OUR INNER NOTE-TAKER:

HOW DO READERS SEARCH FOR INFORMATION IN A LENGTHY PREVIOUSLY-READ TEXT?

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Abstract

This thesis explores how readers search for information in long, previously-read texts. While this is an activity that people engage in regularly, it has been insufficiently studied in the existing body of research on reading and memory. A majority of reading and memory research focuses on short texts, such as word lists or short paragraphs, and the readers are usually tested immediately following the reading, such that long-term memory is not factored in. Furthermore, many reading studies involving the search for information rely more on eye movements or quantitative data collection methods than on the readers' own subjective insights into their reading practices.

In the current study, participants were asked to read a long expository text of over 3,000 words. A few days later, they were given reading comprehension-style questions. While answering the questions, readers were engaged in a Think Aloud Protocol, explaining where they thought the answers were, and how they were searching for the information in the text. Thematic Analysis was used to evaluate their answers, gain metacognitive insights, and explore themes that would shed light on effective search strategies.

The findings and analysis have revealed several interesting themes and insights. A variety of conscious, semi-conscious and unconscious search strategies were employed by the participants – including some which quite possibly have not been fully explored before in reading or memory studies.

There are promising indications that confident readers employ more effective search and memory strategies than their less confident counterparts, especially in how they relate to the text as a whole unit, with divisible subsections.

Follow-up studies in this area should further explore the readers' insights and formulate practicable strategies for both students and educators to utilize in order to assist struggling readers - such as those with learning disabilities - in the search for information in long texts.

Impact Statement

The aim of this research was to get a first look into how people recall and search for information in long, previously-read texts. According to Israeli Ministry of Education officials, supported by what parents, teachers and students in Israel and elsewhere have told me, as well as by my own teaching experience, most reading tests use short texts to evaluate reading abilities, and teach children with reading difficulties. The assumption seems to be that when students encounter a longer text, they will use the same strategies that they have been taught for the shorter ones. But in truth, the whole can be greater – and more complex and intimidating – than the sum of its parts. Strategies for reading and remembering texts should reflect the length and complexity of the text, and not just assume that long is simply an extension of short.

Given that this is exploratory research, looking at a junction between reading and memory that has not been studied in this manner before, it is difficult to say precisely how the results and observations can best be put to practical, professional use.

In the field of education, the goal, beyond the scope of the study, is to enable policy-makers, teachers and students to harness some of the conscious and unconscious strategies of the strongerreaders, and turn them into practicable tools for reading situations both in and out of the classroom. For example, a strategy such as unconscious global chunking could be studied further and incorporated into remedial reading skills. Using the metaphor of seeing either the forest or the trees, the more confident readers in this study were able to put the individual trees together, make a forest, and then re-divide the forest into manageable, logical sections. They were able to see the whole picture, and then divide it coherently in a way that helped them navigate the text. Using some of these techniques, less confident readers, who were seeing a big block of text made up of disjointed sections, could be taught to step back from the text, see it as a cohesive whole, instead of the disjointed sum of its parts, and then divide it into logical, interconnected sections. It is likely that this will aid in comprehension and future recall.

On the international front, and beyond the field of education, the study may have implications in the realm of digital reading. Although this study focused on printed texts, there were several indications that the myriad of clues that readers register while reading, could apply to the processing of digital texts as well. Further research in the area of processing and recalling information on websites and other digital media could build on the insights presented here, and take the study in new directions.

The phenomenon of peripheral processing likely has ramifications and applications beyond the study of locating information in texts. If, as I believe, it is a heretofore unexplored phenomenon, or an offshoot of other types of incidental information processing, then it warrants further exploration from a broad spectrum of memory experts, and could be explored in several fields of academic research.

All readers, no matter what their level of abilities or confidence, could benefit from a deeper understanding of how reading is a multi-sensory, and not just a semantic, experience. A heightened awareness can serve to strengthen and develop our natural Inner Note-Taker.

Declaration

I hereby declare that, except where explicit attribution is made, the work presented in this thesis is entirely my own.

Signed: Naomi Kruger-Arram

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Personal Statement

Background

While I was applying for the EdD programme, a conversation I had with my niece set off a chain of events which eventually led to my initial area of inquiry. A student teacher, she was telling me about her difficulties teaching history to a group of teenage boys. She mentioned that she had introduced a graphic text ('comic'-style book) into the classroom, and described the almost magical effect it had on the students – especially some of the weaker ones. I then recalled my own teaching experiences, noting how some students are repeatedly drawn to this medium. This led me to wonder whether graphic texts could be helpful to hesitant or struggling readers, given that the messages being conveyed in these works are divided into three distinct main components: text, pictures and speech/thought bubbles. It was my feeling that readers who were experiencing difficulties with longer texts could 'anchor' their understanding of the text on these different aspects, instead of relying solely on written text, which can be monolithic and intimidating to those who are struggling with processing and comprehension. Once this was achieved, and the graphic work gave the readers a more solid footing in reading and understanding the text, perhaps it would also be able to aid them in remembering details, and thus help them search for information in the text after they had read it.

A graphic text is broken down into elements which tap into a more varied set of cognitive skills or abilities than merely the verbal ones. It is possible that this breakdown of the textual elements may aid in comprehension and absorption, and thus memory for information may be enhanced as well.

That was the original premise for the research. However, it became clear while I was familiarising myself with the background literature for the IFS, that the study of how readers remember long texts, and then search for information in those texts, has been all but neglected in academic research. This should have been the body of literature that would have provided the basis of comparison for what I wanted to explore with the graphic texts, but it did not exist. It was

then that I realised that I had to take a step back and examine these broader issues, looking more closely at what was taking place during the search process, before I could begin comparing how readers absorb and remember regular linear texts as opposed to graphic ones. I liken the idea of pursuing my original plan while ignoring what was missing in the literature about the search process, to a builder trying to erect the second storey of a house when he hasn't yet put in a solid foundation. Not a wise thing to do. And this is how I began to explore what happens when we read a long text, and then need to return to it to search for information.

The taught courses

Foundations of Professionalism (FOP)

(*General perspective on professional values in education*)

I went into the taught courses not having taken any challenging academic classes in over 20 years. My initial attitude was to simply jump in, write my first essay, and treat this reintroduction to academia as a learning experience. This is more or less what happened, and I quickly realised that returning to the world of research and writing in-depth essays was more difficult than I had anticipated.

Methods of Enquiry 1 (MOE 1)

(*Designing a practicable research study*)

For the MOE1, I made a critical mistake. At the time, I was working on an EU-sponsored project, collecting data about standardising Academic English courses in participating countries, and my superior on the project (herself an IOE doctoral student at the time), encouraged me to apply the EU research to the MOE course. This seemed like a good idea, and even though it meant that I would be sacrificing beginning to explore my own area of interest, it would make the course work more manageable, and also help me better frame the EU study itself. However, unbeknownst to me then, it would make my IFS more difficult, because some of the problems which cropped up during the IFS could have been ironed out – or at least identified – at this earlier stage. This is one of the advantages of doing the MOE prior to beginning the main thesis

research, and I missed out on that critical stage. In retrospect, this made it a wrong decision, but at the time, that was difficult to foresee.

Specialist in International Education (SIE)

(*This component – which was removed from the current programme - was designed to add an international perspective to principles in education*)

With this module, I began to explore the use of graphic texts as a teaching tool, albeit in a different way than I was planning to use them for my IFS and thesis. Still, I was finally going to be delving into the topic and tackling some of the issues involved. I was quite disappointed with my low grade for this paper, considering that I felt very engaged and connected to the topic and put together several good arguments.

Many years ago, someone likened the challenges of life to a video game. Just when you master a level and get comfortable playing it, you're forced to move up to the next level – whether or not you feel ready. That is how I felt with the SIE, and indeed with the EdD programme in general. This is not necessarily a bad thing, it just took me by surprise and 'winded' me.

Methods of Enquiry 2 (MOE 2)

(*Designing and implementing a research study*)

During this module, the stage I was at in developing my research goals and methods for the MOE2 study was probably the stage most people would have already passed with MOE1 or SIE, in terms of how thought-out and practicable their research plan was. I had some good ideas, but there were several errors and flaws with the study. Still, it was a fantastic learning experience, and helped me to jump to the next level of the 'video game': the IFS.

Institution Focused Study (IFS)

(*Pre-thesis research project of approximately 20,000 words in length. Should relate to the thesis subject matter, and be connected to the student's professional work context*)

As stated above, it was whilst carrying out my IFS research, that I realised what was lacking in the body of literature related to reading, search and memory. It also became increasingly clear to me that I was trying to forcibly

extract quantitative data from what was clearly research of a very descriptive, exploratory and qualitative nature. I also discovered that (at least in this area of study), I was much more comfortable with qualitative data-collection methods. While this made for several flaws in the IFS field research, it ultimately paved the way for a much more elegant, refined and applicable research design for my thesis work, and for that, I am truly grateful.

The Thesis Proposal

Although not officially considered a distinct phase of the EdD programme, the proposal stage was a milestone and turning point for me. It was while formulating the proposal that I began to feel like a researcher, and solidified my ideas into a concrete research plan. This was also the critical point at which my supervisors and I became a more unified team, working towards a shared vision of what the thesis would look like. The feedback and criticism from the proposal reviewers was constructive and helpful, enabling me to move forward to the next stage of my research.

The Thesis

I have learned so much over the course of my thesis work, that it's difficult to articulate it all. First and foremost, I gained essential skills in the areas of research design and implementation. Not just for this study, but for any future research that I carry out. I learned a tremendous amount about reading, memory and the search for information in texts. And equally important, even in my late 40s, I was able to learn a great deal about myself. In reflecting on the entire experience, module by module, I can say with confidence and gratitude, that the whole of this process has been more rewarding and enriching than the sum of its parts.

Although the thesis has had its natural ups and downs (and then some), and there have been several times where I was exhausted, burnt-out, plagued by health problems and ready to give up, I am very grateful that I've persevered. I am excited to present my findings to the academic world and hopefully add to the ongoing discussions about reading and memory.

The Future

Going through this process has enabled me to learn and grow. I've become a more confident researcher and a better teacher. Doing a Doctorate in Education has also provided me with some unique professional opportunities. When I first applied to the programme, the course facilitator who interviewed me asked me if my background in Criminology and experience in Education could somehow enable me to create a 'magic formula' for helping troubled youth in the school system. At the time, my answer was, "I wish, but no." It's a bit of a chicken-egg conundrum: for whatever reason, many young people who find themselves getting caught up in various areas of the Criminal Justice System, also have learning difficulties, are intimidated by reading and do poorly in their academic studies. But it's a complex phenomenon, with many factors involved, and not so easily solved.

While I still haven't found any magic formulas, I have begun to develop an innovative teaching enrichment programme that does combine my two areas of expertise in a unique, and hopefully productive way. I look forward to contributing further to the field of education and helping disadvantaged populations, using the knowledge and skills I have obtained from my studies at the IOE.

Introduction

In "The Psychology and Pedagogy of Reading", published over 100 years ago, E.B Huey wrote:

"…to completely analyze what we do when we read would almost be the acme of a psychologist's achievements, for it would be to describe very many of the most intricate workings of the human mind, as well as to unravel the tangled story of the most remarkable specific performance that civilization has learned in all its history" (Huey, 1908, p. 6) [1].

In the more than a century that has passed since, reading has been studied from many perspectives. As Huey said, it is a complex, intricate activity. The act of reading is comprised of many facets, with cognitive, linguistic, cultural, ophthalmologic and neurological processes all occurring simultaneously. It has been studied by experts in all these fields, each emphasizing those aspects which are unique, or most relevant to, their particular field. Despite the ongoing, multi-disciplinary interest in this most important activity, there is still much about reading that remains a mystery.

As explained in the Personal Statement, whilst I was familiarising myself with the background literature on reading and memory, and conducting the preliminary research for this thesis, it became clear that there was a dearth of academic research regarding searching for, and locating, information in lengthy previously-read texts.

In order to better grasp what was occurring during the search process, I needed to first explore these broader issues, and only then, could the absorption and retention of graphic texts, be studied in further research. In the same way that a builder cannot erect the second storey of a home before she puts in a solid foundation, I could not conduct research about memory for

1 This idea was also quoted by Anderson and Pearson, in Anderson et al, 2002 (originally from their 1984 article). It is a testament to Huey's insightful eloquence that it was relevant to both our works, despite the years and conceptual differences that divide this thesis from Anderson and Pearson's chapter.

information using graphic texts, when memory for lengthy regular, linear texts, had not yet been thoroughly explored.
As such, the purpose of this thesis is to explore how confident readers return to a long text which they read previously, in order to search for information. Using the readers' metacognitive insights and observations (through the Think Aloud Method), I set out to gain some understanding into effective search strategies which may then be used to aid less confident readers.

A note about terminology

One aspect of the literature which has made an already enigmatic topic even more difficult to explore, is that there is no universally agreed-upon terminology for describing the phenomena being discussed. This is likely because the phenomena themselves are not fully understood. Researchers coming to the subject from different fields use the lexicon of their particular professions. As a result, there are several differing ways of describing what might very well be the same phenomenon. Conversely, sometimes two theorists appear to be addressing the same phenomenon, and in actuality, are discussing two different things. An example of this would be the use of the term 'text or document structure' which could mean the physical layout or surface form of the text, but could also refer to various contextual and syntactic clues in the text. Such was the case as well with the term 'lookback strategy', which initially seemed to be exactly what I was looking into, until upon closer examination, it became clear that Ruth Garner, the author who used this term, was referring to a teaching tool that involved showing readers where in the text they should be looking. This was quite different from what I wanted to investigate.

The use of gender pronouns – Where referring to, or quoting, specific participants in the study, the pronoun will reflect the gender of the person being referenced. For general examples, the masculine and feminine will be used in a randomly alternating fashion.

Chapter 1: Literature Review

Introduction to the Literature Review

Using participants' self-reflective insights as the basis for data collection, this study sets out to explore what confident readers do when they need to search for, or locate, information in long[2] printed texts that they have already read. Although most readers perform this task on a regular basis, this process has not been thoroughly probed as one cohesive phenomenon. Rather, different aspects of it have been explored individually, or in conjunction with other phenomena (unrelated to this study), and in varying degrees of depth.

When we read, our eyes and brains, and indeed our entire bodies, are engaged in a myriad of activities - some of them conscious and many of them less so. Reading is a multi-sensory experience, with the reader feeling the texture of the page, noticing the font and other surface elements of the text, visualising what is being read, hearing or vocalising the words on the page, and recalling events similar to those being described. Reading is associative and evocative, but these dimensions are often ignored in reading comprehension tests and studies or considered to be of secondary importance to comprehension[3], though, in fact, they may be essential parts of the reading experience.

As such, this study has been informed by research from several fields, which will be grouped under the following broad headings:

A) The Foundations of Reading - Comprehension and Comprehenders

What is reading? Reading comprehension as the central objective of reading; approaches to reading comprehension; characteristics of comprehenders

2 'Long texts' means longer than approximately 1,500 words. Most reading studies use word lists or very short paragraphs that are no more than a few sentences long as their basis of analysis.

3 For example, Luck & Hollingworth (2008), in discussing visual systems and visual memory, mention that reading initially begins as a visual activity. They then immediately negate that aspect, saying that as reading progresses, it moves away from its visual components (p. 3).

B) The Reading Experience

Reader-text interplay; cognitive processes that take place during reading.

C) The Text

Aspects and characteristics of the text which give it cues, contours and 'landmarks'

D) Searching for Information in a Text

The importance of the search for information in texts; pioneering studies in search and location of information in texts.

The sections move from a general discussion of reading and readers and the interplay between them, to research which explores specific characteristics of texts, and then on to the particular skill of searching for information, which is being studied in this thesis.

A common thread which will weave through all the topics, is that of memory, since it is an important component of each of these elements. Memory is first used in reading as an integral part of contextualising what is being read. What is read is then stored, or encoded in memory, and this information is then recalled back from memory during search tasks.

Focused aspects of each of these fields were gleaned and fused together to form the basis for this research. The result is a crossover, or bridging, among the broad areas of reading research, cognition and memory, as well as insights into the search strategies of the readers and the characteristics of the printed texts themselves. Each area of study is complex, multi-faceted, and comprised of many underexplored elements, which made this a challenging task, yielding several unanticipated revelations along the way.

To use an analogy, there is no well-paved path which leads directly from the existing body of knowledge to this thesis. Rather, the existing body of knowledge is more akin to a loosely-paved walkway comprised of a several stepping stones, with large gaps in between them. The stones, but equally, the gaps, point the way to new directions or destinations.

A) The Foundations of Reading

Introduction: What is Reading? The Interrelated Nature of Reading and Comprehension

The first question that needs to be asked, is "what is reading?" Given that reading is an action that involves several different facets and sub-processes, it follows that there cannot be one all-encompassing definition of this skill. There are many interpretations of reading, which make studying this activity all the more challenging. In most of the academic literature and research on reading, the activity itself is not defined at all. Rather, it seems to be taken for granted that what reading is, with all its complexities and nuances, is understood by all to mean the same thing.

When a definition is attempted, it is by no means a simple task. As an example of how complicated it is to arrive at a unified definition of reading, in 2006, the U.S.-based NARAP (National Accessible Reading Assessment Projects) formed a focus group, and subsequently published a paper, centred solely on establishing a definition of reading, with specific attention being paid to accessibility and inclusiveness. For that paper, a total of three definitions were presented, and debated by the focus group (see Appendix A).

In all three NARAP definitions, understanding what is being read is incorporated as one component of the reading activity. However, in many studies, the act of reading itself is not defined at all – only comprehension is. Since reading without comprehension has little value, many researchers skip straight to defining comprehension, and it is assumed that this definition encompasses the act of reading as well. As with reading, however, there is little consensus as to what comprehension is. Pardo, for example, provides two definitions of comprehension: "The RAND Reading Study Group (2002) stated that comprehension is 'the process of simultaneously extracting and constructing meaning through interaction and involvement with written language' ….A common definition for teachers might be that comprehension is a process in which readers construct meaning by interacting with text through the combination of prior knowledge and previous experience, information in

the text, and the stance the reader takes in relationship to the text" (Pardo, 2004).

Perfetti and Stafura (2014), in discussing reading comprehension, assert that there "is no theory of reading, because reading has too many components for a single theory". However, there are several approaches to reading comprehension that warrant mention here.

1.1 Approaches to Reading Comprehension

Given the multiple components referred to by Perfetti and Stafura above, it follows that reading comprehension can be viewed in several different ways. Theories or models of reading comprehension fall into three broad categories: 1) Top-Down, 2) Bottom-Up and 3) Interactive.

It would be erroneous to say that each category is completely discrete and there is no overlap among them. They share many similarities, and the boundaries between them are more fluid than their names suggest. Moreover, as will be shown, they also share several features, including shortcomings, which are directly related to this study.

1.1.1 The Top-Down Approach

The most well-known top-down approach is The Whole Language Approach to reading (WLA), of which Frank Smith, and Kenneth and Yetta Goodman are the leading proponents (see Appendix B.1). 'Top-down' means that a larger whole, or 'top', controls the parts, such that reading is not limited to decoding each letter or word being read, but rather, comprehension involves an ongoing cycle of using prior knowledge to predict or hypothesize about what will come next in the text.

Despite being considered a top-down theory, the Whole Language Approach of reading shares several elements with the interactive approaches, in that most of the stages of reading that Goodman enumerates are cyclical (Israel & Duffy, 2009, p. 95).

The Whole Language Approach is relevant to this thesis because it is concerned with how readers perceive and absorb a text in its entirety, as well as how the reader's schema and memory are constantly activated during the reading process**.** However, as Rayner and Pollatsek (1989) point out, most research contradicts Goodman's assertion that reading is mainly a "psycholinguistic guessing game"[4]. Rayner and Pollatsek further critique of WLA is that, as they say "despite all of the boxes and arrows… it does not really specify much about the reading process" (Rayner & Pollatsek, 1989, p. 464.[5]). This is unfortunate, because a stronger connection between reading, on the one hand, and schema and memory on the other, would have been informative for this study.

1.1.2 The Bottom-up Approach

Bottom-up approaches argue that reading is comprised of decoding the basic units of letters into sounds and words, which are then pieced together to make sense of, or comprehend, the larger text, much like putting together a puzzle or building blocks. In addition, the most predominant bottom-up theories include the supposition that the reader's aural language or listening comprehension is called into play during reading, and thus reading comprehension does not exist in a cognitive vacuum (Gough & Tunmer, 1986; Perfetti, Landi & Oakhill, 2005). (See Appendix B.2 for Gough's "Simple View of Reading".)

Most bottom-up approaches see the two overarching aspects of reading as: 1) decoding and 2) comprehension[6]. Perfetti, Landi and Oakhill (2005) refer to these two processes as "the identification of words" and "the engagement of language processing mechanisms that assemble these words into messages" (p. 229). The reasoning behind the emphasis on these two components is simple: letters and words form the building blocks, or foundation, for all

4 Although Goodman originally developed the model to show how children, not skilled adults, read, he later claimed that his model was applicable to skilled adults as well, and that reading at all levels involved a "elective, tentative anticipatory process", which is guessing (Rayner and Pollatsek, 1989, p. 462).

5 These criticisms are reiterated in condensed form in Rayner et al. 2012.

6 Perfetti, in 2010, seems to prefer what he calls the "Golden Triangle" of reading, adding vocabulary to decoding and comprehension as an essential component of the reading process. For the purposes of the discussion in this study, vocabulary was not taken into consideration as a separate factor.

reading skills, and comprehension is about understanding this decoded language, which is, after all, typically the goal of the reading to begin with.

At this juncture, it is important to mention Andrew Davis' observations regarding decoding and meaning in written language. As he illustrates with several examples, decoding is inseparable from context and prior knowledge, especially if words have multiple meanings and nuances (see his discussion of "paws", "pause" "pores" and "pours"; Davis 2013, p. 23). As we will see below, prior knowledge and schema, beyond the content of the text itself, play important roles in the reading experience (see Section 1.4.1).

1.1.3 Interactive Models of Reading

Interactive models of reading assert that reading is a cyclical or multi-directional process that cannot be encapsulated in either a top-down or bottom-up approach. Most top-down and bottom-up models have a cyclical element to them, acknowledging the interactive nature of reading, but interactive approaches see the cyclical nature of the process as more fundamental than their top-down and bottom-up counterparts.

Models such as Just and Carpenter's (Just & Carpenter, 1980), begin with eye fixations and move towards encoding the text, accessing the reader's lexicon and extracting pertinent information and then on to integrating with previously read parts of the text. The integration stage is a crucial component of the theory. According to Just and Carpenter, both working and long-term memory are continuously called into play, in order to aid the reader in making sense of the text and enabling him to proceed further. This interplay between the text and the reader is what makes it an interactive approach (See Appendix B.3).

One shortcoming of Just and Carpenter's model and research, is that although the authors identify a stage in the reading process which they call "Extract Physical Features", they fail to discuss this stage in their own work. As will be explained later, the physical features of the text are related to how we read,

absorb and retain the text, and as such, a discussion of this stage, which was clearly included for some reason, but then ignored, would have been useful.

A similar interactive model is that of Rayner and Pollatsek (1989) which is comprised of many of the same components as Just and Carpenter (see Appendix B.4). For example, even though the components are given slightly different names in their respective models, both models incorporate components such as: eye movements; encoding; lexicon; moving on to the next word; use of schema (or episodic knowledge) and both working and long-term memory (hereafter also referred to as WM and LTM).

Rayner and Pollatsek admit that their model is vague and sketchy (Rayner & Pollatsek, 1989, p. 472). Indeed, the model seems to require its own exegesis for it to be useful. They themselves appear to be aware of this, stating that criticisms of other models, such as their own critique of Goodman's model, could be directed at theirs just as easily (Rayner & Pollatsek, 1989, pp. 471-472). The biggest shortcoming of their model, however, is that more than 20 years after they developed it, when they updated it for a newer edition of their book, they still admitted that it was vague and voiced their dissatisfaction, referring to it as their "incomplete and schematic illustration" (Rayner et al. 2012, pp. 399-400; see Appendix B.5).

Interestingly, in the original model, both LTM and WM feature quite prominently, as key parts of the reading process, yet in the updated version, they were absorbed into other stages (such as "world knowledge") in such a way as to seem invisible or irrelevant. This shift is disappointing, considering that all the theories of comprehension (including those of Rayner and his colleagues) include memory as an integral part of the reading process (see Rayner et al. 2012, pp. 15-16).

There are two additional difficulties with Rayner et al.'s more recent model. The first is that, like most reading experts, (Goodman and his colleagues being the notable exception) Rayner et al. feel that we process words when we read. The words are seen, absorbed and linked to information in our memory, as

well as to information that was previously read in the text, and then used to facilitate our understanding of the words which follow. However, Rayner and his colleagues question whether the process continues in the same manner when readers process larger and longer texts, or whether the process itself becomes more complex as the text gets longer (Rayner et al. 2012, p. 402). In their own words: "To summarize, the situation is pretty murky after we leave the lexicon". This is a very pertinent observation and one which has direct implications for this thesis: can conclusions about how we read words, sentences and short texts, automatically be transferred to longer texts as well, or are there subtle shifts in the reading process itself as the text lengthens? Is it not logical to suppose that as a text becomes longer, instead of being merely a wordier version of a shorter text, it becomes exponentially more complex, and requires more sophisticated reading, comprehension and memory skills? Unfortunately, even after decades of study, Rayner and his colleagues have no answer [7].

The second problem with the revised model is that 'inner speech' was removed from it. According to Perfetti and Baddeley, as well as Rayner and his colleagues themselves, inner speech is an integral part of the reading process (Baddeley & Lewis in Lesgold & Perfetti, 1981; Perfetti in private correspondence, 2015; Rayner et al, 2012, Chapter 7), and as such, it is both surprising and disappointing that it was removed from the revised model.

Perhaps the Interactive approach which informed this thesis most closely, is that taken by Perfetti and his colleagues. Their assertion, mentioned earlier that there can be no single theory of reading, affirms the multi-faceted nature of the activity which is so central to this thesis. Stafura and Perfetti's framework incorporates "world knowledge" (see Appendix B.6), which parallels Davis' 'context', discussed previously, and is also akin to the activation of schema. Perfetti acknowledges the importance of the text itself, not only as a linguistic and orthographic entity, but also as a visual one. In addition, his approach is also the most cyclical and interconnected of the

7 Smith (2004) does differentiate between short and long texts. When discussing information overload, he states that decoding of individual letters or words is insufficient to make sense of a longer, complex passage.

Interactive theories, allowing for more multi-directional movement among the various components.

Despite the strong connections between comprehension and what this thesis is exploring, comprehension theories alone do not provide sufficient background or theoretical underpinnings for this study. Overall, the reader remains objectified and is still viewed as somewhat of an 'outsider' in the reading process. In order to truly understand comprehension, it is necessary to examine the comprehenders themselves, and their role in the reading process.

1.2 Comprehenders and Reading Abilities

Comprehension is meaningless if the comprehenders themselves are not discussed. There exists a very broad spectrum of abilities and difficulties when it comes to reading and comprehension. If there was no variance among readers, then the question of comprehension would be far less important – a text would either be universally understandable, or it would be incoherent to all. It is because there is such diversity among readers and their abilities, that decoding and comprehension are such crucial foci of the reading process.

With comprehension being the ultimate goal of reading (Nation, 2005), the study of why some people do not possess effective comprehension abilities has become the primary focus of reading research. Over the last several decades, significant progress has been made in understanding several types of reading disabilities, and aiding people who have them. But, as with the concepts of reading and comprehension themselves, what constitutes a reading disability is not universally agreed upon. In addition, there are a range of terms used to describe people with both strong and weak reading skills. In various studies, the terms 'weak', 'struggling' 'inefficient' 'reluctant', 'poor comprehenders'[8] and 'people with reading disabilities or reading difficulties' have all been used to describe readers at one end of the comprehension spectrum, while 'normative', 'strong', 'skilled', 'effective' and 'efficient' have all been used to

8 "Poor comprehenders" is the term favoured by Oakhill and her associates. See for example, Cain and Oakhill, 2006.

describe those at the opposite end (see some of these terms used in Mokhtari & Reichard, 2002; and Swanson, Howard & Sáez, in Cain & Oakhill, 2008). While not a comparative study, this thesis explores the search process of less confident readers as a secondary focal point, after examining what confident readers do. Both groups have self-defined themselves as such (as will be discussed in more detail in the Methods section), but it is still helpful to understand what is generally meant when we discuss strong, efficient readers or those who are hesitant or less efficient.

Based on the research carried out by Pressley and Afflerbach (1995) and Block and Pressley (2001), Duke and Pearson (2009) enumerate several characteristics of what they refer to as "good" readers. The characteristics which pertain to this study are:

> "• Good readers are active readers.
> • From the outset they have clear goals in mind for their reading.
> • They constantly evaluate whether the text, and their reading of it, is meeting their goals.
> • Good readers typically look over the text before they read, noting such things as the structure of the text and text sections that might be most relevant to their reading goals…
> • Good readers construct, revise, and question the meanings they make as they read… They monitor their understanding of the text, making adjustments in their reading as necessary
> • Good readers try to determine the meaning of unfamiliar words and concepts in the text, and they deal with inconsistencies or gaps as needed.
> • They draw from, compare, and integrate their prior knowledge with material in the text.
> • Good readers read different kinds of text differently.
> • When reading expository text, these readers frequently construct and revise summaries of what they have read.
> • Comprehension is a consuming, continuous, and complex activity, but one that, for good readers, is both satisfying and productive[9]" (Duke and Pearson, 2009, p.107).

From the characteristics of strong readers presented above, one can extrapolate that the opposite is true about weaker ones. That is, different types of struggling readers are less effective in some of these areas. For example,

9 List order has been altered slightly, and italics removed.

someone who is grappling with decoding the meaning of each word may not be able to note the larger structure of the text. Frank Smith, and subsequently, several researchers in the field of working memory, discuss the phenomenon of "perceptual bottleneck" (Smith, 2004, p.79), whereby a reader encounters more information than he can process, or inconsistencies in a text, and freezes, or shuts down, experiencing what Smith calls "tunnel vision", making effective reading "impossible" (Smith, 2004, pp.80, 95; see also Jacobson et al., 2011; Schubert, 2008).

However, not all of the less effective readers would have difficulties in all the areas in which the stronger readers succeed. A weak reader may not have clearly defined goals for her reading activity, but may still utilise her prior knowledge whilst engaged in reading. If a reader were to be weak in all the areas that Duke and Pearson list, she would not be engaged in what we recognise as reading. Therefore, it follows that different types of weak readers encounter obstacles in different reading skills and abilities. There exists a very wide spectrum of difficulties that people encounter whilst reading. Just as there is no single universal term for reading disabilities, so too, there is no one cause or explanation for the broad phenomenon – this is not a homogeneous group. As Perfetti points out, both reading ability, and lack thereof are comprised of several complex components (Perfetti, 1985).

Cain and Oakhill (2008), outline three tiers of potential comprehension problems (word-level, sentence-level and discourse-level), with each level being comprised of multiple sub-categories. In this discussion, they do not touch on types of reading difficulties other than comprehension deficits, and yet, focusing on the one aspect alone, they succeed in demonstrating how complex and multi-faceted reading difficulties truly are. Nation calls weak readers a "heterogeneous group", (Nation, 2005, p. 264), enumerating several possible areas of weakness in reading, including phonological and semantic/oral skills; word recognition; working memory and higher-order discourse level processes, such as ability to make inferences, metacognitive monitoring, and the use of prior knowledge (schemata).

Recently, Nation attempted to quantify reading difficulties, using a model based on the Simple View of Reading, and focusing on decoding as the main component of reading comprehension. Ultimately, she concluded that while the Simple View "provides a useful framework" for conceptualising comprehension, reading difficulties are multifaceted, and require a broader understanding of the various problems, and a formulation of solutions beyond decoding alone (Nation, 2019).

As stated previously, this is not a comparative study about weak and strong readers, per se, but rather about memory and search processes. Therefore, a full discussion of reading difficulties is not warranted, beyond raising some of the differences among readers along a spectrum of abilities. Since, as we will see below, reading is about the interplay between reader and text, we now move from a discussion of reading and readers, to take a closer look at how the texts themselves become participants in the reading process.

B) The Reading Experience

1.3 The Reader-Text Interplay

According to Louise Rosenblatt and other proponents of Reader Response Theory, the author, the reader and the text form a triad – an interactive, transactive and dynamic relationship. The text is not flat and one-dimensional, and the reader is not a passive receptacle. The reader is an active partner, bringing with her a wealth of knowledge, experiences and ideas, while she reads.

The writer's role is, of course, essential to the reading experience, and without his or her ideas, there would be no text or reader, but for the purposes of this thesis, the focus will be on the reader-text connection. The writer's intentions and relationship to both the text and the reader, are acknowledged, but lie outside the scope of this study.

Although Rosenblatt (1982) chose the word 'transaction' to describe the relationship between reader and text, the word 'interplay' will be used here

instead. ‘Transaction’ implies a one-off, discrete, or finite encounter, whereas ‘interplay’ has a broader, more dynamic, ongoing, back-and-forth connotation. The participants in this study did not read the text only once. Rather, they read it initially, and then returned to it for the search task, at which point they may have read parts of the text several times over, employing multiple skills and strategies, and engaging with several different aspects of the text. For this reason, ‘interplay’ seems the more fitting term in this context.

The act of reading is typically a purposeful, deliberate one. However, how one reads, what is absorbed, what is noted and what is remembered, are an elusive mix of the conscious, semi-conscious and unconscious. Some intentionally employed strategies, like scanning, are fully conscious. Other facets of the reading process, such as how the written material becomes encoded in memory, are unconscious. Still others are semi-conscious, or oscillate between consciousness and unconsciousness. An example would be when a reader tries to visualise what is being described in a text. This could be a conscious tool, to enhance comprehension, or it could be an automatic response, which pops into the reader’s head before he is fully aware that he is doing it.

