Comprehension of protagonists' goals and intentions: The dynamic relation between reading skill, text characteristics, and reading strategies

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COMPREHENSION OF PROTAGONISTS' GOALS AND INTENTIONS: THE
DYNAMIC RELATION BETWEEN READING SKILL, TEXT CHARACTERISTICS,
AND READING STRATEGIES

BY

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DISSERTATION

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This dissertation has been examined and approved.

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Date
To my family, with gratitude
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ABSTRACT

COMPREHENSION OF PROTAGONISTS’ GOALS AND INTENTIONS: THE DYNAMIC RELATION BETWEEN READING SKILL, TEXT CHARACTERISTICS, AND READING STRATEGIES

by

Jennifer J. Stiegler

University of New Hampshire, May, 2010

Studies by the National Assessment of Educational Progress (NAEP, 2009) indicate that the inability to comprehend text is one of the primary reasons students perform poorly in school. Reading difficulties often persist into adulthood with 23% of U.S. adults only meeting basic reading proficiency levels (NCES, 2004). To address this problem, it is critical to identify the underlying cognitive processes that pose the greatest challenges to struggling readers. Recent research has explored basic skills (e.g., working memory capacity, suppression mechanisms, domain knowledge, and reading strategies) that have been shown to be essential for reading. To date it is unclear which of these factors has the greatest impact on comprehension.

The goals of this dissertation were to determine conditions under which reading skill influences individuals’ abilities to fully comprehend text and what steps can be taken to raise comprehension levels. Across four experiments, participants were indexed as skilled or less-skilled based to the Gates-MacGinitie Reading Test. They were asked to read texts in which a protagonist was highly or moderately motivated to accomplish
goals. Subsequently, participants read target sentences that either satisfied or did not satisfy the protagonists’ goals. The first two experiments showed that skilled but not less-skilled readers were capable of monitoring protagonists’ intentions to accomplish goals. This was true regardless of whether the distance between information about protagonists’ intentions and their actions were presented close or far in the text.

Two subsequent experiments demonstrated that subtle text changes and a reading strategy enabled less-skilled readers to be more sensitive to the protagonists’ motivation to accomplish goals. In Experiment 3 and 4, reinstatement sentences and reading the passages from the perspective of the protagonists, respectively, enabled less-skilled readers to monitor protagonists’ intentions. The results showed that subtle text cues and a reading strategy provided less-skilled readers with the necessary “tools” to circumvent working memory deficiencies by focusing their attention on the important aspects of the text.

The findings are discussed in terms of underlying cognitive differences between skilled- and less-skilled readers and how subtle changes to text and employing a reading strategy can alleviate reading deficits.
INTRODUCTION

Research on reading comprehension has expanded our understanding of the basic cognitive processes involved in learning from text (e.g., McNamara & O'Reilly, 2009; Rapp, van den Broek, McMaster, Kendeou, & Espin, 2007). An important question in reading research is what differentiates skilled from less-skilled readers? How can one person read and learn with ease, while another struggles to understand even basic messages? The practical importance of this issue is evident in the poor reading comprehension skills by students in our school system. Over one third of fourth graders and one fourth of eighth graders cannot read at a basic level (National Center for Education Statistics [NCES], 2005). Reading difficulties even persist into adulthood; approximately 23% of U.S. adults meet only basic reading proficiency levels (NCES, 2004; Pressley & Harris, 2006). Studies by the National Assessment of Educational Progress (NAEP) indicate that the inability to understand text is one of the primary reasons many students perform poorly in school and on standardized tests (McNamara & O’Reilly, 2009).

My dissertation examines how reading comprehension research can help identify cognitive processes that differentiate skilled from less-skilled readers and what types of interventions have the potential to increase comprehension levels of less-skilled readers. The studies of this dissertation provide evidence as to how subtle changes to written text can alleviate the reliance on basic cognitive processes that pose the most difficulties to less-skilled readers. Specifically, as I will explain throughout this document, text factors
can be manipulated and reading strategies can be employed so that less-skilled readers have sufficient information to detect subtle nuances of text and subsequently increase their comprehension of text.

Reading comprehension depends on the efficient construction of mental representations of text (Cornoldi & Oakhill, 2001). Related new information needs to be incorporated while unrelated information needs to be inhibited to reduce WM load (McNamara & McDaniel, 2004). Skilled readers tend to have more working memory capacity to hold and process information from text, which enables them to repair conceptual gaps between sentences and paragraphs, whereas less-skilled readers tend to ignore gaps or fail to make inferences necessary to fill in the gaps (e.g., Oakhill & Yuill, 1996; Magliano & Millis, 2003).

Domain knowledge and the use of reading strategies can also help to remediate reading deficits because they improve a reader’s ability to make important connections between concepts in the text. Domain knowledge enables readers to integrate incoming information with what they already know thereby strengthening the memory traces (McNamara & O’Reilly, 2009). Teaching reading strategies can be used to train students to self-explain text and to use metacognitive strategies that improve self-explanation, thus raising comprehension levels.

Further, comprehension is influenced by the extent to which ideas in text explicitly relate to one another (McKeown, Beck, Sinatra, & Loxterman, 1992). Modifications that increase coherence range from providing connective ties to supplying background information left unstated in the text (McNamara, Kintsch, Songer, & Kintsch, 1996). A high-coherence text has fewer gaps and thus requires fewer inferences,
rendering the text easier to understand. However, there is also evidence that text containing some gaps - gaps that can be filled by the reader - actually produces better levels of comprehension than text that has no gaps or gaps that readers are unable to fill (e.g., O'Brien & Myers, 1985; Keenan, Baillet, & Brown, 1984).

In order for readers to make all the necessary connections between concepts in the text, causal information has been shown to play an important role in the representation of text in memory (Bloom, Fletcher, van den Broek, Reitz, & Shapiro, 1990). One particular type of causal information to be investigated is the goals of the protagonist (e.g., Albrecht, O'Brien, Mason, & Myers, 1995; Suh & Trabasso, 1993). Goals often motivate sequences of actions and events, and thus may be more interconnected than other types of idea units (Trabasso & Sperry, 1985). This is illustrated by research showing that previously introduced yet unaccomplished goals may be reactivated in response to distant contextual cues, even when that goal is not necessary to maintain the causal coherence of the discourse (Albrecht & Myers, 1995; Rizzella & O'Brien, 1996).

In the sections prior to the experiments, I will discuss current theories of text processing in chapter 1; review text factors that influence readers' ability to comprehend text in chapter 2; discuss how reading skill influences comprehension in Chapter 3; provide examples of reading skill assessment methods in Chapter 4; and finally provide a literature review about how information about goals of a protagonist influences text processing in Chapter 5.

The experiments are presented in Chapter 6. Under a variety of conditions, participants were presented with passages that described a protagonist and his/her motivation to accomplish goals. At the end of each passage, a target sentence was
presented that was consistent with a goal either mentioned first or second in the text. Reading times for the target sentences were recorded and analyzed. The experiments were designed to assess whether readers are sensitive to the match between the protagonists’ motivation to satisfy a goal and their subsequent actions. More specifically, the goal of the first two experiments was to determine under what circumstances reading skill has an impact on the ability to fully comprehend text and the third and fourth experiments explored what can be done to raise comprehension levels of less-skilled readers.

A general discussion of the results is provided in chapter 7. The results will be discussed in terms of underlying cognitive differences between skilled- and less-skilled readers and how subtle changes to text can alleviate reading deficits. The generalizability and limitations of the experiments will also be covered in this chapter.
CHAPTER I

CURRENT THEORIES OF TEXT PROCESSING

Successful comprehension of text requires the continual integration of new information with previously read text. Information held by readers in an active portion of memory should maximize the likelihood that incoming information will be integrated more easily (e.g., Cook, Halleran, and O’Brien, 1998; Glenberg & Langston, 1992). In most reading comprehension theories, it has been well established that a reader’s text representation is made up of two components: the text-based representation, which is a representation of the explicitly written text (e.g., Kintsch, 1998; Kintsch & van Dijk, 1987) and the situation-based level of text, which is a representation of the meaning of the text (e.g., Bransford, Barclay, & Franks, 1972; Garrod & Sanford, 1990; Glenberg, Meyer, & Lindem, 1987; Van Dijk & Kintsch, 1983). There is general agreement that readers are primarily focused on the representation at the level of the situation model.

Johnson-Laird and Garnham (1980) have described a situation model as a mental object that organizes knowledge for discourse; the situation model contains information from prior text supplemented by general and specific knowledge. Consider the first paragraph of the short story “Cat in the Rain” by Ernest Hemingway (Scribner, 1997):

There were only two Americans stopping at the hotel. They did not know any of the people they passed on the stairs on their way to and from their room. Their room was on the second floor facing the sea. It also faced the public garden and the war monument. There were big palms and green benches in the public garden.
Despite not identifying the precise location or protagonists, most readers develop a strong sense for what the scene is about.

It has been well established constructing a coherent situation model requires coherence at both the local and global levels (e.g., Albrecht & O’Brien, 1993; Bower & Morrow, 1990; Glenberg, Meyer, Lindem, 1987; Graesser, Singer, & Trabasso, 1994; van Dijk & Kintsch, 1983). Local coherence refers to mapping each proposition in an incoming sentence to other propositions currently active in working memory, whereas global coherence involves mapping incoming propositions to information encountered earlier in the text (beyond the span of working memory) and to relevant world knowledge.

Current models of text processing suggest that at least two processes are involved in achieving global coherence: activation and integration (Kintsch, 1988). When new information is encountered and text is comprehended, the reader will automatically activate other memory traces. The amount of activation depends on the extent to which a memory trace (general world knowledge) shares features in common with the incoming text, how much it has been elaborated in the text, and its recency (O’Brien & Albrecht, 1992; Albrecht & Myers, 1995).

While many researchers (e.g., Fletcher & Bloom, 1988; Kintsch & Vipond, 1979; Trabasso & Sperry, 1985) agree on the contribution of text to the comprehension process, others (e.g., McKoon & Ratcliff, 1988; 1995; Singer, Graesser, & Trabasso, 1994; Van den Broek & Sue, 1989) have questioned how information already stored in memory from previous experiences (e.g., general world knowledge) affects comprehension. As a result, new memory theories develop that focused on the reader’s use of general world
knowledge. This has led to the development of two theoretical frameworks: the explanation-based view and the memory-based view.

**The explanation-based view of text processing**

According to the explanation-based view, readers are actively involved in the reading process and attempt to “construct” meaning out of the text while reading. Readers always seek explanations and attempt to fully integrate current information with all relevant prior information. Readers are actively engaged in searching memory for relevant information; making every effort to ensure full integration at both local and global levels. The representation that would result from such an active process has been best captured by the early work of Trabasso and his colleagues (e.g., Graesser, Singer & Trabasso, 1994; Singer, Graesser, & Trabasso, 1994).

According to the explanation-based view, there are two important processes that take place during reading: search after meaning and the active construction of inferential information. The reader actively searches memory to find possible causes and connections within the text. More specifically, readers organize text into goals, attempts, outcomes, and actions (Graesser et al., 1994). In other words, the “need to know node” drives the reader to continuously engage in an active search of all memory (e.g., what is currently available in short-term memory as well as information from general world knowledge). Readers are continually maintaining both local and global coherence and actively follow the causal chain of events in a story by interpreting events, goals, and outcomes to their best ability to be able to understand what will happen next. A major
assumption of this view is that readers engage in strategic, top-down processing during reading (Graesser et al., 1994).

Proponents of the explanation-based view argue that there are three assumptions in this model that explain why readers search for meaning in the text and engage in the active construction of inferential information (Graesser et al., 1994). First, readers are motivated by their own goals. The second assumption is that readers are motivated to maintain both local and global coherence. Finally, readers are motivated to explain information that has been mentioned in the text. In order to satisfy these three assumptions the reader must activate certain inferences while reading because not all necessary information is explicitly stated in the text. Consider the following excerpt (adapted from Trabasso, Secco, & van den Broek, 1984):

“The fox and the bear ran quickly to a nearby farm where they knew chickens lived. The bear climbed upon the henhouse roof to stand guard. The fox then opened the door very carefully. He grabbed a chicken and killed it. Just as he was about to carry it out of the henhouse, the roof fell in.”

According to the assumptions of the explanation-based view, it is likely that readers infer that the roof collapsed because the bear was standing on it. Readers infer that the roof caved in because they seek the causes of physical changes of state, such as why the roof of the henhouse collapsed (Trabasso et al., 1989).

Furthermore, the concept of “search after meaning” arose, in part, because it appeared to its proponents that simple memory mechanisms could not account for a sufficient range of inferences. Active inferential processes require directed searches of long-term memory to locate specific types of information.
The memory-based view of text processing

The memory-based view provides an alternative view of text processing. It rejects the notion of any active search process. Furthermore, although there is an acknowledgement that an inferencing process takes place, within the context of the memory-based view there is an attempt made to explain the availability of inferential processing without any strategic processes.

According to the memory-based view, the discourse representation is created by the reader but is not contingent upon special strategies. A basic assumption of the memory-based view is that information that a reader has encoded can be affected by information from earlier portions of the text and general world knowledge. Whenever a reader encodes information a signal is sent out to all of memory and related information resonates in response to this signal with the most active information returning to memory and affecting comprehension. Thus, any information that is related to the current contents of memory can affect the comprehension process independent of whether or not it facilitates or interferes with comprehension.

The resonance process, which is a core concept of the memory-based view was first conceptualized by Ratcliff (1978). Ratcliff describes memory retrieval as a process that is influenced by how much a concept is activated in memory. According to this model, the likelihood that a concept will be reactivated is determined by how much the concept in memory activates or resonates with a current idea from the text. Therefore, the more features a concept has in common with a current idea from text, the greater the likelihood of activation. Similar models of memory have described current concepts in
text as probes that emanate a signal to all of memory (see also Gillund & Shiffrin, 1984; Hintzman, 1986).

Myers and O’Brien (1998) proposed a resonance model to explain the activation process during reading (see also O’Brien & Myers, 1999). The fast-acting passive resonance process is based on the assumption that concepts derived from the sentence currently being processed, or concepts residing in working memory as a result of reading earlier portions of the text, serve as signals that are sent out to all of memory in parallel (both the episodic memory trace and general world knowledge). The intensity of these signals depends on the degree of attention given to concepts currently in focus, but the signal proceeds autonomously and is unrestricted. Concepts from earlier portions of the discourse representation as well as general world knowledge resonate as a function of the degree of overlap with the input. This match depends on the overlap of both semantic and contextual features among concepts. Memory elements that are contacted by the initial signal sent out a signal to other memory elements. Concepts in long-term memory that share features in common with the contents of working memory will “resonate” in response (see Ratcliff, 1978), and those concepts that resonate the most are most likely to be incorporated into working memory. During this resonance process, activation builds and when the process stabilizes, the most active elements enter working memory. A critical aspect of the resonance process is that it is “dumb.” In other words, information that resonates sufficiently is returned to working memory independent of whether that information will ultimately facilitate or hinder comprehension.

Using the “inconsistency paradigm,” O’Brien and colleagues have demonstrated the activation of information through this passive resonance process (e.g., Albrecht &
O'Brien, 1993; Hakala & O’Brien, 1995; O’Brien, Albrecht, Rizzella, and Halleran, 1998). For example, Albrecht and O’Brien (1993) presented participants with text in which a main character was introduced, followed by an elaboration section that described some characteristic of the main character. Participants were then presented with information about the main character that was not always consistent with the elaborated characteristic from earlier in the text (see sample passage Table 1). Specifically, participants were presented with a final sentence that was consistent with the immediately preceding text but either globally consistent, inconsistent, or neutral with the earlier elaborated character trait (see Table 1 for an example passage).

When readers were presented with the information in the inconsistent condition about a character named Mary ordering a cheeseburger and fries reading times were slowed because presumably the target sentence reactivated the earlier presented elaborated information about Mary’s eating habits through the resonance process. The reactivated information about Mary being a vegetarian slowed reading time because a global coherence break occurred. Thus, readers attempted to maintain coherence for the character at the global level even when the information was locally coherent.

In order to provide evidence that the resonance process was both unrestricted and dumb, O’Brien et al. (1998) conducted a series of experiments demonstrating that readers use general world knowledge to maintain a globally coherent representation of a protagonist while reading text. Across a series of experiments, the authors included a qualified condition in which the inconsistent elaboration was written to make it clear to the reader that Mary was no longer a vegetarian or that Mary had never been a vegetarian
Table 1.


Introduction
Today, Mary was meeting a friend Joan for lunch. She arrived early at the restaurant and decided to get a table. After she sat down, she started looking at the menu.

Consistent Elaboration
This was Mary's favorite restaurant because it had fantastic junk food. Mary enjoyed eating anything that was quick and easy to fix. In fact, she ate at McDonalds at least three times a week. Mary never worried about her diet and saw no reason to eat nutritious foods.

Inconsistent Elaboration
This was Mary's favorite restaurant because it had fantastic health food. Mary, a health nut, had been a strict vegetarian for 10 years. Her favorite food was cauliflower. Mary was so serious about her diet that she refused to eat anything that was fried or cooked in grease.

Neutral Elaboration
This was Mary's favorite restaurant because it had a nice and quiet atmosphere. Mary frequently ate at the restaurant and had recommended it to all of her friends. She especially liked the cute tables and the country style cloths on them. It made her feel right at home.

O'Brien et al. (1998) Experiment 5: Qualified elaboration
Mary remembered that at a recent party, Joan played a joke by telling people that Mary had been a strict vegetarian for 10 years. Joan told everyone that Mary's favorite restaurant had fantastic health food. She said that Mary was a health nut and wouldn't eat anything that was fried or cooked in grease. She also claimed that Mary's favorite food was cauliflower.

Filler
After about 10 minutes, Mary's friend Joan arrived. It had been a few months since they had seen each other. Because of this Mary and Joan had a lot to talk about and chatted for over a half hour. Finally, they signaled the waiter to come and take their orders. They checked the menu one more time. May and Joan had a hard time deciding what to have for lunch.

Critical Sentences
Mary ordered a cheeseburger and fries. She handed the menu back to the waiter.
Table 1 continued.

**Closing**
Her friend didn’t have as much trouble deciding what she wanted. She ordered and they began to chat again. They didn’t realize there was so much for them to catch up on.
(“Mary’s friend had told a joke that Mary used to be a strict vegetarian for 10 years;” also see Table 1). Comprehension should not be disrupted if readers actively search earlier portions of the discourse for relevant information (i.e., the passage makes clear that Mary no longer is or never was a vegetarian). However, if memory activation is a dumb process, then disconfirmed or false information should resonate and become active simply because it is related to information in the target sentence. Consistent with the memory-based view of text processing, reading times on the target sentences continued to be slow in the qualified conditions, but not as slow as the inconsistent conditions (with the overt contradiction). Although the inconsistent characteristic was not true, the information continued to be activated and affected reading time.

These results are difficult to explain using the explanation-based view. An assumption of this view is that readers maintain a continually updated situation model. That is, when readers encounter qualified information (e.g., Mary is no longer a vegetarian) they should update their situation model so that outdated information is no longer part of the text representation. The results however showed that reading the target sentence ("Mary ordered a cheeseburger and fries") resulted in a slow-down because readers activated information about Mary being a vegetarian despite the qualifying information that was provided in the text.

**The two-stage model of processing**

More recently, researchers began to acknowledge that none of the major theories in reading comprehension can account for text processing and thus a comprehensive theory of discourse comprehension – one that explains the full scope of comprehension
processes - is needed (McNamara & Magliano, in press). It is unlikely that readers can
update their text representation so that it always contains only the most recent and
accurate information. To achieve this, both passive and active processes are necessary
during the comprehension process. Proponents of the memory-based view have focused
on passive processes that are data-driven and occur outside of the readers’ awareness,
while the explanation-based theorists have emphasized higher-order or top-down
processes that are readers motivated and goal directed. These two views can be combined
into maintaining coherence through a two-state process.

During the first stage, information from the text and related general world
knowledge are accessible through a passive resonance process. Once available, the reader
can focus on the information; however in some cases what has become available is not
sufficient to maintain coherence and more strategic processes need to be employed.
O’Brien and Meyers (1999) suggested that when resonance fails to reactivate sufficient
information for comprehension, readers may refocus on other information, which sends
out a signal to all of memory and activate information that shares features in common
with the concept. If no further information is gained through this passive resonance
process, the reader may engage in more active problem-solving strategies (see Cook &
Myers, 2004 for a complete description of this process).

Chapter 1 described current theories of text processing including the explanation-
based view, the memory-based view, and the two-stage model of processing. In the next
chapter, factors that influence reading comprehension will be discussed followed by a
chapter that addresses the role of reading skill in comprehension.
CHAPTER II

TEXT FACTORS THAT INFLUENCE COMPREHENSION

One important factor influencing text comprehension is the way text content is organized and explained. Increasing the coherence of a text improves performance on text comprehension measures such as recall and multiple-choice questions (e.g., Beck, McKeown, Sinatra, & Loxterman, 1991). Coherence is the extent to which the sequencing of ideas in a text makes sense and the extent to which the language used to present those ideas makes the nature of the ideas and their relations apparent. Coherent explanations consist of logical justifications and causal networks that enable the reader to integrate the information in a meaningful way (Beck, McKeown, Omanson, & Pople, 1984). A text is considered locally coherent if each sentence connects up with the next sentence and is considered globally coherent if larger sections of the text relate to each other in a meaningful way. Maintaining both local and global coherence is necessary for successful comprehension. Text modifications that increase coherence range from low-level information, such as identifying anaphoric referents, synonymous terms, or connective ties, to supplying background information left unstated in the text. A high coherence text has fewer gaps and thus requires fewer inferences, rendering the text easier to understand (Beck, McKeown, Sinatra, & Loxterman, 1991).

The concept of coherence and its role in text comprehensibility is an aspect of Anderson and Armbruster's (1984) notion of “considerate text.” A considerate text is
organized in such a way that it allows the reader to easily gather information effectively and is said to increase comprehension and recall of the text. Inconsiderate text on the other hand, has been associated with poorer comprehension and recall because it lacks coherence (Anderson & Armbruster, 1984).

The effect of inconsiderate text on comprehension of expository writing has been extensively studied by Anderson, Armbruster, & Kantor (1980). Especially in the sciences, researchers have found that the use of “reader-friendly” or considerate textbooks increased the number of students that enrolled in science classes (Graesser, Leon, & Otero, 2002). However, research has shown that few textbooks meet the criteria that would achieve these goals. For example, Chambliss (2002) compared textbooks and evaluated them on variables such as curriculum, instructions and comprehensibility and found that none of the texts presented sub-explanations of the materials in a logical order. That is, the texts presented numerous facts; however, there was little explanation of the relation among the facts. Having to make many connecting inferences among ideas with little or no assistance from the book resulted in a decrease of the students’ understanding of the materials (Chambliss, 2002).

These findings regarding easy (considerate) versus difficult (inconsiderate) text may be understood in the context of Kintsch’s (1988) construction-integration model, which states that readers construct a text-base level and a situation model of the text. Knowing the text at the level of text base does not necessarily ensure that the reader understands the text at a deeper level but rather that they are able to reproduce the text itself (Kintsch, 1988). In contrast, constructing a situation model, that is, a representation of what the text is about, requires the reader to contribute domain-knowledge that was not
stated explicitly in the text. This integration process will result in a situation model that allows for a deeper understanding of the text, which is no longer solely based on the actual text (Kintsch, 1988).

Kintsch (1998) further developed his construction-integration theory by proposing that comprehension occurs in two stages - a construction phase and an integration phase. During the construction phase, words from the text serve to activate other concepts that are related to the current text through spreading activation. That is, activation spreads from a concept in a semantic network to activate related concepts. For example, when a reader is presented with an ambiguous word in a sentence the activated meanings of the ambiguous word and the context help the reader to select the most appropriate meaning during the integration phase (e.g., Swinney, 1979, Budiu & Anderson, 2004). Research by Swinney (1979) showed that it takes at least 350 msec to select the appropriate meaning of an ambiguous word and discard the inappropriate meaning when the context suggests that the other meaning is inappropriate. The construction-integration model illustrates that comprehension is not immediate but occurs over time.

Because academic text is more difficult to read than narrative text it is even more important to ensure readability. Gulgoz (1991) demonstrated that Kintsch’s model can be used to make material more readable and therefore reduce the need for inferences. The researchers used a history text about the air war in North Vietnam and identified 40 locations in the text where students were required to draw inferences to understand the text. They wrote a second version of the text in which they spelled out all relations that were left out in the original version. Consider the following example (The information
that is parentheses has been inserted into the original version so the reader would not
have to infer the relation between the title and the first sentence):

Air War in North (Vietnam)
By the Fall of 1964, Americans in both Saigon and Washington had begun to focus on
Hanoi (capital of North Vietnam) as the source of the continuing problem in the South.

Based on the assumptions of Kintsch’s model the readability of the text was higher after
their revisions. Readability can be defined as the number of propositions recalled divided
by the reading time (Kintsch & Vipond, 1979). Gulgoz (1991) found that participants
recalled 5.24 propositions per minute of reading time for the revised version compared to
only 3.44 propositions per minute of reading time for the original version. Thus, the
researchers claimed that textbook writers should decrease the number of inferences that
readers had to make when reading the text because it would lead to better comprehension.

While some research has shown that revising text to reduce the need for
inferences makes it easier to comprehend (Gulgoz, 1991) other research has shown that
text requiring more processing increases comprehension (O’Brien & Myers, 1985). For
example, a study by Rauenbusch and Breiter (1991) showed that the comprehension of
text increased in children when letters of the text were deleted. They concluded that
reading comprehension was enhanced because they had to actively generate the meaning
of the words with the missing letters, which resulted in deeper-level comprehension
(Rauenbusch and Breiter, 1991). However, McDaniel and Einstein and colleagues
showed that deleting letters only improved comprehension at the word level but not
overall (e.g., Einstein, McDaniel, Owen, & Cote, 1990; McDaniel et al., 1986). Further
investigations showed that scrambling the order of sentences of a text improves
comprehension at the sentence level (Einstein et al., 1990). Overall, comprehension of
text can be enhanced by manipulating the text structure so that the reader is required to actively link the sentences in the text.

In general, researchers have found that participants remembered information from text better if they had to actively generate it as opposed to being simply presented with it (e.g., Chi & Bassok, 1989). For example, O’Brien and Myers (1985) showed that comprehension difficulty can even improve memory for text. They found that participants showed better recall for passages that contained an unpredictable word during a recall task. In a series of studies, participants had to read text that was either predictable or unpredictable from a preceding context. The researchers found that participants spend more time comprehending a line of text when it contained an unpredictable target word. This increase in processing time facilitated recognition of the unpredictable word during a recall task. These findings demonstrate that concepts that are difficult to integrate with the text will require deeper processing; however, the successful integration of the information with the previous text will improve memory for portions of the text (O’Brien & Myers, 1985).

Similarly to what O’Brien and Myers (1985) found, Mannes and Kintsch (1987) showed that actively engaging with the incoming information can promote learning because it results in the formation of links between the new information and pre-existing knowledge structures. Because the reader will have tied the information to other concepts, the well-integrated knowledge can be accessed more easily when needed. Hence, an easy-to-read and coherent text is generally easier to recall but active processing, which is necessary for difficult text, facilitates learning.
Another line of research showed that readers generating their own connections between text ideas recalled more information because such elaborations entail additional information and provide further routes to targeted information at the time of retrieval (e.g., Myers, Shinjo, and Duffy, 1987; Keenan, Baillet, & Brown, 1984). Researchers have suggested if readers can quickly relate sentences no further elaboration seems necessary because everything was explicitly stated in the text (O’Brien & Myers, 1985). However, if the sentences are less related, readers are required to create their own connections through elaboration. For example, Keenan, Baillet, & Brown (1984) showed that sentences rated lower on causal relatedness yielded longer reading times because the reader was required to elaborate and draw inferences during the reading process. Interestingly, recall data of the same materials revealed that participants were better able to recall text that was least causally related compared to text that was highly causally related. One possible explanation for these findings is that longer reading times yielded more processing, which resulted in a richer representation of the text (Myers et al., 1987).

