

Do task instructions influence readers' topic beliefs, topic belief justifications, and task interest? A mixed methods study.

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## Abstract

The purpose of this mixed methods study was to investigate whether task instructions influence readers' topic beliefs, topic belief justifications, and task interest. Year 10 high school students completed a topic beliefs scale about a controversial topic (i.e., whether a prominent transportation tunnel should be widened) and provided a written justification of their beliefs. Then they were randomly assigned to one of four pre-reading task instruction conditions before reading a text that presented arguments that supported and opposed the widening of the tunnel. The first condition received rationale instructions, which provided an explanation as to why putting forth effort during the reading activity was useful and worthwhile. The second condition received evidence instructions, which directed readers to focus on the evidence supporting each argument in the text. The third condition received both evidence and rationale instructions. The fourth condition, the control condition, was asked to read for a general purpose. After reading, participants again completed the topic beliefs scale and topic belief justification. Experimental results showed that task instructions affected topic beliefs and topic belief justifications, but did not affect task interest. More specifically, participants who received evidence instructions moderated their beliefs after reading, and participants in the evidence condition and rationale condition included more opposing arguments in their topic belief justifications after reading. The interview data indicated that task instructions influenced readers' goals and the strategies they used to meet those goals. The data sets were complementary: the *quantitative* data indicated differences in topic beliefs and topic belief justifications and the *qualitative* data allowed us to interpret why these differences occurred. Some students displayed belief-reflection, whereas others displayed belief-protection. Results are discussed and implications are provided.

## 1. Introduction

Reading is an intentional act and a primary medium for learning disciplinary knowledge in schools (Kulikowich & Alexander, 2010). As defined by Snow (2002), reading comprehension is “the process of simultaneously extracting and constructing meaning through interaction and involvement with written language” (p. 11), and suggests that reading comprehension is comprised of three key elements: the task, the reader, and the text. The task refers to the purpose for reading; characteristics of the reader include prior knowledge, motivation and cognitive capacity; and the text is the written information that the reader seeks to understand. Collectively these elements, and the context in which they occur, influence comprehension. The present study will focus on two of these elements: the task and the reader.

Reading for academic tasks or purposes is different than reading for entertainment or leisure (Greaney & Neuman, 1990; Lorch, Lorch, & Klusewitz, 1993; van den Broek, Lorch, Linderholm & Gustafson, 2001). For instance, reading for leisure is usually a self-chosen activity, whereas reading for study is often teacher-directed and task-focused. In educational settings, task-oriented reading often involves reading one or more texts to complete an assigned purpose (Bråten & Strømsø, 2011; Gil, Bråten, Vidal-Abarca, & Strømsø, 2010; Vidal-Abarca, Mañá, & Gil, 2010; Wineburg, 1991b). An assigned purpose communicates to readers why they should read (Ramsey & Sperling, 2011). Examples include reading to write an essay, to take a test, or to engage in a discussion. Task-oriented reading in classroom settings is often mandatory. Consequently, students’ interest can wane (Eccles & Midgely, 1989, 1990; Harter, 1981, 1982; Andermann & Maehr, 1994; Goodlad, 1994; Hidi & Harackiewicz, 2000; Wigfield & Eccles, 2000) because they are expected to read texts that they may not find interesting or choose to read on their own (Alexander & Jetton, 1996; Jetton & Alexander, 1997), and some may struggle to learn from text. This has major implications for their potential to succeed in school because reading supports the development of content knowledge.

Pre-reading task instructions support task-oriented reading because they help a reader develop a reading goal and a task model (i.e., a mental



representation of the expected outcome of reading) (Broekkamp, van Hout-Wolters, Rijlaarsdam, & van den Bergh, 2002; McCrudden & Schraw, 2007; Rouet & Britt, 2011). Pre-reading task instructions are external prompts that provide a focus to assist readers by directing them towards text material that is relevant to their task (McCrudden & Schraw, 2010). Text relevance is the extent to which text segments are germane to a reader's goals for reading (McCrudden & Schraw, 2007). Task instructions can affect readers' goals, which can affect perceptions of relevance (Lehman & Schraw 2002; McCrudden et al., 2010), which can subsequently affect reading processes, such as use of inferences and paraphrasing (Linderholm & van den Broek, 2002; Navarez, van den Broek, & Ruiz, 1999) and reading outcomes, such as memory of facts (Di Vesta & Di Cintio, 1997). Task instructions can also affect task interest (Harter 1981; Hidi, 1990, 2001; Jang 2008; Reeve, Jang, Hardre, & Omura 2002; Sansone, Wiebe, & Morgan, 1999).

Further, a reader's prior beliefs about the text topic can shape their impressions of a passage because prior beliefs influence decisions associated with evaluation and judgement of text content (Ennis 1994). For instance, readers with pre-existing beliefs about a controversial topic are more likely to seek evidence that supports their point of view (Lord, Ross, & Lepper, 1979; McHoskey, 1995; Nickerson, 1998) and to accept arguments that are appealing to them at face value, without considering the strength and validity of the evidence presented (Kobayashi 2010). Consequently they ignore evidence that opposes their prior beliefs in favour of evidence that supports their prior beliefs (Anderson, Lepper, & Ross, 1980). Thus, when reading about a controversial topic, it is vital for readers to read objectively, otherwise they may overlook points of dispute (Kobayashi, 2009). This bias can prevent them from performing well in academic tasks, such as an essay, because they are unable to justify arguments with evidence (Rouet, Britt, Mason, & Perfetti, 1996, Wineburg, 1991b) and they are unable to objectively look beyond what they already know and believe.

In the present study, I investigated whether pre-reading task instructions would affect beliefs, belief justifications, and task interest. I used two types of task instructions. The first, rationale instructions provided an

explanation as to why putting forth effort during the activity was useful and worthwhile (Jang, 2008). The second, evidence instructions, prompted readers to focus on the evidence used in arguments that supported or opposed a controversial topic. For the purposes of the present study, evidence was defined as the information used to support a stated belief (Bråten & Strømsø, 2011; Britt & Rouet in press; Gil, Bråten, Vidal-Abarca, & Strømsø, 2009; Lord et.al., 1979; Nickerson, 1998; Rouet, Britt, Mason & Perfetti 1996; Perfetti, Rouet & Britt 1999; Vidal-Abarca, Mañá, & Gil, 2010; Wineburg, 1991b).

This thesis consists of 11 main sections. The present section provides an introduction to the paper. The second section provides a review of articles that are relevant to the present study. The third section describes the purpose of the study, the research questions addressed and the methods of analysis adopted. The fourth section outlines the hypothesis and describes the quantitative phase. The fifth section describes the quantitative method of analysis and participants. The sixth section provides the results of the quantitative data analysis. The seventh section describes the sampling method established for determining the qualitative groups. The eighth section describes the purpose of the qualitative phase. The ninth section describes the qualitative method of analysis and participants. The tenth section describes the outcome of mixing the quantitative and qualitative data. The last section includes a discussion of the present study and conclusions drawn from the findings.