As will be discussed in the Analysis, the realm of the conscious and unconscious in reading is a fluid and elusive continuum, and not a strictly-defined dichotomy. Following are some of the key elements of the conscious/unconscious spectrum in the reading process.

1.4 Conscious and Unconscious Processes During Reading

While we are reading, our brains are active in a multitude of ways. Each theory of reading comprehension discussed earlier touches on several cognitive processes, both conscious and unconscious, which take place during reading, and those factors are by no means the only ones. Baddeley and Lewis address the conscious elements, saying that “reading is not a skill but a range of skills that the fluent reader may deploy in different ways to tackle different tasks” (Baddeley & Lewis, 1981, p. 128). And Christie and Just ((1976) briefly mention one of the unconscious processes, when they state that readers unintentionally store locative information while reading, information that

"may be available after the content is forgotten" (p. 702), although they do not go into detail as to how this happens.
Each of the following sub-processes is one of many components which make up a small part of what we know the brain is doing while we read. Some of these have been studied extensively, others less so, but none of these facets have been studied in the manner in which this thesis is exploring the junction among reading, memory and search. As such, each will be touched upon briefly, and raised as one of the essential "stepping stones" mentioned at the beginning of this Literature Review**.**

It is crucial to note here that there is a complex interplay between what we read and process whilst we are reading, and what we recall when we are searching for information after we have read. Because, although recall happens *after* reading, it depends greatly upon what was observed and noted *during* the reading process.

1.4.1 The Role of Schema in The Reading Process [10]

Schema consists of the prior knowledge and experiences that a person brings to any cognitive process, including reading. It has long been considered an essential factor in how we understand and relate to the world around us. Schema can be called upon deliberately, in order to help one remember an associated piece of information. A new fact can also trigger a person's schematic knowledge without the person's explicit intent. The use of schema, therefore, may be both a conscious and unconscious reading strategy. As mentioned earlier, memory crosses through all of the topics covered in this Literature Review, and schema plays a central role in both encoding into memory and recall from memory. Schema is one of the primary components of both the reading process and reading comprehension, and is included in some form in all the major comprehension theories. For these reasons, it will be discussed before any other facet of reading.

10 The singular 'schema' is often used interchangeably with the plural, 'schemata'.

Schema is an essential element in our understanding of, and relationship with, the world around us. It is also a key factor in basic reading comprehension. Reading and cognitive researcher, Walter Kintsch stated that "text understanding, even of quite trivial texts, is impossible without the help from schemata" (Kintsch, 1977, p. 378). Duke and Pearson (2009) talk about comparing and integrating prior knowledge with the text being read, and Perfetti includes "world knowledge" (essentially schema) in his model of reading comprehension (Perfetti and Stafura, 2014; see Appendix B.6). Similarly, Sadoski calls schema "the software of the mind". He acknowledges that although it remains enigmatic and abstract, it is still an essential part of cognition, comprehension, and memory (Sadoski, 2018, pp. 334-335).

Rayner and his colleagues, while pointing out that schema is almost impossible to quantify and measure, still include what they call "world knowledge/ thematic relations" in their models of reading comprehension (see Appendices B.4 and B.5). According to them, and to Rouet as well (2006) prior knowledge plays a critical role in reading, enabling the reader to fill in the contextual gap between merely reading letters and words, and reading and grasping a whole text. Although he does not refer to it as such, Davis too, emphasised the importance of recognising words in familiar, schematic contexts (Davis, 2013).

Anderson's summary chapter on schema will be used here to raise several key points regarding schemata's role in reading (Anderson, 2004, pp. 594-606).

The reader's knowledge and experiences play at least three different key roles in the reading process. First, they aid in comprehension. As Anderson explains, the very act of comprehension is "a matter of activating or constructing a schema that provides a coherent explanation of objects and events mentioned in discourse" (pp. 597-598). He goes on to contradict the traditional view that comprehension is about taking letters and words and aggregating their meanings to form clauses and sentences, working from the smallest components to increasingly complex ones, but using the same fundamental process for each. Instead, according to Anderson, once the words become a full text, and not just isolated words or phrases, the whole becomes

greater than the sum of the parts and “the click of comprehension occurs only when the reader evolves a schema that explains the whole message” (Anderson, 2004, p. 598). (See Appendix C for Anderson’s example of schema at work during reading.)

Another role which schemata play in the reading process is in how the text is encoded in memory. It is very likely that information which is read is encoded and stored in long-term memory with similar previously learned or experienced knowledge. (See for example, Anderson & Pearson, 2002, pp. 278). This, in turn, can affect how the information is recalled, which is the third function of schemata.

According to Anderson and Pearson (ibid), stored schemata can facilitate “orderly searches of memory”, enabling the reader to more efficiently recall information, since it has been encoded and linked together with similar previously-learned information. Such information may have initially seemed unimportant but will later become significant, and ‘pop’ into readers’ heads, aiding in overall recall.

A final point is that Anderson states that children do not efficiently integrate new information with existing schemata, and also that cultural minorities will have a problem with texts which assume prior knowledge that is related to the majority culture. Although he does not include less confident readers or those who are struggling with reading comprehension in this discussion, it can be inferred from what he says, that they, too, would have difficulty effectively utilising and integrating schemata into the reading process.

1.4.2 Reading Strategies

The employment of a reading strategy is a deliberate action, intentionally carried out in order to achieve success. However, Carrell, Gajdusek and Wise, (1998), in discussing reading strategies, quote Pressley et al, who provide a different view, saying that "strategy functioning at its best occurs without deliberation. It is more reflexive than voluntary (p. 97)." Sue Bodman [11]

11 Skype conversation, Sue Bodman, Emily Farran and Naomi Arram, September 16, 2014.

questioned whether 'strategies' as used here means "a skill that somebody can be taught and can self-monitor and can consciously discuss and know when they've deployed it" (the more traditional view), or are strategies more akin to "within-the-head cognitions and perceptions that happen automatically"?

Carrell et al. (1998) bridge between the conscious and unconscious natures of strategy-use by stating that a conscious act is best regarded as a strategy, whilst a less conscious tactic may be considered a skill. For the purposes of this thesis, the use of reading strategies will be considered a mix of conscious and semi-conscious actions.

1.4.3 Metacognition

Metacognition is the knowledge of, and reflections on, one's own thoughts. The use of metacognitive awareness together with the reader's subjective experience as a tool for insight into the search for information, is a fundamental component of this study. However, whilst metacognition plays a major role in comprehension studies, the readers' experiences and insights into how they remember and search for information in previously-read texts, have not been sufficiently addressed. In Mokhtari and Reichard's exhaustive overview of the literature on reading and metacognition (2002), they do not mention metacognition in relation to the search for information. Retention of information is discussed, but this is when a reader accesses information immediately following reading, not a search that occurs after time has elapsed. Similarly, in "Metacognitive Processes and Reading Comprehension", which covers 30 years of metacognition studies, Baker and Carter Beall (2009), provide a sweeping review of the many facets of reading comprehension and metacognition. Neither searching for information in written texts, nor memory for what was read previously, was mentioned at all.

Hyönä and Nurminen (2006) seek to place stronger emphasis on reading longer texts as a cognitive skill. As such, they fuse together the aspects of cognitive and educational psychology which are both integral parts of the reading experience. They argue that cognitive psychology focuses largely on short texts and the micro-level analysis of reading, whereas educational

psychology has emphasised reader competence, and their objective was to explore these areas together.

To achieve their goal, Hyönä and Nurminen analysed both reader eye movements as well as readers' metacognitive awareness of their own reading behaviours, in particular, looking back and searching for information. Participants were first asked to describe their reading behaviour in their own words. The purpose of this question was solely to activate the readers' self-awareness of how they related to a text, and to open them up to answering the subsequent questions – the answers to that question were not analysed or factored into the study at all. Next, participants were asked to mark their reading speed along a 10-point line (from left to right – very slow to very fast, with the middle marked 0). Finally, in terms of metacognition, the readers' self-awareness was measured via an 8-question feedback questionnaire. Each question was scaled along a 6-point Likert scale. The readers were asked how they read and reread, as well as how they looked back and what they looked back for.

While they were reading, the subjects' saccades were charted with an eye-tracker. After reading the selected text (12 pages, 1,319 words), participants were asked to summarise the main points. Summaries were graded along a pre-set rubric.

The authors found a strong correlation between looking back and accuracy of recall, as measured by the score on the summary rubric. The readers in the study also seemed to be knowledgeable about their own reading behaviours. For example, those who used a lookback strategy, as evidenced by their eye movements, also reported having done so, and readers were fairly aware of their own reading speed.

The metacognitive aspects of this study are informative and relevant to this thesis. However, Hyönä and Nurminen were studying readers' general behaviour *during* reading, such as when and why they looked back. Their study did not explore how readers know where to look back *after* they've read

something and need to find a reference or answer to a question, and in that sense, it differs from this thesis.

Bonnie Meyer's body of work on metacognition focuses primarily on semantic signalling - that is, key words and phrases that cue the reader as to what is coming next in the text in terms of content (Meyer, 1975a; Meyer, 1975b; Meyer & Poon, 2004). Meyer created an elaborate and complex system of hierarchies of syntactic cues in texts which could aid readers in both comprehension and memory. In her study with Poon (2004), Meyer devised a system of signal strategy use, whereby she trained participants to recognise and utilise key words and signals in order to read and remember the text more effectively. While she did not use the term "metacognition", in essence what she was doing was training readers to use metacognitive strategies to recognise structural cues in a text, in order to more effectively retain and recall information.

Part of Meyer's training exercise showed readers how to identify the text's overall syntactic structure and main ideas. The other part was interest-motivational training, whereby participants were made to become aware of, and evaluate their own interest level in the topic of the text. Meyer felt that heightening metacognitive awareness of interest helps to increase motivation. Increased motivation in turn, aids in focusing attention, understanding and enjoyment, and all of these factors influence recall. In a similar vein, Hidi's research (1990) was based on the premise that if information is interesting to the reader, it is more likely to be stored effectively in long-term memory. Likewise, Anderson, too, concluded that if readers feel that if is important for them to remember information, they are more likely to pay attention to it while they are reading, and as a result, they will learn more effectively than if they felt it was not important.

In Meyer and Poon's study, readers were shown similar texts on the same topic, written with and without structural signals (expressions such as "one reason" and "in contrast"). Participants were then given tasks and scored on a variety of variables - both quantitative and qualitative - such as recall of

details, creating a summary, recognising text structure and self-reports of motivation.

The overall results of the study led Meyer and Poon to conclude that strategy training aids recall of the text. As with most of the studies discussed in this Literature Review, Meyer's work used texts that were not longer than two paragraphs each. While her focus is on syntactic, grammatical and conceptual cues in the text, Meyer's observations about motivation and interest are worth noting, as increased metacognition as well as conscious use of reading strategies are shown to be effective tools in recalling information from a text.

1.4.4 Skimming, Scanning and Chunking

Three common reading strategies are skimming, scanning and chunking. Although skimming and scanning are separate skills, they are often discussed together. Skimming is when a reader quickly glances at large sections of the text at a time, in order to get the gist of the main ideas or topics in the text. Scanning is when a reader looks over the text or parts of it, searching for specific words, details or information.

Carrell et al. (1998) list skimming and scanning together, along with several others, as "traditionally recognised reading behaviors" (p. 98). From my experiences as a teacher, I have noticed that readers often use the two skills in tandem, and do not necessarily differentiate between them when discussing their use.

Duggan and Payne (2009) question the efficacy of skimming as a reading strategy and memory aid. They conclude that skimming helps when time is limited, and it is an efficient way to comprehend more of the text faster than would be accomplished by linear reading. According to their studies, skimming helped readers remember the larger, important aspects of the text, but not the less significant ones, and was not useful in enabling the readers to have a deep understanding of the text. What is not questioned at all in their study, is that readers do skim often during the course of reading – is taken for granted that this is done naturally, as part of the reading process.

Chunking has been studied ever since Miller published his groundbreaking research on this memory aid in the 1950's. Chunking is essentially taking small units, or 'chunks', of information and grouping them into larger units, in order to maximise the amount of information that can be absorbed and stored by memory. The famous example is when digits to be memorised are grouped together into units, usually of three or four digits, such that each unit is then remembered as a whole, thus expanding the potential number of digits that can be recalled together. This is why telephone numbers are often seven or ten digits long – people can group the numbers into chunks of three or four and remember them with more accuracy than trying to remember the string of individual digits.

While chunking is primarily known for its use in remembering numbers, both Miller (1956), and later Simon (1974) recognised that what we do when we read is essentially chunking, since readers turn smaller units of letters into more meaningful and recognizable words, and then words into familiar, manageable phrases. It is unclear whether traditional chunking theories would say that this strategy can be applied to significantly larger units of text, where there is far more information to be remembered. It is more likely that longer texts may contain several chunks, not just one. Rouet, however, thinks that text chunking on a larger scale can be done (Rouet, 2006). He uses the term "coherence" in reading to refer to discrete units of text created by the reader. He discusses what he calls "coherence relationships", which is what readers create when they divide the text into manageable and relevant sections (similar to chunks) whereby each section has personalised meaning for the reader. Rouet's "global coherence" is essentially chunking on a macro scale – dividing a long text, in its entirety, into meaningful sections.

According to Gobet et al. (2001), chunking is both a conscious and unconscious phenomenon. When done deliberately, it is referred to as 'goal-oriented' chunking, and when it happens more naturally as part of a process, it is called "perceptual chunking". As will become evident from the insights of the participants in this study, while chunking can be taught and practised, it appears that many readers chunk automatically as well.

1.4.5 Self-monitoring or Self-regulation

An important facet of metacognition during reading is self-monitoring or self-regulation. This occurs when learners monitor themselves, and intentionally guide their actions during learning. A study by Cataldo and Cornoldi (1998) explored self-monitoring in both poor and good comprehenders. Their study focused on comparing the efficacy of embedding comprehension questions in the section of the text where the answer was to be found, with asking questions at the end of the text, for both levels of readers. One interesting finding was that all the participants "were more accurate when they had to respond to embedded questions rather than to questions at the end of the text" (p. 161). This was particularly observable in the weaker comprehenders. The authors inferred from this that "some of the difficulty children meet in text comprehension is due to an inability to search through the text in order to find the relevant information" (p. 161).

Another pertinent observation that the authors made is that weak readers have what they call a "strategy use deficit" rather than merely a processing deficit. This means that not only do they have difficulty processing the text, but they are also employing ineffective strategies when they are searching for information.

Schunk (2012, Chapter 9), when discussing self-regulation, presents the following conclusions: regulating behaviours, such as taking corrective actions, can help achieve learning goals; stronger mental associations and use of schemata build stronger LTM links; learning and memory strategies should be tailored to the students' specific needs, and particular learning situations; and finally, the use of self-regulation, self-monitoring and metacognition can enhance focus and memory. All of these points are directly related to what is being explored in this thesis, and their importance will become more evident in the Analysis section.

Along with the several conscious and semi-conscious cognitive activities in which readers are engaged, the brain is involved in absorbing and processing

information through unconscious channels as well. We will now turn to some of those.

1.5 Unconscious cognitive processes during reading

1.5.1 Automaticity

In their early work on automaticity. LaBerge and Samuels (1974), asserted that as readers become more proficient, parts of the reading process become automatic, thus requiring the reader to exert less mental effort on decoding the words, and enabling the brain to absorb information more efficiently (see also Bargh, 1974; Samuels & Flor, 1997). Today, over 40 years later, the concept of automaticity is not only widely accepted as a fundamental part of the reading process[12], it is often seen as a goal for teaching children with learning disabilities[13]. The main idea behind this is that if some degree of automaticity is attained, then children can focus more on accuracy and comprehension (see for example, Kuhn, Schwanenflugel & Meisinger, 2010, where automaticity is assumed to be an integral part of efficient reading).

An in-depth analysis of automaticity is outside the scope of this study. What is important is recognising that confident readers may, to some extent, be reading on "auto-pilot", thus enabling their brains to be engaged with the text in ways that are not purely verbal or phonological. By the same token, those who are less confident about their reading skills may not have mastered automaticity as successfully, and therefore, their brains would be occupied with more basic text processing, leaving less opportunity for other types of interaction with the text.

1.5.2 Primacy and Recency

Several studies in the 1960s and 1970s demonstrated what have now become known as the 'primacy' and 'recency' effects (see Schunk, 2012). The primacy effect is when people tend to remember information that was presented to

12 Schunk called skilled reading an automatic process (2012, p. 167).

13 This was made clear in courses I took on teaching children with reading disabilities, and is still a priority today, in the teaching college where I teach.

them at the beginning of an exercise - for example a word list, or an array of objects. Conversely, the recency effect states that people will remember the most recent (or last) objects presented to them in a group or list. The two are not mutually exclusive, since a person could remember both the first and last items, with the middle ones being recalled in the least effective manner.

1.5.3 Inner Eye, Inner Ear and Inner Voice (Inner Speech) [14]

Our unconscious minds provide us with tools to enrich the reading experience, and make it about more than simply deciphering black marks on a page. Baddeley explored a facet of visual processing during reading referred to as the "inner eye" (Baddeley & Lewis, 1981). By this it is meant that while readers rely on a variety of visual cues whilst reading, they are also aware of what the words *look like*. Thus, he and others have demonstrated that readers were more likely to recognise the rhyming sequence in the sentence, "*the lone crone was shown the phone thrown on the stone*, than in the sentence, "*I sigh and cry as the sly guy dies*" because the words in the first sentence are slightly more visually similar to one another than the ones in the second example (Baddeley and Lewis, 1981, p. 118) [15].

The "inner ear" (acoustic coding) in reading occurs when a passage describes an auditory phenomenon, such as a creaking door or the caw of a seagull, and the reader hears the noise in her head whilst reading (Baddeley & Lewis, 1981). Like the phenomenon of Dual Coding which will be discussed below, the Inner Eye and Inner Ear activate sensory perceptions in order to absorb written materials in ways other than the strictly verbal or phonetic.

Huey wrote about an "inner voice" that is activated during reading (Huey, 1908, pp. 116- 122). This is a commonly-observed phenomenon, more often known nowadays as subvocalisation, whereby people vocalise what they are reading, inside their heads, silently making the sounds of the words as they

14 Also known as: Visual Coding, Acoustic Coding and Subvocalization (which is also known as Articulatory Coding).

15 In this chapter, Baddeley and Lewis present several experiments, but give very few details for each. Thus, information on the subjects was not available.

read. Reading and memory experts, such as Baddeley and Perfetti, have researched its various facets as well as its relationship to other aspects of memory and reading (Baddeley & Lewis, 1981. See also Halderman, Ashby & Perfetti, 2012; Rayner et al., 2012; Smith, Reisberg & Wilson, 1992). Baddeley incorporated his knowledge of this phenomenon into his models of reading, such that subvocalisation, as form of rehearsal, became an integral part of the phonological loop (Baddeley & Hitch, 1974; see Appendix D). In relation to reading, there is disagreement among reading experts as to whether subvocalisation can be an advantage, helping the reader figure out difficult words or concepts, or a hinderance, distracting the reader and slowing down the reading process. But the fact that it naturally exists to some extent in most readers, is not disputed in the literature [16].

1.5.4 Coding of Information in the Brain

During reading, the information that is absorbed from the text is processed, or coded, and either stored in working memory, then potentially transferred to LTM or forgotten. How and where it is encoded into the brain, is still not fully understood, but there are several established theories of memory, which discuss encoding of information, including that of written texts.

LaBerge and Samuels briefly discussed how the brain processes a text, stating that, "we have specified two different locations in which the unitizing of a word might take place, one in the visual system and the other in the phonological system", but they did not go into detail as to how this works (LaBerge & Samuels, 1974, p. 306). Paivio and his colleagues developed this further, with the theory of Dual Coding, in which they postulate that readers can encode written information both verbally and nonverbally (Sadoski & Paivio, 2001; Sadoski & Paivio, 2004). According to the Dual Coding Theory (DCT), when readers process a text, they see the word verbally, as well as envisioning its meaning. Thus, reading "dog" will activate the verbal/phonological comprehension of "dog", but also the visual imagery of a canine. The imagery from the text will then be stored in visual, as well as in

16 Rayner et al., 2012, and private conversation and correspondence with Perfetti, 2014-2015.

phonological, memory. This in turn leads to the brain having two (or more) possible loci from which to draw upon for information recall related to this text. Vandierendonck and Szmalec make a similar assertion, but do not limit the number of potential coding locations to two (verbal/spatial), stating that "there is consensus that the human brain can represent information in different encoding formats or modalities and that the brain is also able to show working memory for these different kinds of information" (Vandierendonck & Szmalec, 2011, p. 14).

Expanding on Vandierendonck and Szmalec's idea of multiple encoding modalities even further, are the embodiment and grounding theories of cognition. Most scholars use the term 'embodied'. Barsalou, however (see for example, Barsalou, 2010), prefers the term 'grounded' since it takes cognition beyond the body, and extends it to a person's "physical and social environment" (Sadoski, 2018). These theories share many overlapping similarities, and for the purposes of this discussion, the term 'embodied cognition' will be used, but will implicitly include grounded theory.

The theory of embodied cognition states that "all cognitive activity is based in sensorimotor activity" (Sadoski, 2018, p.332). Glenberg and Sadoski both explicitly include reading and reading comprehension in their discussions of embodied cognition (see, e.g. Glenberg, 2011, Sadoski, 2018). Both reference research that demonstrates that during reading, "neural systems of action, perception and emotion" are stimulated (Glenberg, 2015, p. 167; Sadoski, 2018, p. 336). Borghi and Cimatti (2010), Glenberg (2011, 2015), and Sadoski (2018) all reference studies which demonstrate that reading a text containing action verbs stimulates parts of the brain and body associated with the motions being described, or even merely implied, in the text. Sadoski draws a direct link between embodied theory and his and Paivio's DCT, but embodied theory is far more multi-faceted and encompassing than DCT: the word "dual" is in its very nature, limiting, whereas 'embodied', and even more so, 'grounded' as used by Barsalou, offer infinitely more coding possibilities.

Although controversial, and not universally accepted, Howard Gardner's theory of Multiple Intelligences (MI), which states that people have a range of eight (or nine) core cognitive abilities, has a broad base of supporters and still rings true with many teachers, students and academics (see, for example, Gardner, 2008). It has certainly been apparent to me, in my teaching contexts, that different students use different abilities in their learning, and may excel in some areas, while being weak in others. For the purposes of this thesis, the theories of coding outlined above can be integrated with grounded and embodied theories to extend Gardner's Kinesthetic Intelligence, allowing for the possibility that several types of encoding of a text can be taking place simultaneously. MI would also support the idea that different people can unconsciously emphasise different aspects of the same text when processing it, as well as when they return to the text later, to search for information.

Thus, it is highly likely that our brains are processing written texts in a variety of ways, beyond verbal comprehension, and that we encode texts in multiple memory locations and formats, not just one or two.

This section will end with a central question. Our brains are active during reading in ways we do not fully understand. Given that we see the text as something beyond just an amalgam of words, and that we are processing, encoding and remembering written materials in a variety of ways, is it not possible that there are other, as yet uncharted activities taking place in our brains while we read and process written texts?

C) The Text

1.6 Aspects of the Text Which Can Affect how we Read and what we Remember

Alan Kennedy, whose work focuses on eye movements and reading, said that in addition to being a text to be read, a page is also a physical object in and of itself that can be seen and inspected by the reader, who will then be influenced by its layout and other physical features (Kennedy, 1992).

Fischer (1999) stated that the spatial behaviour of the eyes is guided by what and how they are reading, but also may be at least in part "controlled by a memory representation of the spatial layout of the text" (pp. 79-80). And as previously mentioned, Smith (2004) noted that each page of a text has its own unique surface structure.

Bernhardt was even more emphatic about a text being a physical entity beyond its verbal significance. As he stated, "The physical fact of the text, with its spatial appearance on the page, requires visual apprehension: a text can be seen, must be seen, in a process which is essentially different from the perception of speech". He then went on to outline what he saw as a continuum of cues in a text: "white space, illustrations, variation in typeface, and use of nonalphabetic symbols, such as numbers, asterisks, and punctuation" (Bernhardt, 1986, p. 66. See Appendix E).

Some of the visually informative characteristics which Bernhardt identified in the text as drawing the reader's attention and affecting the reading experience are: "visual gestalt" which is the degree to which surface structure is varied; "partitioning" - identifiable sections with headings and divisions; and "emphasis", which includes such things as bolding, underlining and highlighting. Although the text he was using to demonstrate principles of visuality in text was a short fact sheet, with clearly demarcated 'bites' of information, his observations about texts having unique and discernible features are relevant to longer texts as well.

Treisman and others (including Humphreys, who revisited Treisman's theories, over 25 years after they were first proposed; Humphreys, 2016), have discussed the phenomenon that certain features in a visual display stand out and are subconsciously registered in memory before conscious attention is focused on the most salient aspects. Since a text contains its own unique visual elements, it too, can be considered a visual display or scene. Treisman and Gelade note that a visual scene is coded in our brains along several dimensions, such as "color, orientation, spatial frequency, brightness, direction of movement" (Treisman & Gelade, 1980, p. 98). This shares

similarities with Bernhardt's continuum. According to Treisman and Gelade, those features which are conscious focal points of attention become integrated into a cohesive whole, with attention being the "glue" that joins the features together. They go on to say that "unattended features" "are also conjoined prior to conscious perception". That is to say, less important features are registered subconsciously as we look at an object, picture, or quite possibly, a written text, before our conscious observations take over. In the case of reading, it could be said that the surface structure of the text and its unique features are encoded individually in subconscious memory, at some level, before the more routine act of reading dominates, and the text is seen as an amalgam of letters, word and meaning.

There has been some research done on the surface structure of texts and how it affects the reading process, although it is not directly related to searching for information in a previously-read text.

For example, Bonnie Meyer's work on text structure, discussed previously, (see Section 1.4.3) demonstrated that changes in the text can influence memory for what has been read. Building on her work, and combining it with features very much like those identified by Bernhardt, Lorch and his colleagues identified several signalling devices in prose, such as key words and emphatic statements and typographical cues. Using these, he developed his SARA theory (an acronym for Signalling, Availability, Relevance and Accessibility).

While it is important to categorise the essential elements of a text, and pinpoint which ones can be helpful and how, Lorch and his colleagues tried to quantify subjective elements of text, which have decidedly unquantifiable components (such as how the reader perceives these elements and what is done with them in each unique reading context). In his article from 2008, he attempted to create a formula for the usefulness of each element of SARA. The formula is: $\text{Effect}_{IF} = \mathbf{f}(\text{Availability} * \text{Relevance} * \text{Accessibility})$ whereby IF= one of the identified information functions, such that the formula indicates "the degree to which a particular information function facilitates performance

in a text-processing task is a joint function of its availability, relevance and accessibility." Lorch gave availability, relevance and accessibility the attributes of quantifiable variables (Lemarié et al., 2008, p. 45). In practice, however, it is almost impossible to put this formula to use or apply these variables in a meaningful way.

Furthermore, SARA is comprised of the four parts mentioned above (S,A,R and A), but Lorch then gave each of these four parts two components: text-based, and reader-based. The first component has four dimensions to it. And the second has two qualifying statements. Signalling devices communicate seven different types of information, and each signalling device can, in turn, serve multiple functions. As one can imagine, by the time an educator has sorted this out and tried to make practicable use of the theory, the forest has gotten lost for all the trees, and the theory is of very little help.

What *can* be gleaned from Lorch's works is that text signals have both a writer-based syntactical component (what they are and do in the text) as well as a reader-based facet (how the reader perceives them, how useful they are). Moreover, one signal can have more than one function (for example, the signal 'heading' can indicate either 'Introduction' or 'Conclusion') and this in turn can trigger varying reader expectations, responses and strategies. The centrality of reader response brings us back to Rosenblatt's emphasis on the writer-reader-text interaction.

Having now discussed what reading and comprehension are, who readers are, and how they interact with a text, we now come to the final section, which is about the specific task of locating information in written texts.

D) Searching for, and Locating Information in Written Texts

1.7 The Importance of Locating Information in the Reading Experience

Despite the pervasive presence of computerised and digital texts in our lives, we still read printed materials on a daily basis, for school, work and pleasure. People read books, pamphlets, magazines and other print texts, in order to learn or gain knowledge about a certain topic. Readers also integrate previous knowledge with new information and keep abreast of developments in a particular area through written texts. We read to find specific information, and we read for pleasure (Guthrie & Kirsch, 1987; Guthrie & Mosenthal, 1987; TOEFL 2000).

A considerable amount of research on reading, conducted over the years, focuses on the various aspects of comprehension (Garner & Reis, 1981), or what Perfetti calls the "DVC Triangle": Decoding, Vocabulary and Comprehension (Perfetti, 2010). Yet how readers locate information, both while reading for the first time, (the main focus of the available research), as well as in previously read texts, (what I am exploring), is misunderstood, understudied, or often overlooked altogether (see Rouet, 2006, p. 101). Cataldo and Cornoldi (1998) refer to the search for information in texts as an "underestimated" tool, especially for assessment purposes. Guthrie repeatedly points out that the "ability to search for information is increasingly important in modern societies" (Guthrie, Britten & Barker, 1991, p. 302); it is a "form of literacy that has been found to occur in high frequency and high volume" with more time spent on finding information than reading for any other purpose (Dreher & Guthrie, 1990, p. 325; Guthrie & Mosenthal, 1987, p. 283; see also Rouet, 2006).

According to Guthrie, in many reading situations, the successful search for information may be more than twice as valuable to readers as other aspects of reading (Guthrie & Mosenthal, 1987; Kirsch & Guthrie, 1984). He and his colleagues have stressed that the "need to search [printed texts] for specific information is ubiquitous in school, community and occupational contexts" (Guthrie & Kirsch, 1987, p. 221. See also Guthrie & Mosenthal, 1987, p. 283). In fact, it appears that every researcher who touches on this subject, acknowledges its importance, and then begins or concludes by saying that we don't know enough about this "enigmatic skill" (Christie & Just, 1976, p. 702),

and admits that more research must be done in the area (see, for example, Baccino & Pynte, 1994; Bernhardt, 1986; Cataldo & Cornoldi, 1998; Guthrie et al., 1991).

Although Guthrie and many of the others wrote in the second half of the 20th century, at the cusp of the dramatic rise in computer use for home, work and school, including for reading purposes, their insights regarding the necessity of reading printed materials are no less relevant in our digital age than they were when they were written. Printed texts have defied the dire predictions of their impending extinction and are still being used in all of the contexts mentioned here. In fact, all of the participants in this study, regardless of whether or not they grew up in a more digital age, expressed a preference for reading texts in print over on a computer or e-reader screen [17].

1.7.1 Location of Information - Early Studies

Since this study is about how readers remember and re-locate information in a lengthy written text, it is fitting to begin by mentioning the first researchers who noted and set out to explore this phenomenon to some extent, despite the fact that they did so several decades ago.

In his comprehensive article on the various attributes of memory, Underwood (1969) mentioned the spatial aspects of memory. While most of his discussion related to ancient loci memory techniques, almost as an aside he noted that "incidental observations would support the notion of a spatial attribute. It is not unusual to hear a person remark that he doesn't remember a certain aspect of an event about which he has read but does remember that it was 'described near the bottom of a right-hand page'" (p. 562). His conclusion was that there is sufficient evidence to support the idea of memory having a spatial aspect. Clearly, much has been written on the spatial facets of memory since 1969, but Underwood was considered a pioneer in the exploration of the cognitive aspects of memory, and it is of particular relevance that of all the

17 One participant said that if he needs to highlight a concept or search for a word or term, then he prefers to use the features available to him in digital format, such as Word, but for regular reading, he still preferred print.

examples he could have given in order to describe this attribute of memory, the one he gave was that of remembering where something was located on a page.

The earliest study which set out to explore the phenomenon that readers remember "a variety of incidental information about the material they have read" was carried out by Ernst Rothkopf in 1971 (Rothkopf, 1971, p. 608). In this study, Rothkopf wanted to demonstrate that the "widespread impression" that readers have about possessing visual memory for the location of information on a page, was a "superstitious belief, reinforced by accidental successes" (p. 608). Rothkopf acknowledged that readers had reported this phenomenon, but dismissed its importance in the reading process.

In Rothkopf's study, 53 college students were given one of two long texts to read (3,000 words each) and then immediately upon completion, were tested on the "substantive content" of the text in the form of 32 short-answer basic comprehension and content questions, without having the text in front of them. At the same time, they were asked to indicate where in the text they thought the information appeared, by marking the presumed location of the answer on a blank paper that had been divided into eighths to represent the location on the page. They were also asked to rank their confidence at knowing where each answer was, using a four-point scale (which was not provided nor discussed in the article). Although two different texts were used, Rothkopf did not explain the differences between them, nor why two different texts were chosen, yet administered identically. However, he did say that since the results between the two were similar enough, they were treated as one text for the analysis.

Rothkopf's findings are telling. Although readers showed a "marked preference" for indicating that information was located in the middle of the page, even when it wasn't, in the majority of the instances, readers correctly identified the location on the page of the required information (p. 610). Rothkopf found that there was "substantial recall of the location of information within a page". This recall was more accurate when the

participants responded correctly to the task question, meaning that if the participants accurately remembered the content, then there was an increased chance of them correctly remembering its location on the page (p. 611). Rothkopf concluded that recall for the location of information on the page is a genuine phenomenon that has "some basis in fact" (p. 612).

Rothkopf opens his article by mentioning a "*variety* of incidental information" that readers remembered. Yet for the study and throughout the remainder of the article, he does not discuss any other types of incidental information, focusing solely on memory for the location on the page. Furthermore, the aspect of confidence that he touched on was not fully developed, although perhaps it would have allowed us to gain some understanding of the participants' own perspectives or provided some deeper insights into the interaction between reading and memory.