Ample evidence shows that successfully generating inferences can enhance reading comprehension (e.g., O’Brien & Myers, 1985; Einstein, et al., 1990; Mannes & Kintsch, 1987, Dunay & Cobb, 1986; Rauenbusch & Breiter, 1991). One way to increase inference making is to increase the demands of the text. Mannes and Kintsch (1987), for example, demonstrated that giving college students an advanced organizer that was not in line with the organization of the text resulted in better comprehension of the text than when the outline was identical to the organization of the text. The researchers hypothesized that individuals whose outline did not match the organization of the text were forced to make more inferences to resolve the inconsistencies between the outline of
the advanced organizer and the organization of the text. Consequently they processed the information at a deeper level, which led to better comprehension of the materials.

Research by McNamara, Kintsch, Songer, & Kintsch (1996) has demonstrated that high-knowledge readers learn more from low-coherence than high-coherence texts. In this study, junior high school students’ comprehension of one of three versions of a biology test was evaluated via free recall, written questions, and a key-word sorting task. The first study demonstrated an advantage for globally coherent text and for more explanatory text. During the second study, the researchers also accessed prior knowledge of the domain and found that readers who had little or no domain knowledge of the subject benefited most from coherent text whereas high-domain knowledge readers benefited most from a minimally coherent text. They argue that the low coherence text leaves many gaps and forces knowledgeable readers to fill those gaps by making inferences to fill in the missing information. Forcing the knowledgeable reader, who is able to make the necessary connections, yields a deeper level comprehension of the text (McNamara et al., 1996).

Another study by McNamara (2001) examined whether readers benefit from low coherence text because they are forced to use their own knowledge to fill the gaps. To test this assumption, participants were asked to read either a high- or low-coherence text twice, or they read both the high- and low-coherence texts in different orders. McNamara assumed that reading the low-coherence text first would force the reader to use prior knowledge to fill in the conceptual gaps while reading the high-coherence text first would prevent readers to use their prior knowledge because the text explicitly spelled out all the necessary information. She found that high-domain knowledge readers benefited most
when the low-coherence text was presented first and not second. Low-domain knowledge readers, on the other hand, benefited from the high-coherence text regardless of whether it was presented first, second or consecutively (McNamara, 2001). This shows that high-coherence text could potentially hurt the comprehension of high-domain knowledge readers because if everything is spelled out there is no need to engage in deeper level processing (McNamara, 2001).

High-knowledge readers are able to fill in conceptual gaps while low-knowledge readers are often unable to fill in the gaps because they do not have the necessary knowledge to do so. When the reader has sufficient domain knowledge, the challenging coming from a low-coherent text facilitates the access and use of prior knowledge or information from previous texts (McNamara & O’Reilly, 2009). The integration of new information with existing knowledge helps readers to better understand the text and also helps to tie the new information with their knowledge base thus creating multiple retrieval routes.

To extend the findings of McNamara (2001), O’Reilly and McNamara (2004) demonstrated that only less-skilled, high domain knowledge readers benefited from low-coherent text because the conceptually gaps forced them to have to use their prior knowledge. On the other hand, skilled, high-knowledge readers did not need the incentive to have to actively engage with the text due to conceptual gaps to achieve optimal comprehension (O’Reilly & McNamara, 2004).

Researchers have examined whether high- or low-coherence texts yield higher comprehension levels. Although some research suggests that high coherence text is easier to understand, most research has shown that less coherent text requires deeper processing
and will ultimately result in better comprehension because it forces the reader to actively engage with the text (e.g., Myers & O’Brien, 1985). Chapter 3 will provide background information about how reading skill can have an impact on reading comprehension.
CHAPTER III

READING SKILL AND TEXT COMPREHENSION

Students who read on a regular basis will develop the necessary fluency, word recognition, vocabulary, and comprehension skills needed to succeed in college (Newkirk, 2008). Unfortunately, most children and teenagers prefer to watch television or play computer games because reading is viewed as work and not pleasure. A recent survey conducted by the Kaiser Family Foundation revealed that students between the ages of 8-10 years read several pages in a book on the previous day while the same is true for only 26 percent of 15-18 year olds (Newkirk, 2008). This trend seems to continue into young adulthood as most college students are unable to name one book they read on their own for pleasure. The lack of interest in reading can have serious consequences for reading development (Newkirk, 2008). The more students read, the more likely they will be proficient readers who are able to comprehend difficult text. As a result, children and young adults often do not acquire the reading skills necessary to comprehend difficult texts in school and they also do not have the necessary knowledge to fill in the gaps when a text does not explicitly state all connections.

As I explained in the previous chapter, the way text is structured has an impact on how easily readers can comprehend it. Reading ability is another variable that affects text comprehension. Problems of reading ability permeate the school system and have a large impact on a variety of areas, particularly performance in subjects such as science (e.g., Brown, 1999; Snow, 2002). Studies by the National Assessment of Educational Progress
(NAEP) indicate that many students perform poorly on standardized tests due to their inability to understand text (McNamara & O’Reilly, 2009). One important question in reading research is what differentiates skilled and less-skilled readers and how text variables can interact with reading skill.

In order to fully comprehend text the reader must be able to continuously integrate what they are currently reading with what came before. This process allows them to develop a full representation of an entire text independent of length. In other words, the reader develops a representation of the described situation that is almost image-like. Related to situation models but slightly different is the problem mode. The problem mode takes into account formal relations that exist between elements described in the text but readers add to the situation model by integrating the new information with prior knowledge to create a more complete representation of the text (Graesser, Leon, & Otero, 2002). It is important to note that some students might not be able to construct the problem mode because they lack necessary background knowledge. On the pragmatic communication level, the reader also needs to understand the main message that the author is trying to convey in order to fully comprehend the text (Graesser, Leon, & Otero, 2002).

To construct and maintain such mental structures newly presented information that is related to the current structure must be incorporated into the current structure. However, if new information is not related to the current structure, the reader may shift to a new mental substructure, or alternatively, suppress the new irrelevant information (Gernsbacher & Faust, 1991). The latter results in fewer substructures and reduces memory load for the reader.
A question in reading research has been to determine the cognitive processes that differentiate skilled from less-skilled readers. Research has shown that comprehension is influenced by a number of factors including working memory (WM) capacity (Miyake, Just, & Carpenter, 1994), the suppression of irrelevant information (Conway & Engel, 1994), and the existence of prior knowledge about a specific topic (O’Reilly & McNamara, 2002). To date, it is unclear which one of these factors has the greatest impact on reading comprehension.

**Working Memory capacity**

One observation has been that skilled readers show better performance on tasks designed to assess working memory (WM) capacity compared to less-skilled readers (Miyake, Just, & Carpenter, 1994). WM capacity refers to the ability to both process and store information temporarily to complete a particularly task. For example, correlation studies relating measures of WM capacity and measures of verbal ability have indicated that skilled readers recall more words in WM tasks than do less-skilled readers (e.g., Nelson Denny Reading Comprehension test, SAT scores). Thus, skilled readers tend to have more capacity to hold and process information from text, which enables them to make more inferences that go beyond the explicit meaning of the text while reading (Daneman & Carpenter, 1980). For example, Perfetti et al. (1989) found that when encountering a pronoun, a reader with greater WM capacity is more likely to recall the noun referent that was mentioned earlier in the discourse than someone with lower WM capacity. As a result, the reader with greater WM capacity will experience a higher level
of comprehension because they can relate the pronoun to the referent (Perfetti et al., 1989).

The ability to succeed in this type of scenario depends on the working memory capacity of the individual (Miyake, Just, & Carpenter, 1994). People who have larger working memory capacity are more likely to keep the referent to the pronoun active in memory. Individuals with lower working memory capacity typically hold fewer pieces of information in memory than high working memory capacity individuals. Miyake at al. for example tested this assumption using ambiguous words in sentences. Consider the following example: “Since Ken really liked the boxer, he took a bus to the nearest ....” In this example, the reader does not know whether the word boxer refers to a fighter or a breed of dog. The reader has to keep both meanings of the word active until he/she can determine that Ken was on his way to the nearest pet store to buy a dog (Miyake, Just, & Carpenter, 1994). Because fighter is the more dominant meaning of the word “boxer” it is possible that the less-skilled reader would drop the less-dominant meaning of the word boxer by the time they learn that Ken was on his way to the pet store. As a result, integration of the incoming information would be unsuccessful and they would have to use an error recovery heuristic to reinterpret the sentence. This might include re-reading previous sentences and checking previous words that might have contributed to the inconsistency, reinterpreting the inconsistent word, and elaborating on the inconsistency to make it fit with the context again, etc. (Reed, 2006).

These findings suggest that the successful interpretation of ambiguous words depends on WM capacity as readers in some instances need to be able to hold multiple meanings of a word active in memory until the subsequent text clarifies the meaning.
Furthermore, it might be beneficial at times to quickly suppress or inhibit multiple meanings of a word when the context suggests that only one meaning is appropriate. Under such circumstances, keeping more than one meaning (i.e., the correct meaning) active in memory might hinder rapid processing because it overloads working memory (Gernsbacher, 1993).

**Suppression and inhibition**

In addition to the evidence that shows that skilled readers posses larger WM capacity, another line of research indicates that skilled readers differ from less-skilled readers because they are able to suppress or inhibit irrelevant information (Conway & Engle, 1994; Engle, 1996). Being able to suppress or inhibit irrelevant information reduces WM memory load and thus leaves more resources for the processing of relevant information (Gernsbacher & Faust, 1991). Less-skilled readers on the other hand, lack such a suppression mechanism, therefore limiting their ability to effectively process relevant information (Gernsbacher and Faust, 1991). For example, skilled readers can make more inferences because fewer irrelevant processes are competing for cognitive resources. According to Gernsbacher's (1990) Structure Building Model, comprehension consists of (1) creating a representation of what the text is about, (2) incorporating new information into the representation, and (3) shifting to a new representation if the incoming information is new and cannot map onto the existing representation. Successful comprehension depends on the efficient construction and maintenance of those mental structures of text. If new information can be mapped onto an existing text representation it will enhance the activation of the information whereas information that does not map
onto the current representation must be suppressed or alternatively a new mental
substructure must be created for the information. Considering that WM capacity is
limited, fewer substructures will reduce memory load for the reader and therefore
comprehension of the relevant information will not suffer (Gernsbacher & Faust, 1991).

Work by Gernsbacher and her colleagues suggests that less-skilled readers have a
tendency to create more substructures if incoming text does not directly map onto an
existing structure as opposed to suppressing or inhibiting the information. The
consequence is less efficient processing of relevant information because irrelevant
information remains active in WM. To investigate whether or not less skilled readers
have an inefficient suppression mechanism, Gernsbacher, Varner, and Faust (1990) asked
participants to make meaning-fit judgments to sentences with and without ambiguous
words. Participants read a sentence, and were then presented with a test word. Their task
was to verify whether or not the test matched the meaning of the sentence they just read.
For example, participants decided whether target words such as ACE were related to
either experimental sentences ending with homographs such as “He dug with a spade”
(‘ace’ is the inappropriate meaning of the ambiguous word spade) or a control sentence
such as “He dug with a shovel.” The researchers compared how rapidly participants
verified that a word like ‘ace’ was not related to the sentence with how rapidly they
verified that ‘ace’ was not related to the same sentence but with the last word replaced by
an unambiguous word.

This comparison gives the researchers a measure of how activated the
inappropriate meaning of the ambiguous word was (Gernsbacher et al., 1990). Response
times revealed an ambiguity effect indicating that the time to reject the target words were
slower for the homograph sentences than for the control sentences. These results show that the activation of the irrelevant meaning of the ambiguous word competed with the correct response. Skilled readers, however, were no longer affected by the ambiguity effect after a 100ms delay while less-skilled readers continued to activate the irrelevant meaning of the word spade. Gernsbacher and her colleagues (1990) concluded that less-skilled readers lack a suppression mechanism because they fail to suppress the irrelevant information even after a delay.

In a series of studies, Engle and his associates (e.g., Conway & Engle, 1994; Engle, 1996; Rosen & Engle, 1998) demonstrated that the ability to suppress information also depends on WM capacity such that individuals with high memory span abilities are also better at suppressing irrelevant information. In one study, Rosen and Engle (1997) asked high- and low-digit span participants to remember various examples of animals. Even though both groups were able to retrieve an equal number of animals, high-span individuals retrieved more unique animal names compared to low-span individuals. Thus, low digit-span individuals were less able to inhibit previously mentioned animal names while high-span individuals successfully suppressed previously named animals and were able to come up with new animal names (Rosen & Engle, 1997).

However, WM tests such as digit span tasks alone are not good measures of WM capacity because they do not take into account that an individual can use mnemonics to retrieve large amounts of information from LTM. Both domain knowledge and WM capacity play a significant role in determining how well an individual comprehends a given text. For example, McNamara and Scott (2001) demonstrated that strategy use can influence working memory capacity. In this study, the researchers examined the role of
strategy use in WM tasks by providing the participants with short-term memory (STM) task strategy training. In one experiment, participants were trained to use a story-formation (i.e., chaining) strategy and subsequently performed significantly better on STM and WM tasks during a post-test session compared to a pre-test session (McNamara and Scott, 2001). In contrast, participants in the control condition who did not receive strategy use instructions failed to perform any better on the STM and WM tasks during the post-test session than during the pre-test session. This provides evidence that the use of reading strategies (e.g., chaining) can significantly improve performance on a WM task (McNamara and Scott, 2001).

**Domain knowledge**

Although there is ample evidence that less-skilled readers lack the ability to suppress or inhibit irrelevant information, some researchers propose that the effect can be explained in terms of greater elaboration of relevant information (e.g., McNamara, 1997). For example, McNamara claims that skilled readers might simply have a richer representation of the relevant information, which quickly deactivates the irrelevant meaning of a word. Further, McNamara argues that skilled readers have more links to the relevant meaning of the word, which quickly leads to the decay of the irrelevant meaning of the ambiguous word. In other words, the irrelevant meaning of the ambiguous word does not interfere because the relevant word’s meaning is strengthened as the reader has more knowledge associated with the context provided in the sentence.

Within a computational simulation, McNamara (1997) showed that the number of activated associations to the relevant meaning predicted the activation rate of the decay of
the irrelevant information. Skilled readers appear to process the given information more deeply which led to the activation of other relevant information from LTM. These additional links facilitated activation to the relevant meaning of the ambiguous word and led to the decay of the irrelevant meaning of the word (McNamara, 1997). Therefore, the irrelevant meaning of the word essentially decays before it reaches a threshold in skilled readers; however, less-skilled readers do not use their resources effectively and are affected by the activation of the irrelevant meaning of the ambiguous word (McNamara, 1997).

McNamara (1997) showed that successful comprehension relies on the activation of existing knowledge from LTM to quickly select what information is relevant and what should be suppressed or inhibited. Further research by McNamara and McDaniel (2004) demonstrated that greater domain or general knowledge can compensate for lack of reading skills. The researchers demonstrated in a series of experiments that participants with more knowledge of baseball showed an ambiguity effect with baseball sentences immediately after the test; however, this effect disappeared after a delay. For those with little or no knowledge of baseball, a reliable ambiguity effect remained even after a delay. These findings show that ambiguity resolution depends on knowledge activation during comprehension—the more knowledgeable about a topic, the quicker one can resolve the ambiguity.

Also in contrast to the WM capacity explanation, Ericsson and Kintsch (1995) suggest that better performance on a reading span task is due to more efficient access to information in LTM through the use of long-term working memory (LTWM). The authors demonstrate that the traditional models of working memory involving temporary
storage of information must be extended to include working memory based on storage in long-term memory (LTM) (Ericsson & Kintsch, 1995). LTWM entails the use of WM (using information from the current text as cue) to provide access to information or knowledge in LTM (general world knowledge that becomes active due to the information stated in the text) (Ericsson & Kintsch, 1995).

Chase and Ericsson (1982), for example, showed that college students were able to increase their digit span from normal 7 +/- 2 digits to 80 digits by using mnemonics that were related to their favorite pastime activity. One participant enjoyed running in his free time and he was able to use running terms as cues for the to-be-remembered items. As a result, the participant was able to increase his digit span to 80 because he only had to hold the cues relating to his favorite pastime (e.g., running times, race dates, etc.) in WM as opposed to the 80 to-be-remembered items. On the recall task, the cues from his favorite pastime helped the participant retrieve the digits from LTWM. As predicted by Ericsson and Kintsch (1995) more efficient access to LTM is a result of using cues in WM to activate retrieval structures. These cues can be generated strategically using mnemonics, or emerging from existing knowledge structures about a particular topic stored in LTM. Because increased knowledge of a specific domain leads to richer knowledge structures in LTM, individuals with high domain knowledge can bypass the limitations of WM by using other retrieval strategies that involve their existing knowledge.

A wealth of evidence suggests that readers with more knowledge of a domain will better understand written material on the subject (e.g., Alexander & Kulikowich, 1991; Chiesi, Spilich, & Voss, 1979). Bransford and Johnson (1972) for example demonstrated
that titles help the reader activate appropriate knowledge about ambiguous texts. One of the texts presented readers with the information about how to do laundry. Half of the readers were presented with the title, while others only saw the text. Consider the following example:

Doing Laundry

The procedure is actually quite simple. First you arrange things into different groups. Of course, one pile may be sufficient depending on how much there is to do. If you have to go somewhere else due to a lack of facilities, that is the next step; otherwise you are pretty well set. It is important not to overdo things. That is, it is better to do too few things at once than too many. In the short run this may not seem important, but complications can easily arise. A mistake can be expensive as well. At first, the whole procedure will seem complicated. Soon, however, it will become just another facet of life. It is difficult to foresee any end to the necessity for this task in the immediate future, but then one can never tell. After the procedure is completed, one arranges the materials into different groups again. Then they can be put in their appropriate places. Eventually they will be used once more, and the whole cycle will then have to be repeated. However, that is part of life.

Participants who were not presented with the title before reading the text recalled only half as much about the text than participants that were provided with a title prior to reading the text. Without the title, the description of how to do laundry makes little or no sense, which makes it almost impossible to remember the details from the text because the reader cannot construct a coherent mental representation of the text. Hence, comprehension depends on the activation of appropriate and related knowledge while reading (Bransford & Johnson, 1972).

Magliano and Millis (2003) studied reading skill with a think-aloud procedure and latent semantic analysis (LSA) to determine under which circumstances skilled and less-skilled readers draw inferences. Participants were asked to read specific focal sentences that were embedded in two stories. LSA was used to estimate the semantic overlap between participants’ think-aloud protocols and the focal sentences and other sentences that were presented in the stories (Magliano & Millis, 2003). The result showed that less-
skilled readers have a tendency to only report the focal sentences, while skilled readers reported the focal sentences as well as other information from the stories that semantically overlapped with information provided in the focal sentence (i.e., causal antecedents to the focal sentences) (Magliano & Millis, 2003).

Additionally, higher scores on the LSA-based analysis of skilled readers also positively correlated with the amount of information that was recalled. Together these results showed that skilled readers have the ability to draw inferences from information that was not explicitly stated in the text because they were able to relate causal antecedent to the focal sentences in the stories. Conversely, less-skilled readers could only remember the information that was provided in the focal sentences. They were not able to connect the information with relevant details from the stories (Magliano & Millis, 2003).

Due to their ability to use their resources more efficiently, skilled readers are more likely to generate inferences that repair conceptual gaps between clauses, sentences, and paragraphs, whereas less-skilled readers tend to ignore gaps or fail to make inferences necessary to fill in the gaps (e.g., Oakhill & Yuill, 1996; Magliano & Millis, 2003). For example, less-skilled readers are less likely to generate topic-related inferences on line or to integrate incoming information with preceding text (e.g., Long et al., 1994). As a result, less-skilled readers perform poorly on tasks that access text-based or implicit inferences, even when the text is made available during questioning (Oakhill, 1984).

Furthermore, it is also important that the knowledge a reader uses to fill in the gaps during the reading process is interconnected and stable. It is not sufficient to teach the reader a set of facts needed to generate inferences because learning a sequence of
unrelated facts might actually hinder comprehension rather than improve it (McNamara & Kintsch, 1996a). If the knowledge is not interconnected, a *fan effect* might occur (Anderson, 1974).

In a series of experiments Myers, O’Brien, Balota, and Toyofuku (1984) showed that the time required to search memory increased with the number of facts learned about a propositional subject (*fan effect*). The more information associated with a concept, the amount of activation for each item is reduced and thus less available for processing. However, if the facts are interrelated, a fan effect does not occur and the interrelated concepts facilitate activation and increase processing speed (e.g., Reder & Anderson, 1980; Reder & Ross, 1983). Consequently, readers that have greater domain knowledge show better comprehension than those that lack sufficient knowledge because their knowledge is interconnected and therefore facilitates reading comprehension. For example, Chiesti et al. (1979) showed that less-skilled readers (i.e., children) who knew more about baseball outperformed skilled readers (i.e., adults) who lacked such knowledge on a recall task. These results show that domain knowledge can overcome deficits in reading skill (Chiesti et al. 1979).

Shapiro (2004) additionally argues that domain knowledge is more important to reading comprehension than reading skill. In a series of experiments she investigated the effects of domain knowledge on recall of history texts. Participants were asked to read two fictional history texts (adopted from Voss and Silfies, 1996) and two texts about memory. The results showed that prior domain knowledge was a better predictor of higher recall of both texts than reading skill (assessed with the Nelson Denny Reading Comprehension test) (Shapiro, 2004).
Unlike Shapiro (2004), Cottrell and McNamara (2002) found that both domain knowledge and reading skill significantly contributed to comprehension, with a greater contribution from reading skill than domain knowledge. Cottrell and McNamara (2002) used the Nelson Denny Reading Comprehension test to assess reading skill and presented participants with a text about memory. A general test about psychology was used to assess participants’ prior domain knowledge. It is quite possible that testing a broader range of topics in psychology yielded a less accurate estimate of participants’ knowledge about memory, which might have accounted for the different findings of the two studies.

Furthermore, Cottrell and McNamara (2004) assess the relation between students’ aptitudes and their performance in an introductory psychology class. They found that even though reading skill contributed to reading comprehension ability, it did not correlate with test performance in the class. Instead, high marks on the general test about psychology proved to be the best predictor of test performance. However, only students that used reading strategies were able to put their prior domain knowledge to good use while students who did not use reading strategies failed to benefit from their prior domain knowledge (McNamara & O’Reilly, 2009).

There is substantial evidence suggesting that domain knowledge facilitates comprehension because new information is more easily integrated with existing knowledge structures (e.g., Alexander & Kulikowich, 1991). This process requires less effort because the information that is stored in LTM becomes automatically activated when a text contains domain-specific information (Schneider, 1993). Overall, however, there seems to be a trend that high-domain knowledge is correlated with better reading skill. For example, O’Reilly and McNamara (2002) showed that only skilled readers with
high-domain knowledge showed greater comprehension of a text about meteorology compared to less-skilled, low domain-knowledge students. This was only true for multiple-choice questions but not open-ended questions. When participants were asked to answer open-ended questions, both reading skill and domain knowledge contributed equally to reading comprehension (O’Reilly & McNamara, 2002).

**Reading Strategies**

One way to remediate reading deficits is to teach students skills that can utilized during reading to raise comprehension levels. McNamara (2004) assessed the benefits of reading strategy intervention, called Self-Explanation reading Training (SERT). Students were trained to self-explain text and to use metacognitive reading strategies that improve self-explanation. Self-explanation typically involves reading a section of text aloud and then explaining what each sentence means. Specifically, SERT (McNamara, 2004) teaches students five reading strategies: (1) comprehension monitoring, (2) paraphrasing, (3) making bridging inferences, (4) predictions, and (5) elaboration on text.

Comprehension monitoring enables the reader to be aware of any inconsistencies in their understanding of the text and to recognize when the use of active reading strategies is appropriate. One such reading strategy could be paraphrasing. Paraphrasing helps students remember the surface structure of the text and to break ideas into more manageable units. Making bridging inferences are sometimes necessary to link a current sentence to material that was mentioned earlier in the text. Some students might also find it helpful to predict what may happen next by using information from the text and general world knowledge. Lastly, elaboration aids readers in connecting what they are currently
reading with what they already know about a specific topic. Elaboration will result in a richer representation which will increase the likelihood that the reader will remember the information (McNamara, 2004). Several studies have confirmed that SERT helps low-domain knowledge readers to use logic, or general knowledge to enhance their understanding of text (e.g., O’Reilly, Best, McNamara, 2004; McNamara, 2004a).

The presented evidence shows that WM capacity, the ability to suppress or inhibit certain text information, domain knowledge, and the knowledge of reading strategies all play a crucial role in comprehension. WM capacity allows readers to hold more pieces of information from the text in WM, which enables readers to process for information. The ability to suppress or inhibit irrelevant information leaves readers with more resources to process important information. Domain knowledge enables the reader to integrate the incoming information with what they already know, thus strengthening memory traces (McNamara and O’Reilly, 2009). Reading strategies help readers to make more sense of the text through self-explanation. Chapter 4 will provide background of reading skill assessment methods and how they should be used in research and educational settings.
CHAPTER IV

READING ABILITY ASSESSMENT

Identifying students at risk of becoming poor readers is an important goal of researchers and educators because reading deficits can undermine the educational process. Accordingly, there are several tests of reading comprehension that are widely used by reading researchers and educators (e.g., Gates-MacGinitie Reading Comprehension Ability Test, the Nelson-Denny Reading Ability Test, Woodcock-Johnson, and the Scholastic Aptitude Test [SAT]). Typically, test-takers are asked to read a variety of short passages and answer multiple-choice questions about the content of the passage. These tests measure various components of reading comprehension, from vocabulary knowledge and word-level decoding skills to passage-level comprehension ability. Standardized tests are often favored by educators and researchers because they are easy to administer and score, and typically have respectable levels of validity and reliability (e.g., Freedle & Kostin, 1994, van den Bergh, 1990). However, some concerns have been raised concerning the validity of standardized reading ability tests and whether they are able to diagnose readers' specific abilities and deficits (Daneman & Hannon, 2001; Magliano, Milis, Ozuru, & McNamara, 2007).

There are two significant challenges in designing effective methods to assess reading comprehension. First, reading is a complex and multi-component process during which readers need to successfully and fluently execute various cognitive processes that
draw upon different resources. These processes include: phonological decoding or written words (Perfetti, Beck, Bell, & Hughes, 1987); assessing the meaning of individual words; (e.g., Snow, Barnes, Chandler, Goodman, & Hemphill, 1991) combining individual word meanings to form coherent sentence meaning through syntactic knowledge (Marslen-Wilson & Tyler, 1987); and integrating the meaning of individual sentence with the larger meaning of the discourse, using language specific knowledge or general world knowledge (Adamas & Collins, 1979). Thus, reading comprehension problems and/or variability in reading comprehension ability can arise from many reasons.

Second, the variability in reading comprehension situations also creates a challenge when measuring comprehension ability. People read for many different reasons. We read novels and magazines for entertainment, science texts or journal articles to learn new knowledge, or multiple texts to compare and synthesize information. Various types of reading situations are likely to call for different types of comprehension processes, abilities, or strategies (van den Broek, Lorch, Linderholm, & Gustafson, 2001). The diversity in reading comprehension situations, combined with the multi-component nature of reading comprehension ability, contributes to the challenges faced in reading comprehension assessment.

For example, one study by McDaniel, Hines, and Guynn (2002) compared the Nelson-Denny Reading Test and the Gernsbacher (1990) structure-building test. They found that participants that were indexed as less-skilled readers by the Nelson-Denny Reading Test showed decreased recall in a letter deletion task. However, participants' recall was not affected by a sentence scrambling task compared to skilled readers. On the other hand, participants indexed as less-skilled by the Gernsbacher (1990) structure-
building test showed increased recall for information on the unscrambling task but their recall was not affected by the letter deletion task compared to skilled readers. Therefore, McDaniel et al. (2002) proposed that the Nelson-Denny Reading Test measures word decoding ability whereas the Gernsbacher (1990) structure-building test measures the ability to create a coherent text representation.

Therefore, it is important to consider the type of task participants have to complete during an experiment to determine what type of reading test is most appropriate. According to McDaniel et al. (2002) the Gernsbacher (1990) structure-building test is most appropriate for testing a reader’s ability to comprehend expository text, which requires the reader to be able to build a coherent text representation and the Nelson-Denny Reading Test is most appropriate for measuring a reader’s ability to comprehend narrative text, which challenges the reader’s word decoding ability. The Gates-MacGinitie Reading Test is another test that assesses a reader’s ability to decode words but also to build a coherent representation of the text. It has been widely used in research settings to assess a reader’s ability to comprehend text.

