-based component of SARA analyzes whether the information presented by signals can be easily used by the reader, and the different ways this information affects a reader's text processing strategy.

The text-based analysis of SARA proposes that signals can be classified into four dimensions (Lemarie et al., 2008). These four dimensions include *scope*, *realization*, *location*, and *information function*. *Scope* refers to the span of text that a signal encompasses. For example, the "title" of the text has a scope which encompasses the entire text whereas the "introduction" of a text has a scope that encompasses only the opening section of the text. *Realization* indicates how a signaling device communicates the information—a signal can communicate its purpose either through visual or discursive means or both. For example, an author can communicate the information that "the following section of the text is about the SARA model" by either beginning the section with the preceding sentence or by inserting the heading "**SARA MODEL**." In this case, the heading conveys topical information and attracts a reader's attention through visual distinction and the preview sentence conveys similar information through discursive means. *Location* refers to the physical position of a signal in relation to the content it signals. The proximity of a signal to its content may vary between signals. For example, a heading that reads "Functional Devices" could occur in an outline or in the text as part of the heading system. In the case of the outline, the content which it is signaling is probably a few pages away from the signal; however, in the case of an in-text heading, the content follows the signal immediately. Another example would be bold font. A word that is signaled by bold font has the content (the word itself) and the signal (the bold font) occurring simultaneously and there is no separation between the two. Therefore, the *location* of signal is used to describe the occurrence of signals relative to the content it signals. Finally, *information function* refers to the type of information communicated by signaling devices and this will be further explained below.

The *information function* of signals is the most important component of SARA theory. There are seven major functions of signals in text processing. These information functions

include 1) Demarcation, 2) Hierarchical Organization, 3) Sequential Organization, 4) Labeling, 5) Topic Identification, 6) Emphasis, 7) Function Identification (Lemarie et al., 2008; Lorch et al., 2011a; Lorch et al., 2011b). The starting point for understanding how a signal may influence text processing is an analysis of the specific information functions served by a signal. It is not meaningful to ask, for example, "How do headings affect memory for a particular text?" when headings can vary greatly in the information they communicate. A heading that specifies the topic of a text section provides very different information from a heading that simply numbers a text section. Given the theoretical importance of information functions in SARA, let us consider them in more detail.

<div align="center">Information Functions of Signals</div>

This section will now briefly present some research and explanation for each of the seven information functions hypothesized in SARA. Because *function identification* is the information function of interest in this research, it will be discussed separately in the next section.

The first information function is *demarcation*. *Demarcation* refers to the indication of structural boundaries in a text. One way to indicate structural boundaries is by making them visually distinct. For example, white space boundaries set by headings indicate the beginning of a new section (Lemarie et al., 2008). Other signals as simple as slashes or asterisks could also indicate structural boundaries. According to SARA, preview sentences and summary sentences could also demarcate section boundaries through discursive means (Lemarie et al., 2008). In a recent study conducted by Lorch et al. (2011b), researchers used asterisks to separate the different sections of a text and participants were asked to select five sentences from the text that best expressed the main topics in the text. In one condition, the asterisks were placed between sub-topical headings (minor sections within major topic headings), a second condition had asterisks between the major topical headings, and the control condition did not include any asterisks. When asterisks were placed between the minor sections, participants tended to choose sentences from these minor sections as the main topics presented in the text; participants in the other two

<div align="center">6</div>

conditions chose sentences from the major sections as the main ideas expressed in the text (Lorch et al., 2011b). This indicates that *demarcation*, even as simple as boundaries separated by asterisks, can affect the readers' understanding of the structure of the text.

The second information function is *hierarchical organization*. Expository texts are hierarchically organized around topics and subtopics. Consider an essay on the topic of Psychology for example. The title of the text would be "Psychology", with the different fields of Psychology as the sub-titles. These sub-titles may include "Cognitive Psychology," "Counseling Psychology," and "School Psychology." If the title and all its sub-titles have the same indentation and visual appearance, a reader wouldn't know that there are two levels of headings in the text. However, if the text is formatted in such a way so that the title "Psychology" is bolded and centered and the sub-titles such as "Cognitive Psychology" are un-bolded and left-justified, it would allow the reader to better understand the hierarchical difference between the title and the sub-titles. In a recent study done by Lorch et al. (2011a), results indicated that readers who had hierarchically organized headings constructed better outlines than readers who had headings that did not visually distinguish the hierarchical levels of the text. It therefore appears that signaling *hierarchical organization* is valuable in helping readers to better understand the structure of the text.

The third information function is *sequential organization*. Similar to *hierarchical organization*, this information function is often communicated by headings and preview sentences. However, *sequential organization* focuses on the progression of information as indicated by numerical or alphabetical headings. It communicates the ordering of topics instead of their hierarchical relationships to each other. Commonly encountered examples of *sequentially organized* signals can be found with diagrams, pictures, and tables in a research article or textbook. The author often refers to these visual presentations by saying, "please refer to Figure 1.2 for the results of the experiment." This numbering of diagrams facilitates the search process for a reader. In the same series of experiments, Lorch et al. (2011a) looked at the time taken to

search for a topic between readers with hierarchical headings versus readers with sequential headings. The text with hierarchical signals had headings that included both Roman numerals and letters (eg. Ia, Ib, IIa, IIb); the combination of Roman numerals and letters indicated the relationship between major topics and sub-topics for the reader. The text with sequential signals only had number headings regardless of whether the heading indicated a major topic or a sub-topic (e.g. 1, 2, 3). Readers who had the numbered headings found the target information faster than readers with the hierarchical headings. This indicates that *sequential organization* is an independent information function from *hierarchical organization* and readers benefit from this information function in search tasks.

The fourth information function is *labeling*. Signals such as headings, titles, numbering or bullet points can all serve the *labeling* function. These signals act as an index for a particular section of the text. For example, a heading may indicate the beginning of a new section and also provide a unique way to refer to the section. Lorch et al. (2011b) conducted a study where participants were presented with a text that had hierarchically organized headings. One group of participants had questions which referred to the particular section of the text. For example, the question would read: "According to the paragraph titled 'Fire Departments', which fire department is often found in smaller communities?" Other participants received questions which didn't refer to the heading of the paragraph; therefore the question would read: "which fire department is often found in smaller communities?" Participants found the correct answer faster and more accurately in the condition with questions indexing the heading of the paragraph of interest. This shows that *labels* facilitate search for a specific piece of information.

The fifth information function is *topic identification*. Unlike *labeling*, which only points readers to a particular section of the text, a signal that identifies the topic of a section facilitates text processing strategy by giving the reader context and background information about the content of the section. SARA hypothesizes that *topic identification* affects reading because it allows the reader to activate relevant background knowledge on the topic (Lemarie et al., 2008).

In research conducted by Lorch et al. (2011b), researchers gave participants either headings which contained topic identifying phrases or headings without topic identifying phrases. For example, a topic identifying heading would be "Section 2.1: Fire Prevention System", whereas the non-topic identifying heading would just be "Section 2.1". The participants were then asked to search for specific information such as "how do automatic fire sprinkler systems work?" Researchers found that participants with topic identifying headings found the target much faster on average than participants without topic identifying headings.

The sixth information function is *emphasis*, and it refers to signals that distinguish specific content from the rest of the text. The italicized words in this section are good examples of this information function. Typographical contrast such as italicization or boldfacing is a means for the author to draw the reader's attention and stress the importance of a particular word or phrase. However, typographical contrast is not the only way in which information can be emphasized. The author can show the importance of a topic simply by stating, "It is crucial to note that emphasis is one of the seven information functions." *Emphasis* serves to direct the reader's attention and allows readers to do extra text processing on more important topics (Lemarie et al., 2008; Gaddy, Sung, & van den Broek, 2001; Lorch & Lorch, 1995; Mayer et al., 1984; Meyer & Rice, 1982). In an experiment conducted by Lorch et al. (1995), participants were given different texts and were asked to recall certain target statements. Participants read one of three different versions of the same text: 1) No signals, 2) Lightly signaled (only target sentences were underlined), and 3) Heavily signaled (half of the text was underlined, including the target sentences). Participants' recall rate for target sentences in the lightly signaled condition was twice as much as their recall rate for the other two conditions. The participants' recall was better in the lightly signaled condition probably because the signals adequately directed participants' attention to the target sentences. Besides better recall, the researchers also found that participants spent longer time reading the target phrases and the slowed reading rate did not carry over to subsequent sentences that were not signaled. This indicated that participants' memory

enhancement due to signals could have been mediated by attention allocation and was a direct result of greater processing as indicated by the slower reading rate.

<div align="center">Function Identification</div>

The final information function is *function identification*. According to SARA, the function of a section of the text refers to the role fulfilled by that section with respect to the larger text (Lemarie et al., 2008). Therefore, functional signals identify a section of the text without giving any information concerning the contents of that section. Functional signals can come in forms such as labels or particular text formatting. For example, sections such as table of contents and index have unique formatting which differ from other types of signals. The formatting of these types of sections is a type of functional signals, because it communicates the specific purpose of the section. Other functional signals include labels such as summary, introduction, abstract, and they make the function of a section of the text explicit. For example, a summary could occur either at the beginning or at the end of the text and a reader might easily confuse a summary paragraph with the introduction or conclusion without clear labeling.

It is important to distinguish functional signals from functional devices. Functional signals are labels such as "summary" or the specific formatting of a section of text such as the table of contents. Functional devices, on the other hand, are the actual section or paragraph that the signal is indicating. Take the functional signal "summary" as an example. The label "summary" indicates the existence of a paragraph that highlights the main points in a text. The label itself is a functional signal and the paragraph that it refers to is the functional device. It is important to make this distinction because a reader presumably thinks about the actual functional device (the paragraph) even when only the label "summary" is given. Therefore, even though the current study is only presenting functional signals, the participants are presumed to respond according to their knowledge about functional devices. It is imperative to acquire data on readers' knowledge about functional devices before we can investigate the effect of functional signals on reading.