Following Rothkopf's research, Zechmeister and McKillip (1973) and Zechmeister et al. (1975) confirmed these findings through additional studies. In the first study (Zechmeister & McKillip, 1973), the experiments were similar to Rothkopf's original one, with participants reading a long passage (4,000 words), answering questions, and identifying on a blank page which was divided into sections, where they thought the answers were to be found in the text. This study used what appears to be a more complex confidence scale than the four-point one used by Rothkopf, and different types of task questions (fill-in and multiple choice). To account for the possibility that, as Rothkopf noted, people remember certain locations more strongly than others, four versions of the same text were used, each starting and ending in a different quadrant of the page, such that the whole text was laid out differently in each version. In addition, for part of the experiments, some participants were given information about the spatial location of the answers. This was to see whether knowing where the information was located would enable the readers to use the location of the information as a "cue for retention" (Zechmeister & McKillip, 1973, p. 449).

Like Rothkopf, these researchers acknowledged that readers have incidental memory for the location on the page of some information. Their results indicate that although there was more spatial recall for correct answers than for incorrect ones, correct answers were *not* dependent on spatial recall, even in instances when the location was given to the readers. Varying the layout of the text on the page demonstrated that regardless of what was written in a particular quadrant, readers made the most errors regarding information located on the bottom right-hand corner of the page.

The researchers concluded not by questioning whether spatial recall exists altogether, but rather by asking what the "particular mechanism" is that "serves to enable spatial recall" (Zechmeister & McKillip, 1973, p. 453), meaning that they acknowledged that spatial memory for location does exist, but that we don't know much about it.

The second Zechmeister experiment in this area (Zechmeister et al., 1975), was similar to the first, but its main focus was on whether respondents would be more successful in remembering information in the text if they were told prior to reading that they would be performing a test which explored spatial recall. The conclusion was that knowing beforehand did *not* significantly increase the chances that readers would remember location. However, in both studies mentioned here, Zechmeister and his colleagues came to the conclusion that the finding of the existence of spatial memory for location on the page, is "highly reliable" (Zechmeister et al., 1975, p. 43) and that there is a strong correlation between the degree to which the task answers were answered correctly, and the accuracy of location recall.

Zechmeister and his colleagues established that "spatial recall aids item retrieval" (p. 50). They briefly raise the possibility that their results could indicate a 'chicken-egg' scenario, whereby correct answers aided locative memory (and not the reverse) or that both are influenced by attention. However, they quoted an additional, unpublished experiment of theirs which demonstrated that when correct answers were given to the participants *before* they were asked to indicate the location, their spatial recall did not improve,

thus demonstrating that knowing the correct answer did not aid in remembering the location. As for attention, if attention influenced spatial recall and correct answers, then informing the participants that they would be performing recall tests should have led them to pay more attention, thus increasing their correct answers and locative memory, but it did not.

These three studies (Rothkopf, Zechmeister & McKillip, and Zechmeister et al.) form a unit, sharing many elements and similarities. They also lay the foundations for investigating the phenomenon that often people unintentionally remember what they have read in a lengthy text.

What these studies failed to do was examine additional facets of reading memory or search for information, other than location on the page. Nor did they hear from the readers themselves about what they remembered, nor how and why they remembered the information in the ways that they did. They asked them about their confidence in remembering the location of information, but not what cognitive processes were taking place during the search.

1.7.2 The 'Next Generation' of Studies on Locating Information in Texts

The next group of studies in this field was similar to the first group in overall approach, but did explore other aspects of readers' ability to locate information in texts that had already been read, thus adding a new dimension to the findings of the original three studies.

The first of these was by Christie and Just (1976). They acknowledge from the outset of their study that people possess the "enigmatic skill" of remembering where information is located in texts (p. 702). The authors explicitly recognise the value of this ability in aiding recall and finding information. Probing slightly deeper than the original studies, they propose that this locative memory can be either vague and general, or very specific. Either way, they feel that locational information is unintentionally recorded and stored in memory, and often still available even when the content is forgotten.

The authors raise two possible explanations for the existence of locative ability. The first is that perhaps readers are really deducing the location of the information, not from any visual memory, but from their contextual knowledge and the logical order of the passage. The other explanation is that readers may truly be subconsciously encoding locative clues while they read. In order to clarify this, the authors devised a study using a scrambled text, so that it would be difficult for readers to make a deductive guess at the location of information based on logic and the coherence of the text.

In two related experiments, Christie and Just set out to examine two aspects of reading and remembering:
a) "how people remember the location of a sentence in a passage", and
b) "how they make use of the locative information in retrieving content information" (p. 702).
The first experiment was designed to explore whether memory for location of information in a text exists if the text is scrambled. If this were to be the case, it would mean that the reader was not deducing the location of the information from the context or inherent logic of the structure of the passage, but rather, was relying on memory cues which were encoded during the initial reading.

In this study, ten college students volunteered to participate. No further information is given about them. Each participant received six different short passages of eleven lines (15-200 words) each to read. The passages were each divided into three numbered sections, using dark lines marked onto the pages. Three passages were in their correct form, and in three, the text was scrambled so that the sentences were out of order. Five participants had the same three in correct order and the same three in disorganised form, and the other five had the reverse. They each received the passages to read in randomly differing order from one another.

Participants then rated the passage on a five-point scale, according to how well they felt the sentences contributed to the development of the excerpt (in order to heighten the readers' awareness about the disjointed nature of some of the

passages). After a passage was completed, readers were given eleven questions to answer, whereby each question corresponded to a single line of text. Readers were asked about both the content and the location of the information. If they were cued to answer about the content, the participant was to give a short answer into a microphone. If they were prompted to give a location, then they had to respond with a "1", "2" or "3" to indicate in which section of the text the answer could be found. "I don't know" was permitted as a response as well. Although the authors don't state it explicitly, it is implied in the article that the participants were not allowed to refer back to the text to answer the questions, and had to do so from memory.

This experiment yielded several conclusions. Using the patterns of latencies for the responses, the authors observed that the locating latencies for the jumbled passages were longer than those of both their organised counterparts and the content questions. Thus, it was more difficult to locate the information in the jumbled passage than in the organised one. Moreover, remembering the correct answer, even in the less coherent text, was not as difficult as locating it. Thus, the researchers conclude that knowing the location of information is not a prerequisite to knowing the correct answer. It may be useful, but it's not a necessary condition for correctly remembering content information.

Given that the latencies for the organised and disorganised passages were similar for the *content* responses (as opposed to the locational ones), the authors infer that perhaps readers subconsciously reorganise the information in their brains while they're reading. To support this, the authors referred to two of their earlier studies. This proposition is then taken further as they postulate that during subconscious reorganisation of the sentences, some locative information may be lost, resulting in slower responses for location with the jumbled passages (p. 706).

The second experiment in Christie and Just's study used eye fixations to track readers' use of locative information. Six participants [18] were given texts similar

18 Initially, ten participants were used, to parallel the first experiment, but four had excessive head movements and their data was discounted.

to those in Experiment 1, and answered oral content questions, but this time, they were permitted to look back at the text while answering the questions. The authors propose that the readers' "initial [eye] fixations should indicate where they thought the desired information was located" (p. 706), thus providing insights into the use of locative information. Using this technique, the researchers hope to be able to gauge where readers instinctively and unconsciously looked when searching for information.

As in the first experiment, readers were given both regular and jumbled passages. Participants remembered the location of information fairly well, with initial eye fixations on the correct passage 31% of the time when searching for information in the regular passages, and 19% of the time with the disorganised texts. The level of chance was 9%. In addition, even in the instances when readers were not completely correct with their initial eye fixation, they were generally quite close to it. Furthermore, one specific question asked about a character that appeared in more than one line in the passage. The authors note that when readers fixated incorrectly in terms of the answer, they were still fixating on a passage with that character, albeit not the one that contained the correct answer. This led the authors to state that to a certain extent, this was not a truly incorrect fixation.

The overall conclusion of the two experiments is that readers possess the ability to remember the location of information in a passage, although this is less marked than their ability to remember content. Furthermore, the coherence of the passage is *not* a determining factor in the accuracy of the initial fixation. However, since reading the disorganised passages resulted in increased fixations and longer latencies, they conclude that people *do* rely on text cohesiveness to make additional locative choices. This lends support to the supposition, which will be discussed later in this Review, that comprehension is an essential aspect of memory during reading.

Christie and Just postulate that when people read a regular, coherent passage, they "internalize the structure of that passage. That is, they encode how the various proposition in the passage are related to each other" (p. 709). They

then say that despite the fact that locative information is not a recognisable component of the linguistic structure of a text, readers do use a "heuristic strategy that depends on locative information" (p. 710).

Almost hidden in the final discussion is the bold suggestion that "the collection and organisation of such heuristic strategies may eventually provide a better characterization of reading than any single canonical comprehension process" (p. 710). Unfortunately, this is given as a throw-away line, at the very end of the article and without further elaboration, when in fact, it could have paved the way for the exploration of several other types of encoding that take place simultaneously during reading, and their potential importance and applications.

One shortcoming of this study is that the authors state that they are setting out to examine "*how people remember* the location of a sentence in a passage and *how they make use* of the locative information in retrieving content information " (p. 702, emphasis mine), and while they do demonstrate that readers have locative memory, limited insight is provided with regards to *how* this memory is used, other than postulating that some form of encoding or internalising of the information is somehow taking place during reading, and this process is useful for relocating information.

Subsequent works on reading by Just and his colleagues have focused mainly on the area of eye fixations/eye movements, which are not relevant to this study (see for example, Just & Carpenter, 2004).

Lovelace and Southall (1983) begin with the same assertion as their predecessors: readers remember the location of words in a text; and like Christie and Just, they felt that people subconsciously and automatically encode information while they read.

They also assert that memory for the location of information is correlated with memory and understanding of the content and meaning of the sentence. They

amalgamated some of Rothkopf's and Zechmeister's observations and propose three possible explanations for this correlation:

1) The correlation is related to fluctuations in attention, such that in portions of a text where the reader was more attentive, recall for both location and content increased

2) correct recall of an answer provides extra cues, thus facilitating access to the spatial aspects of the text

3) visual recall of a section of the text enables the reader to remember additional features of that section, thus enhancing content memory and performance.

In their studies, Lovelace and Southall set out to demonstrate that spatial memory for information in the text is interconnected with understanding the content of the text, to the extent that each can aid the recall of the other.

Before the main experiments, the authors carried out two preliminary studies, which essentially replicated those of Rothkopf, and Zechmeister and McKillip. They were not reported in full in the article, but they yielded data which was consistent with the previous studies, leading the authors to feel confident that both spatial recall for the location of information, as well as a correlation between spatial recall and content recall exist. However, they felt that it was still unclear as to which of the three theoretical explanations given above would account for the findings.

In their first main experiment, Lovelace and Southall aimed to demonstrate that depriving a reader of locative clues would negatively affect content recall. Sixty college students were divided into three groups of twenty and given the same text in terms of content, although it differed in form for each of the three groups. The first group received the text in the form of a long, continuous scroll, with no discrete pages, in order to minimize locative cues. The scroll was read through a viewing window, one standard-length page at a time. The second group also received a scroll, but pages on the scroll were delineated by spacing, numbers and heavy black dividing lines, such that even though participants were reading one continuous scroll, they were aware of page

divisions. The third group was the control, and they received the text in a typical booklet format. When they finished reading, all participants were given 32 fill-in questions. Next to the questions was a small diagram of a page divided into numbered quarters. Participants in the second and third group were asked to indicate the location of the information by circling one of the numbers to represent where it appeared on the page, if they remembered it. Readers in the first group were told to ignore the diagram and simply answer the questions.

The authors manipulated some of the variables used in previous experiments, such as spatial-location cues (including eliminating the page format altogether and having readers read from a continuous scroll), starting the text in various quadrants on the page (following Zechmeister & McKillip, 1973) and what details the participants were required to recall.

The researchers found that the reading times and the number of items correctly recalled were very similar between the continuous scroll with page markings and the booklet format. However, significant differences in recall were found between the paginated scroll and the continuous, unmarked scroll, such that the authors concluded that when locative information was reduced (in the continuous scroll format without page demarcations), content recall was reduced as well. Furthermore, if the participants who read the continuous scroll couldn't recall the location information, then their content recall was the same as if there was no location information provided at all, lending support to the supposition that location information aids content recall.

Thus, as per the initial hypothesis, the results showed that spatial recall of the location of information is interdependent with recall of the content of words. The authors stressed that recall of location of information on the page is just one of many attributes of the text that readers store in their memories while reading. However, no other attributes were explored or even enumerated. For example, readers may rely on other visual cues, such as paragraph length, italics, capital letters in the text etc. In addition, other types of both visual and non-visual cues may be automatically encoded and then recalled, like repeated

or unusual words. As with most studies in this area, the insights of the readers themselves were not included at all.

The second Lovelace and Southall experiment set out to demonstrate that location cues enhance recall of content and vice versa, content cues enhance the memory for location.

Again, the participants were 60 college students. The control group was a reusing of the data of the control group in the first experiment, since the text and questions were the same for both experiments. This time, all the readers received the text in booklet form, as the control group had in the first experiment. The first group was the reused control group. The second group read the text, and was then given the 32 questions, along with the answers, but instead of answering, the readers were just asked to indicate where they thought the location of the answer would be, on the square diagram at the side (the "location condition"). The third group was given the location on the page of the information and they were asked to recall the correct answers ("content condition"). To this end, once they finished reading, they were given a new copy of the text. In this second copy, most of the words were blacked out, and the sentence where the correct answer appeared, was provided with blanks to be filled in with the appropriate missing words.

The authors found that the number of correct answers was higher for both experimental groups (content and location) than for the control group (booklet) and that providing clues to location enhanced content recall, and vice versa. When readers indicated in the squares that they knew where the information was located, they tended to do better on the content questions.

Overall, the authors conclude that recall of location on the page exists, but that it's "'incidental' to performance of the task in most memory tests for prose material" (p. 433). In their discussion, the authors note that earlier studies had demonstrated that there was a correlation between memory for location and that of content, but it hadn't been shown to be causal, and could have been due to another factor, such as increased attention. In their studies, however,

Lovelace and Southall were confident that they had demonstrated by manipulating the availability of both location and content, that they were interdependent. When the authors removed the spatial cues by using a scroll format, content recall decreased. And when they provided readers with exact location clues, content recall increased. In addition, providing content clues (in Experiment 2) increased locational recall.

An obvious limitation of this study is that the authors treat page delineation as the only locational cue there is in a text. Their model does not allow for the possibility that the entire page's location *within the text* could aid the reader. Where the whole page is located, relative to the rest of the text, can be an important landmark. In fact, there can be a myriad of locational cues in a text, aside from pagination, but the authors implied that location on the page is the only one. Another shortcoming of their study, in the context of the present research, is that Lovelace and Southall dismiss recall of spatial location on the page as "incidental" and something that "one rarely is required to know" (Lovelace & Southall, 1983, p. 429).

Rawson and Miyake (2002) disagree with the Rothkopf and Zechmeister studies, postulating that locating information depends much more on verbal abilities than on visuospatial ones. They claim that the spatial nature of memory exists, and can be helpful, but it is transient and our brains don't hold onto spatial landmarks for very long. Since the tasks were given more than a few seconds after the text was read, any spatial location information was no longer stored in STM/WM, and therefore not readily accessible to the participants (p. 805).

In Rawson and Miyake's study, 58 university students were given a short practice text and questions to ensure that they understood the instructions. They then read an expository text in digital form, of approximately 3,000 words in length, and were then given a fill-in-the-blank question and had to fill in the missing word from memory. The students were then shown the digital text and asked to indicate where they thought the correct word appeared in the text. However, at this point, the original text had been altered

such that instead of letters and symbols in the text, there were only Xs (aside from punctuation). The original contours of the text, such as indentations or subtitles had been maintained, but with Xs replacing all the letters.

Example:

Original text:

Aging is an inevitable process for all of us, yet most of us know very little about it.

Modified text for locative task:

Xxxxx xx xx xxxxxxxxxx xxxxxxx xxx xxx xx xx, xxx xxxx xx xx xxxx xxxx xxxxxx xxxxx xx.

In addition to giving the students the tasks, the researchers measured several variables of the students' abilities, such as verbal and visuospatial skills. Standard ability tests such as the Nelson-Denny test, Corsi blocks and paper-folding tasks were used. These tasks were translated into aggregate ability scores and then used as predictive variables for performance on the reading tasks.

According to their findings, Rawson and Miyake asserted that it is verbal abilities, and not visuospatial ones that enable readers to remember the location of information. They referred to the relationship between visuospatial abilities and location performance as "tenuous at best". They acknowledged that in a written text there exist "visually salient 'landmarks'" that could serve as "useful clues for relocation performance", and that sometimes readers have "the experience of 'seeing' the location of text content", but they felt that these factors are not the primary features of the reading experience (p. 805).

Rawson and Miyake's technique of replacing all the words with Xs raises some questions. On the one hand, it could be an excellent means of separating the surface form from the content, and determining which solely-visual contours and landmarks were helpful to readers (such as location on the page or paragraph length). On the other hand, it seemed (to me) to be disorienting and unnatural, and may have actually interfered with participants' ability to locate

information. While isolating the different factors involved in a search makes sense, it is nevertheless likely that readers need to see the actual words when searching. Moreover, it is probable that contextual clues and visual clues are intertwined and may even work in tandem (in accordance with such theories as Paivio's Dual Coding, which will be discussed below), and that separating them could be detrimental to the search process.

In Rouet's major work on comprehension (2006), he looked at the more complex aspects of the skill, such as how we comprehend multiple documents, and how we process online texts. While much of what he discussed is quite far removed from this study, he did stress the importance of document search as an essential but under-researched part of the reading process, and explored several facets of this activity.

The main shortcoming of Rouet's work is that he created a dichotomy between answering task questions from memory, and answering them whilst searching the text. While it is true that when recalling information from a text when it is not in front of us, we would be relying on memory, it is far less true to assert that when we need to search a previously-read document, we are relying on our text skills alone and not at all on memory. Yet this is what Rouet claims. When discussing "the processes that take place when people attempt to answer questions based on what they have previously learned or read in texts" (p. 95), Rouet distinguished between answering from memory when the text is not available, and answering by searching the text. In discussing the latter, he stated: "The search for a relevant information source will not proceed through the activation of knowledge from long-term memory. It requires the evaluation and selection of relevant text passages, based on the use of signalling devices [19]" (p. 99). Nowhere in this discussion did he allow for the possibility that a person searching a previously-read text, with the text in front of him, may also rely, at least in part, on what he remembers from the initial reading.

19 By "signalling devices" Rouet is referring to the text organisers discussed primarily by Meyer, and also Lorch and his colleagues – signals such as headings, paragraph demarcations and useful key words in the text.

Although Rouet later acknowledged that the distinction he made was “fuzzy” (p. 106), his reason for saying so was that a reader activates prior knowledge (meaning schema, not memory for the text itself) in order to understand the question and therefore since a “memory resource” comes into play during the search for information from a text, it’s not a clear-cut dichotomy. This is unfortunate, because on the one hand, he stated that the nature of his work is exploratory, given the dearth of information in this area, but at the same time, his dichotomy is very rigid and doesn’t allow for other possibilities.

1.8 The Comprehension-Location Connection

The main proponent of researching how readers locate information in written texts, is John Guthrie. Together with his colleagues, Guthrie studied several aspects of the search process, including its relation to comprehension. In all of his studies, he stresses the importance of the search process as an integral part of reading, and as one of the most useful and necessary things that readers do. Like Smith, who views reading as a form of problem-solving, Guthrie sees the search for information in a written text, specifically, in that light (Guthrie & Mosenthal, 1987, pp. 290-291).

Regarding comprehension, Guthrie notes that the search for information is multidimensional, and considered it to be a “separate factor” and “independent dimension” from reading comprehension, with the two requiring different cognitive skills (Guthrie & Kirsch, 1987, p. 226). In their article, Guthrie and Mosenthal contrast these two skills, but from the outset, they acknowledge that the contrast was “primarily conceptual”, and not based on empirical studies, since “insufficient empirical research has been done in this direction” (Guthrie & Mosenthal, 1987, p. 279).

Rouet, who relies heavily on Guthrie and his co-authors, asserts that “deep comprehension is not always needed in order to locate information” (Rouet, 2006, p. 93). This is a very bold statement, which expands on Guthrie’s assertion: however, it appears to be modified by the context, wherein Rouet is discussing how during search, readers can rely on text organisers (signalling

devices and surface structure) to guide them, rather than on comprehension alone.

Although most of the research carried out by Guthrie and his colleagues centred on the search for information in medium-length texts that were being read for the first time (such as instruction manuals and timetables), Guthrie added two important elements to this discussion (Guthrie & Mosenthal, 1987). To begin with, he enumerated five stages a reader goes through in the search for information in a text[20] .

The first step that a reader who is attempting to locate information in a written text must go through, is to formulate a goal: establishing what specific information needs to be found. This step may include formulating subgoals and even reformulating the goal(s) as necessary.

The next step is inspecting categories of information. A "category" for Guthrie refers to sections or segments of the text which the reader thinks may be useful in locating the information. Following this, the reader sequences the search. Since more than one category or section may be relevant, the reader has to prioritize and make the search efficient, by sequencing it in a logical manner. Guthrie's fourth step is extracting details from within a category - sorting out what is relevant and important, from what is less so, within a category. The final stage is to return to the previous components, as needed, until the information is successfully found (Guthrie & Mosenthal, 1987, pp. 286-288. See also Armbruster & Armstrong, 1992. Rouet, 2006, also discusses Guthrie's stages at length).

Surprisingly, Guthrie does not explicitly state whether these steps are consciously undertaken, unconsciously pursued, or some combination of the two. Furthermore, what he refers to as a "category of information" seems like a conceptual unit, but nowhere does he include a locational step. That is, Guthrie does not deem it necessary to have the reader formulate *where* in the

20 While Guthrie tended to use informational texts for his research, he generalised his theories to include all types of written information. In this 1987 article, he and Mosenthal identified different taxonomies of texts and goals of reading stating that not all of them could be discussed within the parameters of the study, but all fit into their generalisations about overall reading practices.

text she should be looking. A category can include an approximate location, but does not automatically presuppose one. What these steps do add to the discussion is the supposition that there are stages in the search for information, and that efficient readers, whether consciously or not, employ a plan, or strategy when searching for information.

Cataldo and Oakhill (2000) used Guthrie's five steps, and many other elements of reading and search which have been discussed here, when they studied the relationship between comprehension and locating information. They came to the conclusion that comprehension and efficient search are strongly linked, but note that (following Zechmeister) successful search involves more than just good comprehension. For example, they were surprised to find that "the memory for the spatial location of words *did not* correlate with the efficiency of searching" (p. 797, emphasis mine). Furthermore, they recognised that readers engage in encoding spatial location while reading, forming what they call a "semantic map" of the text while they read and this can be just as important in the search for information as good comprehension (p. 792).

Guthrie and Kirsch add another element to our understanding of the search for information in texts. In their 1987 article, they briefly touched upon a proposition based on mathematical models of search, namely that readers may search for information in much the same way that children would search for a lost toy in a playground, including using clues provided by the texts' surface structure (based on Cross & Wellman, 1985).

Cross and Wellman's actual research is quite far removed from the field of reading research[21], but they do make some interesting and relevant assertions regarding the search process. They identified four main components of a search: a searcher, a target, a search space and a set of search operations. For the purposes of this thesis, the searcher is the reader, the target is locating a

21 They examined the foraging and searching behaviours of wood lice and other creatures.

specific piece of required information in a text, the search space is the text itself, and the operations are as yet unknown and what I set out to explore.

The authors identified two main approaches to a search: “comprehensive” and “selective”. “Comprehensive” is when the searcher simply searches the entire search space, spreading the search effort out equally across the entire area to be searched. In reading, this would be the equivalent of returning to the beginning, regardless of where the reader currently is, and re-reading the entire text until the correct information is found. This type of method, which is essentially a non-method, would likely be employed by what Ruth Garner terms a “deficient reader” (Garner et al., 1984). In contrast, a “selective” searcher first narrows the search to the areas most likely to yield results, optimising the effort to pinpoint the probable location of the target. Within the context of their discussion, Cross and Wellman conclude that most searchers employ a combination of comprehensive and selective searches – sometimes knowing when to optimize their search techniques and sometimes using a more blind approach. The authors further state that searchers may or may not be aware of their search strategy or be able to define what reasoning dictates the search.

While Guthrie and Kirsch, in using Cross and Wellman’s ideas, do not develop the connection between mathematical models of searching and locating information in texts much beyond raising it as an interesting possibility that “may merit further investigation” (p. 220), this idea provides further support that locating information is not necessarily simply a subcategory of comprehension, but also a form of search – of visuo-spatial memory, relying on other cognitive processes and landmarks in the text to locate information. As with many of the concepts raised in this Review, these ideas deserve a more thorough treatment, rather than being referred to in passing, as secondary phenomena.

Summary of the Literature Review and Positioning of this Study Within the Existing Body of Research

- For experts immersed in the field, the topic of comprehension is a contentious one. Supporters of the various theories take opposing sides in a debate which has far-reaching practical ramifications. Within the framework of this thesis however, those theories are brought together and the focus is on what they have in common, rather than on how they differ. Reading is a cyclical process – activating and relying on memory to make sense of the text, as well as storing the information read in the text, into memory. Schema and prior knowledge aid in comprehension, giving the words meaning and context.

- There is a range of reading abilities, with confident readers relating to the text in more efficient ways than their more hesitant counterparts.

- As Rosenblatt emphasised, reading is a complex, interactive, evocative, multi-sensory interplay between reader and text, which involves several cognitive processes, not simply verbal-phonological ones. Many of these processes have been un- or under-explored.

- Reading triggers both conscious and unconscious responses in the brain. The conscious and unconscious realms are not always clearly delineated, and form a continuum, rather than a dichotomy.

- In order to understand what and how readers remember when they search for information, it is important to understand what readers are observing and encoding, both consciously and unconsciously *while* they are reading.

- The text itself – both its form and content - plays an active role in what our brains encode while we read. There is likely a myriad of cues which aid readers in finding information, not just visual ones or location on the page, and many of these have not been identified or explained.

- Most reading studies use short texts such as word lists, sentences or 3-4 sentence paragraphs as the basis for study.

- Many reading studies explore recall based on tasks given during or immediately after reading, but in real-world situations, people need to return to the text and search for information a few days (or more) after reading. Very often, reading experiments test for recall without the text in front of the participants, but again, this does not necessarily reflect realistic reading situations.

To borrow a metaphor from the text used in this study for the search task, Michel Eyquem de Montaigne refers to his essay-writing as the string which binds other people's flowers together, to form a bouquet. In this study, the bouquet is made up of several 'flowers', each plucked from a different field, and included because each added its own unique, colourful contribution. No theory or study was incorporated into the Literature Review merely because it ticked a box – each one was chosen and discussed because it has something to contribute to the conversation which has been started with this thesis. The string which ties the theories together is the underlying premise in each of them, that reading, memory and the search for information are multi-faceted, interactive processes, involving a range of senses and cognitive activities. This is an Integrative Literature Review, and as the name suggests, it aims to pull together diverse aspects of several works, to achieve a comprehensive whole, albeit a tentative, exploratory one.

Research Questions

My professional experiences, the initial premise of the thesis and the preliminary research that I carried out for it, as well as a review of the literature, have combined to lead me to explore the following questions:

1) How do readers go back and search for information in a long previously-read text?

i.e. What are the processes taking place during the search? What cues, clues, strategies and techniques do readers use to find information?

2) Are the readers aware of the cognitive and memory processes which take place during the search for information?

3) Are there indications that confident readers employ more effective search strategies than less confident or hesitant readers?

These key points form the rationale for my Research Design, as outlined in the Methods section below.

Chapter 2: Methods

2.1 Epistemological and Theoretical Background

The premise for this thesis stemmed from an interest in the use of graphic novels as a reading tool, and comes from my experiences teaching language in a variety of settings. Therefore, the driving force behind this study is more professional curiosity than dogma or ideology.

Given the dearth of information available about this specific junction of reading, memory and search, this thesis took on an exploratory nature, and many of the themes which emerged were a-posteriori, rather than a-priori. Some of the very tentative initial expectations were shaped by my professional experience and knowledge in the field.

I am coming to this study as a researcher-practitioner, and would categorise my perspective as being affiliated with the Constructionist and Interpretivist end of the spectrum. My philosophical outlook is Pragmatic in nature, particularly as defined by Denscombe, who describes a Pragmatist as being "skeptical about the philosophical debates between positivism, interpretivism and critical realism, and regards these debates as rather unproductive" (Denscombe, 2010, p. 128). I find myself, both as a teacher, as well as in the role of researcher, shying away from dogma and ideology, preferring to explore and see what emerges, rather than toeing a particular line of thought. Pragmatism, according to Denscombe, "takes the *research problem* as its starting point, and it gauges the value of any particular approach or method primarily in terms of how well the outcomes work in practice" (p. 128). Pragmatism also lies at the heart of exploratory research, which is the basis of this study.

2.2 Research Rationale, Design and Scope

In many reading studies, the reader is often seen as a medium for gathering information or a tool for observation, and not as an active, self-aware participant. For this study, given that the readers' experiences and perceptions were at the centre of the inquiry, a qualitative research design was the logical choice for gathering data. The Think Aloud method (outlined in more detail below) would enable the readers to be actively engaged in, and aware of, their own reading and search processes, encouraging them to provide insights and observations about what they were doing and thinking, both at the time of search, as well as during the initial reading of the text. The Think Aloud Protocol yields rich and colourful qualitative data, and was very well-suited to the goals of this study.

Thematic Analysis, relying in part on a Constant Comparative Method of examining the data, revisiting it, and reshaping patterns and themes, was chosen as an inductive analytical tool for handling the data after it was gathered (see for example, Glaser, 1965; Kolb, 2012; Maykut & Morehouse, 1994).

Given the exploratory, emergent nature of the study, the limits on the time and resources available, and the fact that Think Aloud and Thematic Analysis yield very detailed, rich data, it was clear that the scope of the study had to be on a small scale. There was no pre-set number of participants, but logistics, availability, a realistic time-frame, and a sense that I had reached data saturation, would all combine to dictate when the study had come to an end.

My goal as the researcher was to be as non-participant (non-invasive and non-intimidating) as possible, allowing the participants to lead the sessions. At the same time though, I had to be a sympathetic and encouraging presence, who would be able to guide the readers through the Think Aloud Protocol and elicit both conscious and unconscious insights from them.

In summary, the salient features which characterise the research design for this thesis are that it is qualitative and exploratory, the Think Aloud Protocol

was used to gather the data, and Thematic Analysis was used to analyse it. There is an element of comparison in the study, in that I explore the responses of both confident and less confident readers, but it was by no means a comparative study, due to the small samples. Rather, the two groups were chosen in order to establish initial themes and reach a deeper understanding into the workings of reading strategies among a range of different types of readers.

2.3 The Think Aloud Protocol – Introduction, History and Rationale

The Think Aloud Protocol is a method of gathering information from participants by having them do exactly what the name implies - they think aloud, verbalising what they are doing, what their thoughts are at the time and what cognitive processes they are using while they are solving a problem or completing a given task.

Use of the Think Aloud method dates back to between the 1920s and 1940s. Ericsson and Simon (1993) mention several researchers in the early 1920s, who, independently, but at approximately the same time, began to ask participants to provide verbal reports of their actions in various studies [22]. According to Ericsson and Simon, Duncker continued using this method well into the 1940s. Someren, Barnard and Sandberg, (1994), also bring the example of De Groot, who documented the thought processes of chess players from the 1940s till the 1960s. Think Aloud was used throughout the 1980s for computer science and Artificial Intelligence (AI) studies, whereby human thought processes were documented, in order to transfer human knowledge and expertise to computer technology.

Simon and his colleagues, (e.g Ericsson & Simon, 1984; Newell & Simon, 1972) are generally recognised as having enabled the Think Aloud method to gain credibility within the world of research and become accepted as a method of gathering reliable verbal and metacognitive data.

22 Ericsson and Simon refer to: Bulbrook, 1932; Claparède, 1934; Duncker, 1926; Smoke,1932; Watson, 1920.

Unlike many reading tests, the primary focus of this study was not the answers themselves, but the process of locating them, and the participants' subjective, metacognitive insights into *how* they were conducting their search. As such, the Think Aloud Protocol was the ideal choice for gathering data. Participants were asked to answer ten questions on the text, while being encouraged to actively search for where they thought the answers appeared in the text, as they were completing the task. While it was important that participants answered most of the answers correctly [23], the focus of the study was to explore what search strategies and methods they employed when looking for the correct answers in the text, and the Think Aloud method enabled the participants to articulate this process. Furthermore, the Think Aloud method in a one-on-one setting was non-intimidating, and once they became accustomed to it, most participants found it easy to relay their insights. The method helped them articulate a full range of thoughts, and in particular, the unconscious ones, right at the moment that they became conscious or moved to the surface of consciousness.