**Gates-MacGinitie Reading Test**

The Gates-MacGinitie Reading Tests were developed in 1965 and replace the Gates primary, Gates Advanced Primary, and the Gates Reading Survey. Included in this seven-test series are tests for grade levels one through 12. This review will cover only the Gates-MacGinitie (4th ed.) reading skill test level 10/12 (MacGinitie & MacGinitie, 1989).
The Gates-MacGinitie Reading skill test consists of 48 multiple-choice questions designed to assess student comprehension on several short text passages. Test takers are asked to read a number of short passages, and answer multiple choice questions based on the passages. The answers must be selected from one of the four answer options (A, B, C, or D) and be marked on a scantron sheet. Test takers may look back at the passage while answering the questions. Test takers are allotted 20 minutes to complete the task.

The reading test contains 11 short stories covering topics such as history, biology, and the arts (see Appendix D for the complete Gates-MacGinitie Reading Test). Each short story is followed by three to six multiple-choice questions. The answers vary in difficulty level as some require inferential processing whereas others can simply be extracted from the text.

Farr and Anastasiow (1969) note that the Gates-MacGinitie Reading Test is well constructed, and allows test administrators to interpret the differences between subtest scores. The tests have also been normed at the beginning and end of each grade, and the subtests and total test scores are very reliable (Farr & Anastasiow, 1969). This test is a useful instrument for measuring the reading achievement of students. It is most useful for evaluating growth, screening students who are in need of more diagnostic testing, organizing instructional groups, and cautiously diagnosing subskill deficiencies (Farr & Anastasiow, 1969).

More recently, Ozuru, Rowe, O’Reilly, and McNamara (2008) examined the extent to which item and text characteristics predict item difficulty on the comprehension portion of the Gates-MacGinitie Reading tests for grades 10-12. They performed detailed item-based analysis on comprehension questions on the basis of the cognitive processing
model framework proposed by Embretson and colleagues (Embretson & Wetzel, 1987). Item difficulty was analyzed for various passage features including word frequency and number of propositions, as well as individual-question characteristics including abstractness and degree of inferential processing using hierarchical linear modeling. The results showed that the difficulty level of the Gates-MacGinitie is influenced by both passage features and the types of questions.

Overall, the test contains a variety of passages with varying ranges of difficulty. Further, the test contains a number of different types of questions (e.g., a large number of inferential questions and more difficult passages are used in the test), most of which cannot be answered by simply eliminating distracter items. Thus, the test measures many different sub-components underlying reading comprehension in the context of a variety of reading circumstances (Ozuru et al., 2008). The authors concluded that the Gates-MacGinitie Reading Test is suitable for researcher on text comprehension and education assessment. The results of this study show that the test provides useful information about the reading comprehension ability of a wide variety of readers by varying item features to produce items with different levels of difficulty.

Chapter 5 will provide a background of how statements about causes have been shown to be critical for organizing text and discourse representations (e.g., Bloom, Fletcher, van den Broek, Reitz, & Shapiro, 1990).
In narratives, statements about causes have shown to be critical for organizing discourse representations (e.g., Bloom, Fletcher, van den Brock, Reitz, & Shapiro, 1990). One particular type of causal information that has been investigated is the goals of protagonists (e.g., Albrecht, O'Brien, Mason, & Myers, 1995; Suh & Trabasso, 1993). Goals often motivate whole sequences of actions and events, and thus may be more interconnected than any other single class of statements (Trabasso & Sperry, 1985).

Successfully comprehending text requires monitoring the goals and intentions of protagonists. The importance of the goals of a protagonist in narratives is illustrated by evidence showing that previously introduced, yet unsatisfied goals, may be reactivated in response to contextual cues, even when the information is not required to maintain coherence of the discourse (Albrecht & Myers, 1995; Rizzella & O'Brien, 1996). For example, Albrecht and Myers (1998) asked participants to read passages containing 2 episodes (see Table 2 for an example): the first described a goal that was satisfied and one that was unsatisfied. Following the second episode, participants read statements that reinstated some part of the goal context (e.g., “Exhausted, Mary sat down in her (leather) chair for a moment”). Albrecht and Myers (1998) found that the reactivation of unsatisfied goal information depended on the type of original goal context (leather chair/chair) and
Table 2.

Sample Passage from Albrecht & Myers (1998).

Introduction
Mary was an advertising agent for a large firm in New York City. This evening, she was sitting at home working on a promotional piece for a blue jean company. This was her last project before she went on vacation. She needed to make an airline reservation tonight by midnight. If she didn’t make the reservation tonight, she wouldn’t get the special rate and might not even get a seat on the flight. She sat down in her (leather) chair and looked through the telephone book.

Unsatisfied goal
However, before she could confirm her reservation, she received a call from her boss. Apparently, the blue jean company wanted the ad by tomorrow morning. Mary had to finish the project tonight and would have to confirm her reservation later.

Satisfied goal
Just after she confirmed her reservation, she received a call from her boss. Apparently, the blue jean company wanted the ad by tomorrow morning. Mary had to finish the project tonight and so she put away her reservation information.

Intervening episode
She needed to decide on the colors for the layout. She set a black-and-white line drawing of the ad on her desk. Then she pulled out several color swatches. At first, she tried several different shades of green and red. However, she knew the company would not like these colors. After much consideration, she selected royal blue and light yellow. Now, she was done with the ad.

Context reinstatement sentence
Exhausted, Mary sat down in her (leather) chair for a moment.

Target Sentences
She was tired and decided to go to bed. She put on pajamas and washed her face.

Conclusion
She was certain she’d have no problem falling asleep.
whether the contextual cues were specific enough to fully reinstate the previously mentioned goal. Thus, propositions currently read in the text can serve to activate related concepts that were presented earlier in the text. However, in order to become fully reinstated it was necessary that the cues mentioned in the reinstatement sentence were specific and matched the original context (e.g., leather chair).

Similarly, Huitman, Dopkins, Klin, and Myers (1993) showed that reading about a character’s actions can reactivate information about their goals stated earlier in the text even if the information was separated by intervening material. In this experiment, participants read passages such as the following:

“Things had not gone well for Dick at the office today. He had missed an important meeting in the morning. On the plus side, though, his boss had just given him a raise. And he was due for a vacation. He hadn’t made the arrangements yet, but he knew he wanted to go somewhere warm where he could swim and sunbathe. Stuck in a traffic jam again on his way home, Dick thought about how the day had gone. He absentmindedly watched the license plates of the cars ahead of him. When he finally got home he phoned TWA and booked a ticket to Florida/Alaska on a flight that was leaving in two weeks.”

Reading times for the target sentences were slowed for text describing an action (“...booked a ticket to Alaska on a flight that was leaving in two weeks”) that was inconsistent with the goal of the protagonist (“he wanted to go somewhere warm where he could swim and sunbathe”) than reading a line about an action that was consistent with the goal of the protagonist described earlier (e.g., “…booked a ticket to Florida on a flight that was leaving in two weeks”) (Huitman et al., 1993).
These results suggest that reading a sentence describing the protagonist’s actions (e.g., booking a ticket to Alaska/Florida) can reactivate relevant information from earlier portions of the text, even when the sentence is coherent with its immediate context (Huitman et al. 1993).

To extend on Huitman et al. (1993)’s findings, Pynor and Morris (2003) investigated whether readers are sensitive to protagonists’ goals when stated implicitly in the text. Huitman et al.’s (1993) passages were adapted to either explicitly (e.g., “He wanted to go somewhere warm and sunny”) or implicitly state goals (e.g., “He had always been a real sun-worshipper”). An example passage is provided in Table 3. Eye movement data and reaction time data to target sentences were recorded.

Eye-movement data revealed that participants took longer to comprehend implicit goal statements (e.g., “he had always been a real sun-worshipper”) than explicit goal statements (e.g., “He wanted to go somewhere warm and sunny”) indicating more effort was required to infer the implicitly stated goal. Reading time measures showed participants were slower to read sentences that contradicted an earlier stated goal (e.g., “..asked for a plane ticket to Alaska”) than when it was consistent with a previously stated goal (e.g., “..asked for a plane ticket to Florida”). The results were held true regardless of goals being stated implicitly or explicitly. These findings indicate that readers inferred the goal of the protagonist when the information was not explicitly stated in the text. Taken together, these results show that readers infer implicitly stated goals and reinstate unsatisfied goals when they are presented with information contradicting the implicitly stated goals of the protagonist (Pynor & Morris, 2003).
Table 3.

Sample passage from Poynor & Morris (2003).

Situation
Dick had a week's vacation due.

Explicit goal statement
He wanted to go somewhere warm and sunny.

Implicit goal statement
He had always been a real sun-worshipper.

Body
He bought a book on travel. Then he looked at the ads in the travel section in the Sunday newspaper. He went to his local travel agent

Consistent target line
and asked for a plane ticket to Florida.

Inconsistent target line
and asked for a plane ticket to Alaska.

Spill-over line
He paid for it on a charge card.

Wrap-up line
The travel book had been very convincing.

Question:
Did Dick originally plan to go to a cold climate?
There is additional evidence suggesting readers infer the goals of protagonists and that goals become incorporated into their long-term memory representation (Albrecht & O’Brien, 1993; Egidi & Gerrig, 2006; Rinck, Hahnel, & Becker, 2001; van den Broek & Trabasso, 1986). For example, Egidi & Gerrig (2006) examined whether readers are sensitive to the match between a character’s goals and actions. Participants were presented with passages similar to the one shown in Table 4. In the mild motivation condition, the protagonist is described as being tired from working at the computer for a long time whereas in the urgent motivation condition, the protagonist smells smoke and hears the fire and carbon monoxide alarms ringing in the hallway. This information was followed by the protagonist carrying out an action that was considered mild (“He walks slowly downstairs into the kitchen. He pats the cat and heads to the back door”) or an action that was considered extreme (e.g., “Rushing down the stairs he knocks over a chair. He grabs the cat and kicks the screen door open”).

Egidi and Gerrig (2006) found it was easier for readers to understand stories providing a match between the intensity of an action and the motivation of a protagonist to accomplish a goal (see Table 6 for an example passage). These findings demonstrate readers are sensitive to subtle nuances of text such as the goals of a protagonist and subsequent actions he/she takes to accomplish a particular goal.

Another finding related to goal information is that readers sometimes adopt the perspective of the protagonist during text comprehension and keep track of his/her goals. Albrecht, O’Brien, Mason, and Myers (1995) showed that readers only focused protagonists’ goals when those goals had not been satisfied yet from the perspective of the protagonist. This was only true when participants were instructed to
Table 4.

Sample passage from Egidi & Gerrig (2006).

**Mild motivation**
Dan has been working at the computer for a few hours. His hands are tired from typing. His eyes are strained from looking at the monitor. It’s about time for a break and some fresh air.

**Urgent motivation**
Dan is working at the computer, when he smells smoke. The fire alarm and carbon monoxide detector begin to sound. Thick smoke fills the room. Breathing has become very difficult.

**Goal**
Dan wants to get outside.

**Mild action**
He walks slowly downstairs into the kitchen. He pats the cat and heads to the back door.

**Extreme action**
Rushing down the stairs he knocks over a chair. He grabs the cat and kicks the screen door open.

**Final sentence**
Outside, he is glad to have some fresh air.

**Comprehension question**
Dan goes downstairs?
view the text situation from the point of view of the protagonist. In contrast, when they were instructed to read the text for comprehension, readers drew inferences relevant to protagonists’ goal even when the goal was already satisfied from the perspective of the protagonist. These findings demonstrate the unlikeliness of readers completely adopting the perspective of the protagonist during reading, thereby ignoring their own knowledge of the situation. Instead, the comprehension process and the resulting memory representation depend not only on the text structure but also on the perspective of the reader.

A large body of research has shown that information about protagonists’ goals is highly accessible to readers while those goals remain unsatisfied; in contrast, this information becomes less accessible once the goals have been satisfied. Perhaps this occurs because the goal is less relevant after it has been satisfied and therefore does not need to remain active in working memory (Albrecht & Myers, 1998; Huitman et al., 1993; Poynor & Morris, 2003). Other research has shown that readers only monitor unsatisfied goals when they are instructed to read from the protagonists’ perspective and continued to draw inferences about the protagonists’ goals even when the goal was already satisfied when instructed to only read for comprehension (e.g., Albrecht, O’Brien, Mason, & Myers, 1995). In chapter 6, a series of experiments will examine under what conditions skilled and less-skilled readers keep track of protagonist’s goals and whether they are sensitive to the match between a protagonist’s actions and their motivation to accomplish a certain goal.
CHAPTER VI

EXPERIMENTS

Successful comprehension often requires readers to monitor the goals and intentions of protagonists. Goals often motivate whole sequences of actions and events, and thus may be more interconnected than any other single class of statements (Trabasso & Sperry, 1985). This is illustrated by evidence showing that previously introduced yet unsatisfied goals may be reactivated in response to distant contextual cues, even when that goal is not necessary to maintain the causal coherence of the discourse (Albrecht & Myers, 1995; Rizzella & O'Brien, 1996; Trabasso & Magliano, 1996).

Research on reading skill has shown that comprehension is also influenced by a number of factors including working memory capacity (Miyake et al., 1994), the suppression of irrelevant information (Conway & Engle, 1994), the existence of domain knowledge (O'Reilly & McNamara, 2007), and the use of reading strategies (McNamara, 2004). To date it is unclear which of these factors has the greatest impact on comprehension.

The current set of experiments addresses three questions about reading skill and the use of goal information in the comprehension of narratives. First, does reading skill have an impact on a reader's ability to monitor protagonists' goals? Second, can subtle changes to text increase the reader's sensitivity to goal information? And third, what role do reading strategies play in monitoring protagonists' goals?
Participants read 24 narrative passages describing protagonists and their motivation to accomplish goals (examples are provided in Table 5). First, protagonists were described as either moderately motivated or highly motivated to accomplish a goal. Following the explicit statement of the first goal, a second goal was introduced. This was followed by four filler sentences that shifted the focus away from the goal information. To test whether participants were aware of the motivation of protagonists to accomplish goals they were then presented with target sentences that were consistent with the first goal or the second goal. The level of motivation of the protagonist mentioned at the beginning of the story should determine which target sentence is integrated more easily.

The 24 narrative passages used in the experiments consisted of stories involving protagonists (9 female protagonist and 15 male protagonists). Eight of the goals described in the narratives were social in nature (e.g., Tim had to decide whether to watch the Red Sox game or talk to his sister who had just broken up with her boyfriend), 14 were practical in nature (e.g., Jimmy had to decide whether he should leave to deliver the newspaper or clean up the mess he had made in the kitchen), and 2 were practical and social in nature (e.g., Angie had to decide whether she should go to the gym to get back in shape or go to the mall with her friend).

For all experiments, participants read passages line-by-line on a computer screen and reading times for the target sentences were recorded. Experiment 1 measured readers’ sensitivity to goal urgency when the elaboration about the motivation to satisfy a goal and a target action were separated by four intervening sentences. A control study was conducted to norm the passages used in Experiment 1. To determine whether participants were more sensitive to the motivation of the protagonist when the goal
Table 5.

Sample Passage 1 for Experiment 1.

**Moderate motivation**
Tim’s father was a big Red Sox fan and the two of them used to always watch games together. The Red Sox were going to play a pre-season game tonight at 8pm. Tim was excited and had been watching TV since 7:30 pm while eating his dinner.

**High motivation**
Tim loved baseball and had been a huge Red Sox fan ever since he was a young child. The Red Sox were going to play the last game of the World Series tonight at 8pm. Tim bet a friend $500 that he could recall every out in the game.

**First goal**
He wanted to watch every single minute of the game tonight to make sure he didn’t miss anything.

**Second goal**
When the game was starting, his sister called because she had just broken up with her boyfriend.

**Filler**
Tim’s sister was two years older than he was. After Tim graduated from college he decided to move back to the New England area to be closer to his family. He had recently bought a condo near his parents’ house. Tim felt it was unique and had a lot of character. It was exactly what he wanted.

**Action consistent w/ first goal**
Tim told his sister he would call her back later. He didn’t want to miss out on parts of the game.

**Action consistent w/ second goal**
Tim agreed to listen to all his sister’s troubles. She sounded upset and needed someone to talk to.

**Question**
Was Tim a Yankees fan?
Sample Passage 2 for Experiment 1.

Moderate motivation
Jimmy just got home from playing ball with his friends. He was a local newspaper delivery boy and needed to distribute all the papers this evening. It took him about an hour to complete his route and he liked the extra cash he earned by doing the job.

High motivation
Jimmy just got home from playing ball with his friends. He had to deliver the local newspaper by 5 p.m. otherwise his supervisor wouldn’t pay him at all. He had to hurry because it took him about an hour to complete his route and it was almost 4 p.m. already.

First goal
Jimmy had to get his bike out of the garage quickly so he could be on his way to deliver the paper.

Second goal
While getting his bike, he realized he didn’t clean up the mess in the kitchen from his snack.

Filler
Jimmy was a freshman in high school. He had been a newspaper delivery boy for several months now. As soon as he was old enough he immediately signed up for the paper delivery job. He wanted to save money for his dream car. He was hoping to buy a Honda Civic once he got his diver’s license.

Action consistent w/ first goal
Jimmy got on his bike and delivered the paper. He knew he had to hurry up to get the job done.

Action consistent w/ second goal
Jimmy returned to the house and cleaned the mess. He took a sponge and wiped off all the crumbs.

Question
Was Jimmy new in town?
information and protagonists’ actions were presented consecutively, the filler section was removed in Experiment 2. To examine whether a reinstatement sentence that made clear the protagonist had to make a choice between the goals was added after the filler in Experiment 3. Experiment 4 focused on whether instructing participants to read from the perspective of the protagonist enabled them to be more sensitive to the protagonists’ intentions.

Experiment 1

The goal of Experiment 1 was to test whether readers are responsive to the match between protagonists’ motivation to satisfy a goal and the actions he/she take to achieve those goals. Consider the following example passage in Table 5. Participants were asked to read a series of passages that establish that the protagonist was either moderately or highly motivation to accomplish a goal in the introduction. This was followed by explicitly stating the first goal and introducing a second goal. This information was followed by four filler sentences that continued the topic but did not re-mention any information about the character’s motivation to accomplish either of the goals mentioned previously. Subsequently, the protagonist carried out an action in the target sentences that was either consistent with the first goal or consistent with the second goal. Reading times for the target sentences were recorded to assess whether readers were sensitive to the match between protagonists’ motivation to accomplish a goal and his/her actions after reading filler information.

Method

Participants.
Participants were 80 University of New Hampshire undergraduate students who received partial course credit for their participation in the experiment. All participants were enrolled in Introductory Psychology, Statistics in Psychology, and Research Methods courses. They were given the Gates-MacGinitie Reading Test. Skilled- and less-skilled readers were determined based on their performance on the reading test (the top and bottom third of the group, respectively). The 40 skilled readers had scores ranging from 75% to 100% (M = 84%). The 40 less-skilled readers had scores ranging from 20% to 60% (M = 48%). All participants were native English speakers.

Materials.

Participants read 24 passages in each of four conditions: Moderate Motivation_First Goal, Moderate Motivation_Second Goal, High Motivation_First Goal, and High Motivation_Second Goal. Each passage began by introducing a protagonist and a general theme for the story. This was followed by information about how motivated a protagonist was to accomplish a goal (e.g., Jimmy had to deliver the paper sometime today or Jimmy had to deliver the paper now otherwise he will not get paid). Across all passages, the mean length of the introduction section in the moderate motivation condition and the high motivation condition was 49 words, with a range of 47-50. The introduction was immediately followed by a statement that explicitly stated a goal that was related to the information in the introduction (e.g., Jimmy had to get his bike out of the garage quickly so he could be on his way to deliver the paper”). Subsequently, readers were presented with a second goal that had not been mentioned in the text before (e.g., While getting his bike, he realized he didn’t clean up the mess in the kitchen from his snack). Across passages, the mean length of the goal elaboration sections for the first
and second goal was 98 characters, with a range of 97-100. The goal information was followed by four filler sentences served to shift the readers’ attention away from the goals of the protagonist. Across all passages, filler sections were always four sentences long and the mean length of the filler sections was 57 words, with a range of 56-58. Subsequently, protagonists carried out actions that were either consistent with the first goal (e.g., “Jimmy got on his bike and delivered the paper.”) or consistent with the second goal (e.g., “Jimmy returned to the house and cleaned the mess.”). Across all passages, the mean length of the target sentences was 48 characters, with a range of 47-50.

Each passage was followed by a short comprehension question to ensure that participants were reading the text carefully. The questions focused on details in the passages that were not directly related to goal information in the text. There are an equal number of “yes” and “no” comprehension questions. In addition to 24 experimental passages, each participant read 12 filler passages so participants could not guess what the hypothesis of the study was. Passages were randomly assigned to four conditions, with the restriction that each experimental passage could only appear once in each of the four conditions.

Control Study

A norming study was conducted to validate the materials in Experiment 1.

Method

Participants.

Participants were 40 University of New Hampshire undergraduate students who received partial course credit for their participation in the experiment.
Materials.

Participants read 24 passages (see Table 6 for examples). These passages were the same passages that were used in Experiment 1, except they did not include the target sentences and comprehension questions. Participants only read the introduction section and the first and second goal sentences. After reading each passage, participants were asked to rate the plausibility of a specific target action described in the text.

Procedure.

Participants were randomly assigned to one of the four materials sets. The experiment was conducted with several small groups of participants in a classroom setting. All participants were given a material set of 24 passages, one per page. Participants were instructed to read each passage, and then for each individual passage, they were asked to rate the plausibility of a specific target action by circling a number from one to seven; the rating of one was reserved for the rating “highly implausible” and the rating of seven was reserved for the rating “highly plausible.” In addition to reading the passages either in the moderate or high motivation condition, they also read the first and second goal sentences. For example, after participants were presented with a passage, they were asked to judge the likelihood of a protagonist carrying out a particular action (e.g., “How likely is it that Jimmy cleans up the mess in the kitchen first?”). Participants completed a plausibility rating for each of the 24 passages.
Table 6.

Sample Passage 1 for Norming Study.

Moderate motivation
Tim loved baseball and had been a huge Red Sox fan ever since he was a young child. The Red Sox were going to play against the Yankees tonight at 8pm. Tim was very excited and had been watching TV since 7:30 pm while eating his dinner.

High motivation
Tim loved baseball and had been a huge Red Sox fan ever since he was a young child. The Red Sox were going to play the last game of the World Series tonight at 8pm. Tim bet a friend $500 that he could recall every out in the game.

First goal
He wanted to watch every single minute of the game tonight to make sure he didn’t miss anything.

Second goal
When the game was starting, his sister called because she had just broken up with her boyfriend.

How likely is it that Tim tells his sister he will call her back after the game?

1  2  3  4  5  6  7
Highly Implausible  Implausible  Neutral  Plausible  Highly Plausible

or

How likely is it that Tim speaks to his sister on the phone?

1  2  3  4  5  6  7
Highly Implausible  Implausible  Neutral  Plausible  Highly Plausible
Sample Passage 2 for Norming Study.

**Moderate motivation**
Jimmy just got home from playing ball with his friends. He was a local newspaper delivery boy and needed to distribute all the papers this evening. It took him about an hour to complete his route and he liked the extra cash he earned by doing the job. (48)

**High Motivation**
Jimmy just got home from playing ball with his friends. He had to deliver the local newspaper by 5 p.m. otherwise his supervisor wouldn’t pay him at all. He had to hurry because it took him about an hour to complete his route and it was almost 4 p.m. already.

**First goal**
Jimmy had to get his bike out of the garage quickly so he could be on his way to deliver the paper.

**Second goal**
While getting his bike, he realized he didn’t clean up the mess in the kitchen from his snack.

How likely is it that Jimmy goes to deliver the newspaper?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Plausible
Implausible

How likely is it that Jimmy cleans up the mess in the kitchen first?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Plausible
Implausible
Results and Discussion.

The norming study examined whether readers were sensitive to the match between the level of motivation of the character to accomplish a goal and their actions. Table 7 shows the mean ratings for each of the conditions. When passages stated that the protagonist was highly motivated to accomplish a goal (e.g., Jimmy doesn't get paid if he doesn’t deliver the paper within the next hour) participants rated the likelihood that he/she would satisfy the first goal (e.g., “Jimmy had to get his bike out of the garage quickly so he could be on his way to deliver the paper”) as more plausible compared to the likelihood that he would satisfy the second goal (e.g., “While getting his bike, he realized he didn’t clean up the mess in the kitchen from his snack.”). In contrast, when passages stated that it was only moderately important that a protagonist had to satisfy a goal (e.g., Jimmy wants to deliver the paper this evening) participants rated the likelihood that he/she would carry out the target action that was consistent with the first or second goal as equally plausible. Passages that received ratings that deviated from this pattern were revised so they would be more consistent with the other passages.

Procedure.

Participants of Experiment 1 were randomly assigned to one of the four material sets. Each participant was run individually in a session that lasted approximately 60 minutes. All materials were presented on a monitor controlled by a Dell 386 microcomputer. Participants were instructed to rest their right thumbs on a line-advance key, their right index finger on a “yes” key, and their left index finger on a “no” key. Each trial began with the word “READY” in the center of the screen. When participants
Table 7.

Mean Plausibility Ratings for Actions as a Function of Goal Motivation for Norming Study.

<table>
<thead>
<tr>
<th></th>
<th>Target Action 1</th>
<th>Target Action 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate Motivation</td>
<td>4.17</td>
<td>4.00</td>
</tr>
<tr>
<td>High Motivation</td>
<td>5.59</td>
<td>2.89</td>
</tr>
</tbody>
</table>
were ready to read a passage, they pressed the line-advance key. Each press of the key erased the current line and presented the next line. Each participant was instructed to read at a comfortable, normal reading pace. Following the last line of each passage, the cue “QUESTIONS” appeared in the middle of the screen for 2,000 milliseconds. This was followed by a comprehension question to which participants responded by either pressing the “yes” or the “no” key. There were an equal number of “yes” and “no” comprehension questions. On the trials where participants make errors, the word “ERROR” appeared in the center of the screen for 750 milliseconds. Before beginning the experimental passages, participants read three practice passages to ensure that they were thoroughly familiarized with and understood the procedure.

Results and Discussion

In all analyses reported, $F_1$ always refers to tests against error terms on participants’ variability, and $F_2$ always refers to tests against an error term based on items variability. All analyses were significant at the standard alpha level of .05, unless otherwise indicated. All latencies more than two and a half standard deviations from a participant’s mean were treated as missing data and excluded from the analyses (3% of the data). Effects were tested at a significance level of $p < .05$ unless otherwise indicated.

The mean reading times for the target sentences appear in Table 8. For skilled readers, there was no main effect of motivation condition, $F_1 (1, 36) = .037, MSe = 52,940.95; F_2 (1,20) = .04, MSe = 46,021.07, p > .05$; but there was a main effect for the type of target sentence, $F_1 (1,36) = 10.21, MSe = 85,126.89; F_2 (1,20) = 4.27, MSe = 62,725.12$. For less-skilled readers, there was no main effect of motivation condition, $F_1 (1,36) = 3.44, MSe = 36,079.66; F_2 (1,20) = .60, MSe = 55,243.01, p > .05$; but there
Table 8.

Mean Reading Times (in Milliseconds) for Target Sentences as a Function of Motivation Condition for Experiment 1.

<table>
<thead>
<tr>
<th></th>
<th>Moderate Motivation</th>
<th>High Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Goal 1</td>
<td>Goal 2</td>
</tr>
<tr>
<td>Skilled</td>
<td>2166</td>
<td>2079</td>
</tr>
<tr>
<td>Less-skilled</td>
<td>2320</td>
<td>2157</td>
</tr>
</tbody>
</table>
was a main effect for the type of target sentence, $F_1 (1,36) = 22.21, MSe = 60,663.07; F_2 (1,20) = 6.07, MSe = 126,920.70$.