## **2. Literature Review**

This chapter provides a summary of research on task instructions and reading strategies, and is comprised of five sections: task instructions and reading strategies; task instructions and learning; previous research on rationale; previous research on beliefs. This section concludes with a description of the present study.

### *2.1 Task instructions and reading strategies*

Teachers provide task instructions because they believe the instructions direct their students to the most relevant information required to meet their reading purpose (Ramsey & Sperling, 2011). This section discusses the relationship between task instructions, readers' purpose for reading, and the strategies they employ to achieve that purpose.

Why do people read? Two foundational articles identified extreme purposes for why people read: reading for entertainment (Greaney & Neuman, 1990) and reading for study (Lorch et al., 1993). The first foundational article investigated young readers' purposes for reading. Greaney and Neuman (1990) asked 8-, 10- and 13-year-old students from 15 different countries to write an essay about why they liked to read and their purposes for reading. They identified three main purposes for reading. The first purpose was utility, which included reading to know how to help one's country, to learn, to distinguish from right and wrong, and to be shown the right way to live. The second purpose, enjoyment, involved reading to fulfil internal needs rather than external goals (i.e., to become absorbed in other lives, places and experiences). The third purpose, escapism, involved reading to alleviate boredom when there is nothing else to do, to relax, and to forget about personal worries. This qualitative study showed that people read to fulfil a variety of needs.

In the second foundational article, Lorch et al. (1993) conducted two studies to investigate how university undergraduates reacted to different reading situations in order to meet the cognitive demands in a university setting. In the first study, the researchers asked 58 undergraduates to think about all the types of material they read in a week, allowing for inclusion of

material not related to academia. They received a sheet of paper that was divided into two columns. In the left column, students listed the type of material they read. In the right column they indicated their purposes for reading. Items read included newspapers, magazines, reference material, journals, advertisements, fiction and non-fiction books, textbooks and letters. Ten purposes for reading were identified: Reading to prepare for an exam (e.g., read class notes to review for an exam), reading to research (e.g., read a medical journal for a research paper), reading to prepare for class (e.g., read a biology chapter to review basic concepts), reading to learn (e.g., read book for English to learn better writing skills), reading to apply knowledge (e.g., read a computer science book to program a computer), reading to search (e.g., read want ads in a newspaper to find a job), reading to self-inform (e.g., read an economics text to understand economic principles), reading to challenge intellect (e.g., read a psychology text for enjoyment), reading for stimulation (e.g., read an article in a medical journal for personal interest), reading for leisure (e.g., read a fiction novel for enjoyment). Of the ten purposes identified, four (reading to prepare for an exam; reading for specific research; reading to prepare for class; and reading to self-inform) were classified as school reading. The remaining six categories were considered to be reading for personal choice.

In the second study, using 124 undergraduates from the same university, the researchers investigated whether mental energy required for processing reading material varied across the 10 types of reading purpose identified in the first study. Participants were asked a series of 22 open-ended questions (e.g., how much does the way in which you read vary over different parts of the text?). Responses to these questions were used to describe all of the different ways in which the students read and processed text. The results indicated that, in contrast to reading for personal choice, reading for study is more demanding because students perceived study to be less enjoyable, interesting, or emotionally-laden, and because they perceived study to take longer and require more cognitive effort.

This study also revealed that students processed information differently across the four reading-for-study purposes. For example, when reading for

class preparation they reported reading faster and paying less attention to detail than when they read for exam preparation or for a research project. They perceived reading for exam preparation as slower because it involved more thinking and memorizing, understanding of concepts, use of supports, re-reading, and closer attention to detail. When reading for research, they said it involved more analysis of the writing style. They were more critical of the text, less distracted and more emotionally involved in their reading. Lorch et al.'s (1993) findings suggest that when teachers develop task instructions, they should clearly communicate the purpose for reading so that students can adjust accordingly, particularly given that teachers are primarily responsible for setting classroom reading tasks (Ennis 1994; Alexander & Jetton 1996). In combination, the findings from Greaney and Neuman (1990) and Lorch et al. (1993) demonstrate that individuals read for different purposes and that they adjust their approaches towards reading based on their reading purpose.

Subsequent research has focused on assigning readers different purposes for reading and measuring how these purposes affect processing during reading and memory. An important aspect of task-oriented reading is the necessity for readers to make inferences that create a mental representation that matches their goals for reading (Braten & Samuelson 2004; Graesser, Singer & Trabasso 1994; Magliano, Graesser & Trabasso 1999; McKoon & Ratcliff 1992). An inference refers to a reader's use of prior knowledge to generate information that is not explicitly stated in a text (McKoon & Ratcliff, 1992). Inferences allow readers to connect facts, ideas and events within a single text or across multiple texts (Graesser 1981; Kintch 1988). Three studies in particular have shown that readers adjust their approaches to reading when asked to read for an assigned purpose (i.e., for entertainment or study; Linderholm & van den Broek 2002; Navarez et al., 1999; van den Broek, et al., 2001).

In the first study, Narvaez et al. (1999) asked undergraduates to read expository and narrative texts to investigate the effect that reading purpose (reading for entertainment or study) had on inference generation during reading. Participants made comments while they read aloud; then after reading they answered a questionnaire about the strategies they used for

reading. The researchers predicted that readers would generate more inferences when they read for study than when they read for entertainment and that participants would read more slowly when reading for study. Readers with a study purpose took more breaks, re-read and spent more time evaluating text than readers who read for entertainment. This supported findings from Lorch et al. (1993) that school study requires more re-reading and attempts to understand and integrate text. Interestingly, readers from the study group did not provide more inferential explanations than those from the reading for entertainment group. The authors speculated that readers do not automatically use the best strategies when reading and need help learning appropriate reading strategies. Navarez et al. concluded that inference generation could be improved if teachers provide instructions that direct readers attention to text material that is relevant to their reading purpose and this in turn will lead to increased understanding and retention of information.

In the second study, van den Broek et al. (2001) replicated and extended Navarez et al. (1999) by exploring not only the effect of reading purpose on inference generation, but also its effect on memory for text. College students read four different expository science texts from a magazine for either an entertainment goal (i.e., imagine they were browsing through a magazine and discovered a science article of interest to them) or a study goal (i.e., imagine that they were reading a science magazine in preparation for an exam). The researchers used a think-aloud protocol (i.e., students vocalized their thoughts) to record students' thoughts during reading. Further, participants did a free recall task after reading, in which they wrote down everything they could remember from the texts.

There were several differences between students who read for study and those who read for entertainment. On one hand, students with a study goal read more slowly in order to grasp the meaning of the text and more frequently paraphrased or re-read text material. They sought more explanations of material within each text and were more likely to construct a coherent argument that met their study goal. They made more inferences during reading and remembered more information. On the other hand, readers with an entertainment goal read faster and were less concerned with

constructing a coherent argument from the text material. They made more connections between text events and their own personal experiences and made more associations to what they were reading. These results demonstrate that reading to study affects inference generation during reading and subsequent memory for the text.