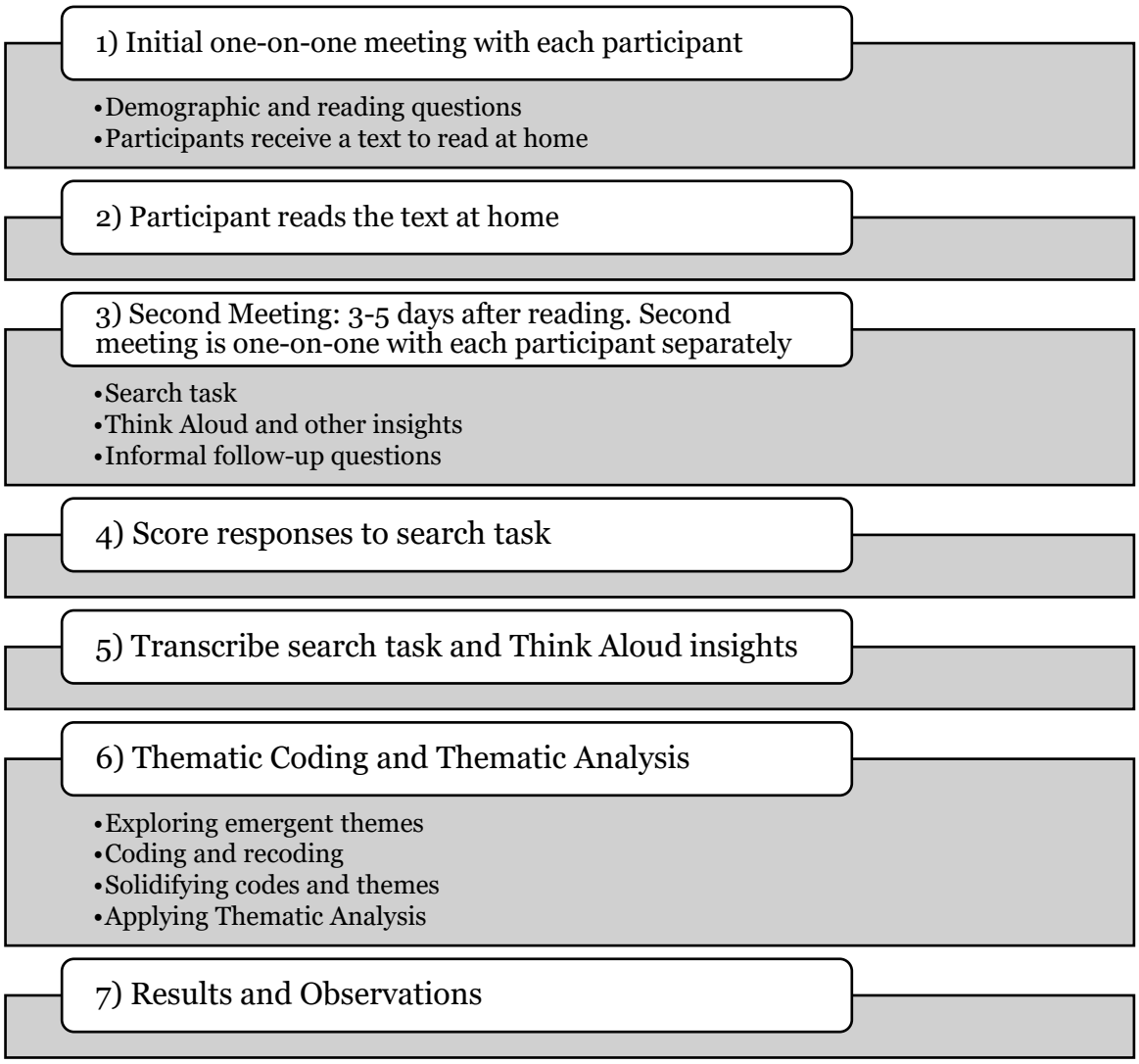
2.4 Timeline

There were three different categories of participants: the Pilot group, the Confident Readers, and the Less Confident Readers (outlined in further detail below), in that order. The four Pilot participants ran through the study first, to identify and solve potential problems with the procedures, text, questions, and equipment. A call was then put out for experienced readers to take part in the study individually. Each participant had his/her own meeting and reading session. As soon as saturation was reached for the Confident group, the text was edited for the Less Confident readers, and a call was put out to find suitable candidates.

For all three phases, the stages of data-gathering and analysis were identical, as follows:

23 A majority of correct answers would indicate that they were efficient readers and had understood the text and the questions. Studies (such as Christie and Just, 1976, and Lovelace and Southall,1983) have shown a correlation between accurate comprehension and memory for location of information in the text. If a participant erred in a majority of answers, it could indicate a lack of comprehension, or a significant lapse in memory for details from the text.

Figure 2 - Timeline of research procedures –Pilot, Confident and Less Confident Readers



2.5 Participants

Although each session was conducted on an individual basis, participants were divided into three distinct groups for the study: Pilot, Confident and Less Confident All three groups followed the same timeline and procedures of data collection. For each group, notices were put out on social media, calling for adult male and female volunteers to participate in a reading experiment. Participants were all native English-speakers living in Central Israel.

It was decided that the participants would be adults between the ages of 25 – 60. While the minimum age of 25 years old was arbitrarily chosen, Rouet and Coutelet (2008) do point out that experienced adult readers are more adept at

handling longer texts, and putting strategies to use effectively (p. 389). In addition, having adults participate would avoid the ethical problems of using children in the study. The maximum age of 60 was decided upon based on prior interviews with people over 60 who had reported a marked decline in the way they remembered written information, after they had reached approximately 60 years of age. Although they do not specify an exact age for the onset of memory degeneration, Borella, Carretti and De Beni (2008) provide a thorough review of multiple studies which demonstrate age-related memory loss phenomena, even among healthy older adults.

Confident and less confident readers were sought out using purposive sampling, and assigned their groups based on their reading abilities, as determined by the initial interview, and self-reports. This will be discussed in more detail, below.

2.5.1 Pilot Phase: There were four participants in the Pilot phase (three women and one man), and they shared the same demographic characteristics and reading abilities with those in the main exploratory group of confident readers (described below). The difference between the Pilot group and the main group was that the materials and equipment were tested out on the Pilot group, so that technical difficulties and problems with the materials could be resolved during this phase and used most effectively during the main body of the research. The responses data from the Pilot participants was were included in the overall analysis, because, as explained later, despite the data it being marginally flawed, it still yielded useful insights that could be included in the findings.

2.5.2 Confident Readers: The main group of ten participants (five men, five women) and the Pilot group (as above) were comprised solely of confident readers, using the guiding principles outlined in Section 1.2 of the Literature Review, so that skilled reading and search strategies could be explored. As such, the notice explicitly asked for adults aged 25-60 who were efficient readers with no reading difficulties, and for whom English was their native language for reading. This ensured that they would be experienced, practiced

readers who would be able to articulate what they were doing, and thus the data would reflect the search strategies of efficient readers. At the initial meeting with each participant, the Confident readers (and the four Pilot participants) were asked again if they had any reading or learning disabilities. This was to ascertain that there were no misunderstandings, and that no participants with unforeseen reading difficulties were accidentally included in the Pilot and Confident groups. These participants were also asked whether they considered themselves efficient readers, how often they read, and how well they remembered information in a text after they had read it.
Whether by chance, or by an unanticipated self-selection, or perhaps as a result of other demographic factors, several of the participants in the Confident group worked in fields where strong reading skills were required, or considered an asset (see Table 2.1). These included a librarian, three teachers, and four people who had worked in the editing/proofreading fields.

2.5.3 Less Confident Readers: A small group of six participants, who were less confident in their reading abilities (three women and three men) was included, not as a comparison group per se, but rather to begin to yield further insights into the reading and memory processes of different types of readers. The comparative aspect of the study was a minor component, and not a defining element. The two groups were divided so that their strategies could be explored somewhat distinctly.

For the group of less confident readers, purposive sampling was used in the recruitment notice, which specified native readers of English who either had a diagnosed reading disability, or who, from experience, knew that they struggled with, or had less confidence in, their reading skills. Self-reporting of reading difficulties was as important as having had a formal evaluation, because people over the age of approximately 40 years old typically did not have access to formal evaluations when they were children. Many reading disabilities were less known or not identified when these people were of school-age. In fact, the three participants who had undergone formal evaluation in school were all under the age of 30, and those who self-reported were all over 40 years old.

Of the three participants who had undergone formal reading evaluations as children, one had dyslexia. He had also suffered a slight lack of oxygen to the brain at birth, which caused a speech impairment and some other related mild cognitive disorders, in addition to affecting his reading and verbal skills. Another participant in this group said he had been told he had dyslexia and other learning disabilities, but he wasn't sure exactly what they were, since he was too young to fully understand what the evaluations meant when they were carried out. He remembered being put into 'special' classes, and having one-on-one tutors in school. The third reader who had undergone a formal evaluation as a child, rolled his eyes when asked what he had been diagnosed with. "'What didn't I have?' is more the question", was what he said. He went to a partially integrated special needs school, and had remedial reading help during his primary school years. When he became an adult and moved to Israel, he purposely left his evaluations and related paperwork behind in North America, because he felt stigmatised in school, and wanted to make a new start in a new country.

The three participants who had not had any formal reading evaluations, reported having experienced the following reading difficulties: reading slowly, finding reading difficult and frustrating, mixing up letters, getting confused or losing the thread of a text, difficulty concentrating on reading (but not ADD/ ADHD in other areas of their lives), and letters "squiggling" on the page. These three older weak readers all recalled being told in school that they were slow or lazy and having to find ways to cover up, or compensate for, reading problems.

Finding a number of hesitant readers who shared the same reading difficulties would not have been possible for this study, given the time and resource constraints. As it was, recruiting six less confident readers was far more challenging than getting fourteen confident ones to volunteer. Furthermore, as discussed in the Literature Review, Perfetti and Nation noted that weak readers do not share uniform profiles and characteristics (Nation, 2005, 2019; Perfetti, 1985. See also, Cain & Oakhill, 2007, Ch.2). Given that there are multiple facets to reading difficulties. creating a homogeneous group in a short amount of time, with limited resources, would not have been practicable.

Moreover, the comparative aspect of the study was secondary and exploratory, and not the primary focus. As such, it was decided that anyone who presented sufficient proof that they were not confident about their reading skills, would be accepted into that group.

Meetings were scheduled with all suitable respondents.

2.6 Materials

2.6.1 Consent Form, Demographic Information and Reading Habits

Participants were asked to sign a consent form (Appendix F), which outlined the general goals of the study, and requested their permission to be filmed or video recorded. Due to a misunderstanding, the four members of the Pilot group gave oral, and not written consent. This problem was quickly rectified for the remainder of the participants.

Next, informal, open-ended questions were asked of the participants, using a questionnaire as a very loose guideline. The purpose of these questions was to break the ice, get to know the participants and gather some basic demographic information. In addition, following the example of Hyönä and Nurminen's study (2006), the questions were intended to prompt participants into thinking about their own reading habits and skills and elicit some initial insights from the participants about reading and memory (see Appendices G.1 and G.2).

2.6.2 Text Used in the Study

Throughout the process of finding a suitable text, the research goals had to be balanced with the needs of the volunteer participants, and practical considerations.
The following were set as essential criteria for a text to be used in the study:

- **Text Availability:** First and foremost, the text had to be known and familiar to me, such that it was identifiable as something that could

potentially be used in the study. In addition, a legible copy in print or digital format had to be readily obtainable.

- **Length**: Text length was of primary importance, given that this is a study of memory for lengthy texts, not short ones, as is typical for reading exercises. Both Rothkopf, and Rawson and Miyake used texts that were 3,000 words in length. A 3,000-word text is long enough to present a challenge to memory and search strategies, but at the same time, it is manageable and not too time-consuming for the volunteers, nor unduly difficult for more hesitant readers.

- **Content:** The excerpt had to convey a rich amount of information from which to create a variety of task questions, but at the same time, be a self-contained unit of text, such that it would give the readers all the information they needed without requiring outside knowledge. This was essential, since the readers were going to be taking the text home, and reading it independently. As stated above, it had to be manageable, non-intimidating, and not take too much time or effort, so that the volunteers could read it easily, and would not get frustrated or drop out of the study because the text was too demanding.

- It was important that the text would be appealing and interesting to a variety of readers. An engaging text makes the experience more enjoyable, and, as Meyer and her colleagues noted, motivation aids in comprehension and recall (Meyer, 1975a, 1975b; Meyer and Poon, 2004). While individual tastes cannot be accounted for in advance, and in fact, not all the participants enjoyed the text which was ultimately chosen for use, the logical starting point was to find a text by an author who was known for his or her popularity, relaxed style, and relatable observations.

- The content of the text also had to be 'neutral', in the sense that readers from a wide variety of beliefs and backgrounds would not be offended

by the subject matter or the language used in the text. This challenge is discussed further at the end of this section.

- **Language Level***:* Similar to the content requirement, the language had to be at a level that was challenging, and at the same time, not overly complex or dry. If the participants felt that text was boring or taxing, it is possible that some would have dropped out of the study. Moreover, the levels of ability and motivation of both the confident, and the less confident readers had to be taken into account.

- **Genre**: Choosing a genre presented several challenges. A novel, or work of fiction, for example, may have had too many characters, or interconnected plotlines relating to other parts of the book, such that it would have been difficult to isolate a stand-alone excerpt that was also rich in detail – as discussed above. On the other hand, an instruction manual (such as Guthrie and Meyer both used) may have been unappealing, and not of interest to several of the participants. Newspaper and magazine articles are often shorter than 3,000 words, but an academic article of the right length may have presented the same problems as an instruction manual. It was decided that a narrative text or non-fiction expository prose, would suit the criteria. To engage the readers and enhance motivation, preference was given to humorous, observational pieces.

- **Surface Structure**: The text needed to possess a natural amount and distribution of visual and syntactic cues. As outlined in the Literature Review, Bernhardt (1986), Meyer (1975a, 1975b; Meyer and Poon, 2004) and Lorch (e.g. in Lemarié et al., 2008, p. 45) all discuss the surface structure and features of a text. Characteristics such as individual lines of dialogue, italics and headings all stand out, and can draw the readers' attention to them. This, in turn, may influence memory, and search strategies. As such, it was important that the text had some degree of variance and natural 'contours', but not be overly reliant on them. In Bernhardt's parlance, the text needed to be on the

middle of the continuum of how visually and structurally informative it was (see Appendix E).

- **Permission**: The excerpt had to be one for which permission to use, edit, copy and distribute it as needed, could be easily obtained. Obtaining permission to reprint and distribute a text, especially if the use includes making changes, was a time-consuming process, with many requests going unanswered, being redirected (sometimes several times) or being refused outright.

Excerpts from three books written by well-known humour authors initially seemed to fit all the criteria, and full author/publisher permission was granted for all three. Of these, one was written several years ago, and contained references to a particular ethnic group, their food and lifestyle, which today could be viewed as derogatory or offensive. There was also some vulgar language and profanity around which part of the humour was based, such that if those sections were removed or edited, the humour would have been diminished, and the flow of the text would have been lost. The second excerpt contained interconnected passages and references, which made it very difficult to isolate a self-contained excerpt of approximately 3,000 words.

The text that fulfilled all the requirements was an excerpt from the introduction for a book by Robert Fulghum (see Appendices H.1 and H.2). Despite the fact that it discussed somewhat unusual or esoteric topics (it meandered from fridges to meatloaf to essay-writing), it was chosen because it fit all the criteria outlined above.

The same text was used as the basis for both the Confident and Less Confident Readers. The text for the confident group (Appendix H.1) was 3,894 words long**.** The text for the second group (Appendix H.2) was shortened to 3,476 words, and modified using a combination of Dale-Chall and Spache online readability calculators to make it more accessible to hesitant readers, but all the main components and ideas were retained, such that the flow, continuity

and content remained true to the original, and the same questions could be asked for both texts.

For example, the first sentence below is from the original text, used for the Confident group, and the second one was adapted for the Less Confident group, while still retaining the original meaning:

> I hummed. The oscilloscope reflected the wave structure of my voice.
>
> I hummed. A special tool measured the sound waves of my voice.

Both versions of the text are reprinted in this thesis in standard A4 size, but the participants received them in the form of a booklet, in order to emulate the experience of reading a small paperback book, and also to preserve as many of the text's original features and structure as possible. In order to reprint it as a booklet, the pages had to be jumbled and reassembled, so page numbers were printed by hand, at the bottom of each page.

2.6.3 The Search Task

A task had to be designed that would enable the participants to demonstrate their search strategies. It had to be manageable, and something which would require the readers to search through the text for information, while simultaneously engaging in the Think Aloud Protocol without undue effort or stress. The exercise had to be straightforward enough that it did not involve complex instructions, and it needed to be something that could be carried out by all the participants – confident and less-so alike.

It was decided that the familiar format of typical content questions, of the nature given in a comprehension quiz or exercise, would meet these criteria. The participant would read each question, and then, regardless of whether or not he knew the answer, he would use the Think Aloud Protocol and talk through how he would go about finding the necessary information to correctly answer the question. (See Appendix I for the questions).

Ten questions offered sufficient opportunity for the participants to become accustomed to the Think Aloud Method, express themselves, and provide a variety of insights into their search process, while at the same time, the task would not be too long or cumbersome. It is also a familiar, standard number of questions for many reading exercises.

There was a mix of literal and inferential questions (8:2). Since inferential questions are a tool for reflecting deeper comprehension[24], it was decided to include two, in order to ensure that the readers fully understood the text. A further two questions were literal, but asked about metaphoric language used in the text, which gave them a more abstract nature. Although the text had been modified for the group of less confident readers, enough of the original text was preserved for the questions to remain identical for the both groups. This made it easier to work with the task questions, score and analyse the responses, and make relevant comparisons and observations.

Most of the participants found the inferential questions more difficult than the literal ones, and in general those who did not get perfect scores (10/10) tended to err on the inferential ones (see Tables 2.1 and 2.2). However, this did not adversely affect their search. If anything, encountering difficulty made them search more carefully, and thus further highlighted their search strategies.

The questions were taken from all over the text, and given in non-chronological order. Often, with comprehension exercises, questions are given in chronological order. In this study, however, the goal of exploring efficient search strategies would have been negated had the questions been given in the order of the text, since the location of the answers would have been easily anticipated by the readers.

A rubric of the correct answers was developed to ensure that the scoring of the participants' answers was carried out in a uniform, reliable and transparent fashion (see Appendix J).

24 Oakhill discusses this extensively in several of her works. See, for example, Cain & Oakhill eds., 2007, p. 47; Cain et al., 2001.

2.6.4 Reflective Feedback Questions

A short series of follow-up questions was given to the participants upon completion of the search task (see Appendix K). The purpose of the questions was *not* to yield hard quantitative data, but rather to enable participants to express any further insights on reading, search and memory or anything else that they felt hadn't been raised during the task, thus rounding out and concluding the task session. The questions were originally designed as a close-ended checklist, but it was more fitting for the way the session was conducted for these questions to be discussed orally, in a more open-ended fashion. As such, participants were encouraged to stray from the format and elaborate further, verbally or in writing, which many did. Most of the participants gave a mix of oral and written responses, with the oral ones being recorded and noted as they elaborated. One participant turned each question into a written five-point Likert scale, another gave a range of between one and three check-marks for each answer, and several responded with a range of verbal responses, such as "yes", "never", "sometimes", "usually", etc., elaborating where they felt it was necessary.

2.7 Procedures

The procedures were identical for all three groups of participants.

2.7.1 First Meeting

During the initial meeting, participants consented to participate in a study on reading and memory. They were asked for basic demographic details, such as age and level of education, and they answered some informal questions about their reading habits, preferences and perceived reading abilities.
At the end of the first session, participants were given the text to take home and read. They were instructed to read it through once, carefully and thoroughly, that they would be asked questions on it, but that they could not take notes or mark up the text in any way (such as highlighting or underlining). So as not to interfere with the spontaneous nature of the search task and Think Aloud Protocol, exact details of the study were not given at this time. As Rouet among others has pointed out, knowing the objectives of the

reading task can influence how readers read and encode the text (Rouet, 2006, p. 101).

A date for the second session was agreed upon, such that it would take place between three and five days after the text had been read at each participant's convenience. Participants told me when they would be able to read the text, and based on that, the second meeting was scheduled for between three to five days later, at their convenience. A message was sent via email or SMS to each participant a day or two before they were supposed to read the text, reminding them to read the text, and asking them to confirm that the prearranged days of both reading and the second meeting were still convenient for them and that they could read the excerpt at the agreed time. All the participants except one confirmed that the task session was indeed taking place between 3-5 days after they had read the text through once. That one participant became ill and could not attend the second session at the appointed time. It was rescheduled for more than a week later, and because of the greater time-lapse, there were several aspects of the text which she had forgotten, but she still wanted to participate and still had some insights into the search process. For these reasons, it was decided she would be included in the Pilot group.

2.7.2 Time-lapse Rationale

The time-lapse of three to five days between reading and the memory tasks was chosen for the following reasons:

- Most reading tasks are administered immediately following the reading of a word-list or short text. The current study focuses on memory for location of information in a long text, and as such, completion of a task immediately after reading was not applicable, since long-term memory had to be activated during the task.

- Literature on what would be considered an appropriate time-lapse between reading and carrying out the search tasks, was not available. Baddeley discusses at length the capacity of working memory, but barely mentions its duration (see for example, Baddeley 2007, p. 11).

Luck and his colleagues have studied working memory in depth, including the time it takes for the visual working memory to consolidate information, but they don't discuss how long the information is kept in visual working memory, other than to say that without rehearsal there is a "fairly rapid, passive decay of information" (Vogel, Woodman & Luck, 2001, p. 92; see also Vogel, Woodman & Luck, 2006).

- It would appear that an item which is transferred into working memory is stored for a few seconds[25], at which time, information which is deemed important is stored in long-term memory. Since what is being explored is how readers return to a text and relocate information, it was clear that the time-lapse between reading and the search for information had to be longer than a few moments. At the same time, a time-lapse of longer than five days was deemed too long, both for accurate memory, as well as practicability and ensuring that the participants would be available for the second meeting. As such, three to five days was considered reasonable for readers to remember something about a text that they had read without annotating - not so close to the reading so as to have the information available in immediate recall, and not too distant that they would have forgotten most of the text and its cues.

- The participants themselves felt that this was a reasonable time-lapse, both in terms of their being able to remember details of the text, as well as being available to return for the task session.

2.7.3 Second Meeting

At the second meeting, participants were given ten questions on the text, and introduced to The Think Aloud Protocol. It was emphasized to participants that it was the *process* of the search that was being explored and observed, and that they should not feel 'tested' or pressured to get a 'high score'. The essence of the reading task was for the participants to read the question and search for

25 Atkinson and Shifrin said that an item in working memory will last between 15-30 seconds if not rehearsed (Atkinson and Shifrin, 1968, pp. 90, 92). As they themselves assert, and Baddeley concurs (from a private communication), it is very difficult to test or quantify the duration of short-term, or working, memory.

the correct answer in the text. Whilst they were searching, they used the Think Aloud method to articulate how they were going about their search, what their search strategies were, what information they remembered, what cues and clues were aiding them. Readers were told that they could, and should, use the text to look for the answers, and in fact this was preferable to answering the questions by heart. If they knew the answer without looking, or remembered its location without searching, participants were encouraged to point out where they thought the answer would be in the text anyway, and use the Think Aloud method to provide as many metacognitive details and insights as possible.

The task session was filmed or audio-recorded with permission from the participants. The purpose of the filming was not to obtain detailed, in-depth video data for each participant, but rather to have a form of backup data collection and a method of revisiting each session, should it become necessary, in order to check or confirm an observation, nuance, comment or action on the part of both the participant and researcher. For example, some of the participants used non-verbal communication, such as pointing. Moreover, during the session, note-taking was the primary source of data collection. Inevitably, if a researcher is taking notes, and/or wants the session to be as natural and non-intimidating as possible, and thus does not look directly at the participant the entire time, there will be moments where she is not focused on, or looking at, the participant. Thus, essential non-verbal communication or other behaviours and nuances may be missed, and they can be viewed later on the video recording. The video recordings also showed exactly how long it took the participants to answer each question.

During the second session the parameters of the participant-researcher relationship were established. As discussed in Section 2.2, my role was to remain as unobtrusive as possible. It was important that I refrain from becoming involved in the search process. There were, however, two overarching reasons why it was sometimes necessary to become more involved, or prompt the participants. One was out of consideration for the participants' feelings, and the other stemmed from the research goals.

1) *Participants' Feelings*: The use of the familiar framework of reading a passage and then answering questions quite likely caused some of the participants to feel as though they were being tested, despite their being told that this was not the case. As a result, out of habit, they may have overemphasized the need to answer correctly, within a certain amount of time. If I sensed that the participant was becoming frustrated, agitated, feeling pressured to 'get it right', or feeling like time was running out[26], even though nothing to that effect was said, then I redirected them to use their own Think Aloud comments and insights as reference points, usually referring back to an answer that they had already articulated. I never spoon-fed them an answer that they had not already contemplated.

Both groups of participants –confident and less-so - tended to become more flustered while trying to look for the answers to the inferential questions. To minimise frustration, and keep the session running smoothly, I sometimes restated the question, or let them know that it was a 'why question' and as such, the answer was not explicit in the text, but rather, implied or inferred. This was often sufficient to redirect the readers' efforts, without my having given them any concrete information.

2) *Research Goals*: If the participants were focusing more on 'getting it right' and less on the Think Aloud and search processes, I would remind them that the process was the important aspect of the task, and not their final score. Usually this involved my picking up on their own insights and comments to guide them towards an answer that they had already mentioned or considered, in order to have them focus on the Think Aloud, and not be fixated solely on getting the right answer.

Very often, these two factors were intertwined, such that a participant would feel flustered or confused, and then focus more on the answer than on the

26 Interestingly, although there was no time limit – either self-imposed or dictated by the study - the task session tended to take between 45 minutes to an hour, for both the confident and more hesitant readers. Having said that, the efficient ones were able to 'pack' more insights into that hour, and answered the questions more correctly and thoroughly during that time.

memory and search processes. It was then that I prompted them, just enough to get them back on track and keep their insights flowing.

After answering the questions and describing how they remembered where the answers were, where they thought they were, or where they chose to search for the answer, participants completed a short follow-up questionnaire about searching for, and locating, information, and were encouraged to reflect on the topic and add any further information that occurred to them.

2.7.4 Scoring the Responses to the Task Questions

2.7.4.1 Scoring Rationale

After the task session, each correct answer was given one point, for a total of ten points. Partial points were awarded when necessary, as per the discussion below.

Although the goal of the task was not to get a perfect score, and the scoring itself was secondary to the readers' insights, it was still important to know how effectively each participant answered the questions. The scoring served the purpose of demonstrating whether or not the participant was on the right track with the search. It provided a concrete indication of the readers' ability to correctly locate the information. Unlike most comprehension exercises, the task was not created solely to yield 'right' or 'wrong' 'answers. However, a search that yielded a correct answer generally indicated that the participant remembered the correct location. This was not always the case, because a participant could have given the correct answer without actually remembering the location – she may simply have remembered the information itself. An incorrect response could still mean that the reader remembered the correct location, or approximate area where the information was to be found, and indicated as such in the Think Aloud, but then for some reason, she answered incorrectly despite knowing the location. Still, a correct answer, when combined with the Think Aloud insights, gave a more complete picture of the participants' thought processes.

Although there is some disagreement as to whether or not comprehension and memory for location are causally related, the majority of research shows that there is a correlation between the two (see Section 1.8 in the Literature Review for a discussion of the Comprehension-Location connection). If this is the case, as it appears to be, then grading the task and recording the scores adds another facet to the discussion.

2.7.4.2 Partial Points

It was the original intent not to have an option for half points. However, during the study it became clear that on occasion, this was necessary. Out of 200 answers (20 participants and 10 answers each), seven answers received a half point [27]. Ultimately, a partial point was useful, as it indicated that the reader knew something about the correct answer, such as its approximate location, but once there, couldn't find the actual information. Alternately, it may be have demonstrated that the reader only partially comprehended the question, or the related portion of the text, and as such, this added an extra dimension to the data. The Pilot participant's answers which received two half points were helpful in that they highlighted ambiguity in those two task questions, which were then revised for the remainder of the participants. (See Tables 2.1-2.3.)

Table 2.1 **Demographic information and task scores, Pilot Group Participants**

Participant	Gender	Age	Education/ occupation	Task Q's	Partial Pts
P1	F	52	Librarian	10/10	
P2	F	43	BA Special Ed, elder care	6/10	2 x .5
P3	M	46	BA, teacher	9/10	
P4	F	44	BA teacher	10/10	

Key: Task Q's = Score on the study's task questions Pts = Points

27 One Pilot participant received two half points for answers, three Confident readers, and two Less Confident readers got one half answer each.

Table 2.2 **Demographic information and task scores, Confident Readers**

Participant	Gender	Age	Education/ occupation	Task Q's	Partial Pts
C1	M	59	Proofread/ investments	8.5/10	.5
C2	M	42	Videographer Web design	9/10	
C3	F	38	Editor/ teacher	7.5/10	.5
C4	M	25	B.Ed Student	10/10	
C5	F	27	Social worker for elderly	7.5/10	.5
C6	M	25	Videographer	8/10	
C7	F	23	Literacy teacher	10/10	
C8	M	37	Computer support	9/10	
C9	F	60	Editing	9/10	
C10	F	34	Editorial Mgr	8/10	

Table 2.3 **Demographic information and task scores - Less Confident Readers**

Participant	Gender	Age	Education/ occupation	Task Q's	Partial Pts
LC1	F	60	Fashion Design Cert (doesn't work)	6.5/10	.5
LC2	M	28	Warehouse Manager	7.5/10	.5
LC3	F	49	Real Estate investor/ Energy Healer	8/10	
LC4	M	27	Logistics Manager	10/10	
LC5	F	47	Computer programmer	10/10	
LC6	M	27	Videographer	9/10	

Table 2.4 Breakdown by task question - Confident Readers [28]

Question Number	Question Type	Question Content	# of correct answers	# of incorrect answers	Partially correct answer	Common Errors
Q 1	Literal (L)	List of deep questions	5	5	0	Thinking it was earlier in the text, seeing a question mark and assuming that was the answer.
Q 2	Inferential (I)	Saving meatloaf for later	9	1	0	
Q 3	L	What is a writer not supposed to do?	10	0	0	
Q 4	I	Why does Fulghum call Montaigne "Mike"?	8	0	2	Inference was too subtle
Q 5	L	Meatloaf filler	8	2	0	Saw food words, took the answer from just before the correct area
Q 6	Literal - asks about metaphors	Montaigne's metaphor for his own writing	6	4	0	Looked for a direct quote, mistook something else he said about writing for his metaphor
Q 7	Literal – Metaphor	What are like leftovers?	10	0	0	
Q 8	L	National Parks Service recommendation for freezer artifacts	10	0	0	
Q 9	L	Origin of the word "essay"	9	1	0	
Q 10	L	Meatloaf song	10	0	0	

[28] **Tables are for Confident and Less Confident Readers only**. The questions for the pilot group were different from those of the other two groups. Some of the original questions were ambiguous or confusing – this was one of the problems rectified during the Pilot phase.

Table 2.5 Breakdown by task question - Less Confident Readers

Question Number	Question Type	Question Content	# of correct answers	# of incorrect answers	Partially correct answer	Common Errors
Q 1	Literal (L)	List of deep questions	4	2	0	Thinking it was earlier in the text, seeing a question mark and assuming that was the answer.
Q 2	Inferential (I)	Saving meatloaf for later	6	0	0	
Q 3	L	What is a writer not supposed to do?	5	0	1	Comprehension
Q 4	I	Why does Fulghum call Montaigne "Mike"?	5	1	0	Lack of comprehension for that section of the excerpt.
Q 5	L	Meatloaf filler	6	0	0	
Q 6	Literal - asks about metaphors	Montaigne's metaphor for his own writing	3	3	0	Looked for a direct quote, mistook something else he said about writing for his metaphor
Q 7	Literal – Metaphor	What are like leftovers?	5	1	0	Lack of comprehension – text and question
Q 8	L	National Parks Service recommendation for freezer artifacts	6	0	0	
Q 9	L	Origin of the word "essay"	6	0	0	
Q 10	L	Meatloaf song	6	0	0	

2.7.5 Transcribing the Think Aloud Sessions

The first step after gathering the data was to transcribe each task session, including pertinent observations from both the hand-written session notes and the video recordings, where applicable. Participants' responses and insights were then categorized and coded. In general, what each participant said was transcribed almost verbatim from the video or audio recordings. The word "almost" is used here in relation to the nature of the transcription, because unfinished sentences and some interjections or filler words were not included if they did not add to the data set in any meaningful way. As stated in Section 2.7.3, the purpose of the video recordings was to function as support for the field notes and to capture what the participants said. It was not to be examined minutely for every detail and nuance, as is the case with some video data-collection methods. Gestures and body language were noted in the transcription when these supplemented or completed the Think Aloud insights. For example, if a participant said "I remember that it was *there*", and the verbal 'there' was punctuated by her pointing to a place on the page, but not articulating the location, then details of the pointing action were included in the transcription in parentheses.

In addition, my own comments were divided into 'probe' and 'prompt' and included in the transcription. 'Probe' indicated a point where I tried to elicit a more complete, clearly articulated, or deeper response from the participant. 'Prompt' was when I redirected them or helped them refocus, if they strayed from the research goals (as discussed in Section 2.7.3).

2.7.6 Thematic Analysis of the Data

After all the data had been gathered and reviewed, it became clear that saturation had been reached. This was evident from the fact that no new themes or responses were being elicited, and many responses were repeating themselves. In order to manage the data, a coherent system had to be developed. At this point, Thematic Analysis was introduced to analyse the data (see Section 3 below). Using Braun and Clarke as a guide, the transcribed responses were classified and re-classified. As the authors state, recognising themes is a recursive process that requires thinking about the same pieces of

data in several different ways, and reviewing them many times until patterns begin to emerge (Braun & Clarke, 2006 pp. 86-93).

Different methods of separating responses from one another, putting responses together, classifying them and colour-coding them were attempted. The colour-coding, however, soon proved to be inefficient and disorganized, as will be discussed below in Chapter 3 (see Appendices L.1 and L.2 for early colour-coding attempts).

Although it was not explicitly my intent to use it, the Constant Comparative Method of relating, revisiting, cross-checking and integrating codes, categories and themes, was a natural fit for this type of exploratory research, and informed the direction that the analysis took (see Glaser, 1965 and Kolb, 2012; Maykut & Morehouse, 1994 was a particularly helpful resource for the Constant Comparative Method).

After several tries, an efficient coding system began to emerge - one which provided logical categories of responses that were manageable, made sense and could contribute to an academic discussion in a meaningful fashion (see Figure 3.1). The response patterns and coding themes tied into the Literature Review and addressed the Research Questions. As well, they had a logic that could be replicated, thus supporting their validity and reliability.

Several independent reviewers read the transcribed responses, or watched the videos, and came up with their own codes, which were remarkably similar to those that I had created.

2.8 Ethical Considerations and Approval

2.8.1 Ethics - Participants

Ethical approval was granted by the University Ethics Committee. The participants were adults, and gave explicit oral and/or written permission for their participation (see Appendix F). One participant did not want the sessions to be filmed, and she was recorded solely on audio, with her consent. Although

participants were not misled in any way, they were initially only told that it was a study on reading and memory, so as not to influence their spontaneous responses. Upon completion of the memory task, participants who were interested were given more details about the nature of the study.