Planned comparisons revealed that in the high motivation condition skilled readers read target sentences that were consistent with the first goal faster than the target sentences that were consistent with the second goal, $F_1 (1,36) = 32.30, MSe = 181,077.05; F_2 (1,20) = 29.76, MSe = 101,224.86$. In contrast, less-skilled readers in the high motivation condition, read target sentences that were consistent with the second goal faster than target sentences that were consistent with the first goal, $F_1 (1,36) = 16.85, MSe = 98,944.78; F_2 (1,20) = 4.33, MSe = 179,086.34$. In the moderate motivation condition, less-skilled readers read target sentences that were consistent with the second goal faster than target sentences that were consistent with the first goal, $F_1 (1,36) = 7.43, MSe = 142,887.40; F_2 (1,20) = 4.74, MSe = 171,042.36$.

The results demonstrated that skilled readers were sensitive to protagonists’ motivation to accomplish a goal while less-skilled readers were not. That is, skilled readers detected the inconsistency when the first goal remained unsatisfied in the target sentence in the high motivation condition. In contrast, less-skilled readers had no problem integrating a target sentence that was consistent with the more recent but less important second goal when the motivation to satisfy the first goal was high.

Additionally, when the motivation to accomplish a goal was moderate, skilled readers read target sentences that were consistent with the first or second goal equally fast. On the other hand, less-skilled readers read target sentences that were consistent with the more recent, second goal faster than target sentences that were consistent with the more distant first goal. These findings show that skilled readers are sensitive to the
motivation of protagonists. In contrast, less-skilled readers integrate what they are currently reading with what came immediately before thereby disregarding the protagonist’s motivation to accomplish a goal.

Experiment 2

In Experiment 2, the filler sentences were removed to assess whether readers are more sensitive to protagonists’ motivation to accomplish goals if the information about the motivation and the goals were presented consecutively. Consider the example passage in Table 9. Participants read the same passages as in Experiment 1 except the filler information was removed. Reading times for the target sentences were recorded.

Method

Participants.

Participants were 80 University of New Hampshire undergraduate students who received partial course credit for their participation in the experiment and had not participated in Experiment 1. The 40 skilled readers had scores ranging from 75% to 100% (M = 83%). The 40 less-skilled had scores ranging from 33% to 60% (M = 49%). All participants were native English speakers.

Materials.

The materials were the same 24 passages that were used in Experiment 1 except that the filler sentences were removed.

Procedure.

The procedure was the same as in Experiment 1.
Sample passage 1 for Experiment 2.

Moderate motivation
Tim's father was a big Red Sox fan and the two of them used to always watch games together. The Red Sox were going to play a pre-season game tonight at 8pm. Tim was excited and had been watching TV since 7:30 pm while eating his dinner.

High motivation
Tim loved baseball and had been a huge Red Sox fan ever since he was a young child. The Red Sox were going to play the last game of the World Series tonight at 8pm. Tim bet a friend $500 that he could recall every out in the game.

First goal
He wanted to watch every single minute of the game tonight to make sure he didn’t miss anything.

Second goal
When the game was starting, his sister called because she had just broken up with her boyfriend.

Action consistent w/ first goal
Tim told his sister he would call her back later. He didn’t want to miss out on parts of the game.

Action consistent w/ second goal
Tim agreed to listen to all his sister’s troubles. She sounded upset and needed someone to talk to.

Question
Was Tim a Yankees fan?
Sample passage 2 for Experiment 2.

Moderate motivation
Jimmy just got home from playing ball with his friends. He was a local newspaper delivery boy and needed to distribute all the papers this evening. It took him about an hour to complete his route and he liked the extra cash he earned by doing the job.

High motivation
Jimmy just got home from playing ball with his friends. He had to deliver the local newspaper by 5 p.m. otherwise his supervisor wouldn’t pay him at all. He had to hurry because it took him about an hour to complete his route and it was almost 4 p.m. already.

First goal
Jimmy had to get his bike out of the garage quickly so he could be on his way to deliver the paper.

Second goal
While getting his bike, he realized he didn’t clean up the mess in the kitchen from his snack.

Reinstatement Sentence
Jimmy thought about whether he should clean the kitchen or get on his way to deliver the paper.

Action consistent w/ first goal
Jimmy got on his bike and delivered the paper. He knew he had to hurry up to get the job done.

Action consistent w/ second goal
Jimmy returned to the house and cleaned the mess. He took a sponge and wiped off all the crumbs.

Question
Was Jimmy new in town?
Results and Discussion

The mean reading times for the target sentences appear in Table 10. For skilled readers, there was no main effect of motivation condition by participants, $F_{1}$ (1, 36) = .34, MSe = 26,940.48, $p > .05$; but there was a main effect of motivation by items, $F_{2}$ (1,20) = 9.03, 66,486.40; there was no main effect for the type of target sentence, $F_{1}$ (1,36) = .00, MSe = 23,145.51; $F_{2}$ (1,20) = .07, MSe = 46,581.17, $p > .05$. For less-skilled readers, there was no main effect of motivation condition, $F_{1}$ (1, 36) = .50, MSe = 68,560.56; $F_{2}$ (1,20) = 2.03, MSe = 21,727.87, $p > .05$; but there was a main effect for the type of target sentence, $F_{1}$ (1,36) = 36.71, MSe = 56,298.87; $F_{2}$ (1,20) = 10.84, MSe = 82,669.77.

Planned comparisons revealed that in the high motivation condition, skilled readers read target sentences that were consistent with the first goal faster than target sentences that were consistent with the second goal, $F_{1}$ (1,36) = 13.47, MSe = 52,008.23; $F_{2}$ (1,20) = 6.20, MSe = 58,814.28. In contrast, less-skilled readers read target sentences that were consistent with the second goal faster than target sentences that were consistent with the first goal, $F_{1}$ (1,36) = 45.05, MSe = 66,399.88; $F_{2}$ (1,20) = 15.32, MSe = 95,020.35.

Additionally, in the moderate motivation condition less-skilled readers read target sentences that were consistent with the second goal faster than target sentences that were consistent with the first goal, $F_{1}$ (1,36) = 12.84, MSe = 102,295.54; $F_{2}$ (1,20) = 3.43, MSe = 137,364.42.
Table 10.

Mean Reading Times (in Milliseconds) for Target Sentences as a Function of Motivation Condition for Experiment 2.

<table>
<thead>
<tr>
<th>Moderate Motivation</th>
<th>High Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal 1</td>
<td>Goal 2</td>
</tr>
<tr>
<td>Skilled</td>
<td>2039</td>
</tr>
<tr>
<td>Less-skilled</td>
<td>2219</td>
</tr>
</tbody>
</table>
The pattern of results for Experiment 2 was the same as Experiment 1. Skilled readers detected the inconsistency when the first goal remained unsatisfied in the target sentences in the high motivation condition. Less-skilled readers on the other hand, had no problem integrating target sentences that were inconsistent with the first goal but consistent with the more recent second goal in the high motivation condition. Even though the first and second goals and target sentences were close in the text, less-skilled readers were not sensitive to the match between the protagonists’ motivation to accomplish the goal and their subsequent actions.

Additionally, in the moderate motivation condition, both skilled and less-skilled readers integrated the more recent, second goal better than the more distant, first goal. These results are consistent with previous findings showing that readers typically integrate incoming text with what came immediately before because it requires less cognitive effort (e.g., O’Brien, Raney, Albrecht, and Rayner, 1997).

Experiment 3

The goal of Experiment 3 was to explore text characteristics that could be modified so less-skilled readers become more sensitive to the motivation a protagonist has to accomplish a goal. More specifically, Experiment 3 examined whether reminding the reader of earlier portions of the text and making clear the relation between the first and second goal was sufficient to increase the reader’s sensitivity to the protagonists’ motivation. Reinstatement sentences were added in Experiment 3 to determine whether contextual cues that allude to information about the protagonist’s motivation can serve to activate information from earlier portions of the text. See Table 11 for an example.
Table 10.

Sample passage 1 for Experiment 3.

**Moderate motivation**
Tim’s father was a big Red Sox fan and the two of them used to always watch games together. The Red Sox were going to play a pre-season game tonight at 8pm. Tim was excited and had been watching TV since 7:30 pm while eating his dinner.

**High motivation**
Tim loved baseball and had been a huge Red Sox fan ever since he was a young child. The Red Sox were going to play the last game of the World Series tonight at 8pm. Tim bet a friend $500 that he could recall every out in the game.

**First goal**
He wanted to watch every single minute of the game tonight to make sure he didn’t miss anything.

**Second goal**
When the game was starting, his sister called because she had just broken up with her boyfriend.

**Filler**
Tim’s sister was two years older than he was. After Tim graduated from college he decided to move back to the New England area to be closer to his family. He had recently bought a condo near his parents’ house. Tim felt it was unique and had a lot of character. It was exactly what he wanted.

**Reinstatement Sentence**
Tim contemplated whether he should talk to his sister on the phone or watch the Red Sox on TV.

**Action consistent w/ first goal**
Tim told his sister he would call her back later. He didn’t want to miss out on parts of the game.

**Action consistent w/ second goal**
Tim agreed to listen to all his sister’s troubles. She sounded upset and needed someone to talk to.

**Question**
Was Tim a Yankees fan?
Sample passage 2 for Experiment 3.

**Moderate motivation**
Jimmy just got home from playing ball with his friends. He was a local newspaper delivery boy and needed to distribute all the papers this evening. It took him about an hour to complete his route and he liked the extra cash he earned by doing the job.

**High motivation**
Jimmy just got home from playing ball with his friends. He had to deliver the local newspaper by 5 p.m. otherwise his supervisor wouldn’t pay him at all. He had to hurry because it took him about an hour to complete his route and it was almost 4 p.m. already.

**First goal**
Jimmy had to get his bike out of the garage quickly so he could be on his way to deliver the paper.

**Second goal**
While getting his bike, he realized he didn’t clean up the mess in the kitchen from his snack.

**Filler**
Jimmy was a freshman in high school. He had been a newspaper delivery boy for several months now. As soon as he was old enough he immediately signed up for the paper delivery job. He wanted to save money for his dream car. He was hoping to buy a Honda Civic once he got his diver’s license.

**Reinstatement Sentence**
Jimmy thought about whether he should clean the kitchen or get on his way to deliver the paper.

**Action consistent w/ first goal**
Jimmy got on his bike and delivered the paper. He knew he had to hurry up to get the job done.

**Action consistent w/ second goal**
Jimmy returned to the house and cleaned the mess. He took a sponge and wiped off all the crumbs.

**Question**
Was Jimmy new in town?
Reading times for the target sentences were recorded to assess whether readers are sensitive to the level of motivation of a protagonist and their subsequent actions after reading reinstatement sentences immediately preceding the target sentences.

**Method**

**Participants.**

Participants were 80 University of New Hampshire undergraduate students who received partial credit for their participation in the experiment and had not participated in Experiment 1 and 2. The 40 skilled readers answered between 75% and 100% (M = 84%) of the questions correctly. The 40 less-skilled readers had scores ranging from 23% to 60% (M = 49%). All participants were native English speakers.

**Materials.**

In Experiment 3, participants read the same passages as in Experiment 1 in addition to a reinstatement sentence immediately preceding the target action of the protagonist. Previous research has shown that cuing can sometimes be necessary to activate information from earlier portions of the text. For example, Albrecht and Myers (1998) showed that goal information from distant text was successfully reinstated when the contextual cues were specific to the earlier episode. The reinstatement sentences of the present experiments contained contextual cues about the introduction that contained information about the level of motivation with which the protagonist wants to accomplish a goal (e.g., “Jimmy thought about whether he should clean the kitchen or get on his way to deliver the paper.”). More importantly, the reinstatement sentences explicitly stated that the protagonist had to decide whether to satisfy the first or second goal. Across all
passages, the mean length of the reinstatement sentences was 96 characters, with a range of 94-98.

**Procedure.**

The procedure was the same as in Experiment 1 and 2.

**Results and Discussion**

The mean reading times for the target sentences appear in Table 12. For skilled readers, there was no main effect of motivation condition, \( F_1 (1, 36) = .05, MSe = 26,106.01; F_2 (1,20) = .57, MSe = 41,278.85, p > .05; \) nor was there a main effect for the type of target sentence, \( F_1 (1,36) = .83, MSe = 33,901.15; F_2 (1,20) = .01, MSe = 79,743.97, p > .05. \) For less-skilled readers, there was no main effect of motivation condition, \( F_1 (1,36) = .70, MSe = 57,717.84; F_2 (1,20) = 1.06, MSe = 32,779.58, p > .05; \) nor was there a main effect for the type of target sentence, \( F_1 (1,36) = .31, MSe = 67,341.43; F_2 (1,20) = .23, MSe = 79,497.73, p > .05. \)

Planned comparisons showed that the reinstatement sentences enabled less-skilled readers to monitor protagonists' motivation to accomplish a goal. In the high motivation condition, skilled and less-skilled readers read target sentences that were consistent with the first goal faster than target sentences that were consistent with the second goal, \( F_1 (1,36) = 18.82, MSe = 53,726.00; F_2 (1,20) = 6.46, MSe = 120,337.96 \) and \( F_1 (1,36) = 11.94, MSe = 108,574.42; F_2 (1,20) = 10.27, MSe = 76,994.37, \) respectively.

When the motivation to accomplish a goal was moderate, both skilled and less-skilled reader integrated target sentences that were consistent with the second and more recent goal faster than target sentences that were consistent with the first goal. In the
Table 12.

Mean Reading Times for Target Sentences as a Function of Motivation Condition for Experiment 3.

<table>
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<th>Moderate Motivation</th>
<th>High Motivation</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Goal 1</td>
<td>Goal 2</td>
</tr>
<tr>
<td>Skilled</td>
<td>2018</td>
<td>1912</td>
</tr>
<tr>
<td>Less-skilled</td>
<td>2260</td>
<td>2035</td>
</tr>
</tbody>
</table>
moderate motivation condition, skilled and less-skilled readers read target sentences that were consistent with the second goal faster than target sentences that were consistent with the first goal, $F_1 (1,36) = 7.33, \text{MSE} = 61,335.63; F_2 (1,20) = 5.77, \text{MSE} = 119,402.92$ and $F_1 (1,36) = 17.81, \text{MSE} = 114,525.39; F_2 (1,20) = 9.15, \text{MSE} = 147,283.18$, respectively.

Experiment 3 demonstrated that the cues provided in the reinstatement sentences were sufficient to enable participants to be more sensitive to the protagonists’ motivation to accomplish goals. In the high motivation condition, skilled and less-skilled readers were faster to read target sentences that were consistent with the first goal than target sentences that were consistent with the second goal.

Further, in the moderate motivation condition, skilled and less-skilled readers read target sentences that were consistent with the second and more recent goal faster than target sentences that were consistent with the first and more distant goal. These results show that adding reinstatement sentences that reminded readers that the protagonist had to chose to either accomplish the first or second goal allowed less-skilled readers to be more sensitive to the motivation of the protagonist.

**Experiment 4**

The goal of Experiment 4 was to assess whether asking participants to use a reading strategy would allow skilled and less-skilled readers to be sensitive to the match between the protagonist’s level of motivation to accomplish a goal and their subsequent actions. Participants were asked to read the same passages as in Experiment 1. The only difference was that participants were asked to read from the point of view of the
protagonist. Previous research has shown that if participants read text from the perspective of the protagonist they adopt the goals of the protagonist (Albrecht, O’Brien, Mason, and Myers, 1995). As a result, readers were more sensitive to the motivation of the protagonist to accomplish a goal.

Method

Participants.

Participants were 80 University of New Hampshire undergraduate students who received partial credit for their participation in the experiment and had not participated in Experiment 1, 2 and 3. The 40 skilled readers had scores ranging from 75% to 98% (M = 81%). The 40 less-skilled readers had scores ranging from 23% to 60% (M = 47%). Twenty-seven percent of the skilled readers and 24% of the less-skilled readers reported that they typically read from the perspective of the protagonist when reading narratives. All participants were native English speakers.

Materials.

The materials comprised the same set of passages that were used in Experiment 1.

Procedure.

The procedure was the same as that used in Experiment 1, 2, and 3, with the following exception: In addition to the standard instructions used in the other experiments, participants were asked to adopt the perspective of the protagonist while reading. The following instructions were adopted from Albrecht, O’Brien, Mason, and Myers (1995):
“I would like you to read each passage from the point of view of the protagonist. For each passage, I would like you to follow the main character through the story, putting yourself in the shoes of that character, seeing, and anticipating things that the character is seeing and experiencing in the story.”

Additionally, participants were reminded once during the experiment to continue to read from the perspective of the protagonist to ensure that they followed the instructions. After the experiment was completed, participants were asked whether they typically read from the perspective of the protagonist or whether it was something new and unusual for them.

Results and Discussion

The mean reading times for the target sentences appear in Table 13. For skilled readers, there was no main effect of motivation condition, $F_1 (1, 36) = .13$, $MSe = 78,797.96$; $F_2 (1,20) = 1.10, 42,937.05, p > .05$; nor was there a main effect for the type of target sentence, $F_1 (1,36) = .02, MSe = 50,124.87$; $F_2 (1,20) = .03, MSe = 58,087.52$, $p > .05$. For less-skilled readers, there was a main effect of motivation condition by participants, $F_1 (1,36) = 4.72, MSe = 133,460.60$; but not by items, $F_2 (1,20) = 3.37, MSe = 57,564.82, p > .05$; there was no main effect for the type of target sentence, $F_1 (1,36) = 3.44, MSe = 54,893.25$; $F_2 (1,20) = .44, MSe = 148,303.30, p > .05$.

Planned comparisons showed that adopting the perspective of the protagonist allowed less-skilled readers to monitor protagonists’ motivation to accomplish goals. In the high motivation condition, skilled and less-skilled readers read target sentences that were consistent with the first goal faster than target sentences that were consistent with the second goal, $F_1 (1,36) = 5.11, MSe = 157,047.76$; $F_2 (1,20) = 9.22, MSe = 73,288.72$ and $F_1 (1,36) = 9.53, MSe = 105,367.99$; $F_2 (1,20) = 4.99, MSe = 224,317.62$, respectively.
Table 13.

Mean Reading Times for Target Sentences as a Function of Motivation Condition for Experiment 4.

<table>
<thead>
<tr>
<th></th>
<th>Moderate Motivation</th>
<th></th>
<th>High Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Goal 1</td>
<td>Goal 2</td>
<td>Goal 1</td>
</tr>
<tr>
<td>Skilled</td>
<td>2158</td>
<td>2026</td>
<td>2005</td>
</tr>
<tr>
<td>Less-skilled</td>
<td>2900</td>
<td>2604</td>
<td>2548</td>
</tr>
</tbody>
</table>
When the motivation to accomplish a goal was moderate, both skilled and less-skilled reader integrated target sentences that were consistent with the second and more recent goal faster than target sentences that were consistent with the first goal. In the moderate motivation condition, skilled and less-skilled readers read target sentences that were consistent with the second goal faster than target sentences that were consistent with the first goal. In the moderate motivation condition, skilled and less-skilled readers read target sentences that were consistent with the second goal faster than target sentences that were consistent with the first goal, $F_1 (1,36) = 8.63, \text{MSe} = 80,984.38$; $F_2 (1,20) = 5.11, \text{MSe} = 106,764.32$ and $F_1 (1,36) = 18.49, \text{MSe} = 18,9274.38$; $F_2 (1,20) = 10.17, \text{MSe} = 242,975.68$, respectively.

Experiment 4 showed that utilizing a reading strategy can also enable less-skilled readers to be more sensitive to the protagonists' intentions and subsequent actions. In the high motivation condition, skilled and less-skilled readers were faster to read target sentences that were consistent with the first goal than target sentences that were consistent with the second goal.

In the moderate motivation condition, skilled and less-skilled readers read target sentences that were consistent with the second and more recent goal faster than target sentences that were consistent with the first and more distant goal. These results show that asking participants to read from the perspective of the protagonist helped them focus on the goal information, thus allowing less-skilled readers to detect inconsistencies between protagonists' actions and prior information about their motivation to accomplish a goal.
CHAPTER VII

GENERAL DISCUSSION

The goal of this dissertation was to determine conditions under which reading skill influences individuals' abilities to fully comprehend text and what steps can be taken to raise comprehension levels of less-skilled readers. First, I identified cognitive processes that are the most challenging for less-skilled readers. More specifically, the first two experiments assessed whether skilled- and less-skilled readers have the ability to detect inconsistencies between protagonists' motivation to accomplish goals and their actions in narratives.

Second, I used the insights gained from the first two experiments to develop potential interventions focused on the processes that pose the greatest challenges for less-skilled readers. The third and fourth experiments examined whether subtle text changes and a reading strategy enable less-skilled readers to be more sensitive to protagonists' motivation to accomplish specific goals.

Recently, researchers have begun to look at the influence reading skill has on the ability to fully comprehend text (e.g., McNamara & O'Reilly, 2009). One observation has been that skilled readers perform better on tasks assessing WM capacity than less-skilled readers. Cain, Oakhill, and Bryant (2000) showed that skilled and less-skilled readers performed comparably on various measures of phonological processing, but differed on tasks making greater demands on working memory. Therefore, WM limitations play an
important role in the ability to fully comprehend text. Another explanation for less-skilled readers’ inability to comprehend text effectively is that they are unable to suppress contextually irrelevant information, and are thus less able to process relevant information effectively. The goal of the current set of experiments was to determine whether less-skilled readers struggle due to their limited WM capacity or their inability to suppress irrelevant information and focus on important aspects of the text.

Across several experiments, participants read passages describing protagonists as moderately- or highly-motivated to accomplish goals. This was followed by further elaboration on the first goal and the introduction of a second goal. Subsequently, participants read target sentences in which protagonists carried out actions that were consistent with either the first or the second goal.

The goal of the first and second experiments was to determine whether reading skill influenced a participant’s ability to detect mismatches between protagonists’ motivation to accomplish goals and subsequent actions. The results provided evidence for the hypothesis that less-skilled readers have less WM capacity than skilled readers (e.g., Cain, Oakhill, and Bryant, 2000; Miyake et al., 1994; Radvansky & Copeland, 2006). Reading times indicated that skilled but not less-skilled readers were sensitive to the match between protagonists’ intentions to accomplish a goal and their actions.

Typically, readers integrate what they are currently reading with what came immediately before. Although all information in long-term memory has the potential to be reactivated, several factors influence whether any particular concept is reactivated. Two of those factors are the strength of the concept in long-term memory (i.e., how recently was it presented in the text) and the degree of featural overlap with information
currently in WM (i.e., strength of association) (O’Brien et al., 1997). Due to limited WM capacity, less-skilled readers integrated incoming information only with the most recent information rather than more distant but important information (McNamara & O’Reilly, 2009). The results of Experiment 1 and 2 confirmed those findings showing that less-skilled readers were unable to use the information presented earlier in the text. This occurred regardless of whether the protagonists’ motivation was high or moderate, indicating that less-skilled readers were not sensitive to this difference in the text.

Additionally, Experiment 2 showed that less-skilled readers were less effective at focusing on the most relevant aspects of text (Conway & Engle, 1994). Experiment 2 showed that even when WM load was reduced by removing the filler section, less-skilled readers were unable to detect inconsistencies in the text. The results demonstrate that the inability to focus on the most relevant information in the text plays a significant role in reading deficits and thus needs to be addressed through reading interventions.

It is also possible that in the second experiment, less-skilled readers had the necessary information about the intentions of the protagonist available to them, however, they were unable to use it. Previous research has shown that readers do not always use information even if it is available to them. For example, Stiegler & O’Brien (cf, 2009, November) asked participants to read stories in which a character’s action was consistent or inconsistent with a character description presented earlier in the text. Probe response times confirmed that immediately after reading a target sentence presenting the inconsistent character action, the earlier-described characteristics were activated. This was true for both skilled and less-skilled readers.
In a second study the distance between the character description and the inconsistent action was varied (cf, Stiegler & O'Brien, 2009, November). When distance was short, reading times for the sentence containing the inconsistent character action disrupted reading for both skilled and less-skilled readers. However, when the distance was increased, reading times were disrupted for only skilled readers (cf, Stiegler & O'Brien, 2009, November).

During comprehension readers may not hold all information in an active portion of memory; rather they can only hold a small amount of information active and other information can become reactivated through cues in the text (Daneman & Green, 1986; O'Brien et al., 1997). However, not all readers are equally efficient at holding important information active in memory. Research has shown that interferences from irrelevant information occur more frequently for less-skilled than skilled readers indicating that less-skilled readers lack the suppression mechanism that allows them to inhibit irrelevant information (Gernsbacher & Faust, 1991; Gernsbacher et al. 1990). Therefore, cuing can sometimes be necessary to make sure that readers not only hold previous text information active in memory but also understand which pieces of information are relevant.

Experiment 3 of this dissertation explored what types of subtle text changes allow less-skilled readers to be more sensitive to protagonists' motivation to accomplish goals. The aim was to explore text changes that allow less-skilled readers to focus on the most relevant aspects of the text. Reinstatement sentences were added immediately prior to the target sentences to examine whether reminding the reader of earlier portions of the text, and making clear to the reader that the protagonists had to make a choice between
satisfying the first or second goal would be sufficient to increase less-skilled readers' comprehension of the text.

The findings of Experiment 3 demonstrated the reinstatement sentences served to remind the reader about both goals that were mentioned previously in the text and more importantly, made clear to the reader that the protagonist had to make a choice between satisfying either the first or second goal.

Due to less-skilled readers' inability to only focus on the most relevant information it was easier for participants in the current study to be presented with one sentence that mentioned both goals rather than two sentences. It is possible that when the goal information was mentioned separately, less-skilled readers were unable to select which of the two statements was more important. Due to the limited nature of WM, readers only integrate what they were currently reading with what came immediately before (Rapp et al., 2007). The reinstatement sentences allowed less-skilled readers to focus on the relevant information and hold the necessary goal information active in WM.

Researchers have shown that less-skilled readers often restrict processing of information to the current text thereby refraining from constructing inferences that go beyond the specific information they read in the immediately preceding text (Rapp et al., 2007). However, sometimes it is necessary to integrate current text with previously read information to fully comprehend text. The goal of the fourth study was to determine whether a reading strategy would also be effective at helping readers focus on relevant information.

Experiment 4 tested whether instructing participants to take the perspective of the protagonist while reading would enable less-skilled readers to integrate current
information with text presented earlier in the story. Research has shown that readers do not naturally adopt the protagonist's prescriptive during reading (e.g., Albrecht et al., 1995). However, when asked to read from the perspective of the protagonist, participants were more sensitive to the goals and intentions of the protagonist (e.g., Albrecht et al., 1995).

The current study showed that asking participants to read the stories from the perspective of the protagonist increased less-skilled readers' sensitivity to the match between protagonists' intentions to accomplish goals and their actions.

Similar to the reinstatement sentences, taking the perspective of the protagonist allowed readers to focus more on the relevant information in the text. More specifically, it may have helped to maintain relevant information in WM memory thereby inhibiting irrelevant information. Because participants read the narratives from the perspective of the protagonist the filler information may have been less distracting and thus required less cognitive resources and space in WM. Therefore, reducing WM load and guiding readers in their decisions on what was important to the protagonist (i.e., satisfying specific goals) allowed less-skilled readers to detect inconsistencies in the text.

One implication of these studies is that less-skilled readers may struggle for various reasons. Therefore, the types of interventions used in this dissertation may not work equally well for all readers. The goal of this dissertation was to determine under what conditions less-skilled readers encounter difficulty detecting inconsistencies in the text and what types of interventions can be used to increase less-skilled readers' ability to detect subtle differences in text. More research is needed to test which types of text
changes and strategies would be most effective for individuals with specific comprehension deficits.

To assess reading skill, the Gates-MacGinitie Reading Test was used in this dissertation. Studies have shown that scores on the Gates-MacGinitie Reading Test correlate with overall WM capacity (e.g., Cain, Oakhill, and Bryant, 2000; Oakhill, 2002). It is possible that if a different reading skill test had been used different results would have been obtained. The results of the present set of experiments can only be generalized to individuals that would be considered skilled or less-skilled readers according to the Gates-MacGinitie Reading Test.