Individual differences in readers can also affect the impact of reading purpose on processing during reading and comprehension. One such variable is working memory capacity (WMC), which is the ability to mentally hold and process information. WMC is related to an individual's ability to retain information, generate inferences, comprehend material and deduce relevant themes from text. In the third study, Linderholm and van den Broek (2002) investigated the effect reading purpose (i.e., for study or entertainment) had on memory for texts amongst readers with higher and lower WMC. University students read two expository science magazine articles (from van den Broek et al., 2001), for either study or entertainment. To support the purpose of the study, these articles were chosen specifically for their educational and interest value. Students in the study condition read in preparation to write an essay for an exam. Students in the entertainment condition were told to imagine they were browsing through a magazine and discovered articles that caught their attention. Results were similar to those of van den Broek et al. (2001) when participants read for entertainment; both low and high WMC readers made more evaluative comments and broader inferences. Their retention of information was also comparable. However, when reading for study, differences occurred. Low WMC readers paraphrased and made more coherence-building inferences. They re-read more often but did not necessarily employ comprehension monitoring strategies (e.g., summarising or questioning). High WMC readers also paraphrased and made more coherence-building inferences, but they re-read less and placed more emphasis on comprehension monitoring strategies. Further, high WMC readers recalled more information than low WMC readers. When reading for study purposes, it was evident that low WMC readers recognised the need to employ different reading strategies, however, they did not know which strategies to apply to efficiently maximise retention of text

information or how they could employ them to effectively achieve their study purpose.

Taken together, these three studies demonstrate that readers apply different strategies when they read for study or for entertainment which in turn affects their generation of inferences and memory of facts. Thus, there are links among task instructions, the types of mental processing strategies students use during reading, and how well they remember text material (Linderholm & van den Broek 2002; van den Broek et al., 2001). Linderholm (2006) suggests that instructors should emphasize and teach students that different reading strategies are required for different reading purposes because one size does not fit all. For example, if students always employ a reading for entertainment mind-set when reading for exam study, they may be able to answer low level exam questions that require simple answers (e.g., true/false questions and simple matching questions), but they may struggle to answer deeper level questions (e.g., compare and contrast or fully explain and analyse) that require critical thinking because they may develop a superficial understanding of the material.

Further, it is important that teachers effectively communicate the purpose for reading to help students identify relevant and important information because a teacher's perception of important information may not always coincide with students' perceptions of importance (Alexander & Jetton, 1996; Rouet, Favart, Britt, & Perfetti, 1997; Wineburg, 1991a). For instance, Broekkamp, Hout-Wolters, van den Bergh and Rijlaarsdam (2004) investigated whether teachers' perceptions and students' perceptions of task demands were the same when using instructional text to guide and influence reading purposes and goals. Eleventh-grade high school teachers and their students rated the importance of sections of an instructional history text which would be used for a test. The researchers investigated differences among teachers' perceptions, differences among students' perceptions, and differences between teachers' and students' perceptions of task demands. The researchers expected that teachers and students would both distinguish some sections of the text as being more important than other sections. This expectation was accurate; however, there was considerable variation between



teachers and students on the importance ratings for various sections of the text. This led the researchers to infer that some text sections had more instructional value than others but the importance of these sections was not made clear to students. There was also inconsistency between teachers as to what sections were important. This caused unexpected controversy between them. Within classes, some students deviated from the average class rating of importance. These findings suggest that students had difficulties in grasping task demands and teachers had difficulty in presenting these demands. However, many students did not experience difficulty in deciphering text importance and some teachers showed higher correspondence with their students than other teachers. This finding indicates that some teachers were more effective in conveying task demands than others. Overall however, there was more agreement amongst teachers and between teachers and students in the sections that were deemed important than in the sections that were regarded as less important. This finding led Broekkamp et al. (2004) to theorize that, although teachers stress the part of learning content they consider to be important, they offer relatively less information about the learning content that they consider of less importance and this has an impact on students' learning because the purposes and goals for reading are not clear.

Taken together, the aforementioned studies highlight that task instructions that pertain to reading purpose affect how text information is processed and remembered (Linderholm & van den Broek 2002; Navarez et al., 1999; van den Broek et al., 2001). Task instructions provide readers with a goal focus that is designed to highlight material that is relevant to readers' purpose for reading. This is helpful because often teachers' expectations of task are not aligned with students' perceptions of task (Broekkamp et al., 2004; Linderholm, 2006). Teachers can provide task instructions that highlight information they consider to be important to achieving a specific reading purpose. It may be possible to use rationale and evidence instructions to align teacher's expectations with students' task perceptions because they highlight specific information and provide a designated focus for learning. However to date, there is limited research to substantiate this claim.

## *2.2 Task instructions and learning*

Relevance is the property of a text that, at a moment in time and in mind of the reader, makes learning the text content worthwhile (Ramsey & Sperling, 2011). This section highlights how different types of task instructions (general or specific) influence learning because they direct readers' attention to the most critical information necessary to achieve their reading purpose.

Since teachers are responsible for setting a purpose for reading and students can adjust their reading behaviours in response to different reading purposes, it is important for teachers to communicate the purpose for reading to their students so that they can identify what teachers value as important for a given task (Broekkamp et al., 2004; Jetton & Alexander, 1996; Lorch et al., (1993). In this regard, Alexander and Jetton (1997) and Mannes and Kintsch (1987) posed two questions "How can the retention of prose be improved?" and "How can learning from texts be made more efficient". One way to answer both of these questions is by providing detailed pre-reading task instructions that signal the relevance of information.

Readers are sensitive to the instructions given to them prior to reading and they adjust their reading in accord with those instructions (McCrudden, & Schraw 2007; van den Broek, et al., 2001). Task instructions are explicit cues that readers use to establish reading goals (Kaakinen, Hyona, & Keenan, 2002; Lehmann & Schraw, 2002; McCrudden, Schraw, & Hartley 2006; McCrudden, Schraw, & Kambe 2005; McCrudden & Schraw 2007; McCrudden, Magliano, & Schraw 2010). Providing task instructions is a teaching strategy that can be used to focus readers' attention on relevant information that can help them learn more and read more efficiently (Graesser et al., 1994., Kintsch, 1988; McCrudden et al., 2005; Zwaan & Radvansky, 1998).

McCrudden and Schraw (2007) identify two main types of task instructions: general and specific. General task instructions include perspective which are prompts that ask readers to view a text from a designated reference point (e.g., read about the Mt Victoria tunnel from the perspective of a resident of the area) and purpose, prompts that ask readers to read for a general reason (e.g., read to be able to summarize the main

ideas). Specific task instructions include targeted segments, which are prompts that target discrete text segments (e.g., what did the local resident say about the traffic flows through the Mt Victoria tunnel?) and elaborative questions, prompts that promote explanatory inferences (e.g., How would widening the Mt Victoria tunnel affect the local economy?).