2.8.2 Ethics – Materials

Express permission to edit, alter, reprint and distribute the text used in the study, was granted directly from the author via email, as per the recommendation of the publishing company.

Chapter 3: Process of Analysis: Coding and Themes

When the data was first sorted and analysed, the initial codes were haphazard and disorganized. Colour-coding the different response categories seemed like an efficient system, but in practice, it did not add clarity at all. Although there were too many colours, and no inherent logic to the coding, this strategy did help to categorise the responses. Strips of paper printed with both colours and codes were arranged and rearranged, until patterns began to emerge (as per Maykut & Morehouse, 1994; Miles & Huberman, 1994; Braun & Clarke, 2006). Although the colour-coding system was ultimately abandoned, it helped the responses to separate organically into two different sets of characteristics, and this provided the coherence needed to organise and analyse the data.

First, textual cues, clues and information began to cohere into two broad sub-categories: 1) content and 2) form. Content is what the text is about - the verbal messages, information and meaning that are being conveyed. The form is the surface structure of the text – the way the page looks to the reader, and physical features which distinguish one paragraph, page or section from another. Both of these offer readers a myriad of 'landmarks' with which to navigate the text. While they seem very different, and easily distinguished from one another, over the course of the research it became clear that at times, they can be interrelated, or difficult to separate.

In addition, there are two distinct, but not necessarily clearly delineated temporal phases of processing information - during reading and during search. Information is processed and absorbed both whilst the text is being read for the first time, as well as later, during a search for a word, phrase or an answer to a question. In this study, it was not always clear if textual cues were absorbed and processed during reading, or if they were absorbed during the search. Sometimes the reader was aware of, and could articulate, this distinction; sometimes it was clear from what they said or did during the Think Aloud search task, or from the logical/ chronological sequence of when it was likely to have taken place; but sometimes it was more vague or ambiguous than that. In those instances, the 'when' cannot be pinpointed - the reader simply stated that it happened at some stage. For example, many participants mentioned that they felt the text had sections, but it wasn't necessarily clear whether they had fully defined what those sections were whilst they were reading, when the search tasks required them to utilise the divisions to aid the search, or some combination of the two.

This last possibility would occur if, while reading, they had a vague inkling that the text had distinct sections, but it was only when they began the search task, and were required to use the Think Aloud Protocol, that they articulated and clarified for themselves what those sections were. These stages of processing can interact, in the sense that information absorbed during reading can aid in the subsequent search, and during the search, information absorbed during the initial reading can be recalled, reinforced or more clearly defined.

Within these two conceptual groups (form/content; during reading/during search), common themes began to emerge, such as readers recalling a piece of information because they found it interesting while they were reading it, something in the text striking a familiar chord and triggering a schema response (see the section on Schema in the Literature Review, for example: Rayner & Pollatsek, 1989; Rayner et al., 2012; Rouet, 2006; Schunk, 2012;), or readers noticing and remembering structural aspects of the text. Studies on surface structure were particularly helpful in identifying these themes (see in particular, Bernhardt, 1986; see also: Lorch, 2008; Meyer & Poon, 2004).

Instead of working with the initial colour-coding, a more efficient coding method was devised, centering around these categories. A page was divided into two columns – on the right were the participant's responses, and on the left, were the codes that matched. The codes were categorised as:

1) **DR** (during reading) and 2) **DS** (during search), then **F** or **C** (form or content) and then a more specific description of the phenomenon – such as 'interest', 'schema' 'location'. (See Figure 3.1 for a complete coding key; Figure 3.2 for an example of coding the transcriptions; Appendix M for a complete sample transcript with coding.)

Figure 3.1 Coding Key

CODE	DESCRIPTION
A) DURING READING (DR)	
DR Form (DR F)	
DR F Surface Structure	Something about the text's physical attributes is noted
DR F Physical division of text	Physical division of the text, **not** based on context/ content/ ideas
DR Content (DR C)	
DR C Captured attention	A detail captured their attention while reading, so they noted/remembered it
DR C Schema	Noted because it specifically triggered schema
DR C Divided text by content/context	While reading, as opposed to while searching
T Comp	Seemed to not understand something in the text – demonstrated lack of reading comprehension
B) DURING SEARCHING (DS)	
DS Form (DS F)	
DS F Location on page	
DS F Surface Structure	
DS F Physical division of text	
DS Content (DS C)	
DS C Remembers detail	Recalls informational detail or another aspect of content
DS C Key words deliberate	Deliberate use of key words
DS C Key words popped out	Non-deliberate - they just noticed the key words
DS C Skim/scan	Scan for related info or not 100% defined but **not** key words (sub-categories: finger, read out loud
DS C Contextual/ division	Uses contextual clues and text division
Q Comp	Doesn't understand question
DS Other (DS O)	
DS O – unsuccessful/ unhelpful strategy	

DS O Self-correct, self-check	Re-checks the question or answer, changes an answer. Includes not satisfied with answer but can't say why
DS O Eye gestures	Looks upwards or closes eyes - uses an eye movement to prompt memory and recall
DS O Backwards	Flips pages backwards - usually on purpose
DS O Peripheral Processing	Absorbed or remembered info while looking for other, unrelated info ie. - from a different Q
DS O Other	Anything else not mentioned (usually unique to only one participant
Naomi probe	Asking questions to elaborate and get further/deeper info/ insights out of the participants
Naomi prompt	Mainly for me to note where and why I prompted them somewhat, if it came up in the transcript. Usually to help them move along, especially if they're feeling pressured or discouraged

Figure 3.2 Example of coding from C10's responses:

Theme and Code	Transcribed response
DR C - captured attention	I thought it was cute when I read it.
DS F - surface structure	National Park Service. The capital letters are very good at finding what you're looking for

Over the course of the research, it also became clear that the absorption and processing of information can be seen to run along a continuum of consciousness. While 'conscious vs. unconscious' may seem like a dichotomy, what emerged in this study was more akin to levels or layers of consciousness rather than 'either/or'. That is, readers are sometimes quite aware that they are doing certain things, both while they read and while they search; sometimes they are only marginally or vaguely aware; and sometimes they only become aware of what they are doing if they are asked to stop and think about it, such as while they are participating in a Think Aloud study. As such, consciousness takes on a retrospective element, in that they recognise what they were doing only in hindsight, when prompted to examine the process more closely. Due to its illusive nature, this continuum was not overtly incorporated into the coding system; rather, it provided a backdrop for the readers' insights throughout the research, and informed the coding process.

Summary of Data Analysis

After repeatedly examining the responses, using, in part, the Constant Comparative Method, and asking colleagues to create their own coding systems, I arrived at manageable broader themes, as well as more precise sub-categories. There are essentially three continua occurring simultaneously:

1) Processing time of locational information: During Initial Reading/ During Search

2) Characteristics of textual cues: Form/ Content

3) Unconscious/ Conscious processing of textual cues and locational information

None of the three present dichotomies. Rather, they are dynamic continua. The continuum of consciousness was the most difficult to frame, and is reflected in the details of the coding, in the respondents' insights, and in my observations, rather than as a discrete coding category.

Chapter 4: Findings

Given the fact the task questions were a means to understanding the search process, and not an end in and of themselves, the participants' scores on the task are not as fundamental as they would have been, had the task itself been the goal of the study. As such, the primary focus of the findings and subsequent discussion will be the search process and the participants' metacognitive insights into reading and memory, and not their individual scores.

With regards to the actual search task, most of the participants, whether confident or less-so, found the inferential questions more difficult than the literal ones. In general, those who did not get perfect scores (i.e., 10/10) tended to err on the two inferential ones, as well as the two more esoteric metaphor questions (see Tables 2.4 and 2.5). However, this did not adversely affect their search. If anything, encountering difficulty made them search more carefully, and thus further highlighted their search strategies.

Although the scores for the less confident group were on par with those of the confident readers, *all* six of the hesitant readers struggled more than their counterparts with the first few questions, and each one had at least one task question that took them far longer to answer than any of those of the confident readers (about 10 minutes, as opposed to 2 or 3 minutes)[29]. Most of the less confident readers recovered, and ended up taking the same total amount of time to complete the tasks and share their insights, but their overall approach to the tasks was less systematic, and more haphazard.

Following are the findings from each coding theme that emerged, with examples from the transcribed Think Aloud sessions, to illustrate the main points. The findings are presented in the order in which they appear in the coding chart, with During Reading (DR) preceding During Search (DS), since that is how the reader would absorb and process the information. DR is then subdivided into Form and Content, with further subdivisions in each category, according to the themes that emerged as the coding progressed.

4.1 DR (During Reading) Form (DR F)

4.1.1 DR F - Surface Structure

(*Something about the text's physical attributes is noted during reading*)

Six of the participants specifically mentioned that they noticed the asterisks, which then helped them divide the text into logical components while they were reading. These sections were subsequently useful to them while they were answering the task questions. One of the readers said the asterisks were the only way she divided the text and another reader referred to the asterisks as "chapters". This is one example of the surface structure of the text aiding in absorption during reading, and ultimately being used as a memory aid during search.

29 Because the exact time it took for each question, was clearly discernible from the video recording, this information was easily obtained.

4.1.2 DR F - Physical Division of the text

*(Division of the text **not** based on content/ideas, but rather by a physical attribute)*

When the text was printed in booklet form, in order to maintain some of the features of the original book from which it was taken, centre staples were used to collate the pages. In the text for the confident readers (and to a lesser extent, in the adapted version as well), the centre pages coincidentally also demarcated a conceptual division. Two readers (one confident, and one hesitant) said they used the physical division of the staples as a conceptual division. A third reader said he didn't use the staples, but divided the text in half, by the number of pages it had, apparently by the kinesthetic feel of the booklet in his hands.

During the Think Aloud session, one of the confident readers repeatedly demonstrated that he relied on the physical division of the staples to locate information. For him, the centre of the booklet delineated a shift from the author talking about fridges and meatloaf, to becoming "more philosophical", which constituted two distinct sections of the text. One additional reader (C7) used the asterisks to divide the text into small sections, giving each one a heading in her mind, but then also used the centre staple as a more macro physical and topical division.

4.2 DR Content (DR C)

4.2.1 DR C - Attention/ Interest

(Something about the content of the text captured the reader's attention or interest during reading)

One of the main influences on memory seems to have been if the readers' interest was piqued while they were reading. Small, unusual details and humorous parts were remembered more clearly than the longer, more 'boring' or drier parts. A very common response from the participants was some variation of "Oh, I remember this, I thought it was funny when I read it",

especially in reference to the Meatloaf Protest song, and the author's "recipes" about what ingredients could go into making meatloaf.

Whilst reading the text, one reader wondered to herself whether the B-flat story at the beginning was true, and consequently, remembered that section very clearly. Two of the hesitant readers had similar experiences: one said she was "impressed" by how many questions the author had, and so was able to answer the related task question very quickly, and another felt that Montaigne's metaphor about his essays being the strings that tie other men's flowers was a "nice image". She noted that during her search for the answer the words "bunch of flowers" popped out at her (more on this below), and she recognised it as the metaphor, based on the fact that it had captured her attention when she first read it.

4.2.2 DR C - Schema

(The reader's knowledge and life experience beyond the text connect to something in the text)

Schema plays a crucial role in comprehension, encoding and recall during the reading process (see for example, Anderson & Pearson, 2002; Anderson, 2004; Davis, 2013; Sadoski, 2018; Schunk, 2012)). An example of schematic knowledge being activated and helping the reader recall information, was in Question 8 ('Using the National Park Service idea, what should people do if they find "artifacts" in the freezer?'). One reader remembered how he read that with interest because it reminded him of his wife's motto for going on family nature outings: 'take nothing but pictures and leave nothing but footprints'. He referred to this schematic trigger as having "extra (memory) neurons", meaning, it activated more synapses in his brain while he was reading, and possibly during the search as well.

Many of the readers who had experience with making meatloaf remembered Fulgham's suggestions for meatloaf filler (Question 5). LC3 joked about how she now felt she should expand her meatloaf-making repertoire based on the filler ingredients that Fulghum gave.

C7 and C8 both remembered the location of the answer to the question about what a writer is not supposed to do, because of schema – C7 because she learned about it in teachers' college, and C8 because of something his father said about essay-writing when he was a university student. These associations enabled the participants to find the correct answers very quickly and efficiently. As C7 said, "It kind of made an impression on me, because this is what we were taught as teachers. I didn't bookmark it in my head (something she does to remember important information), but I kind of sat on it [while reading the first time] for a couple of minutes longer than I did the rest of it, so coming back to it wasn't really so hard to find." Similarly, C6 is an amateur musician, and he already knew that everything has its own tone. He's used a website which can tell you what key different noises are in, and he had also recently watched a documentary about how in regular speech, people's inflections have their own notes. Thus, the B-flat anecdote was familiar to him, and made it easier to read the excerpt, and remember more details.

Some activation of schema may have taken place during the searching stage, and not the reading, but as mentioned earlier, it is sometimes difficult to differentiate between the two. Most often, as illustrated by the readers' own metacognitive insights, schema seemed to be triggered during reading, and then further remembered during the search, thus aiding the search task, but it wasn't triggered by the search itself.

4.2.3 DR C - Division of Text by Context

(The readers divided the text in their heads. Division may not have been fully conscious or articulated, and/or may have been more clearly realised during the search task)

Three of the four Pilot participants mentioned dividing the text in their heads. All ten of the Confident readers reported having divided the text by topic. Interestingly, each participant divided the text in very different ways, and yet were convinced that the way they had divided the text was *the* obvious, correct, and only way to divide it. Thus, they referred to "the introduction", "the meatloaf section" or "the philosophical parts" as if they were self-explanatory.

Typically, a discussion about the division of the text went like this (an amalgamation of several transcripts):

Participant: "I remember that, it was in the fridge section"
Naomi: "When you say 'fridge section' what do you mean?"
P: "There were sections in the text"
N: "Could you tell me what they were?"
Here, some participants faltered, some were able to give partial answers, and some had to think about it for a few moments before articulating at least a few of the sections.

The number of sections varied greatly, from two, to between five and six (C8 said six, but then he only enumerated five). Two of the participants (plus C7, as above), who divided the text in half, used the middle staple as the division, but noted that the two sections were conceptual as well as physical. One defined the two sections as "rambling about meatloaf" and "more philosophical", and the other felt that before the staple dividers, the author was being more humorous and then after them, he got more serious. C2 divided the text into three units: pre-meatloaf, meatloaf, and post-meatloaf. Similarly, LC6 talked about three sections: the "introduction with the classroom and the music", then the "whole thing about food, refrigerator" and then "he kind of talks about his writing style afterwards, so that 'self-aware time'". Interestingly, this division was from one of the less confident readers, and the division is less precise, and more vaguely-worded than several of the other ones. During Think Aloud, C8 referred to "Section 5" at one point. While he couldn't enumerate precisely what the other sections were, it was clear that he had divided the text into smaller, more specific sections than some of the other participants. For example, he differentiated between "the fridge" section, and the "leftovers in the fridge" section, and also had the "children's pictures" and the "serious part". Other headings given by participants were: 'fridge', 'meatloaf', 'Hudson's Bay', 'philosophising', and 'the French guy'.

Of the six Less Confident readers, only one, LC6 as above, divided the text in a coherent, practicable fashion. The others complained that it was "bitsy" or

"disconnected", with one saying she tried to divide it "by topic – science, fridge, leftovers" but then couldn't remember the rest, saying that the author began "wandering" after that. Three participants in this group used the exact same terminology, referring to the text as "all over the place".

4.2.4 DR C - T comp

(The reader misunderstood, or demonstrated a lack of comprehension of, a part or aspect of the text)

This was not a strategy, but rather a thematic category that was included whenever it seemed that participants did not comprehend something about the text. It was more evident with the less confident readers than with the stronger ones. For example, LC4 who has dyslexia, among other learning disabilities, stated that the author discussed writing versus film (this was not true). He also said that towards the end, the text got boring which made it harder to remember. LC1 felt that way about the author's discussion of the Hudson's Bay Start. She also said the author discussed the "different parts of the head" (he didn't), and thought that maybe the author knew Montaigne personally (four centuries divided them). She said she "switched off" for all the "French bits" (of which there were two, both of which were immediately followed by their English translations).

4.3 DS (During Search) Form (DS F)

4.3.1 DS F - Location on page

(The participant remembered where on the page the information was located)

As per the original studies on search and memory by Rothkopf (1971) and then Zechmeister and his colleagues (Zechmeister & McKillip, 1973; Zechmeister et al., 1975), many of the participants reported remembering where on the page information was located. This was evident for the most part, in that they kept their eyes focused on one part of the page during searching, and sometimes they articulated that use of location was a strategy or memory aid. LC4, for example, said "I knew it was on the top of the page, so I looked at the top of the pages (while leafing through them)". When probed, several said they were aware that they did this, and that it was very helpful in retrieving information.

For example, when asked about this ability, C10 said that she felt she has a bit of "photographic memory" in that she remembers what the page looks like. She recalled that when she was younger in school, she would take notes for a test, but then rarely refer to the notes while studying. Instead, during the test, she would remember where on the pages of notes the information was located. Similarly, LC6 referred to the Shas Pollak [30], and his own very visual work as a videographer, and said he remembered "physically" where information was.

4.3.2 DS F – Surface structure cues

(Surface contours and landmarks of the text)

All but one of the readers reported noticing surface structure cues. These were the non-linguistic aspects of the text, such as the contours of the page, change in font, asterisks, etc. An obvious example was the italics used for both the 'Meatloaf Protest Song' and the French word, 'essai'. In addition, several of the readers reported searching for question marks, when they were looking for questions in the text. Upper-case letters are usually seen as part of the grammatical makeup of the text, but the readers used them as surface structure cues. For example, one reader said that finding Eyquem's name would be easy, since it was three capitalized names together, forming what she called a "chunk that I can identify". Another participant noticed Eyquem's name, not only because of the capital letters, but also because, as he said, "the letters 'y' and 'q' pop".

4.3.3 DS F - Physical Division of the Text

The physical division of the text of the centre staples that was used by some readers during the reading stage, was reinforced or brought to a more conscious level, during the search process.

30 The Shas Pollak were a group of Talmudic scholars who, in the early 1900's, were reported to possess unusual photographic memory for the location of words and phrases in the Babylonian Talmud.

4.4 DS Content (DS C)

4.4.1 DS C – Division of Text

This strategy during search was essentially an extension or continuation of the conscious or unconscious division of the text that was begun during the initial reading of the text. In general, readers divided the text in their heads to some extent whilst reading, and then further division of, or solidifying, what they had already done, took place during the search, as they began to utilise those divisions to aid in the search task. The search task provided them with the opportunity to articulate how they divided the text, but none of the readers *began* the division process during the search.

4.4.2 DS C – Deliberate Use of Keywords

(Readers intentionally looked for key words, or phrases, in order to find the answers to the task questions)

Most participants used a keyword at some point in their search tasks. By 'keyword', it is meant a word or phrase that is associated with the question and/or the answer they were searching for. Readers deliberately look for that word when searching for the correct answer.

4.4.3 DS C – Keywords Popped Out

(Unintentional or semi-conscious use of key words or phrases)

In many instances, readers reported having a word 'jump out' at them. That is, they were not purposely searching for that word, but while they were looking for the correct answer, a word or phrase 'popped out' at them - often for reasons that they could not clearly articulate. One participant said that words that repeat themselves jump out sometimes. Others said that unusual words pop out. For example, C4 said he "stumbled" on the Eyquem metaphor (Q6). He thought it would be something else, but when he saw the words "bunch" and "flowers" he knew that had to be it. LC4, too, saw "men's flowers" and "thought that might be something." Some felt that the words associated with what they needed to find, such as "show" and "tell" simply jumped out at them, but didn't know why.

4.4.4 DS C – Remembered Detail

(Readers remembered something interesting about the text during the search)

As with "During Reading C - Captured Attention", many of the readers were able to quickly home in on an answer to one of the task questions because the text contained a detail that was memorable for them, and they remembered it when asked. The subtle, and not always so distinguishable difference between interest being piqued *during reading* and remembering a detail *during search*, highlights the interconnectedness of the two stages. It would seem that most of the time, a detail captured the reader's interest during reading, and then they remembered its location during search. And, in fact, often the readers would say something like "Oh, I thought that was funny when I read it".

4.4.5 DS C – Skim/Scan [31]

(With subcategories of 'finger' and 'out-loud')

All the participants skimmed or scanned for information. Sometimes this was conscious and articulated, and sometimes it was clear from their eye movements, or other body language and non-verbal communication, and even indistinct whispering or muttering. Scanning was often used in conjunction with the deliberate search for a keyword.

In addition, many of the readers either read out loud, said keywords out loud, or used their fingers to help them skim/scan. These were strategies more often used by the less confident readers than the more confident ones. It is possible that they were either taught to do this as a compensatory skill, or perhaps they developed these techniques over the years, as a way to help themselves stay focused.

31 Skim and scan are used here interchangeably. This is because: a) it was sometimes difficult to distinguish during the session, which one they were doing, b) participants often switched rapidly from one to the other and c) the participants themselves used the words interchangeably.

4.4.6 DS C – Q comp

(Misunderstanding the task question)

Like "T comp", this was a thematic category that was included when participants did not comprehend a question. It was more common with the group of hesitant readers, but both groups had difficulties with the two inferential questions, and a few readers weren't quite sure what was meant by a metaphor in this context, or how to look for it.
This was an example of where "Prompt" was used, so that the respondents were not spending undue amounts of time, or becoming nervous, wondering what the question meant.

4.5 DS O - A variety of responses and reactions that were different from both "F" or "C"

4.5.1 DS O – Unsuccessful Strategies

(Strategies that led the participant to an incorrect answer, or no answer at all)

This theme was not particularly prevalent, or easy to identify, but it was created when the group of less confident readers began giving their responses. Anyone can make a careless mistake on one of the answers – this happened to readers in both groups. But when they purposefully employ an ineffective strategy, and it leads them to an incorrect answer, it was worth noting. LC2 frequently used the strategy of looking for a keyword that appeared in the question. At one point he tried this and it did not work for him. As he said, "it was trickier for me because it didn't match the whole theory of looking for a certain key word", and in fact, he answered that question incorrectly.

4.5.2 DS O - Self-check/ self-correct

Many of the readers did what became coded as 'self-check/self-correct'. These actions parallel what Schunk refers to as taking "corrective actions" (Schunk, 2012, p. 437). Self-check was when they either re-read the question or the section which they thought contained the correct answer, or both, before writing down their response on the answer sheet. Self-correct was after they found what they thought was the answer, or while they were on their way to it,

but for some reason, they continued looking for a different answer and corrected themselves. Participants in both groups self-checked fairly often. That is, they would look back and forth between the question and the text, or re-read one or both, before answering. It is likely that, to some extent, having to articulate their thoughts out loud while preforming a search task, may have necessitated this strategy.

4.5.3 DS O – Eye Gestures

Several participants, at some point, looked upwards or closed their eyes in order to remember where the information was located. This strategy seemed to be unconscious, and was generally employed before the use of another strategy, such as the search for a keyword, or scanning. Although it did not yield any concrete insights into the search process, it was noted in the transcriptions.

4.5.4 DS O –Leaf Backwards

During the task sessions, it was noted that several of the readers leafed through the text backwards. That is to say, while they initially read the text from beginning to end, when it came to searching, especially if they were uncertain as to where to look, they began their search from the end or latter part of the text, and leafed backwards towards the beginning.

4.5.5 DS O - Peripheral processing

'Peripheral Processing' of the text is a phenomenon that does not seem to appear in reading or memory literature. Typically, the phenomenon was observed as follows: a reader would answer Question 6 (for example) very quickly, because she had noticed a word related to it, whilst she was searching for information for Question 3. She would then say something like, "Oh, that. I saw that when I was looking for the answer to Question 3, so I know exactly where it was." When she was answering Question 3, she seemed completely focused only on that question, and had not yet looked at Question 6 (so she wasn't trying to look for the answers to two questions at once) but it was now

clear that somehow she had been registering details and information related to a different question, while she was searching and flipping around in the text.

Twelve of the participants clearly articulated having done this. Following are some examples:

C8 answered Question 9 very quickly. When I asked him how he found it so quickly, he said that he had already seen the answer when he was looking for the answer to Question 6.

Similarly, C10 said "I just saw that again… when I was looking for another answer".

C7 also did this. She remembered seeing the options for meatloaf filler (Question 5), while she was answering the question about saving some meatloaf for leftovers (Question 2). "I remember reading about it before. I remember seeing it when I was looking for the 'why shouldn't you eat meatloaf when it's fresh' question, so I remember seeing it there….. In the text, as I was glancing over it the first time when I was looking for a meatloaf question, or answer, I remember seeing 'meatloaf filler'" (even though the initial question was about the leftovers). She also thought she may have noticed Eyquem's metaphor (Question 6) when she was looking for the answer to Question 4.

LC5 also noticed the meatloaf fillers when looking for something else, and for her, the peripheral information was combined with both interest and surface structure. She said, "stuff like Rice Crispies stuck out to me (while looking for another answer). I knew Rice Crispies because that was weird. It's also capitalised which makes it stand out more to me".

Later on, she went to the flowers metaphor faster than any other reader – confident or not. This was one that several readers struggled with – both the metaphor concept, as well as finding the correct answer. When asked how she found it so quickly and confidently, and if she remembered it from the initial reading, she said, "No – when I was browsing through (for an earlier question)

I noticed also 'flowers' is sticking up at the top of the page, so that helps, that stuck out to me as something."

C6 (who had mentioned earlier that he left himself "breadcrumbs" when he read) said, "as I was flipping through pages before, I saw the italics (of the song), I didn't look at it because I knew I didn't have to, and I guess I made a mental note that that was the song, and then I saw this question and I remembered that I had just seen where the song was on the page, and about the italics, so I knew exactly where to look".

LC4 was unique, in that he verbalised the moment that he registered peripheral information. When he was looking for the answer to Question 8 (National Park Services), he said out loud to himself, "Okay, there's the song", and then continued in his search for the correct answer, not knowing that the song was to come up in Question 10. Later he acknowledged that he had seen the song earlier, and said, "yeah, because I saw it (the song) before."

These, then, are the main categories of strategies that were observed during the Think Aloud process. I will now turn to a more detailed discussion of some of the more salient findings.

Chapter 5: Discussion, Limitations, Implications and Conclusions

The overarching observation that emerges from this research is that readers consciously and unconsciously register a myriad of facets of the text, both while they are reading, and when they return to the text to search for information. The reading experience is not just about comprehending words, sentences, paragraphs or even the entire text, but also about absorbing multiple of features of the text - linguistic, contextual, structural, visual, kinesthetic and more. Very often, several search strategies can be used simultaneously and in conjunction with one another, since each one can tap into a different facet of reading and memory.

5.1 Answering the Research Questions

The short answer to the first Research Question - how do readers go back and search for information in a long previously-read text? - is that there are many processes taking place during reading and the subsequent search for information in a previously-read text.

Historically, most of the research has focused on the more obvious and necessary linguistic aspects of the reading experience, but it is clear that reading is a far more multi-sensory event than we realise, and many of its facets can aid in search and memory tasks. Thus, some of the readers were aware of a physical division in the text (in this case, centre staples), and used that division to help them remember where information was located. Several readers reported having a visual memory of the location on the page, others relied on surface structure cues such as asterisks and italics, and still other readers found that certain words "popped out" at them – not necessarily merely because of their semantic relevance, but also because their physical appearance or surface structure.

The longer answer is that there were conscious, unconscious and semi-conscious strategies, some deliberate and some more haphazard. As Cross and Wellman observed, most searchers use a combination of "selective" and "comprehensive" search strategies (Cross & Wellman, 1985). At some point, every participant leafed through the text at random, skimming or scanning with no real goal, waiting until something 'popped up'. Leafing backwards could also be considered a comprehensive strategy, since oftentimes it seemed aimless, and merely a backwards-moving version of skimming or page-turning. Some of the readers themselves, however, described their backwards searches as more focused, and therefore at least in part, "selective". Other strategies, such as searching for a keyword, or looking in a particular section of the text, were far more "selective". The search process is clearly multi-tiered and many-faceted, and this study has only begun to reveal some of the cues, clues and strategies upon which readers rely.

In answer to the second Research Question (are the readers aware of the cognitive and memory processes which take place during the search for information?), the readers consciously and unconsciously employed a variety of strategies to aid in the search tasks. A conscious strategy would be looking for keywords. Less conscious techniques would be having schema trigger a memory for the location of a phrase or idea, or an interesting, humorous or unusual detail helping the reader remember where something was in the text. Moreover, as previously mentioned, consciousness can be viewed as a continuum or as having multiple levels of awareness, and not merely as a dichotomy. It was clear from the participants' responses that an unconscious aspect of memory became more conscious – as if bubbling up to the surface – as it was put to use in the search process.

The third Research Question was: are there indications that confident readers employ more effective search strategies than less confident/hesitant readers? This question is more difficult to answer fully, given the limited scope of the study. As stated from the outset, the comparative element of the study was not a defining one, but rather, a secondary one, intended to explore themes, and gain some understanding of the processes of memory and search among a variety of readers. From the findings, it would seem that confident readers may have more effective search strategies than less confident ones.

What seemed to emerge from the Think Aloud session, were tentative indications that the stronger readers conducted searches that were more organised and purposeful than their more hesitant counterparts. Some of the differences noted could be at least partially attributed to the confident readers being better at, and less distracted by, the Think Aloud process than the less confident ones. It must be reiterated that these findings are preliminary and by no means conclusive.

I will now turn to an in-depth interpretation of some of the more interesting facets of the search process which came to light during the Think Aloud Protocol.

5.2 Interpretation of Findings

Many of the observations that emerged from this research correspond directly to themes that were raised in the Literature Review. Each theme will be noted alongside the individual findings that most closely reflect it. However, it is fitting to mention here that many of Schunk's conclusions tie most closely into the findings in this research. Some of his conclusion are: that regulating behaviours, such as taking corrective actions, can help achieve learning goals; that stronger mental associations and use of schemata build stronger LTM links; learning and memory strategies should be tailored to the students' specific needs, and particular learning situations; and finally, the use of self-regulation, self-monitoring and metacognition can enhance focus and memory (Schunk, 2012, pp.399-443).

5.2.1 Schema

As asserted by Rayner and Pollatsek, (1989), Rouet (2006), and Smith (2004), and others, the activation of schema played a very large role in the search process. Several of the participants explicitly stated that they remembered a detail in the text because it triggered a personal memory for them, and thus was easier to find during the task search.

In the Literature Review, following Anderson's claim that some readers integrate schema less effectively than others in their reading, I suggested that perhaps the more hesitant readers would incorporate schema less than the confident ones, but this was not the case. In fact, both groups evoked schema and articulated where and when it helped them with recall. The findings did, however, support Anderson's assertion that prior knowledge which may have seemed unimportant or unrelated to what was being read, can suddenly 'pop' into readers' heads, aiding in recall (Anderson, 2004).

5.2.2 Comprehension of the Text

Oakhill and her colleagues stressed that efficient search is dependent on comprehension (e.g. Cataldo & Oakhill, 2000). Rouet, however, felt that a deep level of comprehension was *not* necessary to engage in successful search

(Rouet, 2006, p. 93). From observing the less confident participants, and some of the more confident ones as well, Rouet's assertions seem to ring true. Not every participant understood the entire text, and some of the hesitant group articulated where and when they didn't understand parts of the excerpt, but this did not seem to have an effect on their overall ability to recall information in the text, nor to engage in a fairly successful search.

However, although readers were able to recall parts of the text that they did not fully comprehend, some of the less confident readers lost the thread of what Eyquem said towards the end, and then also found the question referring to his metaphor one of the more difficult ones to answer, and the two are likely related. As was the case with LC1, who switched off when she misunderstood the "French bits", comprehension amongst the more hesitant readers affected their overall confidence and the efficiency of their search. Duke and Pearson (2009) refer to the ability of efficient readers to deal with unfamiliar words and fill in gaps when needed. Difficulty in doing this was apparent in LC1's experiencing of "bottleneck" when she encountered the French words.
The less confident readers were far less effective in how they divided the text for themselves. This appears to be one of the strongest links between comprehension and search and will be discussed in more detail below (Section 5.2.6).

5.2.3 Location on the Page

Contradicting Rothkopf's and Zechmeister's dismissal of location on the page as "incidental", many of the participants reported remembering where on the page a word or phrase was located- top/bottom, left/right side. What none of the participants were able to articulate, however, is how they know *whilst reading* what locational information is worth registering, and what is not. After all, readers do not note the location of every word or phrase in a 3,000-word text. And since the task was being performed between three and five days after the reading, it is safe to say that this locational information had been transferred, consciously or unconsciously and for reasons likely unknown to the reader, from STWM to LTM. One participant tried to articulate what he

does, saying that he leaves himself mental "breadcrumbs" [32] when he reads. What he meant by this is that he tries to register a variety of details that he can then use later on to help him find information in the text. This was similar to C7 'bookmarking' information in her head while she reads.

5.2.4 Surface Structure Cues

Consistent with Bernhardt's discussion of the surface structure of the text, readers relied on a variety of visual cues to aid in search and memory. Some were more obvious, such as the asterisks or italics, but some were surprising. For example, we are accustomed to thinking of upper-case letters as part of the semantic or grammatical makeup of a text. But, in fact, as a search aid, they became surface structure landmarks. Such was the case with "National Parks Service", where readers looked for the capital letters, since they were in the question and provided an easily-spotted cue.

Earlier, the possibility was raised that readers may use two or more strategies together, although it may be difficult to separate them. The search for a word beginning with upper case letters could be an example of just such a phenomenon. This is likely in part the use of a keyword, and partly also the use of the surface structure of the text. Another example of a combination of strategies at work, would be when C9 noticed that the word "essai" was both italicised and in quotation marks. The italics stood out for her because they affected the surface structure, but they also triggered her schema, since as an editor she was taught that one mustn't use both italics and quotation marks together.