Examining what differentiates skilled from less-skilled readers is imperative because identifying underlying cognitive differences can help develop interventions that increase comprehension levels of readers. The picture that emerges of less-skilled readers is that they are poor at seeing the "bigger picture" in the text. They fail to connect current text with previously read information. WM limitations and the inability to focus on the most relevant information play an important part in such abilities, which was demonstrated by the first two experiments in this dissertation. However, it seems unlikely that all difficulties could be explained in terms of WM capacity, because the third and fourth studies showed that making connections between information in the text was possible through either changes to the text or utilizing a reading strategy. Presumably, such training did not affect reader's working memory capacity; however, it enabled less-skilled readers to focus on the important aspects of the text. The reinstatement sentences and the reading strategy used in the present set of experiments provided less-skilled readers with the necessary "tools" to circumvent WM deficiencies.
The results of this dissertation suggest that there are multiple pathways to achieving better comprehension, each path building on a different set of processes. In the future I will further examine text characteristics and reading strategies that allow readers of various skill levels to rely less on the cognitive processes that pose the most difficulty to them. I also plan to use complementary experimental methodologies (e.g., talk-aloud protocols) to gain more insight into activities or processes readers implement while reading. Taken together, the results of such research will provide us with profiles of good and struggling readers and aid in the development of effective reading interventions.
LIST OF REFERENCES


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APPENDICES
APPENDIX A

The passages used in the Norming Study are presented in this Appendix. Each participant only saw one of the four conditions of each passage.
Moderate Motivation:
Tim loved baseball and had been a huge Red Sox fan ever since he was a young child. The Red Sox were going to play against the Yankees tonight at 8pm. Tim was very excited and had been watching TV since 7:30 pm while eating his dinner.

High Motivation:
Tim loved baseball and had been a huge Red Sox fan ever since he was a young child. The Red Sox were going to play the last game of the World Series tonight at 8pm. Tim bet a friend $500 that he could recall every out in the game.

First goal:
He wanted to watch every single minute of the game tonight to make sure he didn’t miss anything.

Second goal:
When the game was starting, his sister called because she had just broken up with her boyfriend.

How likely is it that Tim tells his sister he will call her back after the game?

1     2     3     4     5     6     7
Highly Implausible Neutral Plausible Highly Plausible
Implausible

How likely is it that Tim speaks to his sister on the phone?

1     2     3     4     5     6     7
Highly Implausible Neutral Plausible Highly Plausible
Implausible
Moderate Motivation:
Sara was moving from Indiana to Arizona because she had recently found a new job there. While driving along the road in her truck she was listening to her favorite music. Once she arrived at a small town, Sara decided to take a short break from driving.

High Motivation:
Sara was crossing the desert because she was moving from Indiana to Arizona for a new job. Because it took her longer than expected she ran out of water hours ago. When she arrived at a town, her throat was dry and she was in desperate need for a drink.

First goal:
Because she didn’t have any water left, she wanted to buy some as soon as she got out of the truck.

Second goal:
On the way to the store, she noticed some jewelry at a Native American stand that looked beautiful.

How likely is it that Sara goes to the store to buy something to drink?

1  2  3  4  5  6  7
Highly Implausible Neutral Plausible Highly Plausible
Implausible

How likely is it that Sara looks at the jewelry at the stand?

1  2  3  4  5  6  7
Highly Implausible Neutral Plausible Highly Plausible
Implausible
Moderate Motivation:
Daniel had been working on a project at the computer for a few hours. His hands hurt from typing and his eyes were strained from staring at the screen for so long. He felt ready to take a break and go for a short walk around the block.

High Motivation:
Daniel had been working on a project at the computer at home for a few hours. As he was sitting in front of the computer, he suddenly heard the fire alarm and carbon monoxide detector go off in the hallway in front of his office. He could even smell smoke.

First goal:
Daniel stopped working, got up from his desk and decided to go outside to get some air right away.

Second goal:
On his way downstairs, he suddenly remembered that he had left his cell phone on the console table.

How likely is it that Daniel goes outside?

1  2  3  4  5  6  7
Highly Implausible Neutral Plausible Highly Plausible
Implausible

How likely is it that Daniel goes back to get his cell phone?

1  2  3  4  5  6  7
Highly Implausible Neutral Plausible Highly Plausible
Implausible
Moderate Motivation:
Kim was an advertising agent for a large firm in New York City. She wanted to make an airline reservation for a business trip before going to bed. She wanted to get it done tonight so she wouldn’t have to worry about it the next day at work.

High Motivation:
Kim was an advertising agent for a large firm in New York City. She needed to purchase an airline ticket for a business trip. An agent had reserved the last seat on the plane for her and she knew they would only hold it for an hour.

First goal:
Kim searched through her purse for her cell phone so she could call the travel agent right away.

Second goal:
As Kim reached for the phone, her co-worker called about a project that he wanted her to work on.

How likely is it that Kim tells her boss that she needs to call him back later?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Implausible

How likely is it that Kim discusses the project with her boss?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Implausible
Moderate Motivation:
John was having a great time traveling across the country in his brand-new SUV. He had agreed to meet some friends in Mexico later this afternoon so they could spend some time together. He still had more than 50 miles to drive until reaching the border of Mexico.

High Motivation:
John was driving to Mexico to attend his best friend’s wedding. He was running late because he had been stuck in traffic for a long time. He was stressed because he knew his friend would be very upset if he didn’t make it to the wedding on time.

First goal:
John was aware that he needed to drive without taking any breaks in order to make it there on time.

Second goal:
As he was listening to his favorite jazz song on the radio, John realized that he was very hungry.

How likely is it that John drives without taking any breaks?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Plausible
Implausible

How likely is it that John stops to get something to eat?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Plausible
Implausible
Moderate Motivation:
Jeff was excited about his upcoming time off from work because he had worked a lot of overtime lately. His sister lived in California and he thought it might be fun to visit her. He had visited her a few times and always enjoyed the beautiful scenery there.

High Motivation:
Jeff was excited about his upcoming time off from work because he had worked a lot of overtime lately. His sister lived in California and had just had a baby a few weeks ago. Jeff was thrilled for his sister and her husband and couldn’t wait to meet his nephew.

First goal:
Jeff knew it was very important to his sister to see him regularly because they were very close.

Second goal:
Jeff also remembered that his guy friends were going on a trip to Las Vegas to have fun all week.

How likely is it that Jeff visits his sister in California?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Plausible
Implausible

How likely is it that Jeff goes to Las Vegas with his friends?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Plausible
Implausible

117
Moderate Motivation:
Sally was having a group of friends over for a dinner party this evening. Her kitchen was messy because she had been baking cookies all day. She didn’t realize how much work it was going to be to prepare the house for having guests over for a formal dinner.

High Motivation:
Sally was having a group of friends over for a party tonight. She had been baking cookies all day and the kitchen was a mess. She hated a dirty kitchen and would be very embarrassed if she didn’t put everything away before her guest arrived in a few minutes.

First goal:
Sally needed to hurry and clean the mess in the kitchen because she wanted everything to be perfect.

First goal:
She then remembered some festive tins she had in the attic that would look nice with her cookies.

How likely is it that Sally continues to clean the kitchen?

How likely is it that Sally searches for the cookie tins in the attic?

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118
Moderate Motivation:
Adrian had just returned from a trip to the store to get the New York Times. He had been feeling tired of his current job and wanted to look for a new one. He wanted a job that would be more fulfilling and enjoyable than his current one.

High Motivation:
Every day, Adrian spent the afternoon reading the New York Times looking for job openings. He had been unemployed for the last six months and his savings were almost used up. He was so desperate that he would accept almost any job to pay for rent and other bills.

First goal:
Adrian wanted to spend the afternoon reading the employment section to look for suitable new jobs.

Second goal:
Adrian’s neighbor came by to tell him he and some friends were going for a bike ride that afternoon.

How likely is it that Adrian continues to look for jobs in the paper?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Plausible
Implausible

How likely is it that Adrian goes for a bike ride with his neighbor?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Plausible
Implausible

119
Moderate Motivation:
Ms. Jones liked her new teaching position very much and couldn’t wait to go to work every morning. She was working on some of her lesson plans in her office. She wanted to get them done so she could have a relaxing evening without having to do work at home.

High Motivation:
Ms. Jones liked her new teaching position but she also felt overwhelmed with the work load at times. She absolutely needed to finish her lesson plans tonight. She knew it would be a disaster if she didn’t have them ready and had no class activities for her students tomorrow.

First goal:
Ms. Jones knew she had to stay focused on her work and not get distracted by things around her.

Second goal:
As she was working hard, the janitor came into her office and complained about the mess in the room.

How likely is it that Ms. Jones continues to work on her lesson plan?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Plausible
Implausible

How likely is it that Ms. Jones cleans up the mess in the room?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Plausible
Implausible
Moderate Motivation:
Mary loved to travel to different places around the world. For her current vacation she was scheduled to go on a skiing trip to Switzerland. She had plans to go to a travel bookstore this evening to pick up another travel guide about Switzerland and the Alps.

High Motivation:
Mary loved to travel to different places around the world. She was going skiing in Switzerland tomorrow morning. She had to leave work in five minutes to pick up the ticket at her travel agent’s store before they closed, otherwise she wouldn’t be able to go on her trip.

First goal:
Mary was determined to leave work on time because she had to make it to the store before it closed.

Second goal:
Just as she was leaving work, her intern asked Mary to read over a ten-page report he had written.

How likely is it that Mary leaves work to go to the store?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Plausible
Implausible

How likely is it that Mary reads over the ten-page report?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Plausible
Implausible
Moderate Motivation:
Emily sat in her office at the university. She was about to leave when she realized it was the first of the month and she hadn’t made her mortgage payment yet. Thankfully, she recalled that her bank allowed her a grace period to make the payment without paying a penalty.

High Motivation:
Emily sat in her office at the university. She was about to leave when she realized it was past the first of the month and she hadn’t made her mortgage payment. If she didn’t pay it today they would charge her a late fee and it would affect her credit.

First goal:
Emily left her office and got into her car to get to the bank before they closed for the evening.

Second goal:
Emily noticed she had a ticket on the windshield even though her parking sticker was up-to-date.

How likely is it that Emily goes to the bank to make the payment?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible
Implausible Plausible

How likely is it that Emily goes to the parking office to complain about the ticket?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible
Implausible Plausible

Plausible
Moderate Motivation: 
Angie was going through her closet to find something to wear for today. During a recent vacation, she had gained almost seven pounds and none of her clothes fit properly anymore. She decided that she should begin to exercise more to lose some of her extra weight.

High Motivation: 
Angie, a fashion model, had gained seven pounds on a recent vacation and none of her clothes fit properly anymore. She had a photo shoot in less than a week and needed to get back to her old weight. Otherwise, she knew she would lose the job.

First goal: 
Angie needed to go to the gym to start an exercise regimen to get back to her old figure right away.

Second goal: 
On her way out the door, her friend called to tell her she was going to go shopping at the mall.

How likely is it that Angie goes to the gym?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Plausible

How likely is it that Angie goes to the mall with her friend?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Plausible

123
Moderate Motivation:
The Eriksons lived along the Massachusetts coastline and the weather forecast predicted that they were going to get a severe rainstorm today. Because they lived a few miles inland, they assumed it would not be so bad. They decided to wait the storm out in their home.

High Motivation:
The Eriksons lived along the Massachusetts coastline and were preparing for a hurricane that was coming today. Because they lived right by the water they needed to cover up all of the windows. They knew it was the only way to reduce damage to the house.

First goal:
Mr. Erikson had to board up the windows quickly because the storm was coming in less than an hour.

Second goal:
Just as he began working, his wife suggested that they could rent movies from the store for later.

How likely is it that Mr. Erikson continues to board up the windows?

1  2  3  4  5  6  7
Highly Implausible Neutral Plausible Highly Implausible
Highly Plausible

How likely is it that Mr. Erikson drives to the store to get movies?

1  2  3  4  5  6  7
Highly Implausible Neutral Plausible Highly Implausible
Highly Plausible
Moderate Motivation:
Carry’s fiancé, Steve, had asked her to accompany him to an important business dinner that night. Even though she had many outfits in her closet, Carry decided that she would buy a new one for the business dinner. Carry wanted to look nice for the special occasion.

High Motivation:
Carry’s fiancé, Steve, had asked her to accompany him to an important business dinner that night. Carry only had casual clothes and didn’t own anything suitable for a business dinner. Carry knew she absolutely had to buy a new outfit otherwise Steve wouldn’t be able to make a good impression.

First goal:
Because it was getting late, she had to hurry to be able to buy a new outfit and get ready on time.

Second goal:
When she arrived at the mall, she noticed that fifty minute massages were half off at the spa today.

How likely is it that Carry looks for an outfit at the mall?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly
Implausible Plausible

How likely is it that Carry gets a massage?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly
Implausible Plausible
Moderate Motivation:
It was the end of the semester and Ted had to work on his final projects. He knew it would take him all day to finish the work. The weather was supposed to be nice the next day so he wanted to get as much work done as possible today.

High Motivation:
It was the end of the semester and Ted had fallen far behind on his work. He knew he would have to work all day today to finish a project otherwise he would fail the class. If he didn’t pass the class, Ted wouldn’t be able to graduate in May.

First goal:
Ted was determined to sit at his desk all day today and work and he would let nothing distract him.

Second goal:
While studying, Ted’s roommate came in and told him that several people were going to the movies.

How likely is it that Ted continues to study in his room?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Implausible
Implausible

How likely is it that Ted goes to the movies with his roommate?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Implausible
Implausible

Plausible
Moderate Motivation:
Today was the final day of the hearing and it was almost time for a fifteen minute
break. Defense attorney Robertson felt that things had gone well for his client. He
thought that the last day would be easy because his star witness would confirm that
his client was innocent.

High Motivation:
Today was the final day of the hearing and defense attorney Robertson felt nervous.
Things had gone badly for his client and his last hope was his star witness. He was
scheduled to testify after a break and Robertson knew if the testimony didn’t go well
it would be over.

First goal:
Robertson wanted to meet with the star witness during break to make sure he was still
testifying.

Second goal:
When break started, Robertson realized that he was hungry because he hadn’t eaten
since breakfast.

How likely is it that attorney Robertson meets with the witness during break?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Implausible

How likely is it that attorney Robertson gets something to eat during break?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Implausible
Moderate Motivation:
Everyone was having a great time at Mike’s cookout. When Mike went to the food
table outside he realized that all the ice he had brought out to cool the food had
melted. Most of the food had been eaten but he figured he should get some more ice
anyway.

High Motivation:
Everyone was having a great time at Mike’s cookout. When Mike checked on the egg
salad he realized the ice he used to cool it had melted. There was no room in the
fridge so he desperately needed to buy ice or the salad would spoil and make
someone sick.

First goal:
Mike had to hurry up and get to the gas station before they closed in ten minutes to
clean up the mess in the kitchen.

Second goal:
On his way out the door, he noticed that somebody had spilled chips all over the
kitchen floor.

How likely is it that Mike goes to get ice from the gas station?

1  2  3  4  5  6  7
Highly Implausible Neutral Plausible Highly Plausible

How likely is it that Mike first cleans up the mess in the kitchen?

1  2  3  4  5  6  7
Highly Implausible Neutral Plausible Highly Plausible
Moderate Motivation:
Dr. Lee was a surgeon on the hospital staff. He was working the night shift and was making his rounds. Suddenly he was paged to report to the emergency room because a person had been brought in with cuts on their hands that needed to be stitched up.

High Motivation:
Dr. Lee was a surgeon on the hospital staff. He was working the night shift and was making his rounds. Suddenly he was paged to report to the emergency room as soon as possible because the victim of a major car crash had just arrived and had life-threatening injuries.

First goal:
Dr. Lee wanted to get to the emergency room as quickly as possible to care for the injured person.

Second goal:
On the way, a nurse stopped him to ask a question about the medication for one of his patients.

How likely is it that Dr. Lee rushes to the emergency room?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Plausible Implausible

How likely is it that Dr. Lee answers the nurse’s question?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Plausible Implausible
Moderate Motivation:
Jimmy just got home from playing ball with his friends. He was a local newspaper delivery boy and needed to distribute all the papers this evening. It took him about an hour to complete his route and he liked the extra cash he earned by doing the job.

High Motivation:
Jimmy just got home from playing ball with his friends. He had to deliver the local newspaper by 5 p.m. otherwise his supervisor wouldn’t pay him at all. He had to hurry because it took him about an hour to complete his route and it was almost 4 p.m. already.

First goal:
Jimmy had to get his bike out of the garage quickly so he could be on his way to deliver the paper.

Second goal:
While getting his bike, he realized he didn’t clean up the mess in the kitchen from his snack.

How likely is it that Jimmy goes to deliver the newspaper?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Implausible

How likely is it that Jimmy cleans up the mess in the kitchen first?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Implausible
Moderate Motivation:
Betty was preparing a nice dinner for some relatives. Her husband had bought her a dozen red roses because it was their wedding anniversary today. Betty decided that they would look beautiful in her special crystal vase that her in-laws had given her for her birthday last year.

High Motivation:
Betty was preparing dinner. Her husband had brought her red roses for their wedding anniversary. Betty wanted to put them in the crystal vase that her in-laws had given her last year because they were coming tonight and would have been offended to see the flowers in a different vase.

First goal:
Betty had to find the vase before her relatives arrived and everyone would sit down to have dinner.

Second goal:
Before finding the vase, she realized she never found the photo album she wanted to show everyone.

How likely is it that Betty continues to look for the vase?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Implausible Plausible

How likely is it that Betty looks for the photo album?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Implausible Plausible
Moderate Motivation:
Ben was excited because it was his sister’s wedding day. His sister had asked him whether he could pick up a few more centerpieces for the tables because she wanted some extras. Ben figured he could stop by the florist before the ceremony to pick up more centerpieces.

High Motivation:
Ben was excited because it was his sister’s wedding day. His sister had asked him to pick up more centerpieces from the florist because they didn’t have enough. Ben knew his sister would be devastated if there weren’t enough for the reception because she wanted everything to be perfect.

First goal:
Ben needed to hurry to be able to make it to the florist to pick up the flowers before the wedding.

Second goal:
As he was leaving, he realized that he had never picked up his shirts for work from the dry cleaner.

How likely is it that Ben goes to the florist?

1  2  3  4  5  6  7
Highly Implausible Neutral Plausible Highly Plausible
Implausible

How likely is it that Ben gets the shirts from the cleaners?

1  2  3  4  5  6  7
Highly Implausible Neutral Plausible Highly Plausible
Implausible
Moderate Motivation:
The cruise was coming to an end and the ship would dock soon. The captain sat in his office working on an inventory that needed to get done before the end of the cruise. His entire desk was covered in papers he needed in order to complete the inventory.

High Motivation:
The cruise was coming to an end and the ship would dock soon. The captain sat in his office frantically working on an inventory that needed to get done before the end of the cruise. He would have to pay a huge fine if he didn’t complete it before docking.

First goal:
The captain pulled up his chair and immersed himself in the paper work so he would get it done.

Second goal:
As he was working, the stuart came in and told him they had sighted a pod of whales in the water.

How likely is it that the captain continues to work on the inventory?


1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Plausible
Implausible

How likely is it that the captain looks at the pod of whales?


1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Plausible
Implausible
Moderate Motivation:
Things at the D.A.'s office were very hectic because they had many unsolved cases. They were grossly understaffed and were currently interviewing several potential employees. The D.A. had decided on a first-rate applicant for the position and was planning on calling him to offer him the position.

High Motivation:
Things at the D.A.'s office were very hectic because they currently had many unsolved cases. They were understaffed and were currently interviewing several potential employees. The D.A. had decided on a first-rate applicant, which he needed to call immediately to ensure that he wasn't hired by another agency.

First goal:
The D.A. searched his messy desk for the applicant’s phone number so he could call him right now.

Second goal:
Before he could pick up the phone his assistant entered the office and wanted to talk about a raise.

How likely is it that the D.A. calls the applicant right away?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Plausible

How likely is it that the D.A. talks to the assistant about the raise?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Plausible
Moderate Motivation:
Peter and his friend Sam were going to a soccer game. Peter was excited because he hadn’t been to a game in a long time. Because it was already late, Peter decided to park in the lot right by the stadium so they wouldn’t have to walk far.

High Motivation:
Peter and Sam were going to a soccer game. Peter had won VIP passes that allowed them to meet the players before the game. Peter was anxious because if they didn’t make it to the gate in ten minutes they wouldn’t be allowed to go to the locker room anymore.

First goal:
Peter and Sara quickly parked the car and rushed to the gate so they would make it there on time.

Second goal:
While walking, Peter realized that they had not looked at the row number where they had parked.

How likely is it that Peter continues walking to the stadium?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Implausible Plausible

How likely is it that Peter returns to his car to check for the number?

1 2 3 4 5 6 7
Highly Implausible Neutral Plausible Highly Plausible
APPENDIX B

The passages used in Experiment 1 and 4 are presented in this Appendix. Each participant only saw one of the four conditions of each passage.
Moderate Motivation:
Tim’s father was a big Red Sox fan and the two of them used to always watch games together. The Red Sox were going to play a pre-season game tonight at 8pm. Tim was excited and had been watching TV since 7:30 pm while eating his dinner.

High Motivation:
Tim loved baseball and had been a huge Red Sox fan ever since he was a young child. The Red Sox were going to play the last game of the World Series tonight at 8pm. Tim bet a friend $500 that he could recall every out in the game.

First goal:
He wanted to watch every single minute of the game tonight to make sure he didn’t miss anything.

Second goal:
When the game was starting, his sister called because she had just broken up with her boyfriend.

Filler:
Tim’s sister was two years older than he was. After Tim graduated from college he decided to move back to the New England area to be closer to his family. He had recently bought a condo near his parents’ house. Tim felt it was unique and had a lot of character. It was exactly what he wanted.

Action consistent with First goal:
Tim told his sister he would call her back later. He didn’t want to miss out on parts of the game.

Action consistent with Second goal:
Tim agreed to listen to all his sister’s troubles. She sounded upset and needed someone to talk to.

Question:
Was Tim a Yankees fan?
Moderate Motivation:
Sara was moving from Indiana to Arizona because she had recently found a new job there. While driving along the road in her truck she was listening to her favorite music. Once she arrived at a small town, Sara decided to take a short break from driving.

High Motivation:
Sara was crossing the desert because she was moving from Indiana to Arizona for a new job. Because it took her longer than expected she ran out of water hours ago. When she arrived at a town, her throat was dry and she was in desperate need for a drink.

First goal:
Because she didn’t have any water left, she wanted to buy some as soon as she got out of the truck.

Second goal:
On the way to the store, she noticed some jewelry at a Native American stand that looked beautiful.

Filler:
Sara was looking forward to living in Arizona and starting her new job there. She felt that she needed to take advantage of not having many responsibilities at the moment. She figured it would be fun to live in a new place for a couple of years. If she liked Arizona she could even imagine settling there someday.

Action consistent with First goal:
Sara walked into the grocery store to get water.
She got a bottle of water from the cooler and paid.

Action consistent with Second goal:
Sara tried on one of the bracelets at the stand.
She thought it looked nice and decided to buy it.

Question:
Was Sara going to college in Arizona?
Moderate Motivation:
Daniel had been working on a project at the computer for a few hours. His hands hurt from typing and his eyes were strained from staring at the screen for so long. He felt ready to take a break and go for a short walk around the block.

High Motivation:
Daniel had been working on a project at the computer at home for a few hours. As he was sitting in front of the computer, he suddenly heard the fire alarm and carbon monoxide detector go off in the hallway near his office. He could even smell smoke.

First goal:
Daniel stopped working, got up from his desk and decided to go outside to get some air right away.

Second goal:
On his way downstairs, he suddenly remembered that he had left his cell phone on the console table.

Filler:
Daniel had moved into the house a few years back after he had gotten a divorce. His ex-wife insisted on keeping their old house. Daniel was too tired to argue with her so he agreed. He liked being in a completely new place where nothing reminded him of his ex-wife. He loved his new home.

Action consistent with First goal:
Daniel continued to walk downstairs to go outside. He couldn’t wait to finally get some fresh air.

Action consistent with Second goal:
Daniel went upstairs again to get his cell phone. He found it on the table and put it in his pocket.

Question:
Was Daniel going on vacation?
Moderate Motivation:
Kim was an advertising agent for a large firm in New York City. She wanted to make an airline reservation for a business trip before going to bed. She wanted to get it done tonight so she wouldn’t have to worry about it the next day at work.

High Motivation:
Kim was an advertising agent for a large firm in New York City. She needed to purchase an airline ticket for a business trip. An agent had reserved the last seat on the plane for her and she knew they would only hold it for an hour.

First goal:
Kim searched through her purse for her cell phone so she could call the travel agent right away.

Second goal:
As Kim reached for the phone, her co-worker called about a project that he wanted her to work on.

Filler:
Kim had been very busy in the past weeks. She had a lot going on at work and a very busy personal life. Her roommate from college was getting married the following weekend. Kim was thinking about what to wear for the wedding. She would probably wear one of the dresses she had hanging in her closet already.

Action consistent with First goal:
Kim told her co-worker she didn’t have time now. She explained she had to pick up her plane ticket.

Action consistent with Second goal:
Kim talked about the project with her co-worker. She told him she was interested in working on it.

Question:
Was Kim working for an advertisement company?
Moderate Motivation:
John was having a great time traveling across the country in his brand-new SUV. He had agreed to meet some friends in Mexico later this afternoon so they could spend some time together. He still had more than 50 miles to drive until reaching the border of Mexico.

High Motivation:
John was driving to Mexico to attend his best friend’s wedding. He was running late because he had been stuck in traffic for a long time. He was stressed because he knew his friend would be very upset if he didn’t make it to the wedding on time.

First goal:
John was aware that he needed to drive without taking any breaks in order to make it there on time.

Second goal:
As he was listening to his favorite jazz song on the radio, John realized that he was very hungry.

Filler:
John was a big fan of Jazz music. When he was seven years old he started playing the saxophone. His parents encouraged John’s interest in learning an instrument. He took lessons with a teacher once a week and practiced for half an hour each day on his own. He dreamed of becoming a musician one day.

Action consistent with First goal:
John continued driving to make it there on time. He couldn’t wait to finally make it to Mexico.

Action consistent with Second goal:
John took the next exit to find a place to eat. He was starved and couldn’t wait to get some food.

Question:
Did John like Jazz music?
Moderate Motivation:
Jeff was excited about his upcoming time off from work because he had worked a lot of overtime lately. His sister lived in California and he thought it might be fun to visit her. He had visited her a few times before and always enjoyed the beautiful scenery there.

High Motivation:
Jeff was excited about his upcoming time off from work because he had worked a lot of overtime lately. His sister lived in California and had just had a baby a few weeks ago. Jeff was thrilled for his sister and her husband and couldn’t wait to meet his nephew.

First goal:
Jeff knew it was very important to his sister to see him regularly because they were very close.

Second goal:
Jeff also remembered that his guy friends were going on a trip to Las Vegas to have fun all week.

Filler:
Jeff was in need for some time off from work. He was an air traffic controller and his job was very demanding. He always had to be alert. He knew that not paying attention for just a moment could lead to a devastating accident. He sometimes felt like he was under a lot of pressure at work.

Action consistent with First goal:
Jeff decided to visit his sister in California.
He knew she would be very happy to see him again.

Action consistent with Second goal:
Jeff decided to go to Las Vegas with his friends.
He knew it would be fun to hang out with them.

Question:
Was Jeff excited about his time off from work?
Moderate Motivation:
Sally was having a group of friends over for a dinner party this evening. Her kitchen was messy because she had been baking cookies all day. She didn’t realize how much work it was going to be to prepare the house for having guests over for a formal dinner.

High Motivation:
Sally was having a group of friends over for a party tonight. She had been baking cookies all day and the kitchen was a mess. She hated a dirty kitchen and would be very embarrassed if she didn’t put everything away before her guest arrived in a few minutes.

First goal:
Sally needed to hurry and clean the mess in the kitchen because she wanted everything to be perfect.

First goal:
She then remembered some festive tins she had in the attic that would look nice with her cookies.

Filler:
Sally and her husband had just moved into their new home two months ago. They had moved a few streets over from where they used to live. This was the first home they owned. Sally had spent a lot of time decorating the place. She was excited to finally have a home where she could entertain guests.

Action consistent with First goal:
Sally decided to focus on cleaning the kitchen. It was important to her that everything was clean.

Action consistent with Second goal:
Sally decided to look for the tins in the attic. She knew they would be perfect for her cookies.

Question:
Was Sally baking cookies?
Moderate Motivation:
Adrian had just returned from a trip to the store to get the New York Times. He had been feeling tired of his current job and wanted to look for a new one. He wanted a job that would be more fulfilling and enjoyable than his current one.