Previous research has shown that general task instructions can affect text learning. For instance, Lehman & Schraw (2002) found that highly relevant task instructions facilitated deeper comprehension of text compared to less relevant general task instructions because they provided readers with a designated focus that pertained to their reading goal. Undergraduates were asked to read an historical account of explorations in the Arctic Ocean between Greenland and Alaska. Students in the first experimental group were given a general (less relevant) task instruction (i.e., read a text of an historical account of explorations in the Arctic Ocean between Greenland and Alaska and try to remember as much as possible from the story). Students in the second experimental group were given a specific (highly relevant) task instruction (i.e., read a text of an historical account of explorations in the Arctic Ocean between Greenland and Alaska and focus on explorers who made momentous discoveries and try to remember what their discovery revealed). Readers' who received highly relevant task instructions had higher overall interpretation scores by writing essays that included more causal arguments. Thus, highly relevant task instructions facilitated deeper learning because they provided more relevance to students' reading purpose. Lehman and Schraw (2002) concluded that even simple relevance instructions will direct readers focus and support their goals and purposes for reading. This is because relevance arouses readers' attention to focus on primary ideas and inferences between ideas that might not have otherwise been generated (Di Vesta & Di Cinto 1997; Navarez et al., 1999).

A subsequent study by McCrudden, Schraw, and Hartley (2006) extended Lehman and Schraw (2002) by investigating the effect of general relevance instructions on reading time and learning from expository text. Undergraduates were randomly assigned to either an experimental condition that received pre-reading task instructions or a control condition that was

asked to read for understanding. Those in the experimental condition were asked to compare and contrast leisure activities (e.g., playing piano for fun) with activities used in the development of skill performance (e.g., practicing piano for a concert). The text described expertise development. After reading, students were tested on their ability to recall explicit facts contained in the text and on their ability to integrate background knowledge and text information. They also wrote an essay where they compared leisure activity to deliberate practice and explained how the differences affected the development of expertise. Participants in the experimental condition performed better on the concept test and wrote better quality essays. They also made more integrative claims and showed a deeper understanding of the text than students in the control condition. Reading times were similar between the two groups. This suggests that providing readers with task instructions can improve learning and make reading more efficient.

Explicit task instructions aid learning because they help readers develop reading goals that focus their attention on relevant text rather than irrelevant text segments (McCrudden, Magliano, & Schraw, 2011). For example, McCrudden, Schraw, & Kambe (2005) investigated the effect of specific task instructions on reading time and learning of relevant and non-relevant text. The researchers used pre-reading questions that explicitly targeted specific text segments in addition to a general purpose task instruction. College students were randomly assigned to one of three groups, physiology, space traveler and control, and read an expository text about space travel. All participants received a general purpose instruction asking them to read carefully and to try to remember as much as possible about the text because they would be tested for recall, and on how well they understood what they had read. In addition to the general task instruction, participants in the physiology and space traveler conditions received specific questions about targeted segments and were told to focus on these questions as they read. They found that pre-reading instructions improved memory of information that was targeted by the pre-reading questions. This affirmed previous work (Di Vesta & Di Vinto 1997; Kaakinen et al., 2002) that pre-reading task instructions improve recall of task-relevant information. Reading

times of relevant material was slightly faster than when reading non relevant material. This was in contrast to previous research where reading times increased when readers read relevant material compared to non-relevant material. McCrudden et al. (2005) concluded specific pre-reading questions that signal the relevance of specific information, as opposed to general purpose instructions, allows readers to quickly locate relevant material and store in memory without additional effort because the alignment between pre-reading questions and relevant text segments enhanced goal focusing.

Further, explicit task instructions facilitate learning because they influence readers' text processing and recall. For example, McCrudden, Magliano, & Schraw (2010) used a mixed methods study to investigate how task instructions influence readers' personal intentions, goals, processing and recall. Undergraduates were randomly assigned to one of three groups (Pitcairn, Honduras, or control) before reading a text that described four remote countries. Participants in the control group were told to read for understanding and try to recall as much information as possible. Participants in the other two groups were told to focus on either Pitcairn or Honduras whilst they read because they were going to live and work there and try to recall as much information as possible.

The quantitative findings revealed that readers spent more time reading relevant information than non-relevant information and recalled more of it. This is congruent with previous research (Kaakinen et al., 2002). The qualitative findings revealed differences in readers' processing of non-relevant information. They identified readers who spent either very little time or a lot of time on non-relevant information. Readers who described developing narrowing goals focused almost exclusively on relevant information, whereas readers who described developing broadening goals used non-relevant information to help them evaluate relevant information. This was true of readers in both experiment conditions and illustrates that fact that although task instructions affect reading processes and outcomes, readers use identical task instructions differently.

The aforementioned studies highlight that task instructions help readers focus their attention on relevant text and have a beneficial influence

on reading comprehension and memory. General task instructions aid deeper comprehension of text, influence personal reading intentions, reading goals and text processing, and reading times (Kaakinen et al., 2002, 2003; Lehmann & Schraw 2002; McCrudden, et al., 2006). Specific task instructions, in contrast to general instructions, improve reading times and aid learning because they enhance goal focusing by targeting relevant text segments. Readers are able to locate material, draw inferences and store in memory with less effort (McCrudden et al., 2005; McCrudden et al., 2010).

### *2.3 Previous Research on Rationale*

This section highlights how a rationale for reading is important because it can improve readers focus when engaged in an uninteresting reading task.

The distinction between reading for entertainment and reading for study is important as it has implications for the way teachers deliver reading tasks. This is because students' purpose for reading usually emanates from what teachers value as important (Alexander & Jetton, 1996; Broekkamp et al., 2002). Reading in school is often mandatory and directed towards achieving a specific goal, for example, reading for an exam, to research or for class preparation (Lorch et al., 1993). For that reason, students' interest in reading can decrease because they are expected to read texts that they may not find interesting or choose to read on their own (Alexander & Jetton, 1996; Jetton & Alexander, 1997) and they may struggle to learn from text.

Providing a rationale for reading may invoke interest and focus students' attention if it allows them to understand why putting forth effort is genuinely worthwhile because it has personal meaning and is relevant to their learning task (Jang, 2008). Previous research has highlighted that when students encounter difficult and complex activities that lack personal relevance, coupled with an unsupported class environment, their interest and academic engagement can decrease (Harter, 1981, 1982; Hidi & Harackiewicz, 2000; Midgely, Feldlaufer, & Eccles 1989; Wigfield & Eccles, 2000).