As mentioned in the Findings, C8 noticed Eyquem's name, partly because of the upper-case letters, but also because, as he said, "So [I know that] it's towards the end. It's here cuz it's 'loud' and easy to see…It pops up very quickly - the 'y' and the 'q' pop and the capital letters…"

32 This is a reference to the Hansel and Gretl fairy-tale. Hansel left a trail of breadcrumbs so that they could orient themselves and find their way back home from the forest.

The use of the word 'loud' here is interesting. It seems that he is saying that in addition to having capital letters, the word is visually unusual, and stops the reader in his tracks during reading, because it strikes the eye as exceptional. This resonates with Treisman's feature integration theory (Treisman & Gelade, 1980) whereby a feature which 'pops out' then becomes a visual landmark for finding information.

It is quite likely that semantic, contextual and visual clues and cues are intertwined and work in tandem (in accordance with such theories as Paivio's Dual Coding). It is for this reason that I felt that separating the different types of cues, as Rawson and Miyake did in the "X" experiment, could be detrimental to the search process (see Section 1.7.2; Rawson & Miyake, 2002).

5.2.5 Physical Division of the Text

Reflecting what grounded and embodied theories of cognition tell us, readers who divided the text kinesthetically, either by using the centre staple, or by the feel of the number of pages in their hand, seemed to be using an unconscious and very physical response to the text, which was then reinforced or brought to a more conscious level, during the search process. This use of touch is also consistent with Gardner's interpretation of kinesthetic intelligence.

5.2.6 Division of Text by Content

Readers divided the text conceptually in very personal ways, consciously and unconsciously, both during the initial reading, as well as more fully articulated during the search. This relates directly to what Rouet referred to as the "coherence assumption" (Rouet, 2006, p. 13). According to Rouet, in addition to working to comprehend the text at its most basic levels, readers are also constantly making links in long texts, looking for familiar concepts and patterns, referring to schematic knowledge, and dividing the text into large, but meaningful "chunks" that help them achieve a sense of global coherence for the text as a whole.

The observations about readers dividing the text raise three interesting possibilities. The first is that apparently, stronger readers do "chunk" a long text, even if this it is not done in a fully conscious or intentional manner. The second, is that it was clear from the responses that even though the actual divisions varied greatly, the readers utilised the division, not only during reading and comprehension, but also in remembering the text and locating information when they worked on the task questions. They were at least partly aware of the divisions, and became more aware of them as they used them in the search.

The third noteworthy observation is that the less confident readers found it more difficult to divide the text effectively, and this may have affected their overall comprehension and possibly their memory for location of information as well. Participant C7 stated that she gave each section its own heading while she was reading. This is consistent with Duke and Pearson's assertion that good readers are those who notice sections in the text, as well as the theory that poor comprehenders have problems with coherence (see, for example, Cataldo & Oakhill, 2000). Furthermore, Duke and Pearson assert that "good readers read different kinds of texts differently" (2009, p. 107). Interestingly, C4 mentioned that he felt that Fulghum's text was more like two different texts, with the "rambling fridge part" and then the "more philosophical part", and that as a result, he treated the two sections differently.

5.2.7 Deliberate Use of Keywords

Most of the readers searched for keywords, relying on the exact words or phrases from the question, but many – especially the more confident ones – were aware that they also had to look for synonyms and related words as well. Thus, for a meatloaf question, they would look for the word 'meatloaf', but also for the words 'fridge' and 'leftovers'. The keywords also helped them contextually, in the sense that they did not only look for the word that was in the question, they also knew from that word where in the text the answer was likely to be. Thus, keywords could help the readers home in on both a broader 'macro' location in the text (based on the reader's association with that word in

context), and a finer, more focused 'micro' location, using the word itself, or related words or synonyms.

Although none of the less confident readers were asked directly if they had been taught to search for keywords as an aid in reading comprehension activities, they themselves seemed to use this strategy more deliberately than their more efficient counterparts. LC5 repeatedly referred to the use of keywords as a "word search", LC1 stated that she would combine reading the first few words of each paragraph [33] with looking for keywords, and LC2 said that usually if a few keywords could be found together, it "tells me what I want to know".

Below, unsuccessful strategies will be discussed. An ineffective or mistaken use of keywords was one of the most common of these errors, and was committed often by the more hesitant readers. This was when they focused too much on an exact word in the question, and ignored the possibility of synonyms or related words appearing in the text.

5.2.8 Keywords Popped Out

This phenomenon is likely linked to Treisman's theory of feature integration and attention, whereby certain features pop out and attract visual attention (Treisman & Gelade, 1980). C4 said he "stumbled" on the Eyquem metaphor (Q6). He thought it would be something else, but when he saw the words "bunch" and "flowers" he knew that had to be it. LC4, too, saw "men's flowers" and "thought that might be something." These responses clearly fall along the conscious-unconscious continuum, involving multiple levels of consciousness during the search.

33 This is a technique that my colleagues and I often teach our ESL-EAP students, especially those who are having difficulties, or read slowly.

5.2.9 Remember detail during search

Sometimes the readers seemed to recall a fact or detail when they read the task question, and did not need to look for the information. It is likely that something in the question triggered their memory for an interesting word, phrase or point that they became more acutely aware of for the first time because they were asked about it. But then, it is also possible that the question triggered a memory for something that they had found interesting during the initial reading. C10 had this to say about the National Park Service question: "Now this I remember. I don't think I have to look (for it) … I'm going to look anyway (to expand on the Think Aloud process)". When probed, she said "I thought it was cute when I read it".

But, when asked about the meatloaf and leftovers, C2 said "I seem to remember him saying that he enjoys it later on somehow. He compares it to New Year's or Thanksgiving or something". This seemed to a refelction that he was just articulating for the first time, because he had to search for it. This could be an example of the reader recalling a detail when asked to search for it, but it is also possible that, hidden within that recall, is the fact that the he had paid special attention to it to begin with, when he read it for the first time.

5.2.10 Unsuccessful Strategies

As mentioned in the findings, some of the readers employed unsuccessful strategies while searching. Several of the readers in both groups used unsuccessful strategies for the inferential questions. For the literal task questions, it was mostly the less confident readers who did this, usually with one of the first few questions, before they found the right 'rhythm' of searching and engaging in Think Aloud.

LC6 did something that highlights the difficulty of distinguishing the conscious from the unconscious in the use of strategies, as well as the blending of form and content. He spent 14 minutes trying to answer the first question (longer than any other participant, and about a third of his whole task session). This was because he was convinced that the answer would be found

before page 12, and no matter how many times he looked for the answer and couldn't find it, when he drew near either page 12 or the centre staples on the previous page, he would go back and look again at all of the text before, and up to, page 12. In fact, the correct answer was on page 16. At one point he said, "I really don't think it's after the Hudson's Bay thing (i.e. page 12) because then he goes and describes the company, and their philosophy and how he applied that to his book." When he started to realise that he needed to change his strategy, he said, "I guess I'm just gonna relax and go back to page 1… I guess now the approach is I have no preconceived notions and I'm just gonna look for something that might answer this." After 11 minutes, he said, "I've read this three times already", but he still stopped at the centre staple. Finally, after over 12 minutes, he said, "maybe I should be looking at that end section". He then flipped forwards to the centre staple and began to skim from there onwards. At that point, he found the correct answer very quickly, and said "Probably shouldn't have trusted myself….So I guess what threw me off there was I thought it was in one section and I kept looking for it there." This participant was in the less confident group, and was probably the least confident reader of the six (based on his own self-evaluation and admitted lack of confidence in reading).

5.2.11 Self-check/ self-correct

Although self-correcting is mentioned in the literature (such as Schunk, 2012), a phenomenon was observed in this study which seems to be unique or not previously observed. It appeared that participants self-corrected more often on questions where they were heading towards an incorrect answer than when they were about to answer correctly. It was as if the readers knew that they were answering incorrectly, and needed to go back and look again, either at what the question was asking, or at what they were answering. In some of the cases, the self-check did indeed help them find a correct answer when they were on the verge of answering incorrectly. Returning to the issue of consciousness, there were several levels of consciousness in this action. It seemed as though a reader would begin to answer in a certain way, or think she remembered where the information was, but then right in the middle, she would realise that she had misunderstood the question or was focusing on the

wrong part of the text. She knew deep down, that something was not quite right with the way she had understood the question, and this led her to double-check the question and/or the answer.

It was only after several participants did the same thing, that I began to question why they self-corrected exactly when they were on the verge of answering incorrectly. When I asked LC4, why he self-checked, his answer was a simple, "I don't know. Just to see what else there was." This did not explain why he did it at certain times, and not others.

C9 was another such participant, and I decided to probe further with her since she is very articulate, works in the strongly verbal field of editing, and she had expressed a desire to provide detailed insights for the study. In Question 6, about Montaigne's metaphor, the correct answer was that his work was like the piece of string that tied together other men's flowers. However, in that same section, he says, "my trade and my art is living". She, like a few of the other participants, homed in on that incorrect sentence as the metaphor. But then she re-read the question, putting oral emphasis on the word "metaphor". She frowned to herself, read a few more words out loud, returned to the question, and kept reading until she said "Oh here – commenting on his essays". She then re-read the question one more time, just to make sure, before writing down the correct answer.

At this point, I probed, asking her why she was not satisfied with her initial answer ("my trade and my art is living"). I asked her how she differentiated between answers that she knew were correct, and answers where she felt she needed to self-check or keep looking for a different, better, answer. It took her a while to fully grasp what I was asking.

Following is the transcript:
Naomi probe: So now I have a question for you. You found two or three different options, you had two or three answers before that but you weren't comfortable with them. Some answers, right away, you're like "okay, I found bread crumbs". But here you found something, you found "work in progress",

*but then you kept reading, you weren't happy with it, (*she nods*). "My trade is my art" - you could have written that down but somehow…. What was going through your head? Or would it be hard to articulate?*

C9: Um….What was really going through my head was that maybe it wasn't nice to keep you here all day, go through every line, until I got exactly the right answer

But why weren't those answers not good enough? You're right, they weren't, but why…

Because I think I haven't really hit the nail on the head, but I didn't, I felt….

But how did you know that?

How did I know that? It was just a feeling. I thought "If I look farther, I can get the really right answer"

Okay, because with some of them you were more confident, and with this one, you weren't. You were right (to re-check it and pursue it)…. what made you want to keep going (in this particular question)?

I wanted to get the right answer.

But how did you know the other ones weren't right?

Well, the bread crumbs was clear, because I saw it right there.

But why would this one [she's not understanding my question]

If you're happy with a wrong answer, and you think you're right, you just write it down. You know, "two plus two – oh! That's five!" right? And you go ahead and (motion writing)

But here you were really hesitant, what made you know, what made you feel like it might not be the right answer – with the flowers?

Because I saw that it said specifically "commenting on his"…

Yeah, but what made you keep reading to there? You found an answer (incorrect, but plausible) somewhere here –[I show her the earlier answer]. Why did you decide that wasn't right? I saw you read the question two or three times.

I don't know.

Okay.

At this point I didn't want to pursue this further, since she did not seem to understand my line of questioning, and it was not worth making her nervous

or uncomfortable over it. Then, she suddenly began to tell an anecdote about her husband working as a District Attorney: "Sometimes a cop would stop someone for a routine traffic check and it would turn out the driver had committed a crime. When asked why he stopped him in the first place, the policeman would say 'something didn't feel right' - it felt like something was amiss. So here, my answer to you is that something didn't feel right. But what it was, I'd have to go back through and say 'well this is a possible answer, but…it wasn't really the perfect answer."

5.2.12 Leaf Backwards

A majority of the readers leafed backwards at some point. This was not simply for convenience, such as if they felt they were one page ahead of where they needed to be, and merely flipped back one page. The phenomenon described here was a pronounced and deliberate working through the text from the end, or near the end, towards the beginning. The readers invariably did not know why they did this, and could only vaguely explain that it somehow gave them what P3 called having "more control over the text". LC3 also used the word 'control' in reference to skimming backwards, saying she felt "less intimidated by texts" if she was able to flip backwards, and that it was her way "of breaking it down into smaller pieces".

After this phenomenon was observed several times, I felt it warranted further reflection, and the only explanation that I had was that it was akin to working through a maze backwards. Many people, when working through a pencil maze, work from the Finish to the Start, and not the other way around. C3 articulated her reasoning for doing this by saying, "you remember the end stronger than the beginning. Because that's what you read more recently". This fits in well with the recency effect, which states that people remember more clearly the facts and details that they read about or learned more recently, than those at the beginning of a lesson or text (Schunk, 2012; see Section 1.5.2). C3 continued to say that you can "trace your way back, as in a conversation[34], 'oh this came from that and came from that and came from

34 She described a game she used to play as a child, similar to Broken Telephone, whereby she and her friends would try to retrace the thread of a conversation, from the end to the beginning.

that' and then I can get straight to where I need to go, as opposed to working forwards, you don't quite know where you're going yet."

5.2.13 Peripheral processing

Perhaps the most unique phenomenon observed during the course of this research, is that while reading, people apparently unconsciously register, or take note of, details which are seemingly unimportant at the time. Even when we are scanning or skimming, completely focused on finding a particular piece of information, we seem to register, at some level of consciousness, other pieces of information, which may or may not be useful for us later on.

When I first observed this phenomenon, I did not know what to call it. I combed through all the research I had looked at, trying to put a name to it. When I realised that it did not appear in any of the literature that I had read, and thus had no previously-given title, I began to refer to it as 'Incidental Processing' in my field notes and coding keys. However, as I moved towards a final draft, this term felt inadequate. 'Incidental' made it seem too accidental and insignificant. And in fact, Rothkopf's initial 1971 study was entitled "Incidental Memory for the Location of Information in Text", wherein he describes reports of elusive tidbits that readers remember, such as location on the page. Charles Perfetti raised the possibility that perhaps the phenomenon I had observed was simply another facet of what Rothkopf was discussing [35]. However, Rothkopf's observations centred around vague locational information and what I am referring to as 'peripheral processing' is when readers recall specific factual information from the text, that they had unintentionally processed and absorbed while searching for other, different facts. Perhaps they are related, with the phenomenon my participants reported being a more focused offshoot of what Rothokopf found, but Rothkopf, and later Lovelace and Southall (1983) both used the term 'incidental' in a slightly dismissive manner, which I feel undermines the importance of the unconscious processes taking place.

35 Email correspondence., September, 2018.

I then tried 'Secondary Processing'. But using the term 'secondary' for something, automatically implies that it is less important than the primary one. In addition, 'secondary' processing in reading would necessarily mean that there is a single, known, *primary* means of processing, and I did not think I could state that with conviction – reading is too complex and multi-faceted, and that seemed to be opening a Pandora's Box well beyond the scope of this research.

As I was trying to better understand this new facet of reading and memory, I conceptualised it by imagining a scenario whereby someone is driving in an unfamiliar neighbourhood, and needs to make a right turn at a certain landmark. The driver should be focusing on his right side. But of course, as a good driver, he's taking in a wealth of information from all parts of the road, even though he is focusing primarily on the right side, looking for his turn cue. Later on, though, he might be able to recall what buildings, shops or landmarks were on his *left* while he was driving, even though he didn't need to register them at all during the drive, or remember them after he had found his turnoff.

This metaphor led me to choose the name 'Peripheral Processing' for this possibly new phenomenon. The name derives from the fact that readers appear to be unconsciously or semi-consciously processing certain information, while overtly searching for other information, often unrelated to what is being processed peripherally. It also tied in with the image of the driver, navigating the streets, while features of the road were being registered in his peripheral vision. And while 'peripheral' does imply that it was not the reader's main nor conscious intent, it seems to carry more significance than both 'incidental' and 'secondary'. It also evokes the image of being horizontally on par with the reader's conscious intent, as opposed to vertically beneath it in the hierarchical sort of way that both 'secondary' and 'incidental' would imply.

In all the twelve cases where readers reported engaging in this phenomenon, they were completely focused on finding the answer to a particular question. They had to locate the correct answer, while thinking aloud, focusing on

articulating what their thought and memory processes were. None of the readers looked ahead to the subsequent questions before they had finished answering the one that was occupying them. It would seem highly unlikely that they would unconsciously process any extraneous information that was not directly related to the search they were involve in at that moment. And yet, that is exactly what happened.

When asked about why and how he processed peripheral information, LC2 tried to articulate it as an unconscious phenomenon that happens when a reader isn't trying. He quoted the *Star Wars* character, Yoda, saying, "Try not. Do. Or do not. There is no try" (Yoda, *The Empire Strikes Back*). What he meant was that this was something that happened most effectively when the reader was not trying to do it at all.

Interestingly, the confident and less confident readers engaged in peripheral processing equally well. Thus, despite the fact that the more hesitant readers had to contend with reading and comprehension difficulties, searching for information, and engaging in the Think Aloud Protocol simultaneously, it would seem that to a certain extent, they were unconsciously taking in the text in similar ways as their more confident counterparts.

Summary of Interpretation

Several interesting themes and observations have begun to emerge, regarding what readers do – both while reading, as well as when they return to a text to search for information. Each one of the themes discussed here comprises a piece of a very complex puzzle. All of the pieces, and the entire puzzle itself, deserve to be explored in more depth. This will be discussed further in the Implications and Conclusions sections, but first, some of the Limitations of the study will be examined.

5.3 Limitations

5.3.1 Research design limitations

It's important to note that since this study is a qualitative one, and exploratory, the data yielded detailed metacognitive insights, and points to several interesting patterns and themes. However, much depended on what the participants were conscious of, able to articulate, and shared at a given moment. Thus, it is nearly impossible to generate 'hard' statistical data about the processes taking place during the initial reading and the search task.

For example, a participant may have relied on the division of text six times during the task, but only mentioned it four times. This may have been the case because he was not conscious of doing so the other two times, he felt it was repetitive, he forgot he used it, or that strategy was combined with a different one (such as keyword), which at that exact moment, he felt was more important or interesting to mention.
As such, perhaps it is safe to say that if participants discussed what they did, then it can be taken at face value that they did what they said. But, if they *did not* mention something, it does not necessarily mean that they did not do it.

This is acceptable for an exploratory, qualitative study. However, it does mean that the data relied entirely on what the participants, thought, said, and decided to share at any given stage of the Think Aloud Protocol.
It is also possible that I did not probe the participants effectively enough, or that I could have drawn out more insights, and made more efficient use of each session time. The Think Aloud method was new to me, and I did not want to push my participants too much, or interfere with their metacognitive processes. Furthermore, especially with the less confident readers, I did not want them to feel pressured in any way. It is therefore quite possible that a more experienced researcher could have elicited more insights, and probed more deeply than I managed to do.

5.3.2 Limitations regarding the participants

1) One participant could only meet for the task session after more than a week had passed since she read the text. As such, she had forgotten much of the text, and her memory during search was clearly poorer than it was with all the other participants. This was helpful, since it demonstrated that the time-lapse of three to five days was, indeed an effective amount of time to use for the study. She still had some interesting, well-articulated insights and she was included as part of the Pilot phase.

2) During two of the sessions with the more confident readers, the participants became distracted with outside interruptions. In both cases, they were able to refocus, and the oversampling of having ten questions enabled them to provide significant insights, despite the interruptions. These were the two participants who were recorded with voice only, and not video, and it is possible that these two factors combined caused their sessions to yield less in-depth data than they would have otherwise.

3) Perhaps the most significant limitation was the small sample number for the group of Less Confident readers. While the study was not intended to be a comparative one, the second group should have had a similar number of participants to that of the more confident readers. Instead, there were fourteen Confident readers (four pilot and ten main group), and only six Less Confident ones. It would have been preferable to have had more hesitant readers take part in the study, but finding adults with reading difficulties who were able and willing to participate proved more complicated than anticipated. Three potential respondents for the second group had to be rejected from participating in the study. Two were referred to the study, and in both cases, it turned out that they had ADD, but actually considered themselves to be highly efficient readers, with no reading difficulties whatsoever. One of these attended the first session and stated that he read quickly, with confidence, and remembered every word of what he read. A third potential participant for the less confident group responded to the notice, but then subsequently informed me that he only had difficulties when reading out loud in front of people, but was a confident reader when reading quietly to himself. It was decided that

rather than pursue any further false leads, the study would continue with these six participants, and suffice with the data they provided.

5.3.3 Limitations regarding the materials

1) At the early stages of the pilot group, there were some difficulties with the materials. For example, the text had to be reformatted from a scanned book into a Word document. When an OCR scan was performed, several parts of the text became garbled and had to be retyped. Even though the text was thoroughly proofread, some very minor errors remained which were noticed and corrected during the pilot phase.

2) There was one ambiguity in the text itself – namely that the excerpt was the introduction to the rest of Fulghum's book, and even though it was self-contained, there was one sentence where he mentioned what he was going to do further on in the book. I explained to each participant that the excerpt was an introduction and part of a full-length book. Only one reader, from the less confident group, found it a bit confusing at first, but then quickly recovered and moved on.

3) It could be argued that the type of text used was very specific and that any findings cannot be generalised to how readers search other types of texts, expository or otherwise. This argument may have some truth to it, but the readers themselves felt that many of the strategies they employed and the cues they noticed were applicable to other types of texts that they would encounter as well, such as work documents, novels, and even digital texts.

4) The field notes for the three of the pilot participants were not as methodical as they were for the subsequent ones. As the study progressed, the process of simultaneous observing, note-taking and eliciting more in-depth Think Aloud insights became more refined. At first it seemed that this shortcoming would affect the data, but when it came to the analysis stage, it was evident that it had only a minimal effect on the quantity or quality of the data that the sessions yielded.

5) During the search task for the Pilot participants, it became clear that some of the questions were not sufficiently precisely-worded, and had caused some confusion.

These setbacks did not affect the data in any significant way for three reasons. First, since the purpose of the task was not to evaluate comprehension per se, but rather to observe and gather metacognitive data on the search process, this could still be done, even when the question was vaguely or ambiguously worded. In addition, as the difficulties with the questions became evident, I was able to clarify their meanings during the search task, without helping the participants more than was necessary.

Moreover, while there were ten task questions, there was nothing 'magical' about this number. The use of ten questions was intentional oversampling. Thus, rich, original and informative data was gathered from an amalgamation of several of the questions together, so that even if one or two did not elicit insights that could be used for analysis, the other responses compensated for them.

5.3.4 Technical Limitations

1) The first three video recordings of the pilot phase were made on a faulty camera, causing the recordings to be erased immediately after they had been made. Since hand-written field notes had been taken, and the video was intended to be a backup, the data was not unduly affected. The fault with the camera led to the use of a more efficient recording method, which worked very well for all the other participant sessions.

Thus, rather than harming the study, the Pilot phase served its purpose of ironing out several potential problems and enabling the rest of the study to run smoothly.

5.4 Implications

The twenty participants have contributed a wealth of heretofore under-studied insights into reading and memory, but we have only just scratched the surface of what there is to be learned in this area. By categorising and conceptualising some of the emergent themes, I have begun to provide a framework for how we view the search for information in lengthy texts, but each theme needs to be explored on its own in more depth.

While the pursuit of knowledge for its own sake has its merit, I would suggest that some of the findings can have practicable implications, especially for hesitant or struggling readers. A heightened awareness of the multitude of processes taking place can certainly be beneficial to both educators and students. Almost all the participants were vocal in their appreciation for the ways in which the study enabled them to become more aware of their own reading strategies.

Obviously, completely unconscious strategies cannot easily be harnessed or employed by teachers or students, but some of the more conscious choices that the participants made, can perhaps be quantified and turned into educational and curriculum goals for both confident and less confident readers. As mentioned at the beginning of Chapter 4, overall, the hesitant readers had less organised, more haphazard search strategies. A more thorough comparative study of different types of readers could yield a deeper understanding of the effective strategies employed by the more confident ones. Those strategies could then be implemented and incorporated into remedial reading tools. For example, all of the stronger readers divided the text in some way, in their heads. Many gave the sections titles, based on the content. This, in turn, enabled them to home in more quickly and efficiently on where information was, based on their division of the text. The hesitant readers all struggled with this – most did not divide the text at all, commenting that it seemed disjointed and confusing. And the one reader who tried to divide the text did not succeed in formulating coherent, discrete sections.

I would strongly recommend that this 'global chunking' (as Rouet would call it) be studied further as an extension of what some hesitant readers are

already taught to do, in terms of chunking small sections of shorter texts. This could become an invaluable strategy for struggling, less confident readers to overcome trepidation when reading a long text, and be able to give it a sense of both coherence and cohesiveness.

Out of curiosity, I asked several of the participants, especially the younger ones, if they preferred reading from books or computer screens, and all of them, from ages 23-60, said they preferred printed texts and books. One participant said that he liked using the 'highlight' and 'find' features in digital texts, but overall, he still preferred reading from paper. Some of the less confident readers also used their fingers to follow where they were reading, or to partially cover the lines that were not being read – techniques that can only be performed on printed texts.

Printed texts were the sole focus of this thesis, and digital texts were well beyond the scope of the study. Still, over the course of the last few years, in discussing my thesis with peers, colleagues and the participants themselves, it has repeatedly come up in conversation that people remember features of websites, such as fonts and layout, using seemingly similar visual and structural memory cues to those raised here. For example, a colleague said that if she looks up information on several websites, but then needs to return to them, she will remember the content based on the visual features of the website.

Perhaps some of the insights which were explored in this study can be adapted to research on how we process digital texts as well.

With regards to the apparently heretofore unexplored phenomenon of 'peripheral processing', clearly further research needs to be conducted in this area by experts in the field of memory, in its widest sense, to explore its scope, prevalence and applications. Since it was a completely unanticipated outcome, the study was not designed to explore it in the depth that it deserved, in order to better understand its nature and implications. I suspect that further study of this phenomenon will have ramifications beyond the study of reading and search for information.

5.5 Conclusions

This study set out to explore what takes place when readers return to a lengthy, previously-read text in order to search for information. More than just acting as conduits for eye saccades or correctly pointing to words in a list, the readers became active partners in the research, providing metacognitive insights and observations of their own reading and memory processes. They dug deep into their own psyches to describe how they read and remembered. They talked about the "bookmarks" and "mental breadcrumbs" they make for themselves while reading. They tried to articulate how, when and why they remember details in a text – even when they were not conscious of doing so, nor required to for any reason. The less confident readers overcame trepidation and frustration in order to help increase our understanding of reading and memory, in the hopes that their insights may lead to improvements for the next generation of struggling readers.

Some apparently new phenomena were uncovered and explored, opening the door for innovative and exciting research in the fields of reading and memory. The most practicable of them is further research into the division of long texts, or global chunking. Perhaps the most esoteric and intriguing would be the study of peripheral processing, both in reading as well as in other areas of cognitive psychology.

Returning now to the Inner Eye, Inner Ear and Inner Voice discussed in the Literature Review, it seems more and more likely that in addition readers of all ilks possess an 'Inner Note-Taker' as well.

It's high time we got to know the stenographer inside ourselves.

This thesis is dedicated in loving memory of

Dr. Levi Jacober,

where it all began.

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Appendix A
NARAP Definitions of Reading (2006)

Definition A
Reading is decoding and understanding written text. Decoding requires translating the symbols of writing systems (including braille) into the spoken words they represent.
Understanding is determined by the purposes for reading, the context, the nature of the text, and the readers' strategies and knowledge.

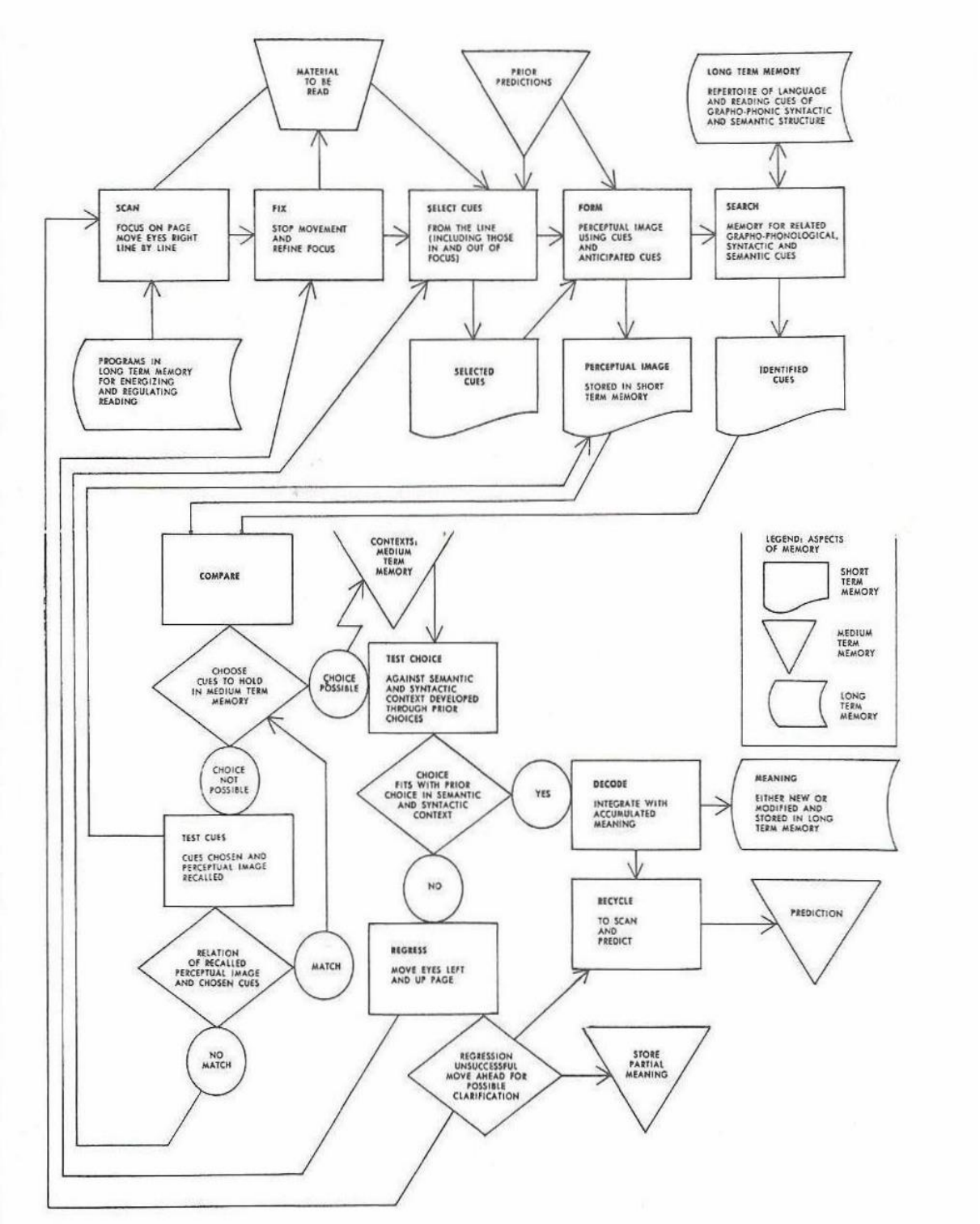
Definition B
Reading is decoding and understanding text for particular reader purposes. Readers decode written text by translating text to speech, and translating directly to meaning.
To understand written text, readers engage in constructive processes to make text meaningful, which is the end goal or product.

Definition C
Reading is the process of deriving meaning from text. For the majority of readers, this process involves decoding written text. Some individuals require adaptations such as braille or auditorization to support the decoding process. Understanding text is determined by the purposes for reading, the context, the nature of the text, and the readers' strategies and knowledge.

National Accessible Reading Assessment Projects, 2006.

Appendix B.1
Reading: The Top-Down Approach

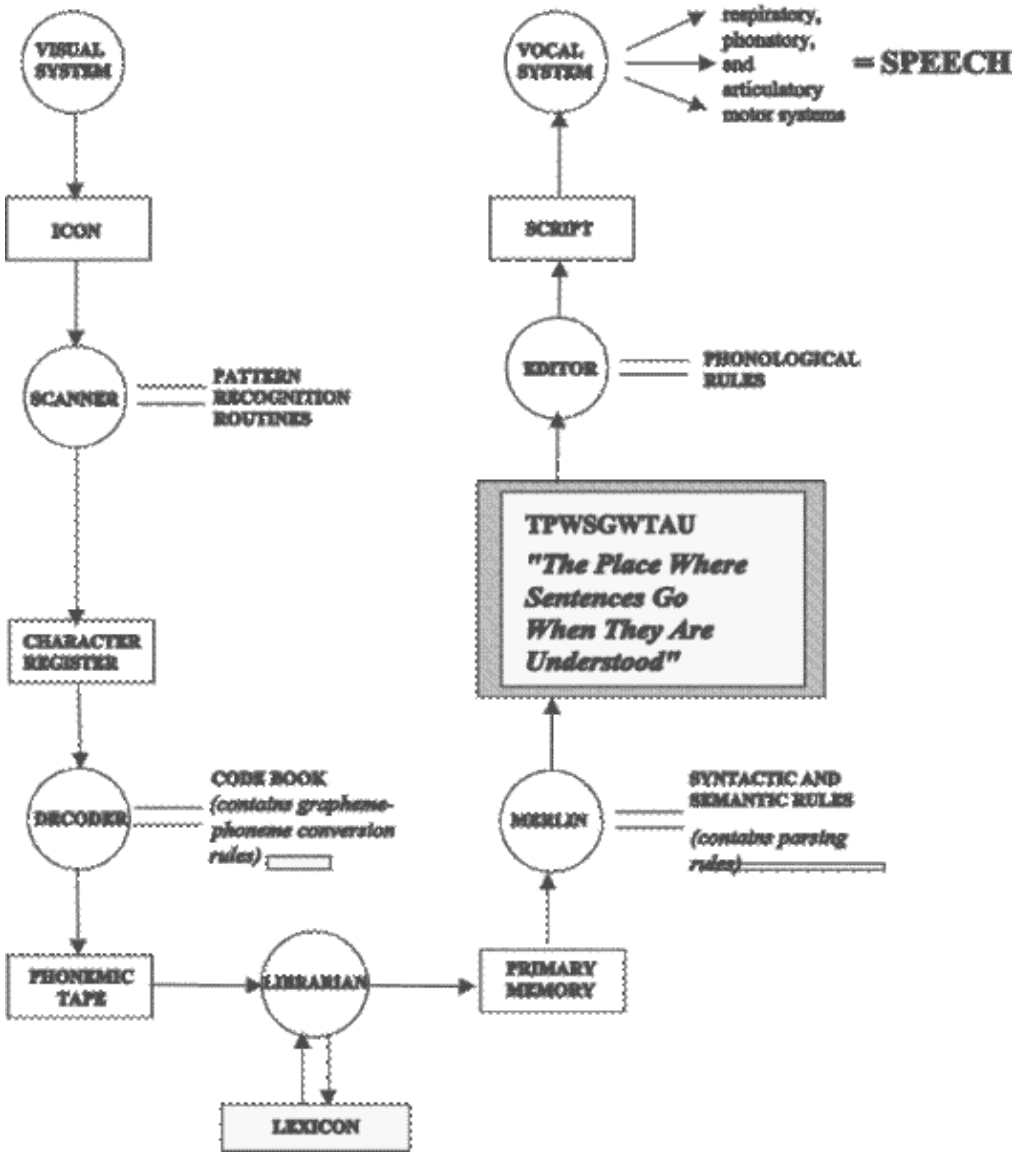
The Goodman Model of Reading (1970).