High Motivation:
Every day, Adrian spent the afternoon reading the New York Times looking for job openings. He had been unemployed for the last six months and his savings were almost used up. He was so desperate that he would accept almost any job to pay for rent and other bills.

First goal:
Adrian wanted to spend the afternoon reading the employment section to look for suitable new jobs.

Second goal:
While reading, Adrian’s neighbor came over to tell him he was going for a bike ride that afternoon.

Filler:
Lately, Adrian had been doing a lot of work around the house. For example, last week he cleaned out his basement. He used to simply throw everything he didn’t need downstairs. After a few years he wasn’t able to find anything anymore. Once he was done, Adrian felt it was much easier to find his things.

Action consistent with First goal:
Adrian told his neighbor he had to look for jobs. He knew there was not enough time to go biking.

Action consistent with Second goal:
Adrian decided to go biking with his neighbor. He knew they were going to have a blast together.

Question:
Did Adrian just start a new job?
Moderate Motivation:
Ms. Jones liked her new teaching position very much and couldn’t wait to go to work every morning. She was working on some of her lesson plans in her office. She wanted to get them done so she could have a relaxing evening without having to do work at home.

High Motivation:
Ms. Jones liked her new teaching position but she also felt overwhelmed with the work load at times. She absolutely needed to finish her lesson plans tonight. She knew it would be a disaster if she didn’t have them ready and had no class activities for her students tomorrow.

First goal:
Ms. Jones knew she had to stay focused on her work and not get distracted by things around her.

Second goal:
As she was working hard, the janitor came into her office and complained about the mess in the room.

Filler:
Ms. Jones had recently graduated with a Master’s degree in teaching. She had studied to become an English and Math teacher at the high-school level. The new position was her dream job. Her parents were very happy for her when she finally found this job. Ms. Jones always knew that her hard work would pay off eventually.

Action consistent with First goal:
Ms. Jones continued to work on her lesson plan. She knew that she had to stay focused to finish.

Action consistent with Second goal:
Ms. Jones started to clean up her messy office. She knew the janitor would be mad if she didn’t.

Question:
Did Ms. Jones just start a new job?
Moderate Motivation:
Mary loved to travel to different places around the world. For her current vacation she was scheduled to go on a skiing trip to Switzerland. She had plans to go to a travel bookstore this evening to pick up another travel guide about Switzerland and the Alps.

High Motivation:
Mary loved to travel to different places around the world. She was going skiing in Switzerland tomorrow morning. She had to leave work in five minutes to pick up the airline ticket at her travel agent’s store before they closed, otherwise she wouldn’t be able to go on her trip.

First goal:
Mary was determined to leave work on time because she had to make it to the store before it closed.

Second goal:
Just as she was leaving work, her intern asked Mary to read over a ten-page report he had written.

Filler:
Mary was ready to leave work tonight and go on her vacation. She loved to explore new places abroad. No matter where she traveled she would try to learn as much as she could about the culture. She would even try to learn the local language. It was important to her to fit in wherever she went.

Action consistent with First goal:
Mary told the intern she had to leave right now.
She told him she had to run an important errand.

Action consistent with Second goal:
Mary agreed to read the report before she left.
She sat down at her desk and started reading it.

Question:
Was Mary going to the Bahamas?
Moderate Motivation:
Emily sat in her office at the university. She was about to leave when she realized it was the first of the month and she hadn’t made her mortgage payment yet. Thankfully, she recalled that her bank allowed her a grace period to make the payment without paying a penalty.

High Motivation:
Emily sat in her office at the university. She was about to leave when she realized it was past the first of the month and she hadn’t made her mortgage payment. If she didn’t pay it today they would charge her a late fee and it would affect her credit.

First goal:
Emily left her office and got into her car to get to the bank before they closed for the evening.

Second goal:
Emily noticed she had a ticket on the windshield even though her parking sticker was up-to-date.

Filler:
Emily was an associate biology professor at a large Mid-Western university. She loved her research and looked forward to coming to work every day. She was glad that she had known very early on that research was her calling. There was no other job that she would rather have had than her position at the university.

Action consistent with First goal:
Emily grabbed the ticket and drove to the bank. She drove as quickly as possible to make it there.

Action consistent with Second goal:
Emily went to the parking office and complained. She showed them her up-to-date parking sticker.

Question:
Did Emily own a home?
Moderate Motivation:
Angie was going through her closet to find something to wear for today. During a recent vacation, she had gained almost seven pounds and some of her clothes didn’t fit her properly anymore. She decided that she should begin to exercise more to lose some of the extra weight.

High Motivation:
Angie, a fashion model, had gained seven pounds on a recent vacation and none of her clothes fit properly anymore. She had a photo shoot in less than a week and needed to get back to her old weight. Otherwise, she knew she would lose the job.

First goal:
Angie needed to go to the gym to start an exercise regimen to get back to her old figure right away.

Second goal:
On her way out the door, her friend called to tell her she was going to go shopping at the mall.

Filler:
Angie had just returned from a fun and relaxing vacation in Miami. She had gone there with two of her best girlfriends. They had a great time relaxing at the beach during the day and partying at night. She wished that they could have stayed even longer. Angie loved being in the sun and swimming in the ocean.

Action consistent with First goal:
Angie told her friend she had to go to the gym. She wanted to lose weight as quickly as possible.

Action consistent with Second goal:
Angie agreed to go to the mall with her friend. She loved shopping and thought it would be fun.

Question:
Was Angie having lunch with a friend?
Moderate Motivation:
The Eriksons lived along the Massachusetts coastline and the weather forecast predicted that they were going to get a rainstorm today. Because they lived a few miles inland, they assumed it would not be so bad. They had experienced many rainstorms before and knew it would eventually pass.

High Motivation:
The Eriksons lived along the Massachusetts coastline and were preparing for a hurricane that was coming today. Because they lived right by the water they needed to cover up all of the windows. They knew it was the only way to reduce damage to the house.

First goal:
Mr. Erikson had to board up the windows quickly because the storm was coming in less than an hour.

Second goal:
Just as he began working, his wife suggested that they could rent movies from the store for later.

Filler:
Mr. and Mrs. Erikson had both grown up in Massachusetts. They loved the New England area and couldn't imagine living anywhere else. Mr. Erikson loved to sail during the summer. He had bought a small sailing boat a few years ago. They had been spending a lot of time on the water ever since they bought the boat.

Action consistent with First goal:
Mr. Erikson continued boarding up all the windows. He wanted to finish them before the storm came.

Action consistent with Second goal:
Mr. Erikson went to the video store right away. He walked through the store and got two movies.

Question:
Do the Eriksons live in Connecticut?
Moderate Motivation:
Carry’s fiancé, Steve, had asked her to accompany him to an important business dinner that night. Even though she had many outfits in her closet, Carry considered buying a new one for the business dinner. Carry liked clothes and was always looking for something new to add to her wardrobe.

High Motivation:
Carry’s fiancé, Steve, had asked her to accompany him to an important business dinner that night. Carry only had casual clothes and didn’t own anything suitable for a business dinner. Carry knew she absolutely had to buy a new outfit otherwise Steve wouldn’t be able to make a good impression.

First goal:
Because it was getting late, she had to hurry to be able to buy a new outfit and get ready on time.

Second goal:
At the mall entrance, she saw a sign from a spa advertising hot stone massages at a bargain price.

Filler:
Carry and her fiancé had been dating for about two years. They had plans to move in together very soon. Carry was excited and couldn’t wait to set a date. They had decided it would be best to live in Steve’s apartment. It was more spacious and there was plenty of room for the both of them.

Action consistent with First goal:
Carry decided she only had time to buy an outfit. She was in a rush and needed to get ready soon.

Action consistent with Second goal:
Carry decided that she wanted to get a massage. She felt stressed and needed some time to relax.

Question:
Was Carry going to a dinner party that night?
Moderate Motivation:
It was the end of the semester and Ted had to work on his final projects. He couldn’t wait to finally be done with all his school work. The weather was supposed to be nice the next day so he wanted to get as much work done as possible today.

High Motivation:
It was the end of the semester and Ted had fallen far behind on his work. He knew he would have to work all day today to finish a project otherwise he would fail the class. If he didn’t pass the class, Ted wouldn’t be able to graduate in May.

First goal:
Ted was determined to sit at his desk all day today and work and he would let nothing distract him.

Second goal:
While studying, Ted’s roommate came in and told him that several people were going to the movies.

Filler:
Ted was a communications major. He wasn’t sure yet what he wanted to do after graduation. He figured his major would allow him to pursue many different careers. Ted wanted to do several internships to gain experience before deciding what he wanted to do. He thought this was a good way to get started with his career.

Action consistent with First goal:
Ted told his roommate he had to get his work done. He needed to stay focused and continue working.

Action consistent with Second goal:
Ted agreed to go to the movies with his friends. He was a big movie buff and knew it would be fun.

Question:
Was Ted still in college?
Moderate Motivation:
Today was the final day of the hearing and it was almost time for a fifteen minute break. Defense attorney Robertson felt that things had gone well for his client. He thought that the last day would be easy because his star witness would confirm that his client was innocent.

High Motivation:
Today was the final day of the hearing and defense attorney Robertson felt nervous. Things had gone badly for his client and his last hope was the star witness. He was scheduled to testify after a break and Robertson knew if the testimony didn’t go well everything would be over.

First goal:
Robertson wanted to meet with the star witness during break to make sure he was still testifying.

Second goal:
When break started, Robertson realized that he was hungry because he hadn’t eaten since breakfast.

Filler:
Attorney Robertson had been a lawyer for many years. He loved his job and couldn’t imagine doing anything else. When Robertson graduated from high school he already knew he would eventually go to law school. Luckily, he was awarded a scholarship to go to law school. Otherwise, Robertson would have never been able to afford going.

Action consistent with First goal:
He decided to eat later and met with the witness.
He knew it was important to check in with him.

Action consistent with Second goal:
He went down to the cafeteria and got a sandwich.
He sat down at a table and began to eat his lunch.

Question:
Was today the first day of hearing?
Moderate Motivation:
Everyone was having a great time at Mike’s cookout. When Mike went to the food
table outside he realized that all the ice he had brought out to cool the food had
melted. Most of the food had been eaten but he figured he should get some more ice
anyway.

High Motivation:
Everyone was having a great time at Mike’s cookout. When Mike checked on the egg
salad he realized the ice he used to cool it had melted. There was no room in the
fridge so he desperately needed to buy ice or the salad would spoil and make
someone sick.

First goal:
Mike had to hurry up and get to the gas station to get more ice before they closed in
ten minutes.

Second goal:
On his way out the door, he noticed that somebody had spilled chips all over the
kitchen floor.

Filler:
Mike had moved to his current home last winter. He loved the climate in California
and wanted to spend the rest of his life here. He liked being able to go to the beach
and have fun in the sun. Mike had even started to surf. He was still learning but had a
blast surfing with his friends.

Action consistent with First goal:
Mike decided to get ice first and clean up later.
He was in a rush because the store was closing.

Action consistent with Second goal:
Mike decided to clean up the mess in the kitchen.
He got the broom and started sweeping the floor.

Question:
Was Mike celebrating his 24th birthday?
Moderate Motivation:
Dr. Lee was a surgeon on the hospital staff. He was working the night shift and was making his rounds. Suddenly he was paged to report to the emergency room because a person had been brought in with cuts on their hands that needed to be stitched up.

High Motivation:
Dr. Lee was a surgeon on the hospital staff. He was working the night shift and was making his rounds. Suddenly he was paged to report to the emergency room as soon as possible because the victim of a major car crash had just arrived and had life-threatening injuries.

First goal:
Dr. Lee wanted to get to the emergency room as quickly as possible to care for the injured person.

Second goal:
On the way, a nurse stopped him to ask a question about the medication for one of his patients.

Filler:
Dr. Lee’s work schedule was very hectic. Sometimes he would have to work two shifts in a row. Even though it was stressful, he usually liked working night shifts. It allowed him to see his kids in the morning. He would make them breakfast and sleep for a few hours before they came home from school.

Action consistent with First goal:
Dr. Lee told the nurse he didn’t have time now. He wanted to get to the ER to care for his patient.

Action consistent with Second goal:
Dr. Lee stopped to answer the nurse’s questions. They had a discussion about one of the patients.

Question:
Was Dr. Lee working the night shift?
Moderate Motivation:
Jimmy just got home from playing ball with his friends. He was a local newspaper delivery boy and needed to distribute all the papers this evening. It took him about an hour to complete his route and he liked the extra cash he earned by doing the job.

High Motivation:
Jimmy just got home from playing ball with his friends. He had to deliver the local newspaper by 5 p.m. otherwise his supervisor wouldn't pay him at all. He had to hurry because it took him about an hour to complete his route and it was almost 4 p.m. already.

First goal:
Jimmy had to get his bike out of the garage quickly so he could be on his way to deliver the paper.

Second goal:
While getting his bike, he realized he didn’t clean up the mess in the kitchen from his snack.

Filler:
Jimmy was a freshman in high school. He had been a newspaper delivery boy for several months now. As soon as he was old enough he immediately signed up for the paper delivery job. He wanted to save money for his dream car. He was hoping to buy a Honda Civic once he got his diver’s license.

Action consistent with First goal:
Jimmy got on his bike and delivered the paper. He knew he had to hurry up to get the job done.

Action consistent with Second goal:
Jimmy returned to the house and cleaned the mess. He took a sponge and wiped off all the crumbs.

Question:
Was Jimmy new in town?
Moderate Motivation:
Betty was preparing a nice dinner for her relatives. Her husband had bought her a dozen red roses because it was their wedding anniversary today. Betty decided that they would look beautiful in her special crystal vase that her in-laws had given her for her birthday last year.

High Motivation:
Betty was preparing dinner. Her husband had brought her red roses for their wedding anniversary. Betty wanted to put them in the crystal vase that her in-laws had given her last year because they were coming tonight and would have been offended to see the flowers in a different vase.

First goal:
Betty had to find the vase before her relatives arrived and everyone would sit down to have dinner.

Second goal:
Before finding the vase, she realized she never found the photo album she wanted to show everyone.

Filler:
Betty and her husband had been married for exactly eleven years today. Last year they had gone to a trip to Hawaii for their ten year anniversary. They had left their two children with their grandparents for a week. They had a wonderful time on their vacation. They very much enjoyed spending some quality time together.

Action consistent with First goal:
Betty searched until she found the crystal vase.
The flowers would look lovely in the crystal vase.

Action consistent with Second goal:
Betty decided to look for the photo album first.
Her family would enjoy seeing the new pictures.

Question:
Was Betty going to a party?
Moderate Motivation:
Ben was excited because it was his sister’s wedding day. His sister had asked him whether he could pick up a few more centerpieces for the tables because she wanted some extras. Ben figured he could stop by the florist before the ceremony to pick up more centerpieces.

High Motivation:
Ben was excited because it was his sister’s wedding day. His sister had asked him to pick up more centerpieces from the florist because they didn’t have enough. Ben knew his sister would be devastated if there weren’t enough for the reception because she wanted the room to look beautiful.

First motivation:
Ben needed to hurry to be able to make it to the florist to pick up the flowers before the wedding.

Second goal:
As he was leaving, he realized that he had never picked up his shirts for work from the dry cleaner.

Filler:
Ben’s sister and her husband-to-be had been dating since college. At one point his sister even went to study abroad in Argentina for a semester. It was hard for them to be apart for so long but they continued their relationship. They had always been a very harmonious couple. Ben couldn’t have been happier for them.

Action consistent with First goal:
Ben rushed out the door to pick up the flowers.
He wanted to make sure he got the center piece.

Action consistent with Second goal:
Ben decided to get the shirts from the cleaners.
He would need them for work on Monday morning.

Question:
Was Ben going to his sister’s wedding today?
Moderate Motivation:
The cruise was coming to an end and the ship would dock soon. The captain sat in his office working on an inventory that needed to get done before the end of the cruise. His entire desk was covered in papers he needed in order to complete the inventory.

High Motivation:
The cruise was coming to an end and the ship would dock soon. The captain sat in his office frantically working on an inventory that needed to get done before the end of the cruise. He would have to pay a huge fine if he didn’t complete it before docking.

First goal:
The captain pulled up his chair and immersed himself in the paperwork so he would get it done.

Second goal:
As he was working, the stuart came in and told him they had seen a group of dolphins in the water.

Filler:
The captain and his crew were on their way home from the Bahamas. The ship had recently been overhauled. It was now equipped with all the amenities one could imagine. It had a full-size bowling alley, a miniature golf course, and even a rock-climbing wall. People of all ages could enjoy their time on the cruise ship.

Target action consistent with First goal:
The captain told the stuart he didn’t have time. He needed to finish the inventory before docking.

Target action consistent with Second goal:
The captain left his office to see the dolphins. He got up from his desk and followed the stuart.

Question:
Was the cruise just leaving the harbor?
Moderate Motivation:
Things at the D.A.’s office were busy because they received new cases almost every day. They had been given some extra funding and were currently interviewing potential employees. The D.A. had decided on a first-rate applicant for the position and was planning on calling him to offer him the position.

High Motivation:
Things at the D.A.’s office were very hectic because they currently had many unsolved cases. They were understaffed and were currently interviewing several potential employees. The D.A. had decided on a first-rate applicant, which he needed to call immediately to ensure that he wasn’t hired by another agency.

First goal:
The D.A. searched his messy desk for the applicant’s phone number so he could call him right away.

Second goal:
Before he could pick up the phone his assistant entered the office and wanted to talk about a raise.

Filler:
The D.A. had been working the same job for several years. It was a very stressful job. He had to listen to so many different cases each day that he could hardly keep track of them. All the decisions he had to make were very crucial because they affected other people. He took his responsibilities very seriously.

Action consistent with First goal:
He told the assistant he had to make a phone call.
He knew he had to call the applicant right away.

Action consistent with Second goal:
He agreed to discuss the raise with the assistant.
He asked him to sit down so they could discuss it.

Question:
Was he working at the library?
Moderate Motivation:
Peter and his friend Sam were going to a soccer game. Peter was excited because he hadn’t been to a game in a long time. Because it was already late, Peter decided to park in the lot right by the stadium so they wouldn’t have to walk far.

High Motivation:
Peter and Sam were going to a soccer game. Peter had won VIP passes that allowed them to meet the players before the game. Peter was anxious because if they didn’t make it to the gate in ten minutes they wouldn’t be allowed to go to the locker room anymore.

First goal:
Peter and Sam quickly parked the car and rushed to the gate so they would make it there on time.

Second goal:
While walking, Peter realized that they had not looked at the row number where they had parked.

Filler:
Peter had been a huge soccer fan. He started playing soccer when he was five years old. Unfortunately, he tore his ACL about a year ago and wasn’t supposed to play soccer at the moment. He was hoping that he would eventually fully recover and play soccer again. It was his favorite way to stay in shape.

Action consistent with First goal:
Peter decided to continue walking to the stadium. He and Sam hurried to make it to the gate on time.

Action consistent with Second goal:
Peter returned to the car and checked the number. He wrote it on a piece of paper and walked back.

Question:
Were Peter and Sam going to a soccer game?
APPENDIX C

The passages used in Experiment 2 are presented in this Appendix. Each participant only saw one of the four conditions of each passage.
Moderate Motivation:
Tim’s father was a big Red Sox fan and the two of them used to always watch games together. The Red Sox were going to play a pre-season game tonight at 8pm. Tim was excited and had been watching TV since 7:30 pm while eating his dinner.

High Motivation:
Tim loved baseball and had been a huge Red Sox fan ever since he was a young child. The Red Sox were going to play the last game of the World Series tonight at 8pm. Tim bet a friend $500 that he could recall every out in the game.

First goal:
He wanted to watch every single minute of the game tonight to make sure he didn’t miss anything.

Second goal:
When the game was starting, his sister called because she had just broken up with her boyfriend.

Action consistent with First goal:
Tim told his sister he would call her back later. He didn’t want to miss out on parts of the game.

Action consistent with Second goal:
Tim agreed to listen to all his sister’s troubles. She sounded upset and needed someone to talk to.

Question:
Was Tim a Yankees fan?
Moderate Motivation:
Sara was moving from Indiana to Arizona because she had recently found a new job there. While driving along the road in her truck she was listening to her favorite music. Once she arrived at a small town, Sara decided to take a short break from driving.

High Motivation:
Sara was crossing the dessert because she was moving from Indiana to Arizona for a new job. Because it took her longer than expected she ran out of water hours ago. When she arrived at a town, her throat was dry and she was in desperate need for a drink.

First goal:
Because she didn't have any water left, she wanted to buy some as soon as she got out of the truck.

Second goal:
On the way to the store, she noticed some jewelry at a Native American stand that looked beautiful.

Action consistent with First goal:
Sara walked into the grocery store to get water. She got a bottle of water from the cooler and paid.

Action consistent with Second goal:
Sara tried on one of the bracelets at the stand. She thought it looked nice and decided to buy it.

Question:
Was Sara going to college in Arizona?
Moderate Motivation:
Daniel had been working on a project at the computer for a few hours. His hands hurt from typing and his eyes were strained from staring at the screen for so long. He felt ready to take a break and go for a short walk around the block.

High Motivation:
Daniel had been working on a project at the computer at home for a few hours. As he was sitting in front of the computer, he suddenly heard the fire alarm and carbon monoxide detector go off in the hallway near his office. He could even smell smoke.

First goal:
Daniel stopped working, got up from his desk and decided to go outside to get some air right away.

Second goal:
On his way downstairs, he suddenly remembered that he had left his cell phone on the console table.

Action consistent with First goal:
Daniel continued to walk downstairs to go outside. He couldn’t wait to finally get some fresh air.

Action consistent with Second goal:
Daniel went upstairs again to get his cell phone. He found it on the table and put it in his pocket.

Question:
Was Daniel going on vacation?
Moderate Motivation:
Kim was an advertising agent for a large firm in New York City. She wanted to make an airline reservation for a business trip before going to bed. She wanted to get it done tonight so she wouldn’t have to worry about it the next day at work.

High Motivation:
Kim was an advertising agent for a large firm in New York City. She needed to purchase an airline ticket for a business trip. An agent had reserved the last seat on the plane for her and she knew they would only hold it for an hour.

First goal:
Kim searched through her purse for her cell phone so she could call the travel agent right away.

Second goal:
As Kim reached for the phone, her co-worker called about a project that he wanted her to work on.

Action consistent with First goal:
Kim told her co-worker she didn’t have time now. She explained she had to pick up her plane ticket.

Action consistent with Second goal:
Kim talked about the project with her co-worker. She told him she was interested in working on it.

Question:
Was Kim working for an advertisement company?
Moderate Motivation:
John was having a great time traveling across the country in his brand-new SUV. He had agreed to meet some friends in Mexico later this afternoon so they could spend some time together. He still had more than 50 miles to drive until reaching the border of Mexico.

High Motivation:
John was driving to Mexico to attend his best friend’s wedding. He was running late because he had been stuck in traffic for a long time. He was stressed because he knew his friend would be very upset if he didn’t make it to the wedding on time.

First goal:
John was aware that he needed to drive without taking any breaks in order to make it there on time.

Second goal:
As he was listening to his favorite jazz song on the radio, John realized that he was very hungry.

Action consistent with First goal:
John continued driving to make it there on time.
He couldn’t wait to finally make it to Mexico.

Action consistent with Second goal:
John took the next exit to find a place to eat.
He was starved and couldn’t wait to get some food.

Question:
Did John like Jazz music?
Moderate Motivation:
Jeff was excited about his upcoming time off from work because he had worked a lot of overtime lately. His sister lived in California and he thought it might be fun to visit her. He had visited her a few times before and always enjoyed the beautiful scenery there.

High Motivation:
Jeff was excited about his upcoming time off from work because he had worked a lot of overtime lately. His sister lived in California and had just had a baby a few weeks ago. Jeff was thrilled for his sister and her husband and couldn’t wait to meet his nephew.

First goal:
Jeff knew it was very important to his sister to see him regularly because they were very close.

Second goal:
Jeff also remembered that his guy friends were going on a trip to Las Vegas to have fun all week.

Action consistent with First goal:
Jeff decided to visit his sister in California.
He knew she would be very happy to see him again.

Action consistent with Second goal:
Jeff decided to go to Las Vegas with his friends.
He knew it would be fun to hang out with them.

Question:
Was Jeff excited about his time off from work?
Moderate Motivation:
Sally was having a group of friends over for a dinner party this evening. Her kitchen was messy because she had been baking cookies all day. She didn’t realize how much work it was going to be to prepare the house for having guests over for a formal dinner.

High Motivation:
Sally was having a group of friends over for a party tonight. She had been baking cookies all day and the kitchen was a mess. She hated a dirty kitchen and would be very embarrassed if she didn’t put everything away before her guest arrived in a few minutes.

First goal:
Sally needed to hurry and clean the mess in the kitchen because she wanted everything to be perfect.

First goal:
She then remembered some festive tins she had in the attic that would look nice with her cookies.

Action consistent with First goal:
Sally decided to focus on cleaning the kitchen. It was important to her that everything was clean.

Action consistent with Second goal:
Sally decided to look for the tins in the attic. She knew they would be perfect for her cookies.

Question:
Was Sally baking cookies?
Moderate Motivation:
Adrian had just returned from a trip to the store to get the New York Times. He had been feeling tired of his current job and wanted to look for a new one. He wanted a job that would be more fulfilling and enjoyable than his current one.

High Motivation:
Every day, Adrian spent the afternoon reading the New York Times looking for job openings. He had been unemployed for the last six months and his savings were almost used up. He was so desperate that he would accept almost any job to pay for rent and other bills.

First goal:
Adrian wanted to spend the afternoon reading the employment section to look for suitable new jobs.

Second goal:
While reading, Adrian's neighbor came over to tell him he was going for a bike ride that afternoon.

Action consistent with First goal:
Adrian told his neighbor he had to look for jobs. He knew there was not enough time to go biking.

Action consistent with Second goal:
Adrian decided to go biking with his neighbor. He knew they were going to have a blast together.

Question:
Did Adrian just start a new job?
Moderate Motivation:
Ms. Jones liked her new teaching position very much and couldn’t wait to go to work every morning. She was working on some of her lesson plans in her office. She wanted to get them done so she could have a relaxing evening without having to do work at home.

High Motivation:
Ms. Jones liked her new teaching position but she also felt overwhelmed with the work load at times. She absolutely needed to finish her lesson plans tonight. She knew it would be a disaster if she didn’t have them ready and had no class activities for her students tomorrow.

First goal:
Ms. Jones knew she had to stay focused on her work and not get distracted by things around her.

Second goal:
As she was working hard, the janitor came into her office and complained about the mess in the room.

Action consistent with First goal:
Ms. Jones continued to work on her lesson plan. She knew that she had to stay focused to finish.

Action consistent with Second goal:
Ms. Jones started to clean up her messy office. She knew the janitor would be mad if she didn’t.

Question:
Did Ms. Jones just start a new job?
Moderate Motivation:
Mary loved to travel to different places around the world. For her current vacation she was scheduled to go on a skiing trip to Switzerland. She had plans to go to a travel bookstore this evening to pick up another travel guide about Switzerland and the Alps.

High Motivation:
Mary loved to travel to different places around the world. She was going skiing in Switzerland tomorrow morning. She had to leave work in five minutes to pick up the airline ticket at her travel agent's store before they closed, otherwise she wouldn't be able to go on her trip.

First goal:
Mary was determined to leave work on time because she had to make it to the store before it closed.

Second goal:
Just as she was leaving work, her intern asked Mary to read over a ten-page report he had written.

Action consistent with First goal:
Mary told the intern she had to leave right now.
She told him she had to run an important errand.

Action consistent with Second goal:
Mary agreed to read the report before she left.
She sat down at her desk and started reading it.

Question:
Was Mary going to the Bahamas?
Moderate Motivation:
Emily sat in her office at the university. She was about to leave when she realized it was the first of the month and she hadn’t made her mortgage payment yet. Thankfully, she recalled that her bank allowed her a grace period to make the payment without paying a penalty.

High Motivation:
Emily sat in her office at the university. She was about to leave when she realized it was past the first of the month and she hadn’t made her mortgage payment. If she didn’t pay it today they would charge her a late fee and it would affect her credit.

First goal:
Emily left her office and got into her car to get to the bank before they closed for the evening.