It is hypothesized that functional signals enable the reader to activate relevant experience in processing, thus facilitating text processing. The "experience" mentioned here refers to a reader's knowledge of the organization, purpose, usability, and categorization of a section of text as implied by the heading. For example, if a section is labeled "Abstract", then a reader would generally expect to find major topics and goals outlined in that section. The reader has this knowledge from encountering other abstracts in previous reading experiences. The reader is therefore likely to pay more attention to the abstract section if he wants to get a general grasp of the entire text. Another example is "Table of Contents". When a reader encounters the "Table of Contents", he knows that this section of the text contains a list of topics with their respective page numbers in order of appearance. Generally, the purpose of the table of contents is to outline the text and help the reader search for a specific topic. The reader, however, might not have enough reading experience to use the table of contents effectively or might have a different reading purpose than searching for a topic. Therefore, researchers must analyze the *function identification* of signals both from the linguistic perspective (i.e. the information communicated by the signal) and how the reader actually uses this information in different reading situations.

There is little research done on the *function identification* property of signals. Most signals identify the function of a text at the subsection level and not the entire text itself. There is, however, some evidence from previous research that a reader's familiarity with the type of organization structure of the text such as a cause/effect or problem/solution structure could affect comprehension in low reading ability readers (Meyer, Brandt, & Bluth, 1980; Englert & Hiebert, 1984). Some researchers have also investigated the effect of genre on text processing. For example, knowing whether a text is fiction or non-fiction could cause the reader to read more slowly, remember either the surface structure or create better inferences, and pay more attention to a sentence that is cued (Zwann, 1991; 1994). These findings imply that experience with a particular type of text affects a reader's text processing strategy. It seems plausible that functional signals could have similar effects.

This research has the goals of determining what experienced readers know about functional devices and how readers claim to use these devices in various reading situations. There are two parts to this study: Experiment 1 investigates the knowledge that college students have about functional devices, and Experiment 2 asks readers to rate the relevance of these functional devices in various reading situations.

Section Two

Experiment 1

A reader's knowledge of the type of information communicated by a functional device should directly influence how the reader uses that functional device. Thus, the first step in investigating the effects of functional signals is to determine what readers know about various functional devices. In Experiment 1, we investigated college students' knowledge of 10 different functional devices. These devices included introduction, conclusion, preface, summary, overview, discussion, abstract, glossary, index, and table of contents. The 10 functional devices were selected on the basis that they each served distinct purposes and that most participants were familiar with them. Participants were also asked to identify the form of media where each device could be found. It was important to know the types of media in which each device was expected to be found because this information would be used in Experiment 2 to create hypothetical reading situations. All participants were given 7 forms of media and 16 potential functions for each device and were asked to check all media and functions that applied to a particular device. The list of media and functions were meant to be exhaustive and a text-box of "other media/functions not listed" was also provided for the participants for free response.

Participants

Participants were 37 volunteers from a 200-level or a 300-level summer courses in psychology at the University of Kentucky. All participants spoke English as their native language and each received extra credit from the course instructor for their participation.

Material

Experiment 1 was conducted online using SurveyMonkey (www.surveymonkey.com). Participants could access the survey from any personal or public computer. Each participant was presented with 10 labels corresponding to the 10 functional devices including: introduction, conclusion, preface, summary, overview, discussion, abstract, glossary, index, and table of

contents. Figure 1 is a snapshot of the actual survey and presents the complete list of media and functions. The survey consisted of 10 pages (not including the informed consent form) and only one device was presented per page. All pages were identical except for the functional device presented.

Participants were presented with a functional device at the top of the page and were asked to identify the specific functions of the particular device. The functions were presented in two sections. The first section asked the participant to identify the media in which one would encounter the particular device. Participants could choose one or several forms of media which they expect to find the particular functional device. The second section consisted of a list of functions which a device could serve.

Figure 1. Screenshot of the Survey for the Functional Device, "Introduction".

Each functional device had the same list of media and functions; there were a total of 7 items in the list of media and 16 items in the list of functions. Participants were also given a text-box to type in forms of media or functions that were not included in the list.

<center>Procedure</center>

All participants logged on to the survey using any available computer with an internet browser. Each participant took the survey individually and the duration of the survey was between 20 and 45 minutes. Each participant received the same survey consisting of the 10 functional devices mentioned previously and the items were presented in the same order for each participant.

Participants were first presented with an online informed consent form at the beginning of the survey, where the experiment purpose, risks, and rewards were briefly described. Only after participants had checked the "I agree" box at the bottom of the informed consent form were they allowed to proceed with the experiment. Participants were then asked to identify the types of media which they expected to find a particular device and the corresponding functions for that device. There were checkboxes beside each media and function; participants were allowed to choose multiple functions or media per functional device. The same task was performed for each functional device.

<center>Results and Discussion</center>

A frequency distribution was created for each function and media under each of the 10 devices. The percentage of participants who chose a particular media or function was computed. The top three functions and media for each device are presented in Table 1. The numbers in parentheses refer to the 95% confidence interval for the percentage of participants that chose a particular form of media or function. If two functions or media tied in the top three choices, then both functions/media are listed.

Table 1. Summary of The Top Three Media and Functions Selected by Participants.

Functional Devices	Media	Functions
Introduction	Research Articles (82.5%, 83.3%) Textbooks (82.5%, 83.3%) Essays (76.7%, 77.6%)	Sets expectations for the reader (68.1%, 69.1%) Presents all topics and/or main ideas in the text (59.5%, 60.5%) Provides background information for the reader (56.6%, 57.7%) Presents the organization of the text (56.6%, 57.7%)
Conclusion	Essays (88.2%, 88.9%) Research Articles (82.3%, 83.3%) Textbooks (62.3%, 63.4%)	Reviews/recaps the ideas mentioned in the text (82.5%, 83.3%) Suggests future direction of study (71.0%, 71.9%) Provides additional information and reference (42.3%, 43.4%)
Preface	Textbooks (73.8%, 74.7%) Novels (68.1%, 69.1%) Research Articles (45.2%, 46.2%)	Provides background information for the reader (43.6%, 44.7%) Sets expectations for the reader (40.6%, 41.7%) Author's comment section (34.8%, 35.8%) Provides the reasons for the book, the writing process, production process, other contributors, etc. (34.8%, 35.8%)
Summary	Textbook (87.9%, 88.6%) Research Articles (76.0%, 76.9%) Essays (58.3%, 59.4%)	Review/Recaps the ideas mentioned in the text (67.1%, 68.2%) Presents all topics or main ideas in the text (64.2%, 65.2%) Synthesizes the findings/ideas of the text (61.2%, 62.3%)
Overview	Textbooks (75.3%, 76.2) Research Articles (72.2%, 73.2) Web Pages (54.0%, 55.1%)	Provides quick access for review or search (51.0%, 52.1%) Synthesizes the findings/ideas of the text (41.9%, 43.0%) Sets expectations for the reader (38.9%, 39.9%) Provides the reasons for the book, the writing process, production process, other contributors, etc. (38.9%, 39.9%) Presents all topics and/or main ideas in the text (38.9%, 39.9%)

Table 1 (continued).

Functional Devices	Media	Functions
Abstract	Research articles (93.7%, 94.2%) Essays (26.8%, 27.8%) Textbooks (26.8%, 27.8%)	Sets expectations for the reader (60.1%, 61.1%) Provides quick access for review or search (57.0%, 58.1%) Provides background information for the reader (41.9%, 43.0%)
Glossary	Textbooks (93.7%, 94.2%) Research articles (26.8%, 27.8%) Magazines (26.8%, 27.8%)	Lists key terms and their respective definitions (78.3%, 79.2%) Provides additional information and reference (32.8%, 33.8%) Provides quick access for review or search (32.8%, 33.8%)
Index	Textbooks (93.7%, 94.2%) Magazines (41.9%, 43.0%) Research articles (26.8%, 27.8%) Web Pages (26.8%, 27.8%)	Provides quick access for review or search (54.0%, 55.1%) Provides additional information and reference (32.8%, 33.8%) Presents all topics and/or main ideas in the text (23.8%, 24.7%) Presents the organization of the text (23.8%, 24.7%)
Table of Contents	Textbooks (96.8%, 97.2%) Magazines (75.3%, 76.2%) Novels (69.2%, 70.2%)	Provides quick access for review or search (60.1%, 61.1%) Presents the organization of the text (60.1%, 61.1%) Presents all topics and/or main ideas in the text (38.9%, 40.0%)

The results presented in Table 1 summarize the top three functions and media by percentage for each functional device. Although the top three functions and media were presented, some of the functions or media were chosen by less than 50% of participants; therefore, these functions and media were not considered to be typical for a particular functional device.

The device *Introduction* is typically found in textbooks, research articles, and essays and readers understand an *Introduction* to set expectations, present the main topics, and provide background information and organization for the reader. Also, an introduction does not always present the organization of the text to the reader although that could be a possible function of an introduction.

Conclusion sections are also found in essays, textbooks, and research articles and they are understood to review the topics presented in the text and suggest directions for future studies.

A *Preface* is often found in textbooks and novels but participants don't seem to be able to agree on the function of a *Preface.* According to Dictionary.com (n.d.), *Preface* is used as "a preliminary statement in a book by the book's author or editor, setting forth its purpose and scope, expressing acknowledgment of assistance from others, etc." The correct function for *Preface* should be "provides reasons for the book…" but only 35% of the participants chose this function. Thus it seems that readers either are not familiar with the function of *Preface* or they believe that *Preface* can be used in a more varied way.