However, when students are provided with a meaningful reason for learning that they adopt as their own they are more likely to be motivated and

engaged in learning (Alexander & Jetton, 1996; Elliot & Dweck, 1988). Harter (1981) investigated differences in intrinsic and extrinsic motivation of 9-to-12 year old elementary school students to determine whether students who were intrinsically motivated had higher perceptions of competence and performed better than those who were extrinsically motivated. Ryan and Deci (2002) define intrinsic motivation as doing an activity for its inherent value (i.e., for fun or a challenge) rather than for some detachable outcome, whereas extrinsic motivation relates to doing an activity for some separable reason (i.e., to pass a test). Harter provided students with a questionnaire that asked them to self-report their motivation (i.e., intrinsic or extrinsic) when completing a variety of classroom activities and, in order to undertake this study, redefined intrinsic motivation as “students’ orientation toward learning and mastery in the classroom, pitting it against an extrinsic stance” (p. 304). For example, one of the dimensions Harter used pitted independent mastery (intrinsic motivation - i.e., does the student prefer to work and/or figure out problems on their own?) against dependence on teacher (extrinsic motivation - i.e., does the student rely on teacher help and guidance when endeavoring to solve problems?).

Harter found students who were intrinsically-oriented were curious, confident in their cognitive ability, enjoyed hard work, preferred to work and problem-solve independently and demonstrated greater competence than students who were extrinsically-oriented. In addition, the intrinsically oriented students had deeper understanding of what factors control their success or failure in life and tended to report the source of this is as internal.

In a subsequent study, using 9-to-12 year old elementary school students and 13-year-old junior high school students, Harter (1982) investigated the perceived cognitive, social, and general self-worth of these students and discovered that their academic motivation declined over time and was particularly noticeable when students made the transition from middle school to high school. Harter attributed this to the idea that school work became less mastery-oriented and more performance-oriented.

The aforementioned findings have two implications for teachers. Firstly they suggest that the learning atmosphere can affect perceived competence,

actual competence, and perceived control. Therefore, to enhance students' learning, teachers in high schools should be aware of the intrinsic factors that are key to motivating and engaging their students (Brophy 1986; Keller 2008; Skinner, & Belmont 1993) especially as they progress to more performance oriented work. Secondly, to improve academic success, teachers should design task instructions whose goal is to provide intrinsic motivation and encouragement to students (Alexander & Jetton 1996; Elliot & Dweck 1988).

In their review of the effect of interest and goals on academic performance, Hidi & Harackiewicz (2000) supported the work of Harter (1981). They state, "Many factors can contribute to students' lack of effort, interest and motivation in school. For example, school work can be too difficult or boring, teachers can be too demanding, and non-academic activities may be preferred" (p.151). They suggest more effort should be applied by teachers to engage students' mastery motivation by making educational resources more challenging, and providing students with more autonomy and choice because this leads to increased motivation and interest. Other strategies, such as providing a rationale to focus students' attention during uninteresting activities, may also help improve academic achievement (Sansone et al., 1992; Sansone, Wiebe, & Morgan, 1999).

Previous research has shown that rationale instructions enhance learning because they improve students' perceptions of interest towards school tasks, especially ones that are perceived as uninteresting (Deci, Eghrari, Patrick, & Leone, 1994; Jang, 2008; Reeve et al., 2002; Sansone, et al., 1992; Sansone, et al., 1999; Wolters, 1998). Rationale instructions provide an explanation as to why putting forth effort during the activity is useful and worthwhile (Jang, 2008).

For instance, Wolters (1998) investigated college students' rationale for studying when performing four common tasks encountered in an introductory psychology course: attending a lecture; reading a textbook chapter; writing a paper; and studying for an exam. He examined what students did when faced with three motivational problems: material that seemed personally irrelevant or unimportant; material or a task that was difficult; material that was boring or uninteresting. In particular, Wolters wanted to know what students did to



motivate themselves to keep working on the task. Students used both intrinsic motivation strategies (e.g., I connect the material to information I already know and how it relates to my life) and extrinsic motivation strategies (e.g., socializing with friends, TV, food) to moderate their effort and perseverance for academic tasks. Students varied their motivational strategies across tasks. For example, when studying for a test, they were more extrinsically motivated than when attending a lecture, reading a textbook or writing a paper. Interestingly, many students saw increasing task difficulty as a problem in their cognitive attention, not as a problem in the amount of effort they put into the task. Students who were more intrinsically motivated tended to focus on learning goals in contrast to performance goals and employed more elaborative strategies, critical thinking and metacognitive strategies to their learning. The use of learning goals, as opposed to performance goals, has been linked positively to course grades (Skinner, & Belmont 1993).

Students who receive a rationale for learning put more effort into tasks (Hidi, 1990, 2001; Harter 1981). For example, Sansone et al. (1992) asked psychology undergraduates to engage in an uninteresting task (i.e., to duplicate letters from a text presented in different fonts, to find and record hidden words in a text, or to copy specific words from the text). They told participants in the experimental group that the task offered health benefits. Though bogus, the health benefits rationale increased on-task effort and interest. This study showed that hearing a rationale helped students transform an otherwise boring task into a potentially more interesting one because it is a strategy that fosters engagement.

Deci et al. (1994) extended this research by investigating how the use of rationale instructions can affect task engagement. The researchers asked psychology undergraduates to perform an uninteresting computer-based concentration task (i.e. watch for dots to appear on a computer screen, and when they appear press the space bar to make them disappear). There were three independent variables: verbal rationale (present or absent); language tone (controlling or non-controlling); and acknowledgement of negative feelings they might experience (present or absent). Participants who received the rationale instructions perceived the task as more important. However,

when the rationale was communicated using controlling language or without an acknowledgment of negative feelings towards the task, engagement was low. In contrast, when non-controlling language and an acknowledgement of negative feelings were communicated in the rationale, engagement was high. Their study concluded that a verbal rationale increased self-determination for performing a task, but it needed to be supported by non-controlling language and an acknowledgement of negative feelings in order to improve engagement. Deci et al. described this as an autonomously-supportive rationale.

Sansone et al. (1999) replicated and extended Sansone et al. (1992), once again using undergraduate participants. In the previous study, the copying activity was short term and limited in time and no option was given to quit the activity during the time period allotted. In this subsequent study, there was no time constraint. Participants were told they should perform the copying task until they felt they had enough experience to evaluate their performance. In addition, unlike the benefit of personal value (rationale) conveyed to the experimental group in the previous study, the benefit rationale given to the experimental group in this study did not have direct personal value. Instead, individuals were told that their evaluation of the activity would help the researchers create better jobs for others. The benefit was conveyed in the form of written task instructions. No benefit was given to the control group. As previously found by Sansone et al. (1992), participants in this study who received the benefit instructions were more likely to persist with the copying task and copied more letters. This suggests that when students perceive a task as being of benefit, irrespective of whether the benefit is personally relevant or not, they demonstrate more interest, perseverance and motivation, than those who do not see any benefit or relevance in performing a task.

A subsequent study by Reeve et al. (2002) replicated and extended Deci et al. (1994). They created a lesson in conversational Chinese and delivered it to undergraduate teachers. The rationale was verbally conveyed and, in addition to the type of language used and the feelings of participants, they added an externally provided reason to try and convey why effort during an activity was worthwhile. They called it an autonomously-supportive

rationale, which is meant to be internalized by the students, which in turn gains attention and maintains interest. The results showed that autonomously-supportive rationale increased perceived importance, self-determination, and effort.