Second goal:
Emily noticed she had a ticket on the windshield even though her parking sticker was up-to-date.

Action consistent with First goal:
Emily grabbed the ticket and drove to the bank. She drove as quickly as possible to make it there.

Action consistent with Second goal:
Emily went to the parking office and complained. She showed them her up-to-date parking sticker.

Question:
Did Emily own a home?
Moderate Motivation:
Angie was going through her closet to find something to wear for today. During a recent vacation, she had gained almost seven pounds and some of her clothes didn’t fit her properly anymore. She decided that she should begin to exercise more to lose some of the extra weight.

High Motivation:
Angie, a fashion model, had gained seven pounds on a recent vacation and none of her clothes fit properly anymore. She had a photo shoot in less than a week and needed to get back to her old weight. Otherwise, she knew she would lose the job.

First goal:
Angie needed to go to the gym to start an exercise regimen to get back to her old figure right away.

Second goal:
On her way out the door, her friend called to tell her she was going to go shopping at the mall.

Action consistent with First goal:
Angie told her friend she had to go to the gym. She wanted to lose weight as quickly as possible.

Action consistent with Second goal:
Angie agreed to go to the mall with her friend. She loved shopping and thought it would be fun.

Question:
Was Angie having lunch with a friend?
Moderate Motivation:
The Eriksons lived along the Massachusetts coastline and the weather forecast predicted that they were going to get a rainstorm today. Because they lived a few miles inland, they assumed it would not be so bad. They had experienced many rainstorms before and knew it would eventually pass.

High Motivation:
The Eriksons lived along the Massachusetts coastline and were preparing for a hurricane that was coming today. Because they lived right by the water they needed to cover up all of the windows. They knew it was the only way to reduce damage to the house.

First goal:
Mr. Erikson had to board up the windows quickly because the storm was coming in less than an hour.

Second goal:
Just as he began working, his wife suggested that they could rent movies from the store for later.

Action consistent with First goal:
Mr. Erikson continued boarding up all the windows. He wanted to finish them before the storm came.

Action consistent with Second goal:
Mr. Erikson went to the video store right away. He walked through the store and got two movies.

Question:
Do the Eriksons live in Connecticut?
Moderate Motivation:
Carry’s fiancé, Steve, had asked her to accompany him to an important business dinner that night. Even though she had many outfits in her closet, Carry considered buying a new one for the business dinner. Carry liked clothes and was always looking for something new to add to her wardrobe.

High Motivation:
Carry’s fiancé, Steve, had asked her to accompany him to an important business dinner that night. Carry only had casual clothes and didn’t own anything suitable for a business dinner. Carry knew she absolutely had to buy a new outfit otherwise Steve wouldn’t be able to make a good impression.

First goal:
Because it was getting late, she had to hurry to be able to buy a new outfit and get ready on time.

Second goal:
At the mall entrance, she saw a sign from a spa advertising hot stone massages at a bargain price.

Action consistent with First goal:
Carry decided she only had time to buy an outfit. She was in a rush and needed to get ready soon.

Action consistent with Second goal:
Carry decided that she wanted to get a massage. She felt stressed and needed some time to relax.

Question:
Was Carry going to a dinner party that night?
Moderate Motivation:
It was the end of the semester and Ted had to work on his final projects. He couldn’t wait to finally be done with all his school work. The weather was supposed to be nice the next day so he wanted to get as much work done as possible today.

High Motivation:
It was the end of the semester and Ted had fallen far behind on his work. He knew he would have to work all day today to finish a project otherwise he would fail the class. If he didn’t pass the class, Ted wouldn’t be able to graduate in May.

First goal:
Ted was determined to sit at his desk all day today and work and he would let nothing distract him.

Second goal:
While studying, Ted’s roommate came in and told him that several people were going to the movies.

Action consistent with First goal:
Ted told his roommate he had to get his work done. He needed to stay focused and continue working.

Action consistent with Second goal:
Ted agreed to go to the movies with his friends. He was a big movie buff and knew it would be fun.

Question:
Was Ted still in college?
Moderate Motivation:
Today was the final day of the hearing and it was almost time for a fifteen minute break. Defense attorney Robertson felt that things had gone well for his client. He thought that the last day would be easy because his star witness would confirm that his client was innocent.

High Motivation:
Today was the final day of the hearing and defense attorney Robertson felt nervous. Things had gone badly for his client and his last hope was the star witness. He was scheduled to testify after a break and Robertson knew if the testimony didn’t go well everything would be over.

First goal:
Robertson wanted to meet with the star witness during break to make sure he was still testifying.

Second goal:
When break started, Robertson realized that he was hungry because he hadn’t eaten since breakfast.

Action consistent with First goal:
He decided to eat later and met with the witness. He knew it was important to check in with him.

Action consistent with Second goal:
He went down to the cafeteria and got a sandwich. He sat down at a table and began to eat his lunch.

Question:
Was today the first day of hearing?
Moderate Motivation:
Everyone was having a great time at Mike’s cookout. When Mike went to the food table outside he realized that all the ice he had brought out to cool the food had melted. Most of the food had been eaten but he figured he should get some more ice anyway.

High Motivation:
Everyone was having a great time at Mike’s cookout. When Mike checked on the egg salad he realized the ice he used to cool it had melted. There was no room in the fridge so he desperately needed to buy ice or the salad would spoil and make someone sick.

First goal:
Mike had to hurry up and get to the gas station to get more ice before they closed in ten minutes.

Second goal:
On his way out the door, he noticed that somebody had spilled chips all over the kitchen floor.

Action consistent with First goal:
Mike decided to get ice first and clean up later. He was in a rush because the store was closing.

Action consistent with Second goal:
Mike decided to clean up the mess in the kitchen. He got the broom and started sweeping the floor.

Question:
Was Mike celebrating his 24th birthday?
Moderate Motivation:
Dr. Lee was a surgeon on the hospital staff. He was working the night shift and was making his rounds. Suddenly he was paged to report to the emergency room because a person had been brought in with cuts on their hands that needed to be stitched up.

High Motivation:
Dr. Lee was a surgeon on the hospital staff. He was working the night shift and was making his rounds. Suddenly he was paged to report to the emergency room as soon as possible because the victim of a major car crash had just arrived and had life-threatening injuries.

First goal:
Dr. Lee wanted to get to the emergency room as quickly as possible to care for the injured person.

Second goal:
On the way, a nurse stopped him to ask a question about the medication for one of his patients.

Action consistent with First goal:
Dr. Lee told the nurse he didn’t have time now. He wanted to get to the ER to care for his patient.

Action consistent with Second goal:
Dr. Lee stopped to answer the nurse’s questions. They had a discussion about one of the patients.

Question:
Was Dr. Lee working the night shift?
Moderate Motivation:
Jimmy just got home from playing ball with his friends. He was a local newspaper delivery boy and needed to distribute all the papers this evening. It took him about an hour to complete his route and he liked the extra cash he earned by doing the job.

High Motivation:
Jimmy just got home from playing ball with his friends. He had to deliver the local newspaper by 5 p.m. otherwise his supervisor wouldn’t pay him at all. He had to hurry because it took him about an hour to complete his route and it was almost 4 p.m. already.

First goal:
Jimmy had to get his bike out of the garage quickly so he could be on his way to deliver the paper.

Second goal:
While getting his bike, he realized he didn’t clean up the mess in the kitchen from his snack.

Action consistent with First goal:
Jimmy got on his bike and delivered the paper.
He knew he had to hurry up to get the job done.

Action consistent with Second goal:
Jimmy returned to the house and cleaned the mess.
He took a sponge and wiped off all the crumbs.

Question:
Was Jimmy new in town?
Moderate Motivation:
Betty was preparing a nice dinner for her relatives. Her husband had bought her a dozen red roses because it was their wedding anniversary today. Betty decided that they would look beautiful in her special crystal vase that her in-laws had given her for her birthday last year.

High Motivation:
Betty was preparing dinner. Her husband had brought her red roses for their wedding anniversary. Betty wanted to put them in the crystal vase that her in-laws had given her last year because they were coming tonight and would have been offended to see the flowers in a different vase.

First goal:
Betty had to find the vase before her relatives arrived and everyone would sit down to have dinner.

Second goal:
Before finding the vase, she realized she never found the photo album she wanted to show everyone.

Action consistent with First goal:
Betty searched until she found the crystal vase.
The flowers would look lovely in the crystal vase.

Action consistent with Second goal:
Betty decided to look for the photo album first.
Her family would enjoy seeing the new pictures.

Question:
Was Betty going to a party?
Moderate Motivation:
Ben was excited because it was his sister’s wedding day. His sister had asked him whether he could pick up a few more centerpieces for the tables because she wanted some extras. Ben figured he could stop by the florist before the ceremony to pick up more centerpieces.

High Motivation:
Ben was excited because it was his sister’s wedding day. His sister had asked him to pick up more centerpieces from the florist because they didn’t have enough. Ben knew his sister would be devastated if there weren’t enough for the reception because she wanted the room to look beautiful.

First motivation:
Ben needed to hurry to be able to make it to the florist to pick up the flowers before the wedding.

Second goal:
As he was leaving, he realized that he had never picked up his shirts for work from the dry cleaner.

Action consistent with First goal:
Ben rushed out the door to pick up the flowers.
He wanted to make sure he got the center piece.

Action consistent with Second goal:
Ben decided to get the shirts from the cleaners.
He would need them for work on Monday morning.

Question:
Was Ben going to his sister’s wedding today?
Moderate Motivation:
The cruise was coming to an end and the ship would dock soon. The captain sat in his office working on an inventory that needed to get done before the end of the cruise. His entire desk was covered in papers he needed in order to complete the inventory.

High Motivation:
The cruise was coming to an end and the ship would dock soon. The captain sat in his office frantically working on an inventory that needed to get done before the end of the cruise. He would have to pay a huge fine if he didn’t complete it before docking.

First goal:
The captain pulled up his chair and immersed himself in the paper work so he would get it done.

Second goal:
As he was working, the stuart came in and told him they had seen a group of dolphins in the water.

Target action consistent with First goal:
The captain told the stuart he didn’t have time. He needed to finish the inventory before docking.

Target action consistent with Second goal:
The captain left his office to see the dolphins. He got up from his desk and followed the stuart.

Question:
Was the cruise just leaving the harbor?
Moderate Motivation:
Things at the D.A.'s office were busy because they received new cases almost every day. They had been given some extra funding and were currently interviewing potential employees. The D.A. had decided on a first-rate applicant for the position and was planning on calling him to offer him the position.

High Motivation:
Things at the D.A.'s office were very hectic because they currently had many unsolved cases. They were understaffed and were currently interviewing several potential employees. The D.A. had decided on a first-rate applicant, which he needed to call immediately to ensure that he wasn't hired by another agency.

First goal:
The D.A. searched his messy desk for the applicant's phone number so he could call him right away.

Second goal:
Before he could pick up the phone his assistant entered the office and wanted to talk about a raise.

Action consistent with First goal:
He told the assistant he had to make a phone call.
He knew he had to call the applicant right away.

Action consistent with Second goal:
He agreed to discuss the raise with the assistant.
He asked him to sit down so they could discuss it.

Question:
Was he working at the library?
Moderate Motivation:
Peter and his friend Sam were going to a soccer game. Peter was excited because he hadn’t been to a game in a long time. Because it was already late, Peter decided to park in the lot right by the stadium so they wouldn’t have to walk far.

High Motivation:
Peter and Sam were going to a soccer game. Peter had won VIP passes that allowed them to meet the players before the game. Peter was anxious because if they didn’t make it to the gate in ten minutes they wouldn’t be allowed to go to the locker room anymore.

First goal:
Peter and Sam quickly parked the car and rushed to the gate so they would make it there on time.

Second goal:
While walking, Peter realized that they had not looked at the row number where they had parked.

Action consistent with First goal:
Peter decided to continue walking to the stadium.
He and Sam hurried to make it to the gate on time.

Action consistent with Second goal:
Peter returned to the car and checked the number.
He wrote it on a piece of paper and walked back.

Question:
Were Peter and Sam going to a soccer game?
APPENDIX D

The passages used in Experiment 3 are presented in this Appendix. Each participant only saw one of the four conditions of each passage.
Moderate Motivation:
Tim’s father was a big Red Sox fan and the two of them used to always watch games together. The Red Sox were going to play a pre-season game tonight at 8pm. Tim was excited and had been watching TV since 7:30 pm while eating his dinner.

High Motivation:
Tim loved baseball and had been a huge Red Sox fan ever since he was a young child. The Red Sox were going to play the last game of the World Series tonight at 8pm. Tim bet a friend $500 that he could recall every out in the game.

First goal:
He wanted to watch every single minute of the game tonight to make sure he didn’t miss anything.

Second goal:
When the game was starting, his sister called because she had just broken up with her boyfriend.

Filler:
Tim’s sister was two years older than he was. After Tim graduated from college he decided to move back to the New England area to be closer to his family. He had recently bought a condo near his parents’ house. Tim felt it was unique and had a lot of character. It was exactly what he wanted.

Reinstatement Sentence:
Tim contemplated whether he should talk to his sister on the phone or watch the Red Sox on TV.

Action consistent with First goal:
Tim told his sister he would call her back later. He didn’t want to miss out on parts of the game.

Action consistent with Second goal:
Tim agreed to listen to all his sister’s troubles. She sounded upset and needed someone to talk to.

Question:
Was Tim a Yankees fan?
Moderate Motivation:
Sara was moving from Indiana to Arizona because she had recently found a new job there. While driving along the road in her truck she was listening to her favorite music. Once she arrived at a small town, Sara decided to take a short break from driving.

High Motivation:
Sara was crossing the dessert because she was moving from Indiana to Arizona for a new job. Because it took her longer than expected she ran out of water hours ago. When she arrived at a town, her throat was dry and she was in desperate need for a drink.

First goal:
Because she didn’t have any water left, she wanted to buy some as soon as she got out of the truck.

Second goal:
On the way to the store, she noticed some jewelry at a Native American stand that looked beautiful.

Filler:
Sara was looking forward to living in Arizona and starting her new job there. She felt that she needed to take advantage of not having many responsibilities at the moment. She figured it would be fun to live in a new place for a couple of years. If she liked Arizona she could even imagine settling there someday.

Reinstatement Sentence:
Sara wondered whether she should go look at the Native American jewelry or buy something to drink.

Action consistent with First goal:
Sara walked into the grocery store to get water.
She got a bottle of water from the cooler and paid.

Action consistent with Second goal:
Sara tried on one of the bracelets at the stand.
She thought it looked nice and decided to buy it.

Question:
Was Sara going to college in Arizona?
Moderate Motivation:
Daniel had been working on a project at the computer for a few hours. His hands hurt from typing and his eyes were strained from staring at the screen for so long. He felt ready to take a break and go for a short walk around the block.

High Motivation:
Daniel had been working on a project at the computer at home for a few hours. As he was sitting in front of the computer, he suddenly heard the fire alarm and carbon monoxide detector go off in the hallway near his office. He could even smell smoke.

First goal:
Daniel stopped working, got up from his desk and decided to go outside to get some air right away.

Second goal:
On his way downstairs, he suddenly remembered that he had left his cell phone on the console table.

Filler:
Daniel had moved into the house a few years back after he had gotten a divorce. His ex-wife insisted on keeping their old house. Daniel was too tired to argue with her so he agreed. He liked being in a completely new place where nothing reminded him of his ex-wife. He loved his new home.

Reinstatement Sentence:
Daniel stopped and contemplated whether he should get the cell phone or go outside straight away.

Action consistent with First goal:
Daniel continued to walk downstairs to go outside. He couldn’t wait to finally get some fresh air.

Action consistent with Second goal:
Daniel went upstairs again to get his cell phone. He found it on the table and put it in his pocket.

Question:
Was Daniel going on vacation?
Moderate Motivation:
Kim was an advertising agent for a large firm in New York City. She wanted to make an airline reservation for a business trip before going to bed. She wanted to get it done tonight so she wouldn’t have to worry about it the next day at work.

High Motivation:
Kim was an advertising agent for a large firm in New York City. She needed to purchase an airline ticket for a business trip. An agent had reserved the last seat on the plane for her and she knew they would only hold it for an hour.

First goal:
Kim searched through her purse for her cell phone so she could call the travel agent right away.

Second goal:
As Kim reached for the phone, her co-worker called about a project that he wanted her to work on.

Filler:
Kim had been very busy in the past weeks. She had a lot going on at work and a very busy personal life. Her roommate from college was getting married the following weekend. Kim was thinking about what to wear for the wedding. She would probably wear one of the dresses she had hanging in her closet already.

Reinstatement Sentence:
Kim considered whether to talk to her co-worker about the project or tell him she had to leave.

Action consistent with First goal:
Kim told her co-worker she didn’t have time now. She explained she had to pick up her plane ticket.

Action consistent with Second goal:
Kim talked about the project with her co-worker. She told him she was interested in working on it.

Question:
Was Kim working for an advertisement company?
Moderate Motivation:
John was having a great time traveling across the country in his brand-new SUV. He had agreed to meet some friends in Mexico later this afternoon so they could spend some time together. He still had more than 50 miles to drive until reaching the border of Mexico.

High Motivation:
John was driving to Mexico to attend his best friend's wedding. He was running late because he had been stuck in traffic for a long time. He was stressed because he knew his friend would be very upset if he didn’t make it to the wedding on time.

First goal:
John was aware that he needed to drive without taking any breaks in order to make it there on time.

Second goal:
As he was listening to his favorite jazz song on the radio, John realized that he was very hungry.

Filler:
John was a big fan of Jazz music. When he was seven years old he started playing the saxophone. His parents encouraged John's interest in learning an instrument. He took lessons with a teacher once a week and practiced for half an hour each day on his own. He dreamed of becoming a musician one day.

Reinstatement Sentence:
John tried to decide whether he should stop to get something to eat or keep on driving to Mexico.

Action consistent with First goal:
John continued driving to make it there on time.
He couldn’t wait to finally make it to Mexico.

Action consistent with Second goal:
John took the next exit to find a place to eat.
He was starved and couldn’t wait to get some food.

Question:
Did John like Jazz music?
Moderate Motivation:
Jeff was excited about his upcoming time off from work because he had worked a lot of overtime lately. His sister lived in California and he thought it might be fun to visit her. He had visited her a few times before and always enjoyed the beautiful scenery there.

High Motivation:
Jeff was excited about his upcoming time off from work because he had worked a lot of overtime lately. His sister lived in California and had just had a baby a few weeks ago. Jeff was thrilled for his sister and her husband and couldn’t wait to meet his nephew.

First goal:
Jeff knew it was very important to his sister to see him regularly because they were very close.

Second goal:
Jeff also remembered that his guy friends were going on a trip to Las Vegas to have fun all week.

Filler:
Jeff was in need for some time off from work. He was an air traffic controller and his job was very demanding. He always had to be alert. He knew that not paying attention for just a moment could lead to a devastating accident. He sometimes felt like he was under a lot of pressure at work.

Reinstatement Sentence:
Jeff thought about whether he should go on the trip to Vegas or visit his sister in California.

Action consistent with First goal:
Jeff decided to visit his sister in California.
He knew she would be very happy to see him again.

Action consistent with Second goal:
Jeff decided to go to Las Vegas with his friends.
He knew it would be fun to hang out with them.

Question:
Was Jeff excited about his time off from work?
Moderate Motivation:
Sally was having a group of friends over for a dinner party this evening. Her kitchen was messy because she had been baking cookies all day. She didn’t realize how much work it was going to be to prepare the house for having guests over for a formal dinner.

High Motivation:
Sally was having a group of friends over for a party tonight. She had been baking cookies all day and the kitchen was a mess. She hated a dirty kitchen and would be very embarrassed if she didn’t put everything away before her guest arrived in a few minutes.

First goal:
Sally needed to hurry and clean the mess in the kitchen because she wanted everything to be perfect.

First goal:
She then remembered some festive tins she had in the attic that would look nice with her cookies.

Filler:
Sally and her husband had just moved into their new home two months ago. They had moved a few streets over from where they used to live. This was the first home they owned. Sally had spent a lot of time decorating the place. She was excited to finally have a home where she could entertain guests.

Reinstatement Sentence:
Sally wondered whether she should get the festive tins for the cookies or clean up the kitchen.

Action consistent with First goal:
Sally decided to focus on cleaning the kitchen. It was important to her that everything was clean.

Action consistent with Second goal:
Sally decided to look for the tins in the attic. She knew they would be perfect for her cookies.

Question:
Was Sally baking cookies?
Moderate Motivation:
Adrian had just returned from a trip to the store to get the New York Times. He had been feeling tired of his current job and wanted to look for a new one. He wanted a job that would be more fulfilling and enjoyable than his current one.

High Motivation:
Every day, Adrian spent the afternoon reading the New York Times looking for job openings. He had been unemployed for the last six months and his savings were almost used up. He was so desperate that he would accept almost any job to pay for rent and other bills.

First goal:
Adrian wanted to spend the afternoon reading the employment section to look for suitable new jobs.

Second goal:
While reading, Adrian's neighbor came over to tell him he was going for a bike ride that afternoon.

Filler:
Lately, Adrian had been doing a lot of work around the house. For example, last week he cleaned out his basement. He used to simply throw everything he didn’t need downstairs. After a few years he wasn’t able to find anything anymore. Once he was done, Adrian felt it was much easier to find his things.

Reinstatement Sentence:
Adrian wondered whether he should go for a bike ride or search the paper for job opportunities.

Action consistent with First goal:
Adrian told his neighbor he had to look for jobs.
He knew there was not enough time to go biking.

Action consistent with Second goal:
Adrian decided to go biking with his neighbor.
He knew they were going to have a blast together.

Question:
Did Adrian just start a new job?
Moderate Motivation:
Ms. Jones liked her new teaching position very much and couldn’t wait to go to work every morning. She was working on some of her lesson plans in her office. She wanted to get them done so she could have a relaxing evening without having to do work at home.

High Motivation:
Ms. Jones liked her new teaching position but she also felt overwhelmed with the work load at times. She absolutely needed to finish her lesson plans tonight. She knew it would be a disaster if she didn’t have them ready and had no class activities for her students tomorrow.

First goal:
Ms. Jones knew she had to stay focused on her work and not get distracted by things around her.

Second goal:
As she was working hard, the janitor came into her office and complained about the mess in the room.

Filler:
Ms. Jones had recently graduated with a Master’s degree in teaching. She had studied to become an English and Math teacher at the high-school level. The new position was her dream job. Her parents were very happy for her when she finally found this job. Ms. Jones always knew that her hard work would pay off eventually.

Reinstatement Sentence:
Ms. Jones contemplated whether she should clean the mess in the room or focus on her class prep.

Action consistent with First goal:
Ms. Jones continued to work on her lesson plan. She knew that she had to stay focused to finish.

Action consistent with Second goal:
Ms. Jones started to clean up her messy office. She knew the janitor would be mad if she didn’t.

Question:
Did Ms. Jones just start a new job?
Moderate Motivation:
Mary loved to travel to different places around the world. For her current vacation she was scheduled to go on a skiing trip to Switzerland. She had plans to go to a travel bookstore this evening to pick up another travel guide about Switzerland and the Alps.

High Motivation:
Mary loved to travel to different places around the world. She was going skiing in Switzerland tomorrow morning. She had to leave work in five minutes to pick up the airline ticket at her travel agent’s store before they closed, otherwise she wouldn’t be able to go on her trip.

First goal:
Mary was determined to leave work on time because she had to make it to the store before it closed.

Second goal:
Just as she was leaving work, her intern asked Mary to read over a ten-page report he had written.

Filler:
Mary was ready to leave work tonight and go on her vacation. She loved to explore new places abroad. No matter where she traveled she would try to learn as much as she could about the culture. She would even try to learn the local language. It was important to her to fit in wherever she went.

Reinstatement Sentence:
Mary considered whether she should read the intern’s report or go to the store before it closed.

Action consistent with First goal:
Mary told the intern she had to leave right now.
She told him she had to run an important errand.

Action consistent with Second goal:
Mary agreed to read the report before she left.
She sat down at her desk and started reading it.

Question:
Was Mary going to the Bahamas?
Moderate Motivation:
Emily sat in her office at the university. She was about to leave when she realized it was the first of the month and she hadn’t made her mortgage payment yet. Thankfully, she recalled that her bank allowed her a grace period to make the payment without paying a penalty.

High Motivation:
Emily sat in her office at the university. She was about to leave when she realized it was past the first of the month and she hadn’t made her mortgage payment. If she didn’t pay it today they would charge her a late fee and it would affect her credit.

First goal:
Emily left her office and got into her car to get to the bank before they closed for the evening.

Second goal:
Emily noticed she had a ticket on the windshield even though her parking sticker was up-to-date.

Filler:
Emily was an associate biology professor at a large Mid-Western university. She loved her research and looked forward to coming to work every day. She was glad that she had known very early on that research was her calling. There was no other job that she would rather have had than her position at the university.

Reinstatement Sentence:
Emily thought about whether she should go to the parking office to complain or drive to the bank.

Action consistent with First goal:
Emily grabbed the ticket and drove to the bank.
She drove as quickly as possible to make it there.

Action consistent with Second goal:
Emily went to the parking office and complained.
She showed them her up-to-date parking sticker.

Question:
Did Emily own a home?
Moderate Motivation:
Angie was going through her closet to find something to wear for today. During a recent vacation, she had gained almost seven pounds and some of her clothes didn’t fit her properly anymore. She decided that she should begin to exercise more to lose some of the extra weight.

High Motivation:
Angie, a fashion model, had gained seven pounds on a recent vacation and none of her clothes fit properly anymore. She had a photo shoot in less than a week and needed to get back to her old weight. Otherwise, she knew she would lose the job.

First goal:
Angie needed to go to the gym to start an exercise regimen to get back to her old figure right away.

Second goal:
On her way out the door, her friend called to tell her she was going to go shopping at the mall.

Filler:
Angie had just returned from a fun and relaxing vacation in Miami. She had gone there with two of her best girlfriends. They had a great time relaxing at the beach during the day and partying at night. She wished that they could have stayed even longer. Angie loved being in the sun and swimming in the ocean.

Reinstatement Sentence:
Angie considered whether she should go shopping at the mall or to the gym to get back in shape.

Action consistent with First goal:
Angie told her friend she had to go to the gym.
She wanted to lose weight as quickly as possible.

Action consistent with Second goal:
Angie agreed to go to the mall with her friend.
She loved shopping and thought it would be fun.

Question:
Was Angie having lunch with a friend?
Moderate Motivation:
The Eriksons lived along the Massachusetts coastline and the weather forecast predicted that they were going to get a rainstorm today. Because they lived a few miles inland, they assumed it would not be so bad. They had experienced many rainstorms before and knew it would eventually pass.

High Motivation:
The Eriksons lived along the Massachusetts coastline and were preparing for a hurricane that was coming today. Because they lived right by the water they needed to cover up all of the windows. They knew it was the only way to reduce damage to the house.

First goal:
Mr. Erikson had to board up the windows quickly because the storm was coming in less than an hour.

Second goal:
Just as he began working, his wife suggested that they could rent movies from the store for later.

Filler:
Mr. and Mrs. Erikson had both grown up in Massachusetts. They loved the New England area and couldn’t imagine living anywhere else. Mr. Erikson loved to sail during the summer. He had bought a small sailing boat a few years ago. They had been spending a lot of time on the water ever since they bought the boat.

Reinstatement Sentence:
Mr. Erikson contemplated whether he should get the movies from the store or board up the windows.

Action consistent with First goal:
Mr. Erikson continued boarding up all the windows. He wanted to finish them before the storm came.

Action consistent with Second goal:
Mr. Erikson went to the video store right away. He walked through the store and got two movies.

Question:
Do the Eriksons live in Connecticut?
Moderate Motivation:
Carry’s fiancé, Steve, had asked her to accompany him to an important business dinner that night. Even though she had many outfits in her closet, Carry considered buying a new one for the business dinner. Carry liked clothes and was always looking for something new to add to her wardrobe.

High Motivation:
Carry’s fiancé, Steve, had asked her to accompany him to an important business dinner that night. Carry only had casual clothes and didn’t own anything suitable for a business dinner. Carry knew she absolutely had to buy a new outfit otherwise Steve wouldn’t be able to make a good impression.

First goal:
Because it was getting late, she had to hurry to be able to buy a new outfit and get ready on time.