Abstract, Summary, and *Overview* serve similar functions but an *Abstract* is generally found in research articles while *Summary and Overview* are found in textbooks, essays, and web pages. Participants seemed to not know the precise function of *Overview*, probably because this functional device is less frequently encountered. This was reflected in the poor agreement on the precise function of *Overview*. Most participants knew that *Discussion* could be found in a research article (93.9%) and it could also be found in essays; however, compared to the high consensus for media, only about half of the participants agreed on the functions they expected *Discussion* to serve.

Both *Glossary* and *Index* were found in textbooks and most participants agreed that *Glossary* lists key terms and their respective definitions; however, only about half of the participants chose "provide quick access and search" for *Index*.

Finally, most participants agreed that *Table of Contents* can be found in textbooks, magazines, and novels. About 60% of participants agree that a *Table of Contents* provides quick access for search and presents the organization of the text.

One form of media that was not chosen as one of the top 3 forms of media for any of the functional devices was news report (print & online). Perhaps there is some implication that most

undergraduate readers disregard functional devices when they are reading news or that news reports typically include very few functional devices.

The top three functions listed by participants described each functional device fairly accurately even though there was some overlap in functions among various devices (e.g. conclusion and summary). These functions give us insight into what readers know about each functional device and how they might use these devices during text processing. For example, readers are likely to use *Summary* when they are reading under time pressure and need to grasp the main ideas quickly. Similarly, *Index* would facilitate search for readers and allow them to find a particular term or keyword and read selectively.

Section Three

Experiment 2

Results from Experiment 1 gave us information on what readers know about functional devices and the forms of media in which a device is typically found. However, such information conveyed by signals does not necessarily translate to the usage of functional devices during text processing. There is evidence that people read at different speeds and have different levels of understanding under various reading "types" such as reading for an essay exam or reading for pleasure (Lorch, Klusewitz, & Lorch, 1995). Therefore, Experiment 2 investigated how readers might use these functional devices in various reading situations. For example, most readers know what to expect when they encounter the signal "summary". However, readers might use the functional device "summary" heavily when writing a paper but ignore "summary" when they are searching for a particular piece of information in a textbook. In order to study how function identifying signals influence content text processing, it should be useful to know both a) what readers know about function identifying devices, and b) the conditions under which readers find such information most useful. Experiment 1 has already answered the first question and Experiment 2 will ask participants to introspect on how they would use the functional devices under various reading conditions.

In Experiment 2, participants were presented with eight reading situations. These reading situations included 1) Search for a specific piece of information in a book, 2) Search for a topic and write a six page essay, 3) Search for the definition of a key term under time pressure, 4) Read to cram for an exam, 5) Read to determine the relevance of a textbook, 6) Read to decide if a magazine is worth buying 7) Read a few chapters without a specific topic and then write a short book report, 8) Read a controversial article and decide on the author's viewpoint. From the results of Experiment 1, participants indicated that they were more likely to find certain functional devices in specific types of reading material. For example, about 74% of the participants

indicated that they could find *Preface* in textbooks but less than 40% indicated that they would find *Preface* on web pages. Also, each functional device serves distinct functions. Although some of these functions overlap between functional devices, it was necessary to create different reading situations that would require participants to use a specific function of the functional devices. A study conducted by Lorch & Lorch (1993) identified 10 different types of reading situations that college-level readers claimed to engage on a regular basis. These 10 types of reading situations included: 1) exam preparation, 2) reading to research, 3) class preparation, 4) reading to learn, 5) reading to apply, 6) search, 7) reading to self-inform, 8) intellectually challenging reading, 9) reading for stimulation, and 10) light reading. We compared these 10 different reading situations with the types of functions for each functional device from the results of Experiment 1 and came up with the eight reading situations targeting various possible usages of the nine functional devices. *Abstract* was not included in Experiment 2 because it was very specific to research articles and because most of the participants were first year college students, they would not have had much exposure to research articles.

Participants were asked to choose the two most useful functional devices for each of the eight reading situations and then explain how they would use these two devices. Participants were asked to also give a short response on how they would use the functional devices because this would give more data concerning the possible text processing strategy adopted by the participant. This information could be helpful in analyzing and explaining effects of functional signals on readers.

Although different devices may communicate similar information, a reader might not use them equally. Both *Table of Contents* and *Index* communicate information that is relevant to search tasks, but a reader might use them differently in different reading tasks. For example, a reader is more likely to use *Index* instead of the *Table of Contents* when searching for a specific key term. On the other hand, a reader who is trying to gain knowledge on a broader topic might be more likely to use the *Table of Contents* and search for sections of the text on that specific

topic. Both reading situations require the reader to conduct a search task but different functional devices could be used depending on the specific reading goal. Therefore, Experiment 2 focuses on readers' claimed use of a particular functional device in different reading situations.

Participants

Participants were 70 undergraduate students from the PSY 100 participant pool at the University of Kentucky. Participants signed up through the SONA system and each participant received one research credit for their participation.

Material

Experiment 2 was conducted online using SurveyMonkey in a similar fashion to Experiment 1. Participants were able to access the survey from any computer. The participants were first presented with an online informed consent form where they checked the "I agree" box in order to proceed to the actual experiment. An instruction page followed the informed consent form and the participants were introduced to the nine functional devices and were asked to choose the two most useful functional devices in each of the eight reading situations. These functional devices included introduction, conclusion, preface, summary, overview, discussion, glossary, index, and table of contents. The first reading situation (searching for specific information) was introduced immediately following the instruction page and participants were reminded of the nine functional devices again at the top of the page. Refer to Figure 2 for a screen shot of the first reading situation.

The reading situations were all hypothetical and participants did not actually have to search in a textbook or cram for an exam. Two drop down menus were located below the hypothetical reading situation and participants were asked to rank the two functional devices they thought would be most useful to the particular reading situation. The participants were also asked to briefly describe how they would use the two functional devices in the particular reading situation. The same procedure was repeated for the eight reading situations.

Here is the list of functional devices:

1) Introduction, 2) Conclusion, 3) Preface, 4) Summary, 5) Overview, 6)Glossary, 7) Index, 8) Table of Contents, 9) Discussion.

Imagine that you are given a book on behavioral psychology. The book's content includes a number of famous psychologists, their work, and the progression of ideas contributing to the field of behavioral psychology. The book is about 500 pages and its difficulty is that of a 400 level college course.

Suppose that you are given an assignment to find the answer to the following question: "In what year did Pavlov first publish *The Work of The Digestive Glands*"?

It is OK if you have no clue who Pavlov is. We simply want you to think about how you might use different functional devices to find this specific piece of information. Remember, you must find the answer from the book and you will not be able to use a computer or anything else other than this book.

✱ **According to the reading situation above, choose the two functional devices which you think are most useful.**

	MOST USEFUL	2nd most useful
Select Functional Device	▼	▼

In the text box below, briefly explain how you would use these functional devices to answer the question above:

	27%

Prev   Next

Figure 2. Screenshot of the First Reading Situation—Searching for A Specific Piece of Information.

Each of the eight reading situations had a similar layout to the first reading situation. The eight reading situations included 1) Search for a specific piece of information in a book, 2) Search for a topic and write a six page essay, 3) Search for the definition of a key term under time pressure, 4) Read to cram for an exam, 5) Read to determine the relevance of a textbook, 6) Read to decide if a magazine is worth buying 7) Read a few chapters without a specific topic and then write a short book report, 8) Read a controversial article and decide on the author's viewpoint. Refer to Appendix A for the complete description of the reading situations.

Procedure

Participants signed up for the experiment through the SONA system. Once they signed up, the system provided each participant with a link to the actual survey on SurveyMonkey. Participants read through the informed consent form and the instruction page before they could proceed to the actual survey. Eight reading situations were presented for each participant. The reading situations were presented in the order described in the materials section and participants

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were not allowed to skip a reading situation. Participants chose the two most useful functional devices for each reading situation and also wrote a brief description of how they would use each of these devices in the text box provided. At the end of the final reading situation, participants were re-directed to an online credit slip page where they could fill out their name and student ID in order to receive research credit for their participation. Experiment 2 did not require the participants to record their reading strategy and there was no time limit for the experiment.

<p style="text-align:center"><u>Results and Discussion</u></p>

The results from Experiment 2 will be presented separately for each reading situation. For each reading situation, a bar graph representing the percentage of participants who chose a functional device either as the most or second most useful was created. A conditional percentage table was also created for each of the reading situations. The conditional percentage table listed the most useful functional devices as row items and the second most useful functional devices as column items. The cells represent the conditional percentage of the second most useful functional devices for each of the most useful functional devices. For example, 50% of the participants had chosen *Table of Contents* as the most useful functional device for a particular reading situation; out of the 50%, 80% of those participants chose *Index* as the second most useful functional device and 20% chose *Glossary* as the second most useful functional device. A brief verbal description will be given for each reading situation, outlining the trend of results observed from the graph and the table.