Reproduced from Rayner & Pollatsek, 1989.

Appendix B.2
Reading: The Bottom-Up Approach

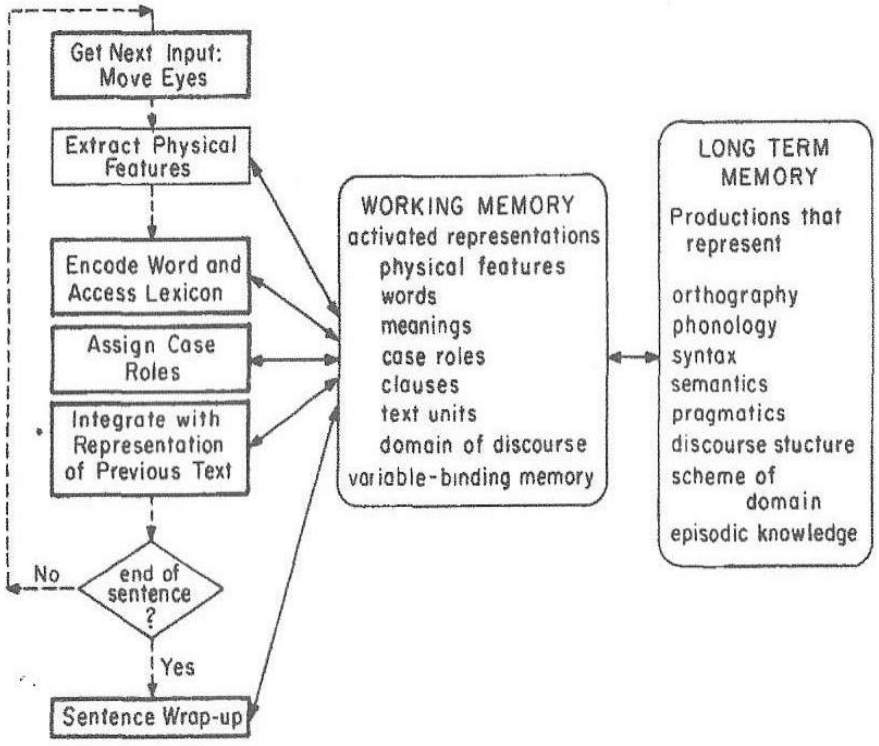
Gough's Model of Reading (1972).



Reproduced from Derek J. Smith, 2002 (smithsrisca.co.uk).

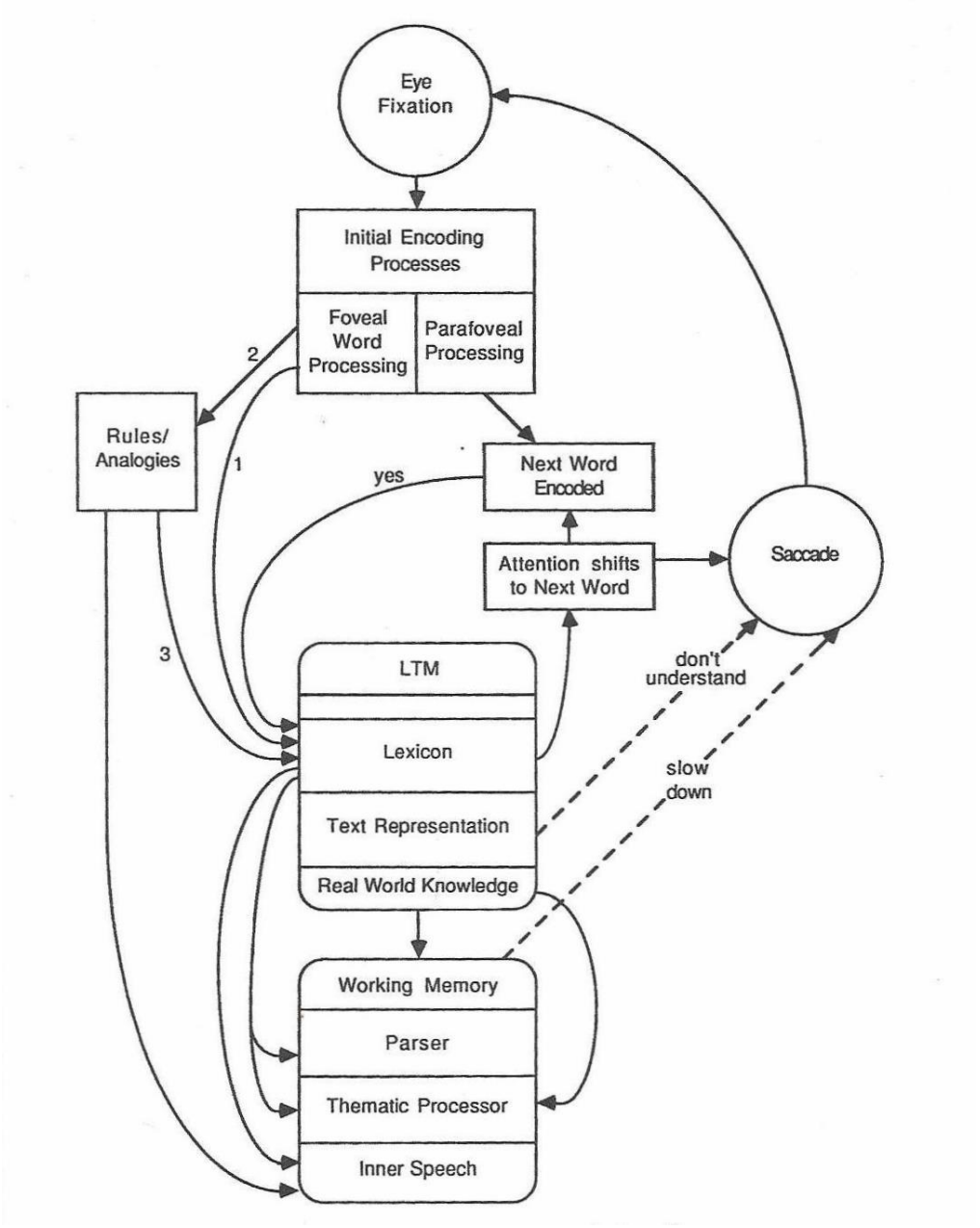
Appendix B.3
Reading: The Interactive Approach

Just & Carpenter's Model of Reading



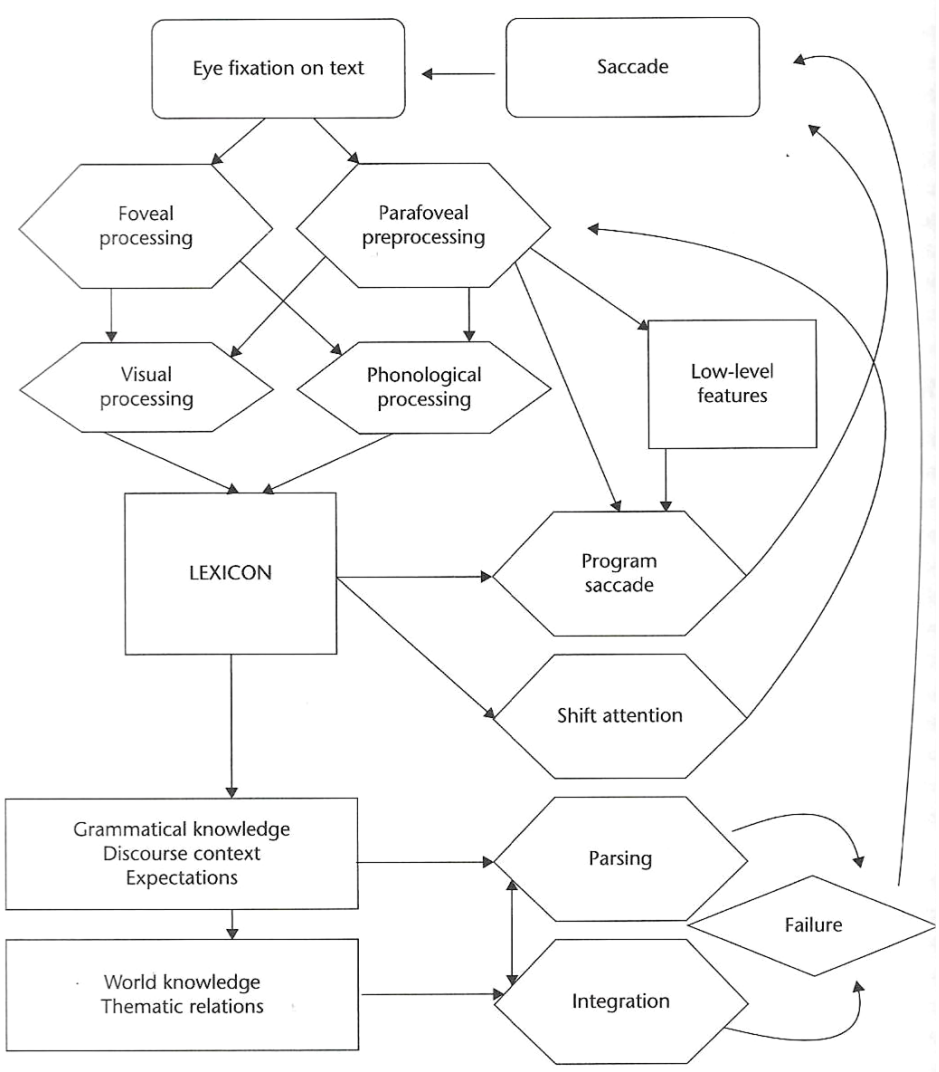
Just & Carpenter, 1980

Appendix B.4
Interactive Approach: Rayner & Pollatsek's Model of Reading



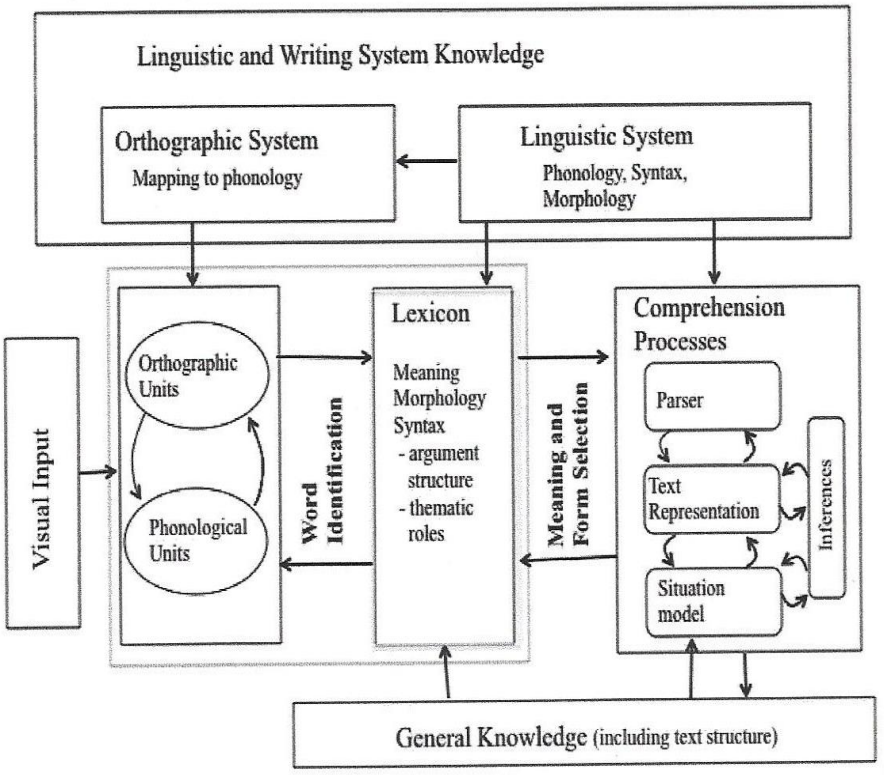
Rayner & Pollatsek, 1989.

Appendix B.5
Interactive Approach: Rayner, Updated Model of Reading.



Rayner et al., 2012.

Appendix B.6
Interactive Approach: Perfetti's Model of Reading Comprehension
(updated version)



Perfetti and Stafura, 2014.

Appendix C
Anderson's Schema Reading Exercise

> "Rocky slowly got up from the mat, planning his escape. He hesitated a moment and thought. Things were not going well. What bothered him most was being held, especially since the charge against him had been weak. He considered his present situation. The lock that held him was strong but he thought he could break it. He knew, however, that his timing would have to be perfect. Rocky was aware that it was because of his early roughness that he had been penalized so severely--much too severely from his point of view. The situation was becoming frustrating; the pressure had been grinding on him for too long. He was being ridden unmercifully. Rocky was getting angry now. He felt he was ready to make his move. He knew that his success or failure would depend on what he did in the next few seconds."

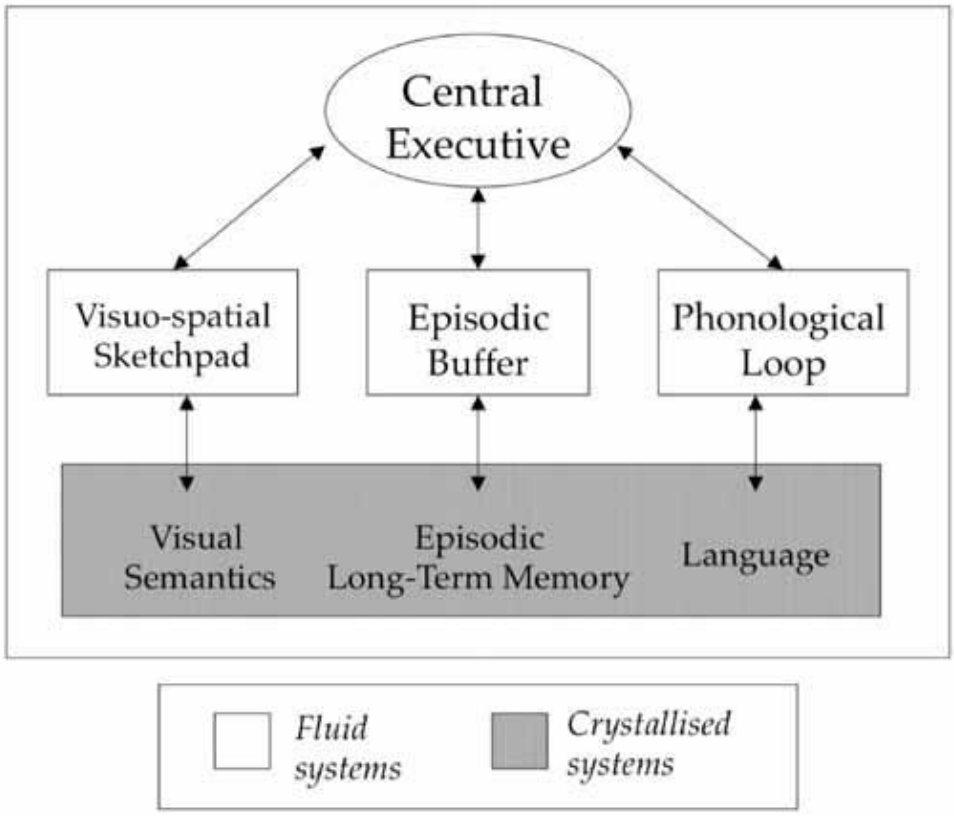
This paragraph is written in such a way that if the reader knew nothing about wrestling, the passage would appear to be about a planned escape from prison[36]. Sixty students - 30 male and 30 female - had to read the passage and Anderson describes how participants who were male weight-lifters with a sports background were more likely to understand that the passage was about wrestling, whereas female music students were more likely to interpret it as being about a planned jailbreak.

Furthermore, when participants were asked to recall the passage, specifically instructing them to try to reproduce the exact words used in the text, there were what the authors called "theme-revealing distortions", such that those who understood it to be about wrestling, recalled the passage using more wrestling terms, and the music students used more words related to escaping from prison. Thus, the original text read, "Tony was aware that it was because of his early roughness that he had been penalized so severely - much too severely from his point of view". The weight-lifters recalled the sentence as saying "he was penalized early in the match for roughness or a dangerous hold", while those who didn't know much about wrestling wrote sentences like "he was angry that he had been caught and arrested" (Anderson in Unrau & Ruddell, 2004, p. 597).

(From Anderson, Reynolds, Schallert & Goetz, 1977, reprinted in Anderson, in Unrau & Ruddell, 2004, p. 597).

36 For example, the word "lock", denoting a wrestling hold, is used ambiguously so as to also be interpreted as a door-fastening, thus leading a reader who is not familiar with wrestling to interpret the passage as a jailbreak scenario.

Appendix D
Baddeley's Model of Working Memory



From Baddeley, 2000, p. 418.

Appendix E
Bernhardt's Continuum of Visual Aspects of Written Texts

Visual Organization of Written Texts

Visually Informative		Non-visually Informative
	Rhetorical Control	
varied surface offers aesthetic possibilities; can attract or repel reader through the shape of the text; laws of equilibrium, good continuation, good figure, closure, similarity.	Visual Gestalt	homogenous surface offers little possibility of conveying information; dense, indistinguished block of print; every text presents the same face; formidable appearance assumes willing reader.
localized: each section is its own locale with its own pattern of development; arrests reader's attention.	Development	progressive: each section leads smoothly to the next; projects reader forward through discourse-level previewing and backwards through reviewing.
iconic: spacing, headings reveal explicit, highly visible divisions; reader can jump around, process the text in a non-linear fashion, access information easily, read selectively.	Partitioning	integrated: indentations give some indication of boundaries, but sections frequently contain several paragraphs and sometimes divisions occur within paragraphs; reader must read or scan linearly to find divisions.
emphasis controlled by visual stress of layout, type size, spacing, headings.	Emphasis	emphasis controlled semantically through intensifiers, conjunctive ties; some emphasis achieved by placement of information in initial or final slots in sentences and paragraphs.
subordinate relations signaled through type size, headings, indenting.	Subordinate Relations	controlled semantically within linear sequence of paragraphs and sentences.
signalled through listing structures, expanded sentences, parallel structures, enumerated or iconically signalled by spacing, bullets, or other graphic devices.	Coordinate Relations	controlled semantically through juxtaposition, parallel structures, and cohesive ties, especially additive ties.
linkage controlled visually; little or no use of semantic ties between sentences and sections; reliance on enumerative sequences or topicalization of a series.	Linking/ Transitional/ Intersentential Relations	liberal use of cohesive ties, especially conjunctives and deictics; frequent interparagraph ties or transitional phrases.
variety in mood and syntactic patterning; much use of Q/A sequences, imperatives; fragments and minor forms; phrases used in isolation.	Sentence Patterns	complete sentences with little variation in mood; sentences typically declarative with full syntax.

Bernhardt, 1986, p. 76

Appendix F
Signed Participant Consent Form

I _____ hereby consent to participate in a doctoral research study, being conducted by Naomi Kruger-Arram.

I am aware that the study involves exploring various aspects of the reading experience, and that I will be asked to answer questions, read a text and discuss the reading process.

I hereby also give my consent for the research sessions to be videotaped and/or recorded **YES / NO**

The purpose of the recording, whether video or audio, is solely to aid the researcher, and it will not be made public in any way, nor seen by anyone outside those involved in the research.

No identifying details about me will be publicized during the course of this study and the dissemination of its results.

The results of the study may be used to further professional or academic knowledge, in the form of professional or academic articles, reports or conference participation, but no identifying details about participants will be disclosed or made public.

Should I wish to withdraw my consent, I will do so via an email sent directly to Naomi Arram: [redacted]

Signed: _____ Date: _____

Appendix G.1
Demographic Information and Reading Habits, Confident Readers

Pre-Reading Questions – Name: _____ Date: _____

Part 1

Name, age, occupation, level of higher ed _____

_____

_____

Part 2

1) Have you ever been evaluated for a reading disability? Or told you have one?
YES NO

2) Do you enjoy reading? _____

3) Do you consider yourself an efficient reader? (do you find it easy to read and understand what you've read?)
_____

4) How easy is it for you to find information in a text once you've read it?

_____

_____

_____

5) Do you read often? For work? For pleasure? Both? What types of text do you read? Fiction, non-fiction?

_____

_____

6) Do you prefer reading online or a printed text? _____

_____

Part 3- I'm giving you a text to read by _____ - just read it. You can take as long as you want, but don't mark it up, don't highlight or take notes – just read it.

And bring it back to me when we meet again. Task meeting date and location :
_____

Appendix G.2
Demographic Information and Reading Habits, Less Confident Readers

RD Pre-Reading Questions – Name: _____Date: _____

Part 1

Name, age, occupation, level of higher ed _____

_____

_____

Part 2

1) Have you ever been evaluated for a reading disability? Or told you have one?
YES NO

2)a) If yes, what sort of reading or learning disability do you have? _____

_____

_____

b) If no, then what made you realize on your own that you may have an RD?

_____

_____

_____

_____

3) What, to you, is the definition of the RD you have? What are some of the characteristics?

_____

_____

_____

_____

4) Explain how it affects your ability to read: _____

_____

_____

_____

5) Were you taught compensatory skills for reading? Did a professional teach you? Or have you developed your own?

_____

_____

_____

6) How would you consider your reading ability today, as opposed to when you were first evaluated? When your first realized it? Has your reading improved? Stayed the same? Gotten more difficult?

_____

_____

_____

7) Would you say you remember most of a long text after you've read it? **YES** / **NO**

_____

_____

8) Do you enjoy reading?

_____

9) Do you read often? For work? For pleasure? Both? What types of text do you read? Fiction, non-fiction?

_____

_____

_____

10) Do you prefer reading online or in print? _____

_____

11) How easy is it for you to find information in a text once you've read it? _____

_____

_____

Part 3- I'm giving you a text to read by _____ - just read it. You can take as long as you want, but don't mark it up, don't highlight or take notes – just read it.

And bring it back to me when we meet again. Task meeting date and location :

_____

Appendix H.1

Text Excerpt Used for the Study: Version 1, Confident Readers

NB- Appendices H.1 and H.2 were printed for the participants in a stapled booklet form which more closely approximated the original book format.

Some Observations
from Both Sides
of the Refrigerator Door

Excerpted from “UH-OH” by Robert Fulghum

Reading Exercise – Naomi Arram

“HUM A LITTLE SOMETHING FOR ME.”
“Why?”
“So I can tell you what key your head is in.”
“I don’t understand.”
“Your head is a sound chamber, and every sound chamber resonates to certain notes better than others because of the shape and size and construction of the chamber.”

I am a visitor in a high school science class, and the teacher is using me to demonstrate to his class that adults don’t know everything. All his students already know what their key is and how and why. I don’t. So he sends me off to do some personal research in a small, empty room. To hum and haw until I sound a note I really like—one that makes my head vibrate a little—in a comfortable and pleasing way. Easy. It’s like standing in the shower singing, with my clothes on and the water off.

When the note felt right, I reported back to the classroom, where the science wizard put me in front of a microphone and said, “Hum for me.” I hummed. The oscilloscope reflected the wave structure of my voice.

”B-flat,” he announced. “Fulghum, you have a head that’s tuned in the key of B-flat major—which is a sixty-cycle tone with natural overtones of D and F.”

Later I learned that trumpets and clarinets are also B-flat instruments, which means a lot of good
jazz is in B-flat. Fanfares and marching-band music are often written in B-flat, which makes it the key of parades and spectacles. At the racetrack, the trumpet call announcing each race is in B-flat and “The Star-Spangled Banner” and the “Marseillaise” are in the same key.

And my refrigerator hums in B-flat major.

The electric motor of the refrigerator gives off a sixty-cycle B-flat hum, as do all motors that run on 120-volt AC current. The washing machine, dryer, electric heater, blender, hair dryer, coffeepot, and all the rest are B-flat appliances. What’s more, even when no motors are running, there is a sixty-cycle leak of energy from all the wall sockets in the house. My house is immersed in B-flat, which may explain why a man with a B-flat head like me really feels at home there. And also may explain why I feel so good near the refrigerator. I am in harmony with it. Now I know why I sometimes sing the national anthem when I invade the refrigerator in the middle of the night.

* * *

Refrigerators. On a very local scale, a refrigerator is the center of the universe. On the inside is food essential to life, and on the outside of the door is a summary of the life events of the household. Grocery lists, report cards, gems

of wisdom, cartoons, family schedules, urgent bills, reminders, instructions, complaints, photographs, postcards, lost and found items, and commands. When the word *GARBAGE* appears there, somebody had better move it and soon.

The door of the refrigerator is a chronicle of current events not found on TV or in the daily newspaper. An important art gallery is often found here as well. Postcards of paintings from museums. Scribbles from a child's long, rainy afternoon with a box of crayons. A collection of drawings, collages, and paintings that come home from school in a steady stream. All stuck to the front of the family fridge.
When you no longer have any art on the refrigerator door, something is over—your children have grown up. And when it appears again years later, it means your children have children. Grandparents are suckers for refrigerator art and will put up just about anything offered them by a child of their child.

I'd like to sponsor a national contest to see who has the most amazing collection of stuff on their fridge— and produce a book of photographs of refrigerator decor. Each photograph would be accompanied by a page of explanation, including a list of all items contained inside and on top of the refrigerator as well. This could be the coffee-table book of the year.

"But my refrigerator has nothing on it—what does that say about me?" you may ask.
It means you are a nice person who has carried neatness in the kitchen one step further than the Good Housekeeping Seal of Approval requires. Lighten up. Get some magnets—the heavy-duty kind—and get your stuff up on the door of the fridge. If you aren't sure about what to put there, consult with friends. Many people know about what should go on the fridge door and will be glad to advise you.

* * *

Ever been present at one of those archeological expeditions when the entire contents of the refrigerator, freezer included, are laid out on the kitchen counters? How can people *live* like this?

From the freezer compartment come especially interesting bits of history. Like a package of mystery meat with freezer burn so bad you don't know whether to bandage it, smoke it, or use it to start a fire. I recall discovering such things as a snowball, the corpse of a very small shrew, some ice cream made from snow, a corsage from a wedding anniversary, and several flashlight batteries—all frozen into the last ice age of the freezing compartment of our refrigerator. All placed in safekeeping in the deep cold by various members of the family for their own reasons. All important to the persons who put them there. What should be done with these relics? I ran across an idea from the National Park Service that has merit. It asks that any historical artifacts found in a park be appreciated by the

finder, left in place, and simply reported to headquarters so that experts may deal with removal or disposal. From hard experience, I urge that those who clean out freezers at home follow the Park Service policy. Those who reclaim their treasures will love you more if they don't have to exhume half-thawed relics from the garbage can.

* * *

Unless you are happily sound asleep at that hour, 2:00 A.M. is usually not the best of times. It's an hour often given to pacing the floor in crisis or in grief -or to consoling wee babes who cry in the night. Telephones that ring at 2:00 A.M. usually mean trouble, as do sounds made by teenagers arriving home late, disturbed dogs, dripping water, and those unknown creatures that gnaw somewhere in the walls. People talk to themselves about serious things at this hour.

I think of 2:00 A.M. as feeding time. The time when I've had some of the best meals I've ever eaten. Gourmet eating. Alone. With nobody standing around saying, "You're not really going to eat THAT, are you?"

One memorable midnight I put away a taco shell full of almond paste and washed it down with a can of Sprite that had been there so long there was rust on the can. Followed that with some celery sticks limp enough to tie knots in. Then I ate a whole dish of tapioca pudding that I picked up out of the bowl in one piece. The last inch from a bottle of red wine made way for a scoop of cold chili smeared on rye bread and topped with fig jam. A spoonful of peanut butter and a spoonful of jam every now and then to clear the palate. A couple of glasses of milk to keep things moving on down my throat without jamming up. Finally, I revived a cup of dead coffee in the microwave and went out on the porch to sit and look at the moon and smoke the remaining half of a cigar I hadn't finished before I went up to bed a couple of nights before: Great meal. One of the *truly* great ones.

* * *

What I really look forward to finding in the fridge in a time of late-night need is meatloaf. Now we're getting serious. Meatloaf.

When I say those words, people usually smile. And then I ask, "Why are you smiling?" And then they laugh. "Why are you laughing?" And they laugh again. "Meatloaf—haw, haw, haw—meatloaf—haw, haw, haw." One of the many mysterious powers of meatloaf.

Mom's Cafe at the four-way stop in Salina, Utah, is high on my list of great places to eat. Mom's advertises THE BEST IN HOMEMADE PIES, SCONES, SOUP, AND MUCH, MUCH MORE!! Mom's specializes in liver and onions,

chicken-fried steak, deep-fried chicken, “real” French fries, and “real” mashed potatoes. But Mom’s doesn’t serve meatloaf. I called them long-distance to check my facts. The lady who answered the phone was a little surprised that I asked. “Don’t you know nothing? Meatloaf is something you eat at home.”

It’s true. Meatloaf is mostly homemade. Mostly made by real moms, by hand. Constructed out what’s around. Some hamburger meat that might be going bad if it isn’t used soon—sprouting potatoes, rubbery carrots, onions, salt, pepper, steak sauce, bacon drippings, etcetera. I say “etcetera” because the list of what’s possible is too long to print. Then there’s the filler—meatloaf expander. Bread crumbs, corn flakes, Rice Crispies, oatmeal, or whatever—even dirt would work, I guess. And some egg to hold the whole thing together. Then it has to be mushed around by hand, kneaded into a loaf, and put into that family museum piece, the meatloaf pan. Into the oven to bake. Served hot with gravy, mashed potatoes, and Wonder bread. Yes. Yes!

But don’t eat it all. Never ever eat all the meatloaf when it’s fresh, Put about a third of it away in the back of the fridge and forget about it. This is the best part. The part you are going to eat about 2:00 A.M. some dark, rainy night when you need sustaining. No health department would allow such a thing to be served in a public restaurant. But nothing’s better for you. It’s a matter of mental health. I’ve never heard anybody say he was depressed by eating a cold meatloaf sandwich.

I’m a mayonnaise-and-sourdough-bread man, myself. I know there are ketchup people and mustard people and even jam people. A kid once joined me in middle-of-the-night feasting, and I made him very happy by fixing him a meatloaf sandwich with Gummi Bears, grape jam and Pringles on it. It’s a free country.

* * *

Now I know that some people don’t like meatloaf. This is true. At a summer camp a group of children complained to me that the adults all gathered around the campfire and sang protest songs (the sixties ones) against war and hate and all that, which was fine with the kids, but they would like it if we sang a children’s protest song or two. Like what? Well, they couldn’t think of one offhand, but they were pretty unhappy about the meatloaf served in the mess hail two nights in a row. So we made up the Meatloaf Protest Song.

“Eat your meatloaf” whined the mommy at the table.
“Eat your meatloaf or your teeth will all fall out!”
“Eat your meatloaf” whined the mommy at the table.
In reply, all the little children shout:

Chorus:

"We don't want to eat the meatloaf"
Meatloaf is fit for pigs and goats.
Red and yellow, black and white, it is icky in our sight!
You can't make us shove that nasty down our throats!"

(For "meatloaf" you can substitute other items of food deemed deadly by children: liver, lima beans, tofu, whatever. It's hard to convey the tune here, but, like meatloaf itself, whatever tune you come up with that works for you is okay. Try it on your kids. Be prepared for many verses.)

* * *

Meatloaf reminds me of other brands of leftovers. Especially Thanksgiving leftovers. When the refrigerator becomes the Fort Knox of late-night dining. Let's fact it Thanksgiving is often a strain. You have to dress up and behave and there's all that ritual fuss and bother with too many people and too much food. Exhausting. But two nights later is a different story. There's good news in the fridge by then—solid-gold leftovers.

The pecan pie has ripened and congealed now, so you can pick up a big piece with your hand, The cranberry sauce has matured; the dark meat of the turkey is easy to peel off the bone. And the dressing has transmogrified into something that would give truffles and caviar a run for the money. THIS is the way dressing ought to taste! A true prayer of thanksgiving is in order.

This is not a group activity. It is a private religious experience. In the holy solitude of the midnight hour, you are taking communion with the spirits of bird and fruit and field. The best moments of past feasts come to mind. And it is at times like these you have no doubt that life is good, that your family, all tucked away in their beds, are royal folks, and that grace abounds. Amen.

* * *

Leftovers in their les visible form are called memories.

Stored in the refrigerator of the mind and the cupboard of the heart.

These are just a few of mine that came up tonight: the laughter of a friend, the last embers of a great fire, the long glance of love from my spouse from across a room full of people, an unexpected snowfall, the year1 everything went wrong and turned out right, and a chunk of poetry I learned in high school.

I'm not often aware that I am happy. But I often remember that I have been happy. Especially when I sit in my kitchen wrapped in an invisible patchwork quilt made of the best moments of yesterdays.
These precious things—these leftovers from living —remain to serve as survival rations for the heart and soul. You can't entirely live off them. But life is not worth living without them.
My solitary late-night forays for food in the fridge are often garnished with such thoughts.