Second goal:
At the mall entrance, she saw a sign from a spa advertising hot stone massages at a bargain price.

Filler:
Carry and her fiancé had been dating for about two years. They had plans to move in together very soon. Carry was excited and couldn’t wait to set a date. They had decided it would be best to live in Steve’s apartment. It was more spacious and there was plenty of room for the both of them.

Reinstatement Sentence:
Carry contemplated whether she should get a massage at the spa or buy an outfit for the dinner.

Action consistent with First goal:
Carry decided she only had time to buy an outfit. She was in a rush and needed to get ready soon.

Action consistent with Second goal:
Carry decided that she wanted to get a massage. She felt stressed and needed some time to relax.

Question:
Was Carry going to a dinner party that night?
Moderate Motivation:
It was the end of the semester and Ted had to work on his final projects. He couldn’t wait to finally be done with all his school work. The weather was supposed to be nice the next day so he wanted to get as much work done as possible today.

High Motivation:
It was the end of the semester and Ted had fallen far behind on his work. He knew he would have to work all day today to finish a project otherwise he would fail the class. If he didn’t pass the class, Ted wouldn’t be able to graduate in May.

First goal:
Ted was determined to sit at his desk all day today and work and he would let nothing distract him.

Second goal:
While studying, Ted’s roommate came in and told him that several people were going to the movies.

Filler:
Ted was a communications major. He wasn’t sure yet what he wanted to do after graduation. He figured his major would allow him to pursue many different careers. Ted wanted to do several internships to gain experience before deciding what he wanted to do. He thought this was a good way to get started with his career.

Reinstatement Sentence:
Ted contemplated whether he should go to the movies with his friends or complete his work schedule.

Action consistent with First goal:
Ted told his roommate he had to get his work done. He needed to stay focused and continue working.

Action consistent with Second goal:
Ted agreed to go to the movies with his friends. He was a big movie buff and knew it would be fun.

Question:
Was Ted still in college?
Moderate Motivation:
Today was the final day of the hearing and it was almost time for a fifteen minute break. Defense attorney Robertson felt that things had gone well for his client. He thought that the last day would be easy because his star witness would confirm that his client was innocent.

High Motivation:
Today was the final day of the hearing and defense attorney Robertson felt nervous. Things had gone badly for his client and his last hope was the star witness. He was scheduled to testify after a break and Robertson knew if the testimony didn’t go well everything would be over.

First goal:
Robertson wanted to meet with the star witness during break to make sure he was still testifying.

Second goal:
When break started, Robertson realized that he was hungry because he hadn’t eaten since breakfast.

Filler:
Attorney Robertson had been a lawyer for many years. He loved his job and couldn’t imagine doing anything else. When Robertson graduated from high school he already knew he would eventually go to law school. Luckily, he was awarded a scholarship to go to law school. Otherwise, Robertson would have never been able to afford going.

Reinstatement Sentence:
Robertson considered whether he should go and get something to eat or meet with the star witness.

Action consistent with First goal:
He decided to eat later and met with the witness.
He knew it was important to check in with him.

Action consistent with Second goal:
He went down to the cafeteria and got a sandwich.
He sat down at a table and began to eat his lunch.

Question:
Was today the first day of hearing?
Moderate Motivation:
Everyone was having a great time at Mike’s cookout. When Mike went to the food table outside he realized that all the ice he had brought out to cool the food had melted. Most of the food had been eaten but he figured he should get some more ice anyway.

High Motivation:
Everyone was having a great time at Mike’s cookout. When Mike checked on the egg salad he realized the ice he used to cool it had melted. There was no room in the fridge so he desperately needed to buy ice or the salad would spoil and make someone sick.

First goal:
Mike had to hurry up and get to the gas station to get more ice before they closed in ten minutes.

Second goal:
On his way out the door, he noticed that somebody had spilled chips all over the kitchen floor.

Filler:
Mike had moved to his current home last winter. He loved the climate in California and wanted to spend the rest of his life here. He liked being able to go to the beach and have fun in the sun. Mike had even started to surf. He was still learning but had a blast surfing with his friends.

Reinstatement Sentence:
Dr. Lee contemplated whether he should stop and talk to the nurse or rush to the emergency room.

Action consistent with First goal:
Mike decided to get ice first and clean up later. He was in a rush because the store was closing.

Action consistent with Second goal:
Mike decided to clean up the mess in the kitchen. He got the broom and started sweeping the floor.

Question:
Was Mike celebrating his 24th birthday?
Moderate Motivation:
Dr. Lee was a surgeon on the hospital staff. He was working the night shift and was making his rounds. Suddenly he was paged to report to the emergency room because a person had been brought in with cuts on their hands that needed to be stitched up.

High Motivation:
Dr. Lee was a surgeon on the hospital staff. He was working the night shift and was making his rounds. Suddenly he was paged to report to the emergency room as soon as possible because the victim of a major car crash had just arrived and had life-threatening injuries.

First goal:
Dr. Lee wanted to get to the emergency room as quickly as possible to care for the injured person.

Second goal:
On the way, a nurse stopped him to ask a question about the medication for one of his patients.

Filler:
Dr. Lee’s work schedule was very hectic. Sometimes he would have to work two shifts in a row. Even though it was stressful, he usually liked working night shifts. It allowed him to see his kids in the morning. He would make them breakfast and sleep for a few hours before they came home from school.

Reinstatement Sentence:
Betty wondered whether she should go look for the missing photo album or find the crystal vase.

Action consistent with First goal:
Dr. Lee told the nurse he didn’t have time now. He wanted to get to the ER to care for his patient.

Action consistent with Second goal:
Dr. Lee stopped to answer the nurse’s questions. They had a discussion about one of the patients.

Question:
Was Dr. Lee working the night shift?
Moderate Motivation:
Jimmy just got home from playing ball with his friends. He was a local newspaper delivery boy and needed to distribute all the papers this evening. It took him about an hour to complete his route and he liked the extra cash he earned by doing the job.

High Motivation:
Jimmy just got home from playing ball with his friends. He had to deliver the local newspaper by 5 p.m. otherwise his supervisor wouldn't pay him at all. He had to hurry because it took him about an hour to complete his route and it was almost 4 p.m. already.

First goal:
Jimmy had to get his bike out of the garage quickly so he could be on his way to deliver the paper.

Second goal:
While getting his bike, he realized he didn’t clean up the mess in the kitchen from his snack.

Filler:
Jimmy was a freshman in high school. He had been a newspaper delivery boy for several months now. As soon as he was old enough he immediately signed up for the paper delivery job. He wanted to save money for his dream car. He was hoping to buy a Honda Civic once he got his diver’s license.

Reinstatement Sentence:
Jimmy thought about whether he should clean the kitchen or get on his way to deliver the paper.

Action consistent with First goal:
Jimmy got on his bike and delivered the paper. He knew he had to hurry up to get the job done.

Action consistent with Second goal:
Jimmy returned to the house and cleaned the mess. He took a sponge and wiped off all the crumbs.

Question:
Was Jimmy new in town?
Moderate Motivation:
Betty was preparing a nice dinner for her relatives. Her husband had bought her a dozen red roses because it was their wedding anniversary today. Betty decided that they would look beautiful in her special crystal vase that her in-laws had given her for her birthday last year.

High Motivation:
Betty was preparing dinner. Her husband had brought her red roses for their wedding anniversary. Betty wanted to put them in the crystal vase that her in-laws had given her last year because they were coming tonight and would have been offended to see the flowers in a different vase.

First goal:
Betty had to find the vase before her relatives arrived and everyone would sit down to have dinner.

Second goal:
Before finding the vase, she realized she never found the photo album she wanted to show everyone.

Filler:
Betty and her husband had been married for exactly eleven years today. Last year they had gone to a trip to Hawaii for their ten year anniversary. They had left their two children with their grandparents for a week. They had a wonderful time on their vacation. They very much enjoyed spending some quality time together.

Reinstatement Sentence:
Betty wondered whether she should go look for the missing photo album or find the crystal vase.

Action consistent with First goal:
Betty searched until she found the crystal vase.
The flowers would look lovely in the crystal vase.

Action consistent with Second goal:
Betty decided to look for the photo album first.
Her family would enjoy seeing the new pictures.

Question:
Was Betty going to a party?
Moderate Motivation:
Ben was excited because it was his sister’s wedding day. His sister had asked him whether he could pick up a few more centerpieces for the tables because she wanted some extras. Ben figured he could stop by the florist before the ceremony to pick up more centerpieces.

High Motivation:
Ben was excited because it was his sister’s wedding day. His sister had asked him to pick up more centerpieces from the florist because they didn’t have enough. Ben knew his sister would be devastated if there weren’t enough for the reception because she wanted the room to look beautiful.

First motivation:
Ben needed to hurry to be able to make it to the florist to pick up the flowers before the wedding.

Second goal:
As he was leaving, he realized that he had never picked up his shirts for work from the dry cleaner.

Filler:
Ben’s sister and her husband-to-be had been dating since college. At one point his sister even went to study abroad in Argentina for a semester. It was hard for them to be apart for so long but they continued their relationship. They had always been a very harmonious couple. Ben couldn’t have been happier for them.

Reinstatement Sentence:
Ben wondered whether he should pick up the shirts for work or the centerpieces for the wedding.

Action consistent with First goal:
Ben rushed out the door to pick up the flowers.
He wanted to make sure he got the center piece.

Action consistent with Second goal:
Ben decided to get the shirts from the cleaners.
He would need them for work on Monday morning.

Question:
Was Ben going to his sister’s wedding today?
Moderate Motivation:
The cruise was coming to an end and the ship would dock soon. The captain sat in his office working on an inventory that needed to get done before the end of the cruise. His entire desk was covered in papers he needed in order to complete the inventory.

High Motivation:
The cruise was coming to an end and the ship would dock soon. The captain sat in his office frantically working on an inventory that needed to get done before the end of the cruise. He would have to pay a huge fine if he didn’t complete it before docking.

First goal:
The captain pulled up his chair and immersed himself in the paperwork so he would get it done.

Second goal:
As he was working, the stuart came in and told him they had seen a group of dolphins in the water.

Filler:
The captain and his crew were on their way home from the Bahamas. The ship had recently been overhauled. It was now equipped with all the amenities one could imagine. It had a full-size bowling alley, a miniature golf course, and even a rock-climbing wall. People of all ages could enjoy their time on the cruise ship.

Reinstatement Sentence:
The captain wondered whether he should go outside to see the dolphins or finish the paperwork.

Target action consistent with First goal:
The captain told the stuart he didn’t have time. He needed to finish the inventory before docking.

Target action consistent with Second goal:
The captain left his office to see the dolphins. He got up from his desk and followed the stuart.

Question:
Was the cruise just leaving the harbor?
Moderate Motivation:
Things at the D.A.’s office were busy because they received new cases almost every day. They had been given some extra funding and were currently interviewing potential employees. The D.A. had decided on a first-rate applicant for the position and was planning on calling him to offer him the position.

High Motivation:
Things at the D.A.’s office were very hectic because they currently had many unsolved cases. They were understaffed and were currently interviewing several potential employees. The D.A. had decided on a first-rate applicant, which he needed to call immediately to ensure that he wasn’t hired by another agency.

First goal:
The D.A. searched his messy desk for the applicant’s phone number so he could call him right away.

Second goal:
Before he could pick up the phone his assistant entered the office and wanted to talk about a raise.

Filler:
The D.A. had been working the same job for several years. It was a very stressful job. He had to listen to so many different cases each day that he could hardly keep track of them. All the decisions he had to make were very crucial because they affected other people. He took his responsibilities very seriously.

Reinstatement Sentence:
The D.A. contemplated talking to his assistant about a raise or calling back the job applicant.

Action consistent with First goal:
He told the assistant he had to make a phone call. He knew he had to call the applicant right away.

Action consistent with Second goal:
He agreed to discuss the raise with the assistant. He asked him to sit down so they could discuss it.

Question:
Was he working at the library?
Moderate Motivation:
Peter and his friend Sam were going to a soccer game. Peter was excited because he hadn't been to a game in a long time. Because it was already late, Peter decided to park in the lot right by the stadium so they wouldn't have to walk far.

High Motivation:
Peter and Sam were going to a soccer game. Peter had won VIP passes that allowed them to meet the players before the game. Peter was anxious because if they didn't make it to the gate in ten minutes they wouldn't be allowed to go to the locker room anymore.

First goal:
Peter and Sam quickly parked the car and rushed to the gate so they would make it there on time.

Second goal:
While walking, Peter realized that they had not looked at the row number where they had parked.

Filler:
Peter had been a huge soccer fan. He started playing soccer when he was five years old. Unfortunately, he tore his ACL about a year ago and wasn't supposed to play soccer at the moment. He was hoping that he would eventually fully recover and play soccer again. It was his favorite way to stay in shape.

Reinstatement Sentence:
Peter considered returning to the car to look at the number or continuing to walk to the gate.

Action consistent with First goal:
Peter decided to continue walking to the stadium.
He and Sam hurried to make it to the gate on time.

Action consistent with Second goal:
Peter returned to the car and checked the number.
He wrote it on a piece of paper and walked back.

Question:
Were Peter and Sam going to a soccer game?
APPENDIX E

The Gates-MacGinitie Reading Test that was used to index participants as skilled and less-skilled readers is presented in this Appendix. Each participant had 20 minutes to complete as many of the questions on the test as possible.
Sometimes - not very often - we get two full moons in one month. That second full moon is called a “blue moon.” No one knows why. Now we say “once in a blue moon” to mean “once in a long time.”

C-1. To be a “blue moon,” the moon must be

A. dark.
B. long.
C. blue.
D. full.

C-2. What is it that no one knows?

A. What the name is.
B. Who uses the name.
C. Where the name came from.
D. What the name means.
A crowd of people surged in to the Eighth Avenue express at 59th Street. By elbowing other passengers in the back, by pushing and heaving, they forced their bodies into the coaches, making room for themselves where no room had existed before. As the train gathered speed for the long run to 125th Street, the passengers settled down into small private worlds, thus creating the illusion of space between them and their fellow passengers. The worlds were built up behind newspapers and magazines, behind closed eyes or while staring at the varicolored show cards that bordered the coaches.

1. Why was it difficult to get on the train?
   A. The train didn’t stop long enough.
   B. There was a barrier in the way.
   C. The train was already full.
   D. The people were reading newspapers.

2. The newspapers helped the passengers
   A. pass the time.
   B. forget where they were going.
   C. sleep.
   D. feel that they were by themselves.

3. Staring at the show cards served the same purpose as
   A. finding a seat.
   B. getting on the train.
   C. shutting one’s eyes.
   D. staring at other passengers.

4. In this passage, the word run means
   A. trip.
   B. race.
   C. string of good luck.
   D. series of performances.
In later life, John Quincy Adams recalled an incident typical of his mother Abigail’s bravery and resourcefulness. In 1775 British troops from Boston were advancing on Braintree, searching for rebel arsenals. All day neighbors traveled the road in front of the Adams’ farmhouse, retreating from the expected attack. Abigail was alone in her home with her children. When rebel troops arrived, they advised Abigail to flee. Instead she stayed, handing over all her precious pewter to the rebels, helping them melt down the metal for bullets. The rebel soldiers departed, and Abigail remained, expecting the worst but refusing to give in to the panic that possessed some of her neighbors. “Do you wonder,” wrote her son, “that a boy of seven who witnessed this scene is a patriot?”

5. The neighbors who passed the Adams’ house were trying to
   A. defend their homes.
   B. avoid being hurt.
   C. join one of the armies.
   D. get to Boston.

6. The passage suggests that the rebels had little
   A. ammunition.
   B. concern for Abigail.
   C. knowledge of the countryside.
   D. warning that the British were advancing.

7. What demonstrated Abigail’s resourcefulness was the way she
   A. fooled the British troops.
   B. sent messages to the rebel troops.
   C. learned where the British troops had come from.
   D. provided what was needed from what she had available.

8. John Quincy Adams believed that this experience was a source of his
   A. resourcefulness.
   B. interest in military history.
   C. courage.
   D. love of country.
*Fresco* involves painting into wet lime plaster with pigment mixed into limewater. The layer of calcium carbonate formed by the limewater binds the pigments to the plaster wall, and the mutual wetness of the pigment and the surface causes the color to dye the wall. This makes for a highly permanent decoration, as long-lived as the building itself. Permanence is the main advantage of fresco and is, of course, its own recommendation.

Michelangelo’s *Creation of Adam*, like all the other works on the ceiling of the Sistine Chapel in the Vatican, is an example of fresco painting. Since plaster cannot be rewet, once it is dry, the fresco artist never applies more plaster to his surface than he knows he can finish in a single day. Consequently, we can find places in this fresco where plaster joints occur. There is a seam where Adam’s neck fits onto his body and another at the line between the torso and the legs. Adam is about twelve feet long, and it took Michelangelo three sessions to complete him.

9. In fresco painting, the pigment is first mixed into
   A. plaster.
   B. limewater.
   C. oil.
   D. the wet part of the wall.

10. Why are fresco paintings long lasting?
   A. The seams are strong.
   B. The pigment becomes part of the wall.
   C. The plaster is protected by the layer of pigment.
   D. The painting is protected by the layer of plaster.

11. About how long does the plaster stay wet enough to paint?
   A. Ten minutes.
   B. An hour.
   C. A day.
   D. A week.

12. A fresco artist must be careful to
   A. rewet the plaster as needed.
   B. apply the plaster to small enough areas.
   C. let the plaster dry before beginning to paint.
   D. let the paint dry before applying plaster.

13. A seam in a fresco is a line
   A. where the wall joins the ceiling.
   B. between different colors.
C. between areas painted at different times.
D. where material has been added to strengthen the plaster.

14. The example of the *Creation of Adam* shows how one can tell

A. where the artist applied plaster.
B. how long ago the fresco was painted.
C. how large the figures on a ceiling fresco are.
D. how many sessions it took to do a fresco.
An author's introduction to the story of his life:

I had planned to write chronologically, but then realized that, of course, I don't think chronologically. Writing a memoir is like fishing. You cast your line and you pull on it when a fish strikes, but you never know what will be on the other end, for the ocean is deep and is filled with marvelous creatures that do not break the surface in expected order. Nor do they swim under the waves with the whales leading and the minnows at the end of long straight lines. A memoir, like a fish, will not thrive under every discipline. Another way of putting this is that if you alphabetize the Iliad you will have approximately the Athens telephone book. When I think back, things don't line up, they stand out, so I will take them as they come, as once I took them as they came.

15. In this passage, the author explains why he

A. decided to write about himself.
B. waited so long to begin writing.
C. included details that seem unimportant.
D. changed his mind about how he would write.

16. What do the ocean creatures represent?

A. Events in the author's life.
B. People the author has known.
C. All the words in the language.
D. The dangers of looking into one's past.

17. In this passage, the word discipline means

A. punishment.
B. a field of study.
C. rules by which something is organized.
D. training that perfects mental or moral qualities.

18. The Athens telephone book is used as an example of something that is

A. too long.
B. impossible to read.
C. orderly but boring.
D. full of information.

19. When the author says "... as once I took them," he means that

A. he was always eager to do things.
B. he could stand up to any difficulty.
C. he believed that he deserved what he got.
D. he dealt with experiences as they happened.
All "symmetrical" organisms develop asymmetries. A fruit fly, no longer than the tip of a lead pencil, having developed while stuck to the inside of a glass culture vessel, has different numbers of sensory bristles on its left and right sides, some flies having more on the left, some more on the right. Moreover, this side-to-side variation is as large as the difference among different flies. But the genes on the left and right sides of a fly are the same, and it seems absurd to think that the temperature, humidity, or concentration of oxygen was different between left and right sides of the tiny developing insect. The variation between sides is a result of random events in the timing of division and movement of the individual cells that produce the bristles, so-called developmental noise.

20. Why does the author put symmetrical in quotation marks?

A. It is a scientific term.
B. It is a new word that the author made up.
C. The author is referring to another author’s use of the term.
D. The usual meaning of the word is not completely accurate in this context.

21. In this passage, the vessel is

A. a boat.
B. a container.
C. a vein or artery.
D. a window.

22. The passage implies that differences such as that between right- and left-hand fingerprints could be a result of

A. differences in genes.
B. differences between individuals.
C. symmetry.
D. unpredictable variations in the way cells divide.

23. How does the number of bristles on the right side affect the number of bristles on the left side?

A. It has no effect.
B. It makes the left side have fewer bristles.
C. It makes the left side have an equal number of bristles.
D. It makes the left side have more bristles.
Margaret had just gotten her first pair of sunglasses, perfect cat-eyes, and she was amazed at how much she could see. She lay in the scrub grass beneath a stand of cottonwoods, took them off, and watched the branches turn gauzy and familiar. Then she put the glasses back on, bracing a little for the barrage of detail. Thousands of leaves leaped out, trembling and hard-edged. The narrow river, a few yards away, turned crunchy-looking again. Bird sounds attached themselves to small shapes on high branches.

She didn’t know when her vision had started to go seriously bad. It had been so gradual, this nearsightedness, that she hadn’t noticed it for a while. At first, it seemed only that a luxurious vagueness had come into her life. Then it had begun to make her uneasy. But this sudden return of all the details was more than she really wanted. It was unnerving. It gave her the same feeling she got when someone explained how something scientific works – osmosis, say, or photosynthesis. The explanations crowded out her imagination and made her feel bleak with information.

24. What was Margaret not sure of?

A. Why she had been feeling uneasy.
B. When she started to need glasses.
C. Whether her glasses were working properly.
D. Why everything looked so different through glasses.

25. What had Margaret liked about not seeing well?

A. She needed to imagine things.
B. She didn’t have to work.
C. She could get people to explain things.
D. She wasn’t expected to understand science.

26. It seems to Margaret that, when she wore glasses, she had

A. a feeling of luxury.
B. a greater enjoyment of nature.
C. too much information.
D. a greater awareness of sounds.

27. The passage suggests that Margaret would have been happier with glasses that were

A. weaker.
B. smaller.
C. like cat-eyes.
D. more stylish.
28. In this passage, the word bracing means

A. turning.
B. pushing away.
C. stimulating.
D. getting ready.
A pulsar is thought to be a rapidly spinning neutron star. Such stars can arise from the gravitational collapse of a supernova’s core. It is in conserving angular momentum as it shrinks to a diameter of only several kilometers that the neutron star attains its high rotational velocity. If the neutron star continuously emits a beam of electromagnetic radiation from a spot in the magnetized plasma overlying its surface, the beam is swept around like the beacon of a lighthouse. Such a radio beam, striking the earth with each revolution of neutron star, can account for the observed radio-frequency pulsations.

29. A supernova’s core becomes a neutron star because of

A. rotation.
B. gravity.
C. pulsation.
D. magnetized plasma.

30. A neutron star speeds up because it

A. gets smaller.
B. has a radio frequency.
C. is magnetized.
D. emits a beam.

31. Pulsars are thought to send out a radio beam from

A. their magnetic poles.
B. explosions in their interior.
C. one place near their surface.
D. the place where the beam strikes the earth.

32. What does like the beacon of a lighthouse describe?

A. Radiation sent out by a pulsar.
B. The star from which a pulsar is formed.
C. Signals scientists send out to detect pulsars.
D. The path of an object caught in a pulsar’s gravity.

33. How often the beam from a pulsar strikes the earth depends on

A. how far the pulsar is from the earth.
B. how large the pulsar is.
C. how fast the pulsar is spinning.
D. how strong the pulsar’s magnetic field is.
It is customary to place the date for the beginnings of modern medicine somewhere in the mid-1930s, with the entry of the sulfonamides and penicillin into the pharmacopoeia, and it is usual to ascribe to these events the force of a revolution in medical practice. This is what things seemed like at the time. Medicine was upheaved, revolutionized indeed. Therapy had been discovered for great numbers of patients whose illnesses had previously been untreatable. Cures were now available. As we saw it then, it seemed a totally new world. Doctors could now cure disease, and this was astonishing, most of all to the doctors themselves.

34. During the 1930s, what did people believe had happened in the field of medicine?
   A. A destructive trend.
   B. A dramatic change.
   C. A return to old practices.
   D. A slowing down.

35. Sulfonamides and penicillins made doctors feel
   A. confused.
   B. like scientists.
   C. old-fashioned.
   D. more confident.

36. In this passage, pharmacopoeia means
   A. a medical research laboratory.
   B. medical school textbooks.
   C. a school for pharmacists.
   D. a stock of available medicines.

37. According to the passage, who was most amazed by sulfonamides and penicillin?
   A. Sick patients.
   B. Doctors.
   C. Patients who had recovered.
   D. Pharmacists.
Stephen’s mother and his brother and one of his cousins waited at the corner of quiet Foster Place while he and his father went up the steps and along the colonnade where the Highland sentry was parading. When they had passed into the great hall and stood at the counter Stephen drew forth his orders on the governor of the bank of Ireland for thirty and three pounds; and these sums, the moneys of his exhibition and essay prize, were paid over to him rapidly by the teller in notes and in coin respectively. He bestowed them in his pockets with feigned composure and suffered the friendly teller, to whom his father chatted, to take his hand across the broad counter and wish him a brilliant career in after life.

38. The passage suggests that the building was

A. hidden.
B. crowded.
C. impressive.
D. hard to get into.

39. What had Stephen done?

A. He had won a prize.
B. He had carried out orders.
C. He had sold a painting.
D. He had had a brilliant career.

40. Why did the teller give the notes to Stephen rapidly?

A. To get rid of Stephen.
B. To show that he was not impressed.
C. Because he was being efficient.
D. Because Stephen’s mother was waiting.

41. It was difficult for Stephen to

A. act calmly.
B. pass into the hall.
C. give up the orders.
D. leave his mother waiting.

42. The teller took Stephen’s hand to

A. greet him.
B. congratulate him.
C. give him confidence.
D. show him how to handle money.
The Museum that Alexander the Great set up in Alexandria was in effect the first university in the world. As its name implies, it was dedicated to the service of the Muses. It was, however, a religious body only in form, in order to meet the legal difficulties of endowment in a world that had never foreseen such a thing as a secular intellectual process. It was essentially a college of learned men engaged chiefly in research and record, but also to a certain extent in teaching.

43. Why was the Museum set up as a religious body?

A. So money could be given to it.
B. So people could come worship there.
C. So priests could work there.
D. So religion could be taught.

44. The Museum was most like a

A. temple.
B. university.
C. hospital.
D. show.

45. Which answer best describes the Museum?

A. Famed for its athletes.
B. Ineffective.
C. Pioneering.
D. Entertaining.
Any list of mutualistic relationships would be heavily weighted toward the highly organized, impersonal world of the insects. The story of ants protecting and "milking" their cattlelike aphids, for example, is well known. Much less common is evidence of mutualism among warmblooded vertebrates, and mutualistic relationships that cross taxonomic class lines, say between birds and mammals, are especially rare.

46. The passage mentions the relation between ants and aphids as an example of

A. crossing taxonomic class lines.
B. insects being similar to people.
C. an impersonal world.
D. mutualism.

47. In this passage, class means a

A. style.
B. school group.
C. social group.
D. category.

48. The passage characterizes insect societies as

A. ordered.
B. highly motivated.
C. small in scale.
D. weighted.
APPENDIX F

For all experiments reported in this dissertation, approval for use of human participants was obtained from the University of New Hampshire Psychology Department Internal Review Board. Forms demonstrating proof of approval are included in this Appendix.
**Exempt Review**

46.101(b)(1) Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as:
- (i) research on regular or special educational instructional strategies, or
- (ii) research on the effectiveness of or comparison among instructional techniques, curricula, or classroom management methods.

46.101(b)(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior unless:
- (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and
- (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to subjects' financial standing, employability, or reputation.

46.101(b)(3) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior that is not exempt under category (b)(2) if:
- (i) the human subjects are elected or appointed public officials or candidates for public office; or
- (ii) federal statute(s) require(s) without exception that confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.

46.101(b)(4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

46.101(b)(5) Research and demonstration projects which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.

46.101(b)(6) Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration, or approved by the Environmental Protection Agency, or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

**Protocol is approved as presented in the category checked**
- Protocol is approved with the following contingencies/comments (attach sheets if necessary)
- Protocol is referred to the IRB for Expedited or Full Board review
- Protocol cannot be approved as presented (cite reasons on separate sheet)

**DRC Reviewer:** [Signature]
**Date:** 1/30/09
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- describe alternative experience