Participants also provided qualitative responses in Experiment 2 and described how they would use the most, and second most useful functional device. Much of the qualitative data collected from participants did not describe how they would use a particular functional device. Instead, participants would simply re-state the given task in a particular reading situation. For example, for first reading situation of searching for a specific piece of information, many participants commented that they would use *Index* to "search for a particular piece of information." Although the qualitative results were thematically analyzed, they will be integrated with the

descriptive results for each reading situation. The thematic codes used to analyze participants'
responses can be found in Appendix B. Quotes from participants' qualitative responses were
included to explain how and why participants might have intended to use the functional devices
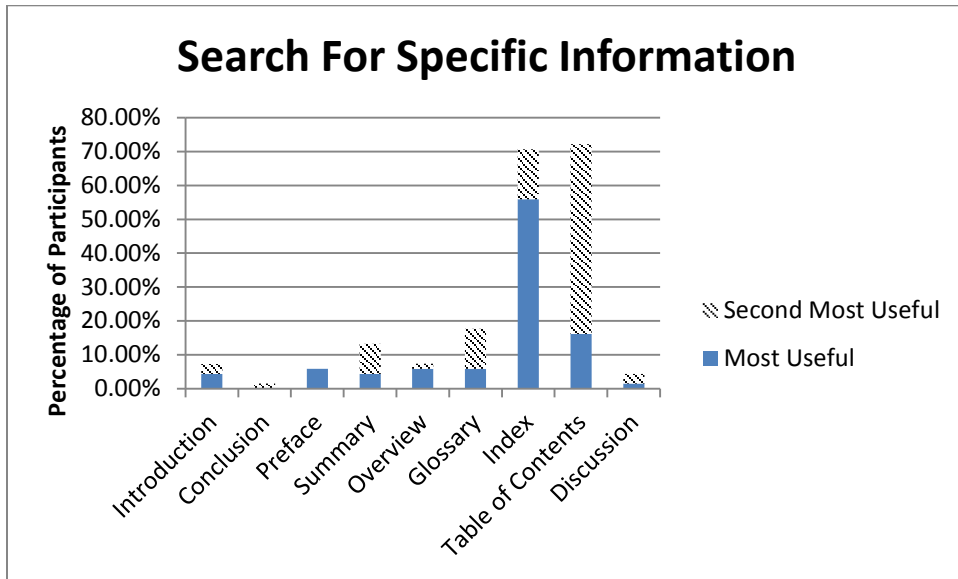selected.

Reading Situation 1

Figure 3. Percentage of First & Second Choices of Functional Devices for the First Reading
Situation

Table 2. Relationships between First and Second Choices of Functional Devices for yhe First Reading Situation (Cells are column devices' conditional percentage on row devices; top & left margins are functional devices and the respective frequency of participants that chose the device)

			Second Most Useful Functional Devices							
			Introduction	Conclusion	Summary	Overview	Glossary	Index	Table of Contents	Discussion
		Frequencies	2	1	6	1	8	10	38	2
Most Useful Functional Devices	Introduction	3			33.3%			33.3%		33.3%
	Preface	4	25.0%		25.0%	25.0%		25.0%		
	Summary	3	33.3%						66.6%	
	Overview	4			25.0%				75.0%	
	Glossary	4			25.0%			50.0%	25.0%	
	Index	38		2.6%	2.6%		13.2%		**81.6%**	
	Table of Contents	11			9.1%		27.3%	**54.5%**		9.1%
	Discussion	1						100.0%		

In the first reading situation, participants were instructed to imagine that they were searching for a specific piece of information in a textbook. According to Figure 3, most participants chose *Index* as the most useful functional device and *Table of Contents* as the second most useful functional device. If we look at Table 3, 81.6% of the participants who chose *Index* as the most useful functional device chose *Table of contents* as the second most useful functional device. In the qualitative data collected, many participants commented on the fact that they would look for a specific piece of information first in the *Index* and then in the *Table of Contents* if they could not find the information in *Index*. For example, one participant said, "You would first look up Pavlov… in the index and reference those pages listed to find the information. If Pavlov were for some reason not listed, you could then look for the section discussing him in the table of

contents." Based on these comments, the participants who chose *Index* and then *Table of Contents* seemed to endorse the strategy of searching very specifically and then try to search within a broader scope of topic if they failed to find a match within *Index*. Half of the participants who chose *Table of Contents* (16.2%) as the most useful functional device chose *Index* as the second most useful functional device. These participants either had a reverse strategy of searching broadly and then specifically, or were using the two functional devices interchangeably. For example, one participant commented, "First, I would look at the table of contents for either Pavlov or The Work of The Digestive Glands. If I did not find either of them within the table of contents, I would turn to the Index…"
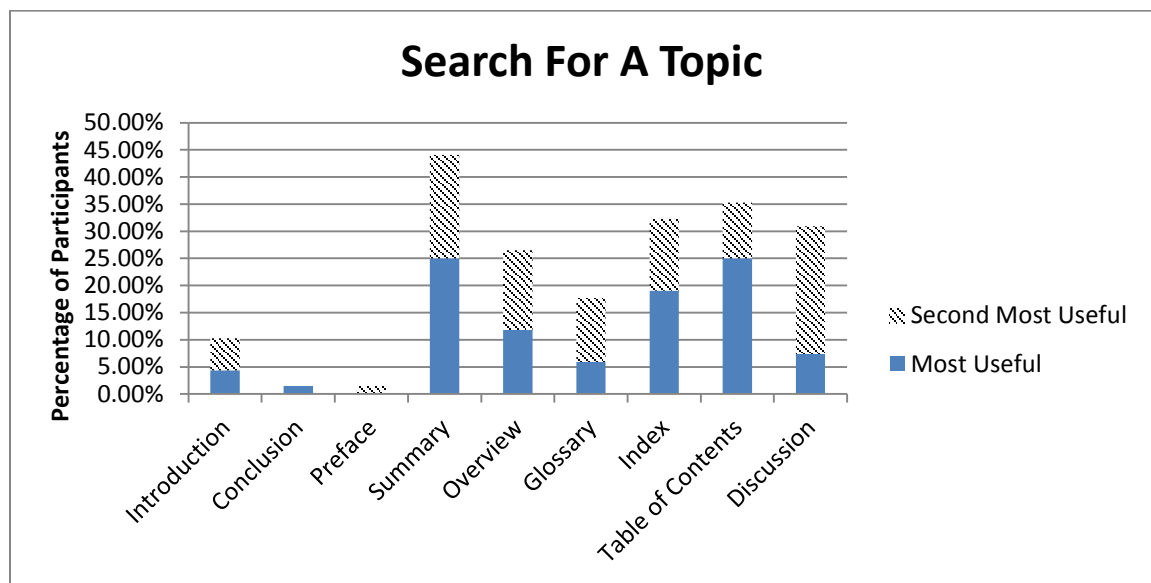
Reading Situation 2

Figure 4. Percentage of First & Second Choices of Functional Devices for the Second Reading Situation

Table 3. Relationships between First and Second Choices of Functional Devices for the Second Reading Situation.

			Second Most Useful Functional Devices							
			Introduction	Preface	Summary	Overview	Glossary	Index	Table of Contents	Discussion
		Frequency	4	1	13	10	8	9	7	16
Most Useful Functional Device	Introduction	3			33.3%	33.3%				33.3%
	Conclusion	1								100.0%
	Summary	17	11.8%	5.9%		35.3%	5.9%	11.8%		29.4%
	Overview	8	25.0%		50.0%					25.0%
	Glossary	4						25.0%		75.0%
	Index	13			7.7%		30.8%		53.8%	7.7%
	Table of Contents	17			23.5%	11.8%	11.8%	35.5%		17.6%
	Discussion	5			60.0%	20.0%	20.0%			

The second reading situation asked participants to search for Pavlov's work across several sections in a textbook in order to write a six page essay. According to results from Figure 3, 25% of the participants chose *Table of Contents* as the most useful and 25% of the participants chose *Summary* as the most useful functional devices. Both of these functional devices provided information on the main topics in a textbook and therefore it was reasonable for participants to want to use either of these functional devices. However, the conditional percentages in Table 3 indicated two different reading strategies between readers who chose *Table of Contents* as the most useful functional device versus the readers who chose *Summary* as the most useful functional device. About 1/3 of the participants who chose *Table of Contents* as the most useful functional device chose *Index* as the second most useful functional device; 1/3 of the participants who chose *Summary* as the most useful functional device chose *Overview* as the second most useful functional device. *Summary* and *Overview* both provide main points for the reader;

however, *Table of Contents* and *Index* are similar in their search facilitating properties. Therefore, the participants seemed to choose *Summary* and *Overview* because their reading strategy focused on identifying the main topics and generating a paper. Some participants who chose *Summary* as the most useful functional device commented that they would use *Summary* to shorten their reading time and produce the paper quickly. The other participants who chose *Table of Contents* and *Index* seemed to be more systematic by finding the sections of relevant information and then processing the information on their own. For example, one participant said, "The Table of Contents could lead me to the chapter or section that talks about classical conditioning where I could then read about it and answer the question. The Index would lead me to the page where discussion of classical conditioning starts and I could read from there and then answer the question." Finally, some participants used a hybrid strategy by finding the relevant information using *Table of Contents* first and then looked for *Summary* to find the main points within that section. A little less than one-fourth of the participants who chose *Table of Contents* as the most useful functional device endorsed this strategy. About 1/3 of the participants chose *Discussion* as a useful functional device. Most of these participants chose *Discussion* as the second most useful functional device; their choice of the most useful functional device, however, varies greatly. Participants who chose *Discussion* focused on its property of providing more detailed information. One participant commented that the *Discussion* section would "go deeper into some aspects of Pavlov's conditioning theory."

Reading Situation 3

Time Pressured Search

Percentage of Participants

100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%

Introduction, Conclusion, Preface, Summary, Overview, Glossary, Index, Table of Contents, Discussion

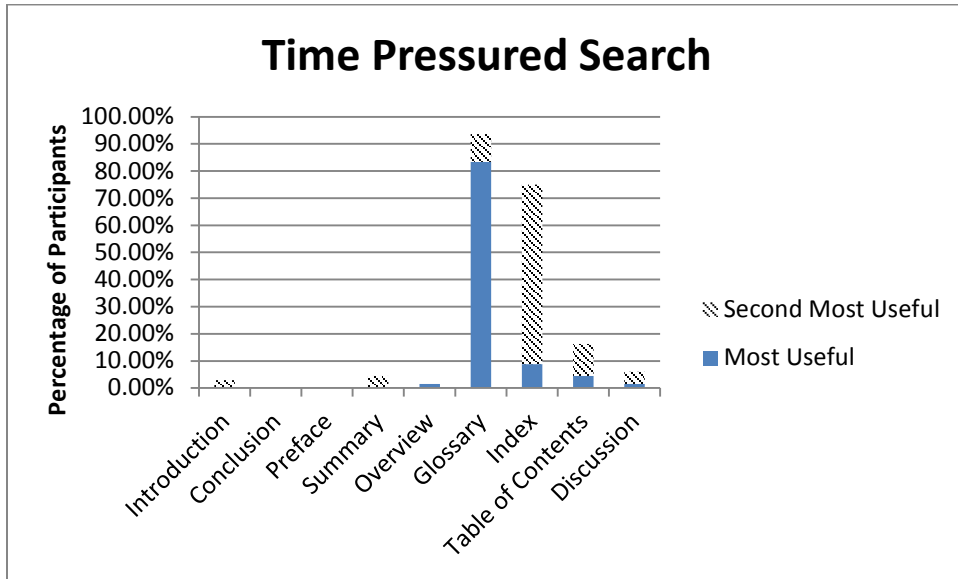▨ Second Most Useful
▪ Most Useful

Figure 5. Percentage of First & Second Choices of Functional Devices for the Third Reading Situation

Table 4. Relationships between First and Second Choices of Functional Devices for the Third Reading Situation.