Recently, Jang (2008) used autonomously-supportive written rationale instructions to see whether motivation, engagement and learning of undergraduate students improved during an uninteresting statistics lesson. Participants who received written rationale instructions delivered in an autonomously-supportive manner had a higher quality learning experience. They demonstrated more focus, interest, engagement and conceptual learning than participants who did not receive the rationale instructions. Jang suggests these findings indicate an externally provided rationale presented for an uninteresting lesson increases personal relevance which assists individuals to adopt the rationale as their own self-endorsed reason to try hard. Jang concluded that rationale instructions are optimally beneficial when students see the importance and personal relevance for doing the task and, they have high perceived autonomy while engaging in the task.

Taken together the findings of the aforementioned studies highlight that rationale instructions can improve promote learning and interest if they are presented in an autonomously supportive manner (Deci et al. (1994; Jang 2008; Reeve et al., 2002; Ryan & Deci 2000, 2002). However, most research about rationale has focused on non-reading tasks; thus, more research is needed on whether rationale instructions affect reading outcomes.

#### *2.4 Previous Research on Beliefs*

This section identifies that readers' judgements are often biased by evidence that conforms to their pre-existing beliefs. It discusses how this can affect reader's ability to objectively justify a position on a controversial topic.

"Knowledge is often defined as factual information that has been agreed upon by scholars within a discipline. Beliefs are more personal and experiential in origin and appear to influence what and how knowledge will be used," (Ennis, 1994, p.164). Therefore beliefs are more difficult to measure than factual knowledge because they are derived from individuals' implicit and

explicit views about truth that have developed over time through experience, observation, and instruction (Schon, 1983; van Fleet, 1979). Beliefs influence judgements associated with the evaluation of text evidence and reading strategies (Ennis, 1994). Therefore beliefs can affect the way readers construct and justify arguments (Kardash & Scholes, 1996).

Individuals with strong views often view evidence in a biased manner and are prone to accept confirming evidence at face value, and to reject or ignore evidence that is contrary to their strongly held beliefs (Lord et al., 1979). In such cases, even when the contrary evidence is empirically compelling, it has little effect on changing individuals' beliefs (Anderson et al., 1980). This phenomenon is known as attitude polarization (i.e., the tendency for an attitude to become even stronger after evaluating supporting and opposing evidence related to that attitude). The reason for attitude polarization stems from biased assimilation which occurs when supportive evidence is seen as more persuasive than opposing evidence even when such evidence is equally as credible (Boysen & Vogel, 2008).

For example, Lord et al. (1979) selected undergraduate students who held extreme views on capital punishment (i.e., they either strongly supported capital punishment or were highly opposed to capital punishment). Participants read two credible studies on the deterrent influence of the death penalty and then answered questions about changes in their attitudes towards capital punishment and their beliefs about the deterrent influence. The results highlighted that participants who supported capital punishment maintained their strongly held beliefs and participants who were opposed remained opposed despite reading credible and persuasive evidence in support of capital punishment.

The findings of the Lord et al. (1979) study highlighted that individuals who have strongly entrenched beliefs maintain their point of view irrespective of whether there is powerful and credible non-supportive evidence to refute their claim. The researchers concluded that contradictory evidence is seldom sufficient enough to cause individuals to disregard their prior beliefs or theories and this poses a dilemma for educators and researchers because individuals who have strongly held beliefs do not act rationally when they

encounter information and therefore it is difficult to modify their views when evidence provided in texts is compelling (Anderson et al., 1980; Nickerson 1998).

In a subsequent study of biased assimilation McHoskey (1995) investigated the mystery surrounding John F. Kennedy's (JFK's) assassination over thirty years after his death and the on-going debate between those who assert that he was assassinated by a lone gunman (i.e., Oswald) and those who believe multiple groups conspired to assassinate him. Undergraduates who were born after JFK's death gave their attitude towards the issue and were then identified as either moderate or extreme supporters of either Oswald or conspiracy theories. They read summaries of evidence supporting each theory and evaluated its content. After reading the evidence supporting each argument they reported their attitudes.

The results indicated a strong biased assimilation effect in which individuals on both sides of the debate either held or amplified (polarised) their position. Even when evidence was shrouded with uncertainty or inconsistencies, it did not shift participants from their initial standpoint.

In contrast to biased assimilation, where equally credible evidence which does not support an individual's strongly held view is disregarded, confirmation bias is the tendency of individuals to look for any evidence that is seen to support their existing beliefs (Lord et al., 1979; Nickerson, 1998) regardless of whether the evidence is credible. This has implications for how readers interpret text in order to justify a position because when they engage in texts on controversial topics, it is important for them to understand different viewpoints (Kobayashi 2009). Thus, if students read controversial texts from a biased view, their ability to understand alternative views may be distorted (Anderson et al., 1980). Consequently, when reading for study, students should be frequently reminded that every text is open to dispute and not to indiscriminately accept what is written in the text (Kobayshi, 2010; Fleming & Weber, 1980; Wineburg, 1991b).

Previous research by Anderson et al. (1980) tested confirmation bias and belief perseverance with undergraduates. Participants were provided with case study evidence that led them to believe an empirical relationship existed

between success as a fire-fighter and a fire-fighters' preference for risk taking. Half of the participants in the experimental group read case study evidence demonstrating a positive relationship between risky choices and later success as a fire-fighter, whereas the other half read case study evidence demonstrating a negative relationship between risky choices and later success as a fire-fighter. Students then indicated on an attitudinal scale (highly positive to highly negative) their belief of the strength of the relationship that they thought existed between risk taking and fire-fighter success. Then they were asked to provide a written explanation of the relationship they had uncovered. Some students were then debriefed and told some of the evidence that they had read was fictitious and the researchers did not know the strength or nature of the "true" relationship. Individuals still held onto their original beliefs, despite being told some of the evidence provided was false.

Anderson et al. (1980) hypothesised that individuals who have strong social, political and scientific views persevere with their beliefs despite encountering compelling evidence that thoroughly rebuts those beliefs. The results led Anderson et al. to conclude that individuals are not always logical because they cling to their beliefs to a significantly greater extent than is rationally warranted, and initial beliefs may persevere even when evidence provided as to why a belief is maintained is weak, suspect or inconclusive.

Furthermore Nickerson (1998) reviewed evidence of confirmation bias in psychological literature and highlighted there is a difference between objectively gauging evidence in order to reach an unbiased conclusion and manufacturing evidence in order to justify a conclusion already drawn. In the first instance, individuals gather evidence from all sides in order to create a rational argument. In the second instance, individuals subjectively gather evidence that supports their position and ignore or fail to gather evidence that is contrary to their point of view.

Nickerson (1998) also made the distinction between deliberate evidence gathered to build a substantial case (i.e. in a court of law) and unwitting selectivity of evidence used to justify personal beliefs and attitudes. Nickerson asserts that confirmation bias is the latter (i.e. unwitting moulding of

facts to fit beliefs) and often people unconsciously case-build without intending to treat evidence in a biased manner or even being aware of doing so. Nickerson also asserts individuals will affirm information that supports their established beliefs even when they have no vested interest in a topic. It is a default position that allows them to stay safely within the bounds of their existing knowledge.