I don't go to the refrigerator just to eat. But to think. To sort it all out. And sometimes I think about the other people who must be at the same place in their kitchen at this very moment, doing exactly what I'm doing, hungering as I hunger, wondering as I wonder. We will never get together. There will never be an international convention of us. No kitchen is big enough. But we are bound together. We make up that secret society of the Fellowship of the Fridge.

Somehow muddling through and getting by. And not as alone as we often think we are, after all.

***

THIS BOOK HAS A HUDSON'S BAY START.
In the glory days of fur trading in North America during the eighteenth century, the Hudson's Bay Company was known for both its willingness to take adventuresome risks and its careful preparation for those risks. Trading journeys were habitually begun with vigorous enthusiasm, yet the frontiersmen always camped the first night a few short miles from the company headquarters. This allowed the gear and supplies to be sorted and considered, so that if anything had been left behind in the haste to be under way, it was easy to return to the post to fetch it. A meeting was held with all participants to make sure they understood the nature and details of the expedition. A thoughtful beginning spared the travelers later difficulties.

I learned about the Hudson's Bay Start when I began backpacking in high school years. It seemed such a sensible thing to do. To this day, I still make it a dimension of almost any trip. Cover a few easy miles the first day, check equipment, review maps, make sure I'm in sync with my companions, relax, eat a fine meal, go to bed early, and sleep well. The next day is usually a fine one, setting the tone for the rest of the way.

In that Hudson's Bay tradition, I want to pause here not far from the beginning of this book, to speak of the two-person experience undertaken between reader and writer.

First, I'll acknowledge that I am well aware of the canon of literary law that says a writer is not supposed to write in his book about the process of writing

his book. “Show them, don’t tell them; do it, don’t talk about doing it” is an admonition hammered home by every good editor and teacher of writing. On the other hand, speechwriters are told the contrary: “Tell them what you’re going to tell them; tell them; and tell them what you told them.”

I believe in both Show *and* Tell. My attitude is that I am always talking to one person, and if I am going to address you in any form, I ought to give you every advantage I can to understand what I have to say. This emphatically does not mean that I underestimate your intelligence. It means that I am aware how complicated communication is. It means that I would rather err on the side of telling you too much than run the risk of leaving you confused. It means I have a profound respect for our differences and will try to bridge them wherever and however I can.
I admit there is a division of opinion over this matter. There are those who do not like to read reviews of books and movies beforehand; those who don’t want to read program notes at concerts, and those who do not like to know what the authors or actors or directors think about their own work before experiencing a performance. My wife is one of these. I am not. But we honor our differences.

I don’t know what your opinion is in this matter, so as a gesture of good faith, I offer you a choice here. The Hudson’s Bay Start may not be your style. If you’d like to plunge on into the rest of the book, please do. Just skip over now to page 33. If you’d like to know now what I have to say about the way this particular book is put together, read on.

* * *

I’m writing this time in what I think of as “lines-of-thought.” Much as conversation is carried on between two people. One thing leads to another, there’s a pausing now and then, and the end of a conversation isn’t always directly connected to the beginning. Nothing definitive is intended on any subject. In fact, I am deliberately depending on your adding your thoughts and experiences to mine as we go—to give completion to our conversation. The book will not work without your taking significant responsibility for it.
My own movement of thought is not meant to be a straight point-to-point, linear line of march, but a horizontal exploration from one area of interest to another. There is no ultimate destination—no finish line to cross, no final conclusion to be reached. It’s the way I feel about dancing—you move around a lot, not to get somewhere, but to be somewhere in time.

* * *

As you’ve read along in this book so far—and especially if you’ve read my two previous books— you will notice that I have come back again and again to a few things that hold my concern fast.

Questions, actually, that I keep on the front burner of my mental stove. Such as:

How shall I achieve a living balance between the mundane and the holy?
Between humor and grief?
Between what is and what might be?
Between self-concern and concern for the common good?
Between the worst that I often am and the best I might well become?
And is it really possible to do unto others as I'd have them do unto me, and why is it so damn hard?

If you notice phrases, ideas, and anecdotes that closely resemble those that appear elsewhere in my writing, it is not a matter of sloppy editing. I'm repeating myself. I'm reshuffling words in the hope that just once I might say something exactly right. And I'm wrestling with dilemmas that are not easily resolved or easily dismissed. I run at them again and again because I am not finished with them. And may never be. Work-in-progress on a life-in-progress is what my writing is about. And some progress in the work is enough to keep it going on.

This attitude is inspired by the man who invented the essay form.
Michel Eyquem de Montaigne. During his life was known as a lawyer, scholar, traveler, diplomat, politician, thinker, and writer. His resources for writing were sixteenth-century France, his experiences as a member of the court of Henry III, and his term as mayor of Bordeaux. His best resource was his own daily life. His reputation today rests largely on the strength of his autobiography, *Les Essais de Michel Seigneur de Montaigne*—the essays of Montaigne. The candid informality of this unique journal has led me to think of Montaigne as a friend and mentor.

He coined the word "*essai*" from the French verb "'essayer"—to try—in the sense of testing thought and experience for merit. Montaigne meant to sort through his life as truthfully as possible. And to try to understand himself and his world as he went along, without coming to any final conclusions. He focused on means, not ends. "*Mon métier et mon art c'est vivre,*" he wrote. My trade and my art is living.

True to his word, he deemed no subject beyond consideration. Philosophy, war-horses, politics, sleep, religion, sneezing, conscience, rare meat, kidney stones, vanity, imaginary enemas, radishes, justice, and the relationship between father and sons - these are just a few of the thousands of topics he addressed.
It is remarkable that he did not write defensively or in a pontifical manner. His essays retain that quality of comfortable confidentiality that marks the conversation of close companions.

It is even more noteworthy that Montaigne insisted that his ideas and concerns were not original.

Commenting on his essays, he wrote: “It might well be said of me that here I have merely made up a bunch of other men’s flowers, and have brought nothing of my own but the string that ties them together in a bunch, which I gladly offer to you.”
If that is the case, I appreciate the care with which he chose his string.

I think Mike Montaigne is a member of the Fellowship of the Fridge, I imagine he’d like some slices of aged pâté on country bread with a little Dijon mustard and some pickles; on the side, the remains of a bowl sweet pudding. With a glass of red *vin ordinaire*. It may sound like gourmet French cuisine, but it’s really meatloaf and leftovers.

* * *

As the final item of this Hudson’s Bay Start, a comment about pace in setting out from here. I realize that it’s my part to write this book and your part to read it; and since you don’t tell me how to write shouldn’t tell you how to read it. But it may help emphasize that it was written one part at a time, and the odds are that it will make more sense if it’s read same way.

Appendix H.2

Text Excerpt Used for the Study: Version 2, Less Confident Readers

Some Observations from Both Sides of the Refrigerator Door

Edited and excerpted from “UH-OH” by Robert Fulghum

Reading Exercise – Naomi Arram

June, 2017

Some Observations from Both Sides of the Refrigerator Door

(Excerpted, with changes, from "UH-OH" by Robert Fulghum)

"HUM A LITTLE SOMETHING FOR ME."
"Why?"
"So I can tell you what key your head is in."
"I don't understand."
"Your head is like a sound chamber, and every sound chamber resonates to certain notes better than others because of the shape and size of the chamber."

I am a visitor in a high school science class, and the teacher is using me to show his students that adults don't know everything. All his students already know what the key in their head is and how and why. I don't. So he sends me off to figure it out in a small, empty room. To hum and haw until I sound a note I really like—one that makes my head vibrate a little—in a comfortable and pleasing way. Easy. It's like standing in the shower singing, but with my clothes on, and the water off.

When the note felt right, I reported back to the classroom, where the science wizard put me in front of a microphone and said, "Hum for me." I hummed. A special tool measured the sound waves of my voice.

"B-flat," he announced. "Robert, you have a head that's tuned in the key of B-flat major—which is a sixty-cycle tone with natural overtones of D and F."

Later I learned that trumpets and clarinets are also B-flat instruments, which means a lot of good jazz is in B-flat. Marching-band and parade music are often written in B-flat. At the racetrack, the trumpet call announcing each race is in B-flat and so is "The Star-Spangled Banner".

And my refrigerator hums in B-flat major.

The motor of the refrigerator gives off a B-flat hum, as do all motors that run on 120-volt AC current. The washing machine, dryer, heater, blender, hair dryer, coffeepot, and all the rest are B-flat appliances. And even when no motors are running, there is a gentle B-flat leak of energy from all the wall sockets in the house. My house has B-flat everywhere, which may explain why a man with a B-flat head like me really feels at home there. And also may explain why I feel so good near the fridge. I am in harmony with it. Now I know why sometimes I sing the national anthem when I raid the refrigerator in the middle of the night.

* * *

Refrigerators. On a small scale, a refrigerator is the center of the universe. On the inside is food essential to life, and on the outside of the door is a summary of the life events of the household. Grocery lists, report cards, wise sayings, cartoons, photographs, family schedules, urgent bills, and instructions. When the word *GARBAGE!!* appears there, somebody had better take it out, and soon.

The door of the fridge is also our home art gallery. Postcards of paintings from museums. Scribbles from a child's long, rainy afternoon with a box of crayons. A collection of drawings and paintings that come home from school in a steady stream. All stuck to the front of the family fridge.

When you no longer have any art on the refrigerator door, something is over—your children have grown up. And when it appears again years later, it means your children have children. Grandparents are suckers for fridge-art and will put up just about anything offered them by a child of their child.

"But what does that say about me if my refrigerator has nothing on it?" you may ask.
It means you are a nice person who needs to lighten up. Get some magnets—the heavy-duty kind—and get your stuff up on the door of the fridge. If you

aren't sure about what to put there, consult with friends. Many people know about what should go on the fridge door and will be glad to advise you.

* * *

While the outside of the fridge can be an emotional trip down memory lane, the inside of the freezer is not always as nice.

Interesting bits of history can be found in the freezer. I've found such things as a snowball, the corpse of a very small animal, some ice cream made from snow, flowers
from a wedding anniversary, and several flashlight batteries—all kept safe in the deep cold by various members of the family, each for their own reasons. All important to the persons who put them there, I'm sure. But what should be done with these items? I ran across an idea from the National Park Service that's worth thinking about. It says that any historical artifacts found in a park should be appreciated by the finder, left in place, and reported to headquarters so that experts may deal with removal or disposal. From experience, I urge that those who clean out freezers at home follow the Park Service policy. The owners will love you more if they don't have to pull their treasures out of the garbage can.

* * *

Fridges and freezers have a special hour, in addition to their special hum, and central place in our lives. Two A.M. is usually a time for sleeping. And if you're not asleep, then it's an hour when we're awake with a problem, or a crying baby. Telephones that ring at 2:00 A.M. usually mean trouble, as do the sounds made by teenagers arriving home late, dripping water, and those unknown animals that scratch somewhere inside your walls. People talk to themselves about serious things at this hour.

But I think of 2:00 A.M. as feeding time. The time when I've had some of the best meals I've ever eaten. Gourmet eating. Alone. With nobody standing around saying, "You're not really going to eat THAT, are you?"

One wonderful midnight I ate up a taco shell full of almond paste and washed it down with a can of Sprite that had been there so long there was rust on the can. Then I ate a whole dish of pudding that was so old, I picked up out of the bowl in one piece. The last inch from a bottle of red wine went down with a scoop of cold chili on rye bread, topped with fig jam. A spoonful of peanut butter and a spoonful of jam every now and then to clear the palate. A couple of glasses of milk to keep things moving on down my throat without sticking. Finally, I revived a cup of dead coffee in the microwave and went out on the porch to sit, relax, and look at the moon. Great meal. One of the *truly* great ones.

* * *

But more than anything, what I really look forward to finding in the fridge in a time of late-night need is meatloaf. Now we're getting serious. Meatloaf.

When I say those words, people usually smile. And then I ask, "Why are you smiling?" And then they laugh. "Why are you laughing?" And they laugh again. "Meatloaf—haw, haw, haw—meatloaf—haw, haw, haw." One of the many mysterious powers of meatloaf.

Meatloaf is best when it's homemade. Mostly made by real moms, by hand. Constructed out of whatever's around. Some hamburger meat that might be going bad if it isn't used soon—rubbery carrots, onions, salt, pepper, steak sauce, etc. The list of what's possible is too long to print. Then there's the filler—this is the meatloaf expander. Bread crumbs, corn flakes, Rice Crispies, oatmeal, or whatever—even dirt would work, I guess. And some egg to hold the whole thing together. Then it has to be mushed around by hand, shaped into a loaf, and put into the oven to bake. Served hot with gravy, mashed potatoes, and Wonder bread. Yes. Yes!

But don't eat it all. Never, ever, eat all the meatloaf when it's fresh, Put about a third of it away in the back of the fridge and forget about it. This is the best part. The part you are going to eat about 2:00 A.M. some dark, rainy night when you need sustaining. No health department would allow such a thing to be served in a public restaurant. But nothing's better for you. It's a matter of mental health. I've never heard anybody say he was depressed by eating a cold meatloaf sandwich.

Personally, I like mine with mayonnaise-and-sourdough-bread. I know there are ketchup people and mustard people and even jam people. A kid once joined me in middle-of-the-night feasting, and I made him very happy by fixing him a meatloaf sandwich with Gummi Bears, grape jam and Pringles on it. It's a free country.

* * *

Now I know that some people don't like meatloaf. This is true. At a summer camp a group of children complained to me that the adults all gathered around the campfire and sang protest songs (the sixties ones) against war and hate and all that, which was fine with the kids, but they would like it if we sang a children's protest song or two. Like what? Well, they couldn't think of one offhand, but they were pretty unhappy about the meatloaf served in the dining hail two nights in a row.
So we made up the Meatloaf Protest Song.

"Eat your meatloaf" whined the mommy at the table.
"Eat your meatloaf or your teeth will all fall out!"
"Eat your meatloaf" whined the mommy at the table.
In reply, all the little children shout:

Chorus:

"We don't want to eat the meatloaf

Meatloaf is fit for pigs and goats.
Red and yellow, black and white, it is icky in our sight!
You can't make us shove that nasty down our throats!"

(For "meatloaf" you can substitute other items of food deemed deadly by children: liver, lima beans, tofu, whatever. It's hard to convey the tune here, but, like meatloaf itself, whatever tune you come up with that works for you is okay. Try it on your kids. Be prepared for many verses.)

* * *

Meatloaf reminds me of other types of leftovers. Especially Thanksgiving leftovers. When the refrigerator becomes the treasure chest of late-night dining. Let's face it, Thanksgiving can be a strain. You have to dress up and behave and there's too many people and too much food. Exhausting. But two nights later is a different story. There's good news in the fridge by then—solid-gold leftovers.

The pecan pie gets so hard that you can pick up a big piece with your hand. The cranberry sauce has matured; the dark meat of the turkey is easy to peel off the bone. And the dressing has turned into something that would give truffles and caviar a run for the money. THIS is the way dressing should taste! A true prayer of thanksgiving is in order.
This is not a group activity. It is a private religious experience. In the holy solitude of the midnight hour, you are at one with the spirits of bird and fruit and field. And it is at times like these you have no doubt that life is good, that your family, all tucked away in their beds, are royal folks, and that grace abounds. Amen.

* * *

Leftovers in their less visible form are called memories.

Stored in the refrigerator of the mind and the cupboard of the heart.

These are just a few of mine that came up tonight: the laughter of a friend, the last glow of a great camp-fire, the long glance of love from my spouse from across a room full of people, an unexpected snowfall and the year everything went wrong and turned out right.
I'm not often aware that I am happy. But I often remember that I have *been* happy. Especially when I sit in my kitchen wrapped in an invisible patchwork quilt made of the best moments of yesterdays.
These precious things—these leftovers from living —remain to serve as survival rations for the heart and soul. You can't entirely live off them. But life is not worth living without them.
My solitary late-night searches for food in the fridge often remind me of this.

I don't go to the refrigerator just to eat. But to think. To sort it all out. And sometimes I think about the other people who must be at the same place in their kitchen at this very moment, doing exactly what I'm doing, hungering as I hunger, wondering as I wonder. We will never get together. There will never be an international convention of us. No kitchen is big enough. But we are bound together. We make up that secret society of the Fellowship of the Fridge. Not as alone as we often think we are, after all.

***

THIS BOOK HAS A "HUDSON'S BAY START".

The Hudson's Bay Company was one of the early pioneers of exploring and trading in North America in the 17 and 1800's. In order to save time, expense, and risk to their traders, they developed this simple rule: before an expedition, traders and explorers would spend the first night camping out very near the company headquarters. This allowed them to check whether they had all the right equipment with them, before they went out into the wilderness on their own. That way, if they realized, on the first night, that they had forgotten something, or that there was a problem with their equipment, they were close enough to their home base that they could turn around, go back and sort it out before setting out on the real trek. This practice outing before the real start became known as "The Hudson's Bay Start".

I learned about the Hudson's Bay Start when I began backpacking in high school. It seemed such a sensible thing to do. To this day, I still make it part of almost any trip. Travel a few easy miles the first day, check equipment, review maps, make sure I'm in sync with my travel-partners, relax, eat a fine meal, go to bed early, and sleep well. This sets the tone for the rest of the way.

In that Hudson's Bay tradition, I want to pause here not far from the beginning of this book, before we move forward, and speak of the two-person 'journey' experienced between reader and writer.

First, I am well aware of the Golden Rule of writing, that says a writer is not supposed to write in his book about the process of writing his book. "Show them, don't tell them; do it, don't talk about doing it" is what every good editor and teacher of writing will tell you. On the other hand, speechwriters are told the exact opposite "Tell them what you're going to tell them; tell them; and tell them what you told them."

I believe in *both* Show *and* Tell. My attitude is that when I write, I am always talking to one person – you - and if I am going to talk to you, I should give you every chance I can to understand what I have to say. This does not mean that I underestimate your intelligence. It means that I am aware how complicated communication is. It means that I would rather tell you too much than run the risk of leaving you confused. It means I respect our differences and will try to bridge them wherever and however I can.

Not everyone would agree with me. Some people don't like to read reviews of books before they read them, or see movie previews and trailers before they go to the theatre, or know what the authors or actors or directors think about their own work before experiencing a performance. My wife is one of these. I am not. But we honor our differences.

I don't know what your opinion is in this matter, so I'm offering you a choice here. The Hudson's Bay Start may not be your style. If you'd like to plunge on

into the rest of the book, please do. Just skip now to page 33. But, if you'd like to know now what I have to say about the way this book is put together, read on.

* * *

I'm writing in what I call "lines-of-thought." Like a conversation taking place between two people. One thing leads to another, we pause now and then, and the end of a conversation isn't always directly connected to the beginning. Nothing definite is said on any subject. In fact, I am depending on you adding your thoughts and experiences to mine as we go—you're part of our conversation. The book will not work without you joining in.

My own thoughts don't flow directly from point A to point B. Rather, I'm moving around from one area of interest to another. There is no single destination—no finish line to cross, no final conclusion to be reached. It's the way I feel about dancing—you move around a lot, not to get somewhere, but to be somewhere in time.

* * *

You may have noticed in this book —and also in my other books —that I come back again and again to a few things that I wonder about. Questions, actually, that I keep on the front burner of my mental stove. Such as:

How shall I achieve a living balance between the mundane and the holy?
Between humor and grief?
Between what is and what might be?
Between self-concern and concern for the common good?
Between the worst that I often am and the best I might well become?
And is it really possible to do unto others as I'd have them do unto me, and why is it so damn hard?

If you notice similar ideas appearing elsewhere in my writing, it is not an accident. I'm repeating myself. I'm remixing words in the hope that just once I might say something exactly right. And I'm wrestling with dilemmas that are

not easily resolved or easily dismissed. I run at them again and again because I am not finished with them. And may never be. Work-in-progress on a life-in-progress is what my writing is about. And some progress in the work is enough to keep it going on.

This attitude is inspired by the man who invented the essay form, Michel Eyquem de Montaigne. He was a lawyer, scholar, traveler, politician, thinker, and writer. He lived in sixteenth-century France, was a member of the court of King Henry III, and a mayor of Bordeaux. His best resource was his own daily life. His reputation today rests largely on the strength of his autobiography, *Les Essais de Michel Seigneur de Montaigne*— "The essays of Montaigne". The candidly informal style of this unique journal has led me to think of Montaigne as a friend and mentor.

He came up with the word "*essai*" from the French verb "'essayer"—meaning 'to try'—in the sense of testing out thoughts and experiences in writing. Montaigne meant to sort through his life as truthfully as possible. And to try to understand himself and his world as he went along, without coming to any final conclusions.
"*Mon métier et mon art c'est vivre,*" he wrote. "My trade and my art is living."

True to his word, his essays touched on everything. Philosophy, politics, sleep, religion, sneezing, conscience, meat, kidney stones, radishes, justice, and the relationship between father and sons - these are just a few of the thousands of topics he addressed.
But his essays didn't sound like speeches. His writings seem casual and comfortable - like conversation between close friends.

Montaigne also insisted that his ideas and concerns were not original.

Commenting on his essays, he wrote: "It might well be said of me that here I have simply made up a bunch of other men's flowers, and have brought nothing of my own but the string that ties them together in a bunch, which I gladly offer to you."

If that is the case, I appreciate the care with which he chose his string.

I think Mike Montaigne is a member of the Fellowship of the Fridge, I imagine he'd like some fine pâté on country bread with a little Dijon mustard and some pickles; on the side, the remains of a bowl sweet pudding. With a glass of simple red wine. It may sound like gourmet French cuisine, but it's really just meatloaf and leftovers.

* * *

And finally, before we begin the book: I realize that it's my part to write it, and your part to read it; and since you don't tell me how to write it, I shouldn't tell you how to read it. But as the final item of this Hudson's Bay Start, it may help to tell you that it was written one part at a time, and it will probably make more sense if it's read same way.

Appendix I

Task Questions (for both Confident and Less Confident readers)

Name: _____ Date: _____

1. Fulghum has a list of deep questions that he keeps asking himself – give one:

_____

2. Why does Fulghum think you shouldn't eat all your meatloaf when it's fresh? _____

_____

3. What is a writer NOT supposed to do in his book? _____

_____

_____

4. Why does Fulghum call Michel Eyquem Montaigne "Mike"?

_____

_____

_____

5. Name one ingredient that can be used as meatloaf "filler"

_____

6. What metaphor does Montaigne use for his own essay writing?

_____

_____

_____

7. Fulghum says that something in our lives is like leftovers– what is it? (leftovers are a metaphor for what, according to Fulghum?)

_____

8. Using the National Park Service idea, what should people do if they find "artifacts" in the freezer?

_____

_____

_____

9. Where does the word "essay" come from? _____

10. According to the children's Meatloaf Protest song, meatloaf is fit for:

_____

Appendix J

Answer Rubric

Question 1

Any one of the six questions from the section that starts "How shall I achieve a living balance between the mundane and the holy?"

Question 2

Some variation of : Because the best part of meatloaf is eating it as leftovers in the middle of the night. Based on "But don't eat it all. Never, ever, eat all the meatloaf when it's fresh… The part you are going to eat about 2:00 AM."

Partial points if they understand it's an inferential question, and get the basic gist, but miss that he likes to eat it in the middle of the night.

Question 3

"A writer is not supposed to write in his book about the process of writing his book. 'Show them, don't tell them.'"

Question 4

He feels a kinship. He thinks of him as a "friend and a mentor" and "a member of the Fellowship of the Fridge".

Question 5

Anything from "Then there's the filler", but *not* from the ingredient list that precedes the filler list.

Question 6

His essays are the string that tie up other men's flowers (i.e. their words). *Not* "My trade and my art is living".

Question 7

Memories

Question 8

Leave them there (and report to headquarters) / Let the owners take care of them.

Question 9

The French verb, 'Essayer'. Partial points for saying just Montaigne's name.

Question 10

Pigs and goats

Appendix K

Reflective Feed-back Questions (for all readers)

Name: _____ Date: _____

Circle the statements that apply to you, and indicate if you feel particularly strongly about any one of them.

When I am looking for information in a text I have read before, I:

i. Go back to the beginning and read the text again in order to find the information
ii. Go back to the beginning and skim the text, looking for the information
iii. Go back to the beginning and skim the text, looking for words that signal the correct answer
iv. Look for headings which indicate what topics appear in a particular section
v. Remember approximately where in the text the answer was, based on the context (ie – it was discussed near the beginning of a new section, or came after another related idea)
vi. Remember the location on the page where the information was (top-bottom / left-right)
vii. Remember features of the paragraph the answer was in, such as indentations, whether it was short or long.
viii. Remember other visual features where the information appeared, such as font-change, italics, dialogue etc
ix. Another feature of the text or something else helped me to remember where the information was located. Please specify:

_____

_____

Appendix L.1
First Coding Key

Coding Colours

Red Gel Pen	= Me to me (notes to myself)
Teal Highlight	= Use of Schema
Brown Marker Pen	= Visual cues such as italics or question marks
Pink Highlight	= Working Backwards
Blue Highlight	= Contextual cues
Purple Higlight	= Conscious division of text by topic
Orange Highlight	= Interesting so remembered
Yellow Highlight	= Key word remembered or searched for
Orange-pink Highlight	= Words jumped out at them
Green Highlight	= Side of page, top-bottom
Turquoise Marker Pen	= Another strategy not yet mentioned (for now includes self-correct and scanning)
Purple Gel Pen	= Physical (Kinesthetic) division of the text
Green Gel Pen	= Important or worth noting, but I'm not sure what to do with it yet

Appendix L.2
Second Coding Key

During Reading

Form

DR F Locative information

DR F Surface structure

Content

DR C Captures attention

DR C Divides text while reading

During Search

Form

DS F Location on Page

DS F Location in text

DS F Surface structure

Content

DS C Schema

DS C Deliberate use of Key words

DS C Key words popped out (non-deliberate use)

DS C Skim/scan for related info or not 100% defined (but not key words)

DS C Contextual clues and text division

Other

DS O Backwards

DS O Rephrase Q and look for synonyms

DS O Self-correct, self-check

DS O - Other (uncommon) **Important to Note vis Research** **Naomi Prompt**

Appendix M
Full transcript with final coding

Participant C7 Transcribed and Coded

DS C - division of text DS C - skims Naomi probe DS F - surface structure DR F/ C - divides text by context and surface structure DS C/ F - uses division of text DS F - location on page DS C - remembered detail, interest Naomi probe DS C - skimmed DR/DS C - schema Naomi probe	Q1) I remember it was somewhere in the beginning-ish part, but not at the first beginning. Lots of meatloaf stuff, leftovers. [flips pages and skims], here it is - he keeps asking himself questions, has questions in mind [writes correct *I noticed that when you turned the page, you went straight to the bottom - were you thinking of a location?* I was guided by the stars (asterisks) - by the paragraph breaks. Because normally what I would do, is by all the paragraph breaks, I would give it a little title so that I wouldn't have to skim the whole thing, but since we couldn't write [in the booklet, as per my instructions], so I just went to all the paragraph breaks and tried to remember what happened in each section. Q2) [remembers answer without looking. Found right away. Looked at correct side of page] And that one I remembered that meatloaf was the staple of his leftover rant - it says here *So you just skimmed it?* Yes Q3) Show not tell. Because that's what we were taught not to do as teachers. [Looks for "show not tell"] He does both *Did you know where it was on the page? Because you're going to the exact locations very quickly. I mean, you're good at this [because she's a reading teacher] but….*

DR C - interest DR C - schema DS C - location in text DS F - surface structure DS O - self-check DS C – skim/scan – finger DS O - self-check DR C - interest DS F - location on page DS O – peripheral processing Naomi probe DS C - skim/scan DS C - remembers detail DS O – peripheral processing	I remember skimming it from before kind of. I remember when I was reading it, it kind of made an impression on me because this is what we were taught as teachers. I didn't bookmark it in my head, but I kind of sat on it for a couple of minutes longer than I did the rest of it, so coming back to it wasn't really so hard to find. I just happened to have been looking and flipped to the correct page though. Also because "and" is italicized so it also stands out a bit more on the page. He believed in "show *and* tell" not just one or the other, so because it's italicized it kind of jumps out of the page a little. Q4) He's the essay guy [turns the pages to the end, as she's reading the question]. Here we go "candid informality…… friend and mentor". So I'm guessing that's why he called him Mike? (looks around what she's found to make sure, using her finger on the page) Seems to be. Re-skims again to re-check. Yeah, I think Mike, yeah. [Looks at the text again after she's answered, and nods]. Q5) Bread or crumbs or something. [Flips back from end, focusing on left side of page.] I also just read that before. Yup - breadcrumbs, cornflakes *Did you notice there that you were doing anything specific to find it? Obviously, you went back to …* I went back to double check. I remember reading about it before, and I remember also seeing it when I was looking for the "why shouldn't you eat meatloaf when it's fresh" question, so I remember seeing it there also,

Naomi probe	*Seeing it where?*
DS O – peripheral	In the text [indicates location] as I was glancing over it the first time when I was looking for the meatloaf question, or answer. I remember seeing "meatloaf filler" so I went back because I knew around where it was. I just had to find out exactly where.
DS F - location on page	Q6) Back to essay writing. [Staying on left side of page, skimming] "it might as well be said of me…. other men's flowers" [writes answer] I had a little bit more trouble finding it because it was a specific question, so to go back and find the metaphor he used, and figure out
DR/DS O – peripheral processing	where the metaphor was. I thought I saw it as I was skimming through it at first
DS O - self-check	but then I continued reading to maybe see if I'd missed it or something
	Q7) (goes directly back to the correct answer)
Naomi probe	*How did you find that so quickly?*
DR/ DS C - division of text ↕ ↕ ↕	I remembered that it has to be, well not that I remember, but the meatloaf and the leftovers - it was that section first and then it kind of split into a second half of the text, kind of into like his writing and his own thought process behind his own writing, so I kind of figured that when he's talking like that it's a metaphor for something in our lives, it's going to be towards the end of it, because he's not going to bring in that metaphor in the middle or the beginning of it. And then I
DS C - key word popped out	happened to turn to the page where it says "the book has a Hudson's Bay start" so that's where I knew where that break was, so I figured that it *has* to be right before there, sort of, and it was right at
DS C - division of text	the top. Right by the little stars, where the topics break.
DR C - interest / attention	Q8) [knew answer] That was funny. Here [reads out correct answer, laughing].

↕ DR/S C - remembers detail DS C - key words popped out DS F - surface structure DS C - remembered detail DS F - location on page DS O - self-check Naomi probe DS C - remembered detail DS O - self-check ↕ ↕ DS O - self-check DS C - remembered detail / schema (DR C -attention / schema) Naomi probe DS F - surface structure DR C - captured attention	 I remember that it was funny. I remember reading about it, so when I was looking back to find where it was, so I knew, I had an idea (about its location), and I used "National Parks Service" as a keyword to find it back in the text and it also just kind of stood out. These three upper case …. Q9) From that dude's name that I can't pronounce because it's French or something. Where was it exactly? [goes to correct page, looks on left, but too far down, and then her eye moves up to the correct area on the page] [she writes his name as the answer first] I'll double check. Yes, he coined the word, from essayer - meaning to try. Essayer is to try in French. *What made you double-check? You just said you were going to double check. What made you want to do that?* Because I knew that it was Michel de Montaigne or whatever, but I wanted to check exactly what the answer was. He did it, but what it was about the essay that he wrote, the title that he wrote. I knew it wasn't his name, but it was something that he did or said specifically so I just wanted to double check what that was. I didn't want to leave the answer as "his name" because I could be more specific than that. Q 10) Garbage and stuff like that - camp, I remember. *What are you looking for?* [Pointing and nodding] the song - which is all italicized and easy to find if you know where to look for it. Yes, pigs and goats. I tried to come up with a tune for it (while I was reading). I was wondering if

	it fits with The Star-Spangled Banner or the ABC song that fits with everything.
	<u>Follow-up</u>
Naomi probe	*I noticed, I could be wrong, that you seem to recognise which side of the page it's on. Do you feel you do that?*
DS F - location on page DR F - physical division of text leads to locative information	[Nodding] Generally, I felt more for the second half than the first half, mainly because when I was reading it, I folded it (the booklet) over (in half) and then flipping it over so I didn't really keep track of the sides, but then when I got to the middle, folding it over got a little weird, so then that's when I started reading it flat, so then I started recognizing which half of the page. The first half, I didn't really, because it was back and forth instead of open (fully flat) the whole way.
Naomi probe	*Tell me, how did you divide it? You talk about sections and the first half, second half.*
DR C - division of text ↕ ↕ ↕ DR F - surface structure (asterisks) DR C - division of text ↕ DR - F/C/O imagines her own surface structure and division of text	So I divided it first into two main topics - the first was kind of like the fun and mealoafy, refrigerator, leftover style stuff, that kind of - it got me attached to the title "Both Sides of the Refrigerator Door" so like at that part I was "okay, so it's the refrigerator" and the stuff that pertains to that. And then after it was like he got into his writing process, so that was a separate topic in general, and then I kind of had subtopics - like where he talks about the greatness of leftovers in general, and specifically the meatloaf. And the stars helped me break that up mentally, in my head a little bit. And then with his writing, it was his thought process and then how he's writing his book, and where "essay" comes from. It was easy to break up into its own sections. Although it's interesting that I found that it didn't have the stars that separated it, so I kind of put the stars in

	myself because I felt like it was different from the rest of the paragraph that it was included in, even though it wasn't, in my head I guess it was.
Naomi probe	*With Montaigne, you're saying?*
	Yes.
Naomi probe	*So if you could have redone it, you would have put stars there?*
DR - F/C/O imagines her own surface structure and division of text	I would have put stars here [indicates where] Just for my own… cuz that's what … I just see it as a separate sections. So just made up my own section.
	<u>Follow-up questions</u>
DS C – skim/scan	I don't reread the text. Skim yes
DR F - surface structure/ DR C - captures attention	Bold, italics, vocabulary that doesn't seem to fit
DR C - captures attention	I like random ideas - that are written - things that don't seem to fit