			Second Most Useful Functional Device					
			Introduction	Summary	Glossary	Index	Table of Contents	Discussion
		Frequency	2	3	7	45	8	3
Most Useful	Overview	1		100.0%				
	Glossary	57	3.5%	3.5%		**75.4 %**	14.0%	3.5%
	Index	6			**100.0 %**			
	Table of Contents	3			33.3%	66.6 %		
	Discussion	1						100.0%

Reading Situation 3 asked participants to imagine that they were searching for a definition under time pressure. According to Figure 5, more than 90% of the participants correctly identified *Glossary* with finding the definition of a term. Some participants chose *Index* as the most useful functional device but all of them also chose *Glossary* as the second most useful

functional device. Participants' qualitative comments revealed two general strategies. Some participants would use *Glossary* to find the definition and then use *Index* to gather more in-depth information. Other participants described that they would search in *Glossary* first and only go on to *Index* if they could not find the definition in *Glossary*. Two general trends in participants' reading strategy had been identified in the three reading situations up to this point. In one scenario, participants would choose one functional device and describe that they would only go on to the second most useful functional device if they could not accomplish the reading task only by using the most useful functional device. About half of the descriptions by participants who chose *Glossary* in Reading Situation3 fit this scenario. Other participants, on the other hand, would simply describe themselves using both functional devices non-sequentially, or they would use the second most useful functional device to gather more in-depth information.

Cramming for An Exam

Percentage of Participants

80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%

Introduction   Conclusion   Preface   Summary   Overview   Glossary   Index   Table of Contents   Discussion

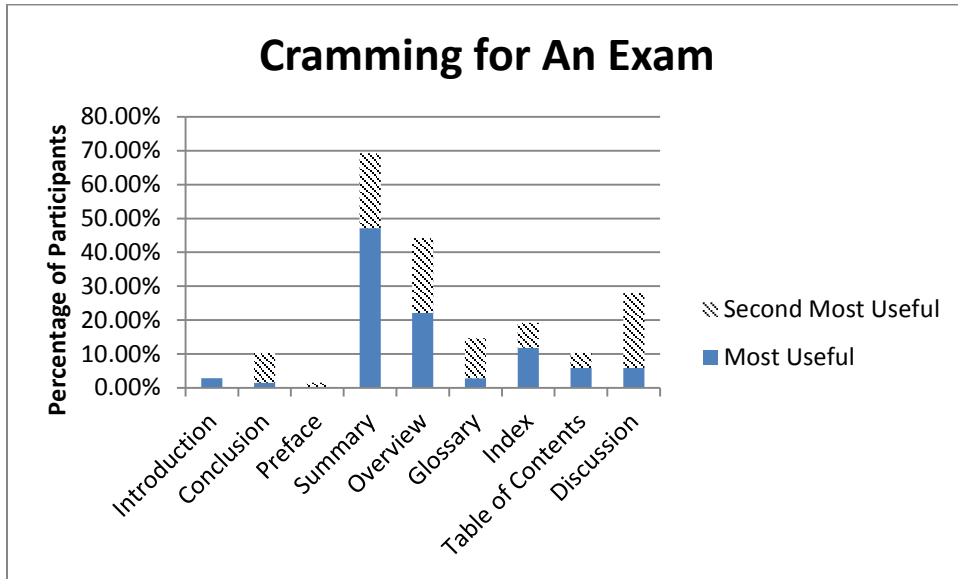⬚ Second Most Useful
■ Most Useful

Figure 6. Percentage of First & Second Choices of Functional Devices for the Fourth Reading Situation

Table 5. Relationships between First and Second Choices of Functional Devices for the Fourth Reading Situation.

			Second Most Useful Functional Device						
			Conclusion	Preface	Summary	Overview	Glossary	Index	Table of Contents	Discussion
		Frequency	6	1	15	15	8	5	3	15
Most Useful Functional Device	Introduction	2				100.0%				
	Conclusion	1		100.0%						
	Summary	32	12.5%			**37.5%**	15.6%	6.3%	3.1%	**25.0%**
	Overview	15			**46.7%**		6.7%		6.7%		**40.0%**
	Glossary	2							50.0%	5.0%
	Index	8			62.5%		25.0%		12.5%	
	Table of Contents	4	25.0%		25.0%		25.0%	25.0%		
	Discussion	4	25.0%			50.0%		25.0%		

According to Figure 6, the majority of participants chose either *Summary* or *Overview* as one of the two most useful functional devices. Also, close to 30% of the participants chose *Discussion* as one of the most useful functional devices with over 20% of them choosing *Discussion* as the second most useful functional device. The results from Table 1 in Experiment 1 indicated that both *Summary* and *Overview* have the property of concisely presenting the main ideas while *Discussion* provides explanation of findings and could have implications for further reading. These properties could have several implications for the participants' reading strategy. First of all, the reading situation described a scenario where students had to cram for an in-class essay exam in a short amount of time. Upon reading this, the student would need to devise a study plan and choose the functional devices that are useful. The qualitative results indicated that most participants decided to use *Summary* and *Overview* because their reading strategy was to get a basic understanding of the text quickly. For example, one participant commented, "By studying a basic overview of a main topic, you are going to gain a better understanding of the material. If I were to read an overview of classical conditioning and cram that information in one night, I'll be able to better comprehend for the exam. The summary works the same way. This way you aren't scanning through tons of terms [but] you are focusing on what the test will strictly be on." It should also be noted that the results from this reading situation were similar to the seventh reading situation where participants were asked to write a short report. This similarity will be further discussed in the results section for the seventh reading situation.
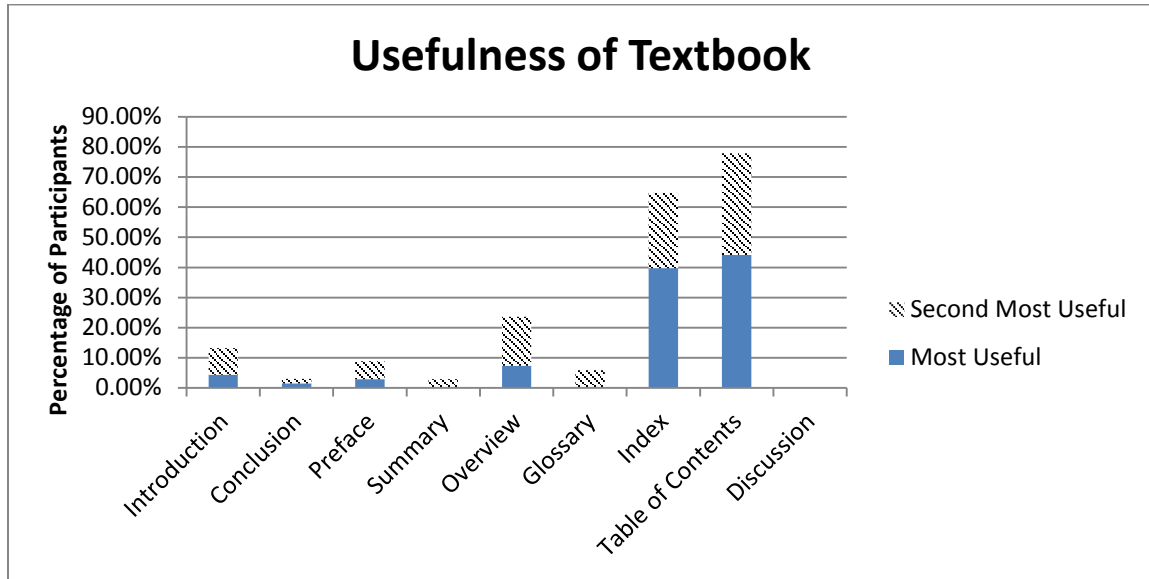
Reading Situation 5

Usefulness of Textbook

Figure 7. Percentage of First & Second Choices of Functional Devices for the Fifth Reading Situation

Table 6. Relationships between First and Second Choices of Functional Devices for the Fifth Reading Situation.