In summary, Nickerson (1998) asked two questions, "Can we assess the merits of our own opinions impartially? Is it possible to put a belief that one holds in the balance with an opposing belief that one does not hold and give them fair weighting?" (p. 210). Nickerson doubts it, however he challenges educators by suggesting they can make students aware of how beliefs influence arguments and train them to think of alternative hypotheses early on in the evaluation process and to adopt learning strategies that enhance objectivity.

Taken together the aforementioned studies highlight two main ideas. The first is that pre-existing beliefs can distort students' ability to act rationally when justifying a position. Secondly, confirmation bias can be modified if educators instigate instructional practices that train students to think objectively. Evidence instructions are one strategy that could be used to modify confirmation bias and enhance objectivity.

### 3. The present study

The purpose of the present study was to investigate whether task instructions affect topic beliefs, topic belief justifications, and task interest when students read about a controversial topic (i.e., whether the Mt Victoria tunnel should be widened). There were two types of pre-reading task instructions. The rationale instructions provided an explanation as to why putting forth effort during a reading activity is useful and worthwhile. The evidence instructions directed readers to focus on the evidence supporting each argument in the text. I sought to address three main research questions. The first question was: Do task instructions affect beliefs? The second question was: Do task instructions affect belief justifications? And finally: Do task instructions affect task interest?

I used an embedded sequential mixed methods design to examine both quantitative and qualitative aspects of topic beliefs (Creswell & Plano Clark, 2007). I selected this type of design because it is ideally-suited to provide insights into experimental findings (Creswell & Plano Clark, 2007; Igo, Kiewera, & Bruning, 2008). This two phase design began with the collection and analysis of *quantitative* data, followed by the subsequent collection and analysis of *qualitative* data. In the quantitative phase, I asked students to indicate whether they believed the Mt Victoria Tunnel should be widened and to justify their belief, gave them their respective task instructions before reading, and then measured their beliefs and justifications again after reading. The purpose of the *qualitative* phase is to explain the results from the *quantitative* phase. With this type of mixed methods design, a researcher identifies specific quantitative results that need additional explanation. In the present study, I conducted individual interviews after the experiment to explain why some students' topic beliefs became weaker whereas other students' topic beliefs became stronger.



#### **4. Quantitative phase**

Participants received different task instructions and then read a text that presented arguments in support of and in opposition to the widening of the Mt. Victoria tunnel. All participants received the same general task instruction which provided a purpose for reading; they were asked to read to be able to explain the reasons behind their position on this topic. These instructions were provided to all participants so that there was a specific study purpose for reading; that is, students needed to prepare to justify their positions on the topic. Participants in the control condition only received these general task instructions. Participants in the rationale only condition received additional instructions that indicated that students who read multiple viewpoints would gain a broader and more in-depth understanding of the topic and that they have more well-informed essays. These instructions were designed to identify the reading task's hidden value and to help students understand why doing the activity was worthy of their effort, and useful to them. Jang (2008) identified these criteria as a way for teachers to help students see the value in academic tasks, and demonstrated that such instructions promote student learning and motivation. Participants in the evidence only condition received additional instructions to pay close attention to the evidence and reasons that were used to support both positions on this issue. These instructions were designed to help students identify the evidence and reasons (i.e., premises) used to support a position, which in turn would help students reflect on their topic beliefs and justifications for those beliefs. Previous research has shown that identifying premises and conclusions promotes informal reasoning (Shaw, 1996). Participants in the rationale and evidence condition received both task instructions to investigate whether there was an additive effect of both kinds of instructions.

I used this text for three reasons. First, the text consisted of sentences that fit into two discrete categories; either supporting or opposing the widening the Mt Victoria Tunnel. When two categories of sentences are both relevant to a task, yet only one of the categories is belief-compatible, then it should be possible to determine whether task instructions affect how readers consider both belief-compatible and belief-incompatible information. For example,

suppose all of the students strongly believe that the tunnel should be widened before reading. Further, suppose that students who receive experimental task instructions moderate their beliefs after reading and include information in their belief justification that was compatible with their initial beliefs, yet students in the control condition do not show the same changes, then there is evidence to suggest that the task instructions affect topic beliefs. Second, the students were familiar with the topic. At the time of the study, there was a debate in the city council about whether the tunnel should be widened, which was covered by local media outlets, including the nightly news and the local newspapers. The text included some of the main arguments from the public discourse on the topic. Thus, the text reflected authentic public discourse about a topic that was familiar to the participants. Third, the topic was considered to be of low to moderate (as opposed to high) interest to the students. I wanted to investigate the effect that task instructions had on interest for a generally low-interest topic because many reading tasks that students encounter in school are usually compulsory and not interesting in nature (Alexander & Jetton 1996). Post reading, I wanted to investigate whether different task instructions would affect task interest, as separate from interest in the topic.

I framed my inquiry in terms of two competing hypotheses. According to the *null hypothesis*, task instructions will not affect topic beliefs. According to this view, students will seek or interpret information in ways that support their pre-existing beliefs, irrespective of the task instructions. This view is consistent with previous research which has shown that people display confirmation bias when evaluating belief-consistent and belief-inconsistent information (Anderson et al., 1980; Lord et al., 1979; Nickerson, 1998). This view would be supported if there are no differences among the conditions on topic belief and belief justification scores.

Conversely, according to the *alternative hypothesis*, task instructions will affect topic beliefs. According to this view, task instructions will affect how students seek or interpret belief-inconsistent information. Students will be more likely to consider belief-inconsistent information, which will influence their topic beliefs. This view is consistent with previous research which has

shown that reflection on one's view and others' views can help students develop a more sophisticated understanding of a topic (Moshman & Geil, 1998). If students have strong beliefs about a topic, but have not seriously considered belief-inconsistent information, they may benefit from task instructions that prompt them to do so. This view would be supported if participants in the experimental conditions differ from the control condition on their topic belief and belief justification scores.

## **5. Method**

### *5.1 Design and Participants*

Participants were randomly assigned to one cell of a 2 x 2 factorial design. The first factor was rationale instructions (yes or no), and the second factor was evidence instructions (yes or no). Testing took place in groups of about 20 students, mixed with respect to conditions, during students' regular classes.

The initial sample included 86 year-10 (ages 14-15) male secondary students enrolled in an English course at a suburban, all-male, public secondary school located on the lower part of the North Island in New Zealand. On the basis of the responses on initial topic belief scale, I identified 45 proponents (i.e., those who supported the widening of the tunnel), and 5 opponents (i.e., those who opposed the widening of the tunnel). Given the low number of opponents, I only analyzed data from the proponents. Thus, the final sample for the quantitative phase included 45 participants, all of whom were proponents of widening the tunnel.