			Second Most Useful Functional Device							
			Introduction	Conclusion	Preface	Summary	Overview	Glossary	Index	Table of Contents
		Frequency	6	1	4	2	11	4	17	23
Most Useful Functional	Introduction	3					33.3%			66.6%
	Conclusion	1					100.0%			
	Preface	2							50.0%	50.0%
	Overview	5	20.0%			20.0%				60.0%
	Index	27			7.4%	3.7%	14.8%	11.1%		**63.0%**
	Table of Contents	30	17.7%	3.3%	6.7%		16.7%	3.3%	**53.3%**	

According to Figure 7, most participants chose either *Table of Contents* or *Index* as the two most useful functional devices in this reading situation. The results of this reading situation

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are similar to the first reading situation where participants were asked to find a piece of specific information in the textbook. Participants in both reading situations chose *Index* and *Table of Contents*. However, in the first reading situation, participants showed a reading strategy where most of them chose *Index* as the most useful functional device and *Table of Contents* as the second most useful functional device. In this reading situation, however, participants did not show such strategy and either functional device had about 40% of the participants choosing it as the most useful functional device. When readers are browsing through a textbook to determine its relevance, they simply have to look for the topic in the textbook and determine if the book contains sections on the particular topic and how much information would be provided. Both *Table of Contents* and *Index* provide a list of the topics included in the textbook; the *Index* may contain more topics than the *Table of Contents* but if a topic is not present in the *Table of Contents* then the book probably would not contain very much information on that particular topic. Therefore, both functional devices could be equally useful to this reading situation. In fact, most participants in their comments stated different usage of *Index* and *Table of Contents* but did not state whether one was more useful or if there is any sequence to the usage of the two functional devices. For example, one participant commented, "By looking at the index of the book, I would be able to see if Pavlov is mentioned in the book. If he is, then it should be located within the index and I can continue on to the page it says. I may also check the table of contents to see if Pavlov is mentioned or maybe something pertaining to him such as classical conditioning. I can then see what chapters or pages talk about this and continue on with my research." The comment from this particular participant described a search task similar to the first reading situation, except here the participant did not indicate that he or she would search in the *Index* first.
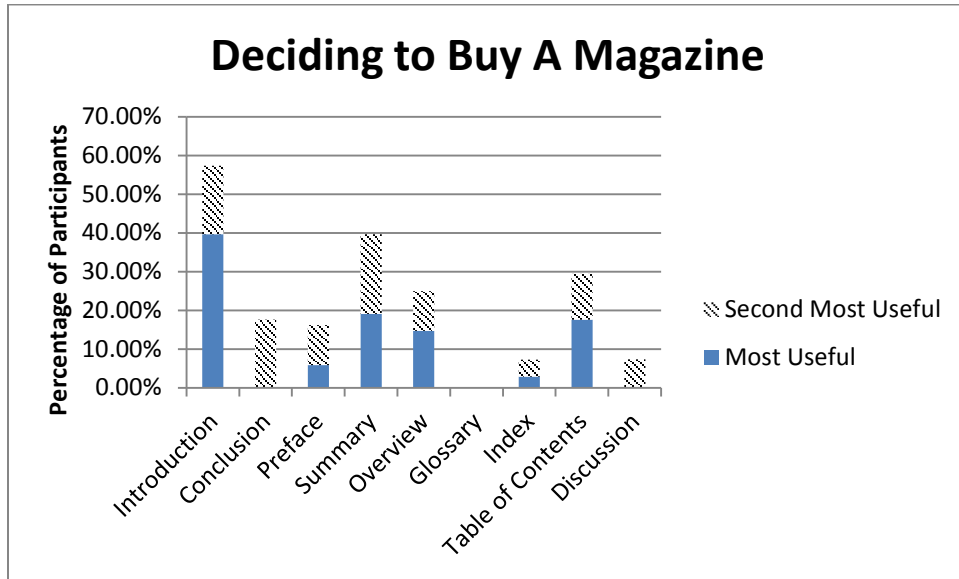
Figure 8. Percentage of First & Second Choices of Functional Devices for the Sixth Reading Situation

Table 7. Relationships between First and Second Choices of Functional Devices for the Sixth Reading Situation.

			Second Most Useful Functional Device							
			Introduction	Conclusion	Preface	Summary	Overview	Index	Table of Contents	Discussion
		Frequency	12	12	7	14	7	3	8	5
Most Useful Functional	Introduction	27		**25.9%**	14.8%	**29.6%**	14.8%		14.8%	
	Preface	4	25.0%	25.0%					25.0%	25.0%
	Summary	13	**30.8%**	15.4%	15.4%	7.7%	7.7%			23.1%
	Overview	10	**30.0%**	10.0%		**40.0%**			10.0%	10.0%
	Index	2							100.0%	
	Table of Contents	12	**33.3%**	8.3%	8.3%	8.3%	16.7%	25.0%		

Most people, when deciding on whether to buy a magazine or not, would read through

the *Table of Contents*. This is similar to the previous reading situation where participants were

asked to determine the relevance of a particular textbook. Buying a magazine could be thought of

as determining the relevance of the magazine according to a person's interest. However, in this particular reading situation, participants were already told that they were to determine whether a specific article titled "Behavioral Psychology" in the magazine was of interest to them. Therefore, we observed that most participants chose *Introduction*, *Summary*, or *Overview* as one of the most useful functional devices in this reading situation with over 50% of the participants choosing *Introduction* as one of the two most useful functional devices. When asked how they would use *Introduction*, most participants commented that they would read the *Introduction* and see if it aroused their interest. One participant commented: "Skimming the introduction should be enough for me to determine whether I'm interested, because I can see if the writing will hook me or not." The participants who chose *Summary* and *Overview* gave similar responses as the ones who chose *Introduction* and this could be because all three functional devices provide main points to an article and allow the reader to achieve a general understanding without reading the entire article. About 1/3 of the participants did chose *Table of Contents* as the most useful functional device. These participants' responses revealed that they either used *Table of Contents* to locate the article of interest, or they were using the *Table of Contents* to judge their interest level of the magazine as a whole. For example, one participant commented: "The table of contents should tell me if there are other topics covered in the magazine that I am interested in." The results from reading situation six thus revealed two types of reading strategies: one group of participants were basing their decision on their interest level of one particular article while the second group of participants were basing their decision based on the magazine as a whole.
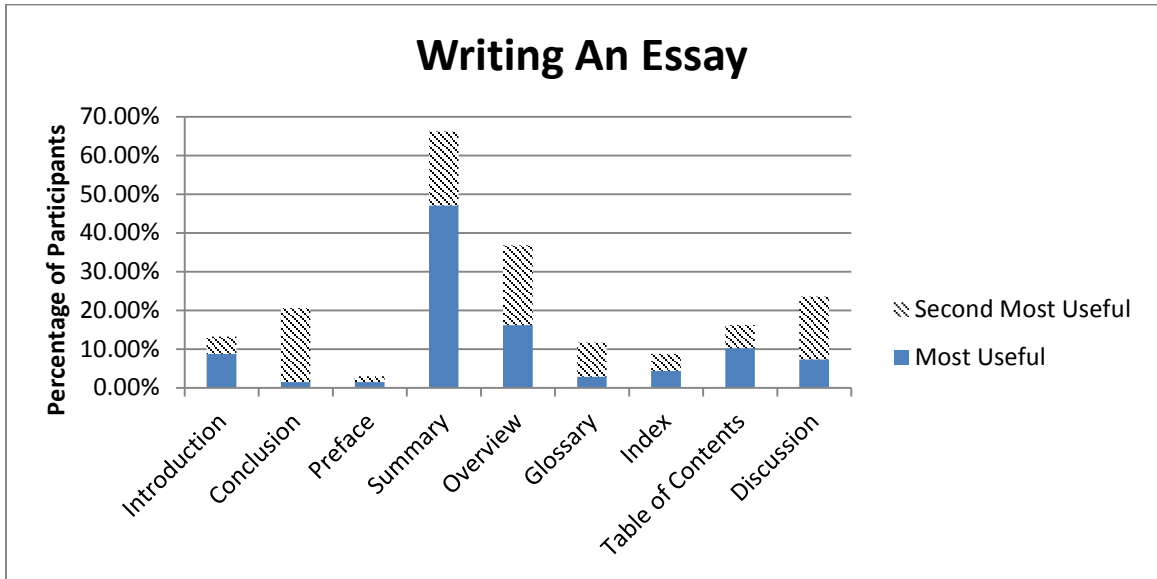
Figure 9. Percentage of First & Second Choices of Functional Devices for the Seventh Reading Situation

Table 8. Relationships between First and Second Choices of Functional Devices for the Seventh Reading Situation.

			Second Most Useful Functional Device								
			Introduction	Conclusion	Preface	Summary	Overview	Glossary	Index	Table of Contents	Discussion
		Frequency	3	13	1	13	14	6	3	4	11
Most Useful Functional Device	Introduction	6		66.7%		33.3%					
	Conclusion	1				100.0%					
	Preface	1		100.0%							
	Summary	32	6.3%	15.6%	3.1%		**40.6%**	12.5%		6.3%	**15.6%**
	Overview	11		27.3%		**54.5%**				9.1%	9.1
	Glossary	2							100.0%		
	Index	3								33.3%	66.6
	Table of Contents	7				14.3%		28.6%	14.3%		42.9%
	Discussion	5	20.0%			60.0%	20.0%				

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Most participants in this reading situation chose either *Summary* or *Overview* as the most useful functional devices. The results for this reading situation were similar to the fourth reading situation where participants were asked to cram for an in-class essay exam. In the fourth reading situation, participants were concerned with getting the main points of the text quickly in order to prepare themselves for the exam. In the seventh reading situation, however, participants seemed to use *Summary* and *Overview* as tools to augment what they have already read and understood from the text. For example, one participant commented: "The summary and overview for each chapter assigned will give a general outline of the topics discussed within. While still not as beneficial as actually reading the chapters, these two devices will provide enough information in order to write a decent report on classical conditioning." About half of the participants who chose *Summary* in this reading situation made a response similar to the one above. This indicated that participants in this particular reading situation were using these two functional devices to organize their thoughts before writing the paper while the participants from the fourth reading situation were mainly using *Summary* and *Overview* to reduce reading time. Besides *Summary* and *Overview*, about 25% of the participants chose *Discussion* as one of the most useful functional devices. Regardless of the reading situation, participants who chose *Discussion* generally talk about looking for more in-depth information in the *Discussion*. This is supported by the qualitative data where very few participants chose *Discussion* as the most useful functional device but many chose it as the second most functional device. This observation is true of *Discussion* in all the reading situations up to this point but the results from the final reading situation would indicate that participants may choose *Discussion* as the most useful functional device in certain scenarios.
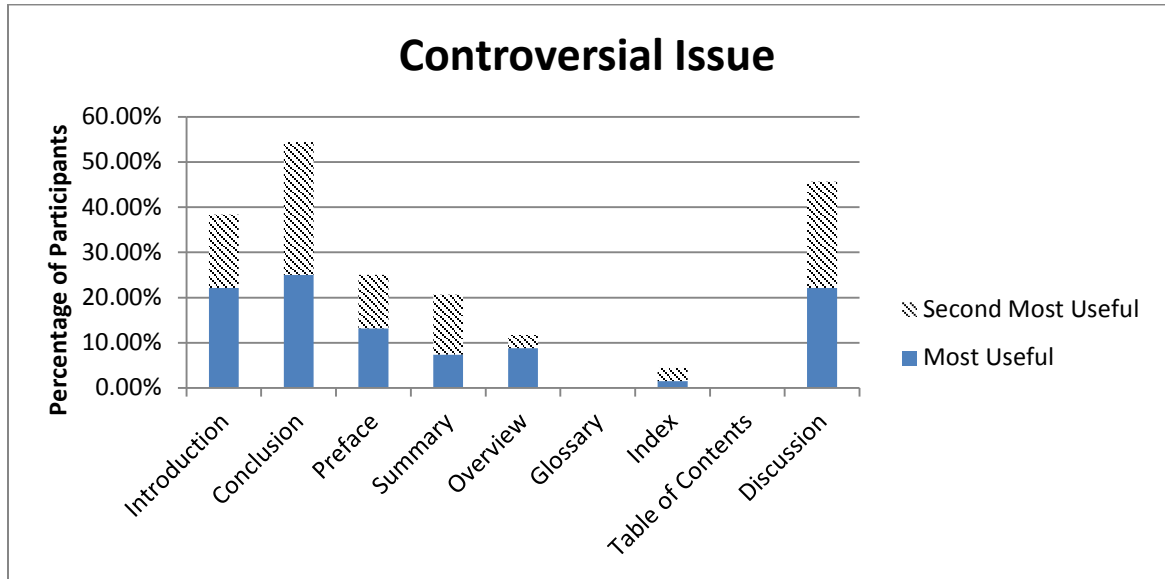
Reading Situation 8

Controversial Issue

Figure 10. Percentage of First & Second Choices of Functional Devices for the Eighth Reading Situation

Table 9. Relationships between First and Second Choices of Functional Devices for the Eighth Reading Situation.

			Second Most Useful Functional Device						
			Introduction	Conclusion	Preface	Summary	Overview	Index	Discussion
		Frequency	11	20	8	9	2	2	16
Most Useful Functional Device	Introduction	15		**73.3%**		6.7%	6.7%		13.3%
	Conclusion	17	23.5%			**29.4%**	5.9%	5.9%	**35.3%**
	Preface	9	33.3%	11.1%	11.1%	11.1%		11.1%	22.2%
	Summary	5		40.0%	20.0%				40.0%
	Overview	6		33.3%	16.7%				50.0%
	Index	1							100.0%
	Discussion	15	**26.7%**	**26.7%**	**33.3%**	13.3%			

The majority of participants chose *Introduction*, *Conclusion*, and *Discussion* as the functional devices that they would find most useful when deciding the author's opinion in the controversial article in a magazine. This may reflect variation in where an author might express his or her view within the article. Sometimes the author's opinion and intention are explicit in the *Introduction* and sometimes the author will wait until *Conclusion*. Participants' opinions were probably influenced by their own reading experience and exposure to articles on controversial issues. Although *Discussion* is usually not a section included in magazine articles, it generally states the author's opinion in other types of media such as journal articles. Therefore, this could explain why over 20% of the participants chose *Discussion* as the most useful functional device.

Section Four

General Discussion

SARA's seventh information function, function identification, claimed that functional signals could activate relevant reader's knowledge about functional devices and thereby facilitate the reading process. A behavioral experiment that measures the effect of functional signals on reading would need to be designed to test this claim. However, we were unable to create such an experiment without knowing 1) the knowledge that readers already possess about functional devices, and 2) the reading situation under which readers would find a particular functional device relevant. By conducting this study, we could better explain the type of information activated by signals and the subsequent application of this information in an actual reading situation.

The results from Experiment 1 gave us information on readers' knowledge about functional devices. Some of the results from Experiment 1 were fairly evident to most mature readers; however, we were also able to get some insight into the level of familiarity that our participants had on functional devices. For example, 45% of the participants indicated that they would be able to find *Preface* in a research article. This would be inaccurate and reflects either an inaccurate knowledge about *Preface* or unfamiliarity with the conventional layout of a research article. Information like this enabled us to fine tune our future research design and allowed us to avoid functional devices or reading situations that could potentially be confusing to our participants.

Experiment 2 put the participants in different reading situations and asked them to choose the most useful functional devices in each reading situation. Two pieces of information were acquired from Experiment 2: 1) the functional devices that readers would find most useful in a particular reading situation, and 2) the specific usage of the functional device in a reading situation. A college level textbook may include all of the functional devices listed in Experiment

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2. The reader, however, may or may not find a functional device useful depending on his or her reading strategy and purpose. For example, a reader would find *Summary* useful when cramming for an exam but would rather use *Index* to search for a specific piece of information. Identifying the relevant reading situations for a functional device would thus allow us to know what instructions to give to readers when designing a behavioral experiment on the effects of functional signals.

The results of Experiment 1 and 2 were combined to generate a list of the most frequently used functional devices, their functions, and the appropriate reading situations where readers would find these functional devices helpful. This information can then be used as a guide for designing a behavioral experiment for functional signals because it maps functional devices to their usage and the relevant reading situations. Refer to Table 4 for the combined results of Experiment 1 and 2. The first column is a list of the eight most useful functional devices across Experiments 1 & 2. These eight functional devices were matched to one or multiple reading situations in the second column as the functional devices that were most useful for those particular reading situations. Finally, we created the third column by taking the functions chosen by participants in Experiment 1 and matched them against readers' claimed usage in Experiment 2.

Several observations should be noted from the combined results of Experiment 1 & 2. First, some functional devices such as *Glossary* only serve one particular purpose and are only useful when searching for the definition of a term. Other functional devices such as *Table of Contents* have distinct pieces information and can be used in either search tasks or a task where one is looking for a list of the main topics in the text. Secondly, functional devices such as *Summary* and *Overview* may have very similar functions but readers find *Summary* useful in more reading situations than *Overview*. This could be attributed to prevalence and readers' familiarity of *Summary* compared to *Overview*. Finally, some functional devices such as *Index* and *Table of*

Contents have almost identical functions and useful reading situations. This could imply that most

readers tend to use these functional devices interchangeably.

Table 10. Combined results from Experiment 1 & 2

Functional Device	Functions that Readers Claim to Use	Useful Reading Situations For A Particular Functional Device
Introduction	• Provides background information for the reader	• Buying a Magazine
Conclusion	• Reviews/recaps the ideas mentioned in the text • Provides additional information and reference	• Controversial Issue
Summary	• Presents all topics or main ideas in the text • Synthesizes the findings/ideas of the text	• Searching for a topic • Deciding to buy a magazine • Cramming for an exam • Writing an essay
Overview	• Presents all topics and/or main ideas in the text	• Writing an essay
Discussion	• Author's comment section	• Controversial issue
Glossary	• Lists key terms and their respective definitions	• Search for definition under time pressure
Index	• Provides quick access for review or search	• Search for a specific piece of information • Search for a definition • Deciding the usefulness of a textbook
Table of Contents	• Provides quick access for review or search • Presents all topics and/or main ideas in the text	• Search for a specific piece of information • Search for a general topic • Deciding the usefulness of a textbook

Besides academic research, the results from Experiment1 and 2 have several applications

in education and design. Elementary school teachers could apply the findings from this study to

reading education for novice readers. For example, the teacher could teach the students to use

Index to look for supplemental material when they do not understand a certain topic. Similarly,

the students can be taught to skip to the end and read *Conclusion* to get an idea for the main

points in the article. By doing this, the students could have a clear expectation of what the author would talk about in the text.

Experiments 1 and 2 are only the first steps to a line of research that studies the effect of functional signals on reading. We now have data on readers' knowledge and claimed usage of functional devices. However, what happens to the reading process after this information has been activated is still unknown. There is data on how participants claim to use these functional devices in hypothetical reading situations but this does not necessarily correspond to what people actually do in actual reading situations. Thus, Experiment 1 and 2 lead to the design of future studies that look at the exact effect of functional signal on reading. For example, a future study could focus on the effect of the functional signal *Summary*. The study could limit participants' reading time and see if *Summary* increases the readers' comprehension or recall of the main topics. There is basis for this experiment design because the results from Experiment 1 and 2 indicate that *Summary* highlights the main points in the text and reduces reading time. We are currently conducting an experiment that looks at the effect of functional signal on reading. The participants are divided into two groups, with one group reading a text containing functional signals such as "summary" and another group reading a text with generic signal such as "section 3". The texts are identical and both contain summary paragraphs. In one condition, the summary paragraph is given the generic heading "section 3" and in the second condition the summary paragraph is clearly labeled with the functional signal "summary". Participants are then asked to perform a free recall of whatever information they could remember from the text. We hypothesize that under time pressure, participants are likely to adopt the reading strategy of focusing on the section that is labeled "summary" and subsequently recall more information from the summary paragraph. It is our hope that this thesis can serve as the platform for designing subsequent experiments like this one that study the effect of functional signals on reading.

References

Collins, A. M., & Loftus, E. F. (1975). A spreading activation theory of semantic processing. *Psychological Review,* **82,** 407–428.

Englert, C.S., Hiebert, E. H. (1984). Children's developing awareness of text structures in expository materials. *Journal of Educational Psychology*, 76, 65-74.

Gaddy, M., Sung, Y., & van den Broek, P. (2001). The influence of text cues on the allocation of attention during reading. In T. Sanders, J. Schilperoord, & W. Spooren (Eds.), *Cognitive approaches to text coherence* (pp. 89-110). Amsterdam: Benjamins.

Kintsch, W., & van Dijk, T.A. (1978). Toward a model of text comprehension and production. *Psychological Review*, 85, 363-394.

Kintsch, W. (1988). The role of knowledge in discourse comprehension: A construction-integration model. *Psychological Review,* **95,** 163–182.

Lemarie, J., Lorch, R.F., Jr, Eyrolle, H., & Virbel, J. (2008). SARA: A text-based and reader-based theory of signaling. *Educational Psychology*, 14, 111-123.

Lorch, R. F., Lorch, E. P., & Matthews, P. D. (1985). On-line processing of the topic structure of a text. *Journal of Memory and Language, 24*, 350–362.

Lorch, R. F., & Lorch, E. P. (1985). Topic structure representation and text recall. *Journal of Educational Psychology, 77*, 137–148.

Lorch, R. F., & Lorch, E. P. (1986). On-line processing of summary and importance signals in reading. *Discourse Processes, 9*, 489–496.

Lorch, R. F., & Chen, A. H. (1986). Effects of number signals on reading and recall. *Journal of Educational Psychology, 78*, 263–270.

Lorch, R. F. (1989). Text signaling devices and their effects on reading and memory processes. *Educational Psychology Review, 1*, 209–234.

Lorch, R.F., Jr., Lorch, E.P., & Klusewitz, M.A. (1993). College students' conditional knowledge about reading. *Journal of Educational Psychology, 85*, 239-252.

Lorch, R. F., Lorch, E. P., & Inman, W. E. (1993). Effects of signaling topic structure on text recall. *Journal of Educational Psychology, 85*, 281–290.

Lorch, R. F., & Lorch, E. P. (1995). Effects of organizational signals on text processing strategies. *Journal of Educational Psychology, 87*, 537–544.

Lorch, R. F., Klusewitz, M. A., & Lorch E. P. (1995). Distinctions among reading situations. In R. F. Lorch & E. J. O'Brien (Ed.), *Sources of coherence in reading* (pp.375-398). Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Lorch, R. F., Lorch, E. P., & Klusewitz, M. A. (1995). Effects of typographical cues on reading and recall of text. *Contemporary Educational Psychology, 20*, 51–64.

Lorch, R. F.,& Lorch, E. P. (1996). Effects of organizational signals on free recall of expository texts. *Journal of Educational Psychology, 88*, 38–48. (b)

Lorch, R. F., & Lorch, E. P. (1996). Effects of headings on text recall and summarization. *Contemporary Educational Psychology, 21*, 261–278. (a)

Lorch, R. F., Lorch, E. P., Ritchey, K., McGovern, L., &Coleman, D. (2001). Effects of headings on text summarization. *Contemporary Educational Psychology, 26*, 171–191.

Lorch, R.F., Lemarie, J., Grant, R. A. (2011). Signaling hierarchical and sequential organization in expository text. *Journal of Scientific Study of Reading*. (a)

Lorch, R.F., Lemarie, J., Grant, R. A. (2011). Three information functions of headings: a test of the SARA theory of signaling. *Discourse Processes*. (b)

Mayer, R. E., Dyck, J., & Cook, L. K. (1984). Techniques that help readers build mental models from scientific text: Definitions pretraining and signaling. *Journal of Educational Psychology*, 76, 1089-1105.

Meyer, B. J. F. (1975). *The organization of prose and its effects on memory*. Amsterdam: North-Holland.

Meyer, B. J. F., Brandt, D. M., & Bluth, G. J. (1980). Use of top-level structure in text: Key for reading comprehension of ninth grade students. *Reading Research Quarterly*, 16, 72-103.

Meyer, B. J. F., & Rice, G.E. (1982). The interaction of reader strategies and the organization of text. *Text, Interdisciplinary Journal for the Study of Discourse*, 2, 155-192.

Meyer, B. J. F., & Poon, Lw W. (2001). Effects of structure strategy training and signaling on recall of text. *Journal of Educational Psychology*, 93, 141-159.

Meyer, B. J. F. (2003). Text Coherence and Readability. *Topics in Language Disorders*, 23(3), 204-224.

Sanchez, R.P., Lorch, E.P., & Lorch, R.F., Jr. (2001). Effects of headings on text processing strategies. *Contemporary Educational Psychology*, 26, 418-428.

Zwaan, R.A. (1991). Some parameters of literary and news comprehension: Effects of discourse-type perspective on reading rate and surface0structure representation. *Poetics*, 20, 139-156.

Zwaan, R.A. (1994). Effect of genre expectations on text comprehension. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 20, 920-933.

Appendices

Appendix A: List of Reading Situations

Reading Situation 1:
> Imagine that you are given a book on behavioral psychology. The book's content includes a number of famous psychologists, their work, and the progression of ideas contributing to the field of behavioral psychology. The book is about 500 pages and its difficulty is that of a 400 level college course.
>
> Suppose that you are given an assignment to find the answer to the following question: **"In what year did Pavlov first publish *The Work of The Digestive Glands*"?**
>
> It is OK if you have no clue who Pavlov is. We simply want you to think about how you might use different functional devices to find this specific piece of information. Remember, you must find the answer from the book and you will not be able to use a computer or anything else other than this book.

Reading Situation 2:
> Suppose that you are given the same textbook on behavioral psychology again, but this time, your task is to read about Pavlov's classical conditioning and then write a six page essay.
>
> We can tell you that Pavlov's classical conditioning theory is not simple and you will need to read several sections of the book in order to explain this theory.
>
> Think about how you might use the functional devices to help you write this paper. When you are ready, answer the question below.

Reading Situation 3:
> Imagine that your best friend has an in-class pop quiz and she secretly texts you and asks you to look up the information in the Behavioral Psychology textbook. Your friend's text says that she needs to know the correct definition of Pavlov's Classical Conditioning.
>
> Suppose that you have no clue what classical conditioning is but being the best friend, you decide to help.
>
> Think about how you can use the functional devices to answer your friend's question quickly. You can only use the textbook (therefore, no Wikipedia, Google, etc.).

Reading Situation 4:
> Suppose that the mid-term exam is coming up in your Behavioral Psychology class but you have not read a single page of the textbook. The mid-term exam is going to be an in-class essay test which asks you to explain the theory of Pavlov's classical conditioning.
>
> Think about how you can most efficiently cram in half a semester's worth of material in one night. Use the functional devices that are relevant to this task. When you are ready, answer the question below.

Reading Situation 5:
> Imagine that you are looking for information about the works of Pavlov and so you went to the library and randomly picked up a textbook in the Psychology section. You are not sure

if this textbook contains the information that you are looking for and therefore you need to determine if this textbook is relevant or perhaps you should try another textbook.

Now, think about the functional devices that can help you in this task and how you might want to use them. When you are ready, answer the question below.

Reading Situation 6:

Imagine that you go grocery shopping and you happen to walk past the magazine aisle. One of the magazines has a story on "Behavioral Psychology" and the front cover has a picture of a salivating Chihuahua. You are intrigued and so you decide to pick up the magazine and start reading.

Suppose that your friend is waiting for you and you don't have much time to read. You need to decide quickly whether the article on Behavioral Psychology is interesting enough for you to spend five dollars and buy the magazine. Think about what functional devices might be useful in this reading situation. When you are ready, answer the question below.

Reading Situation 7:

Imagine that you are given a reading assignment in your behavioral psychology class. The professor wants you to read a few chapters and write a short report on the main ideas of classical conditioning.

What functional devices would you find useful in this reading situation?

Reading Situation 8:

Imagine that you are reading an article in National Geographic on creationism and evolutionary theory. The author presents both views of how humans came to be, including comments from supporters of each position. If you wanted to try to determine the author's point of view on the debate, what functional device would you find useful in deciding if the author sides with creationist or evolutionary theory?

Appendix B: List of Thematic Codes

0. Participant did not mention HOW he/she would use a particular functional device.

Search for relevant pages where the information is located

1. I would use this device to find Pavlov's name, look for words related to the question, turn to the <u>specified pages</u> and scan those pages for the answer.
2. After checking the glossary, I would go on to this device and read the corresponding pages for more in-depth information on the term.
3. I would check for Pavlov and his related work in this device and see <u>how many pages he is referenced on</u>. If he is only referenced on a few pages, then I would deem the book not relevant.
4. I would then use this device to <u>find the chapters</u> on Pavlov and skim through those chapters.
5. I would use this device to see what sections I need to read in order to write a paper.

Find definition

6. I would use this device to find the <u>definition</u> of the term.

Find main points in the text

7. I would use this device to discover the <u>main points</u> mentioned in the book.
8. I would use this device to <u>reduce reading time</u>.
9. I would use this device to help me organize the paper.
10. I would use this device to get supporting points (as opposed to thesis/main points) for the paper.
11. I would re-read this device before writing the paper.
12. I would use this device to <u>reinforce ideas</u> which I already have in my mind.
13. I would read this device to see if the book is going to talk about the same field of Psychology as the one I am looking for.
14. I would look for <u>context clue</u>s on the author's opinion in this device.
15. I would read this device to see if the theme pertains to my question.

17. I would use this device to distinguish between main points from supporting points.

Arouse Interest

16. I would use this device to determine if the article catches my attention and <u>arouse enough interest</u>.

General Understanding

18. I would use this device to get a <u>general understanding</u> of the book or text.

Unspecified

19. The specific process described by participant is different from any of the codes above.

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