### *5.2 Materials*

#### *5.2.1. Topic beliefs scale and justification*

The topic beliefs scale began with the following prompt: "There has been a great deal of debate about whether the Mt Victoria Tunnel should be widened. Please circle the number below to indicate your agreement with the following statement: The Mt. Victoria Tunnel should be widened." Participants stated their initial position using a 9-point Likert-type scale (1 = very strongly disagree to 9 = very strongly agree). Then they were given the following

instruction, “Please *explain and justify* the reasons behind your response. Please explain your position clearly and *use as much detail* as possible in your explanation. This is your opinion so there is no right or wrong answers.” Participants completed the topic beliefs scale and justification activity twice; once before receiving task instructions and reading, and second, after reading.

### 5.2.2. *Task instructions*

There were three different task instructions: General, Rationale and Evidence. Participants in the experimental conditions and in the control condition received the following general task instruction: “You will read a text that provides multiple viewpoints about whether the Mt. Victoria tunnel should be widened. After reading, you will be asked to indicate whether you believe the Mt. Victoria Tunnel should be widened, and you will be asked to explain the reasons behind your position on this topic.” Participants in the control condition received only these instructions.

Participants in the rationale only condition received additional instructions (see Appendix A) that indicated that students who read about multiple viewpoints gain a broader and more in-depth understanding of a topic and this helps them write better essays which can improve their grades and lead to better qualifications. Participants in the evidence only condition received additional instructions (see Appendix B) that explained evidence and gave examples of evidence and told them what information to focus on to explain and justify their position on the topic. Participants in the rationale and evidence condition received general, rationale and evidence instructions (see Appendix C).

### 5.2.3. *Text*

The text was 1,392 words and titled “Should the Mt. Victoria Tunnel be widened?” (see Appendix D). The text contained 10 arguments, five supporting the widening of the tunnel and five opposing the widening of the tunnel. The arguments were selected from local media outlets. The text was interleaved, such that an argument supporting the widening of the tunnel was followed by an argument opposing the widening of the tunnel. Wiley (2005)

found that use of an interleaved text helped readers compare and contrast opposing views on controversial topics.

#### *5.2.4. Interest questionnaire*

The interest questionnaire was a 5-item scale adapted from the questionnaire used in McCrudden et al. (2005) which measured students' interest in performing a reading task (see Appendix E) using a 5-point (1 = strongly disagree to 5 = strongly agree) Likert-type scale. This scale was designed to evaluate students' interest in the reading activity.

### *5.3. Procedure*

Parental and participant consent was obtained before the experiment. The experiment was conducted in students' regular classrooms with participants working independently. The procedure consisted of seven steps. First, participants were randomly assigned to conditions and were provided an overview of the procedures. Second, participants completed the topic beliefs scale and justification. Third, participants read their task instructions and initialled them to indicate that they had read them. Fourth, participants read the text. Fifth, participants completed the topic beliefs scale and justification again. Students had access to the text at this point in the study. Sixth, participants completed the interest questionnaire. Seventh, all materials were collected and students were dismissed.

### *5.4 Scoring*

#### *5.4.1. Topic belief justifications*

The position papers were scored by the amount of evidence participants wrote to justify their positions. For scoring purposes, segments in each position paper were evaluated to determine whether they matched a segment that includes evidence from a particular source in the texts. Ideas were scored by tallying the number of idea units that were included in either verbatim or paraphrase form. For example, "Motorways can actually make congestion worse," (verbatim idea) or "Wider roads like motorways will encourage more people to drive cars and crowd the road with cars" (paraphrase idea). When an idea was incorrect or too vague to be considered

evidence (e.g., roads cause congestion), no score was assigned. To establish consistency of scores, one rater scored ideas on the belief justifications and a second rater, blind to the experimental condition, scored 10 randomly selected of belief justifications. Disagreements were discussed. The first rater then re-scored all of the justifications. The first and second rater then discussed any unclear responses until consensus was reached on the appropriate score.

#### *5.4.2. Interest questionnaire*

The responses to the 5-item interest questionnaire items were combined to create a holistic interest score. The possible range was 5 to 25. This score was then averaged, with 1 indicating lower interest and 5 indicating higher interest. Inter-item reliability was  $\alpha = .86$ .

## 6. Results: Quantitative phase

### 6.1. *Topic beliefs*

Our first research question was: Do task instructions affect topic beliefs? To address this question, I conducted a 2 (time: before reading or after reading) x 2 (rationale instructions: yes or no) x 2 (evidence instructions: yes or no) mixed model ANOVA on topic belief scores. Time was a within-subject factor; rationale and evidence instructions were between-subjects factors. The main effect of time was significant,  $F(1, 41) = 7.30, p < .05, \eta^2 = .151$ . Topic beliefs were lower after reading ( $M = 6.36$ ) than before reading ( $M = 7.02$ ). However, this main effect was qualified by a time x rationale instructions x evidence instructions interaction,  $F(1, 41) = 5.01, p < .05, \eta^2 = .109$ . To follow-up the interaction, I ran dependent-sample t-tests to examine within-group differences. Participants in the evidence only condition reported significantly lower topic belief scores after reading than before reading,  $t(13) = 3.41, p < .01$  (see Table 1). Thus, task instructions affected topic beliefs. No other differences were significant. However, as can be seen in Table 1, there was a general trend for participants in the experimental conditions to report numerically lower topic belief scores, whereas participants who received control instructions reported numerically higher topic belief scores.

### 6.2. *Topic belief justifications*

Our second research question was: Do task instructions affect topic belief justifications? To address this question, I investigated the number of “supporting” and “opposing” ideas students provided in their topic belief justifications before and after reading. I conducted two 2 (time: before reading or after reading) x 2 (rationale instructions: yes or no) x 2 (evidence instructions: yes or no) mixed model ANOVA's. Time was a within-subject factor; rationale and evidence instructions were between-subjects factors. The first analysis used “supporting” ideas as the dependent variable. No main effects or interactions were significant. Thus, task instructions did not affect the use of “supporting” information in the topic belief justifications. The second analysis used “opposing” ideas as the dependent variable. The main effect for time was significant,  $F(1, 41) = 19.36, p < .01, \eta^2 = .321$ .

Participants included more “opposing” ideas in the post-reading justification ( $M = 1.53$ ) than in the pre-reading justification ( $M = 0.40$ ). This main effect was qualified by a time x rationale instructions x evidence instructions interaction,  $F(1, 41) = 7.80$ ,  $p < .01$ ,  $\eta^2 = .160$ . To follow-up the interaction, I ran dependent-sample t-tests to examine within-group differences. Participants in the rationale only and the evidence only conditions included more “opposing” ideas in their post-reading justifications than in their pre-reading justifications (see Table 1). Thus, task instructions affected the use of “opposing” information in the topic belief justifications. That is, participants in the rationale only and the evidence only conditions included more information that opposed their initial views on the post-reading justification.

### 6.3. *Task interest*

Our third research question was: Do task instructions affect task interest? To address this question, I compared participants’ task interest scores (see Table 1). I conducted a (rationale instructions: yes or no) x 2 (evidence instructions: yes or no) ANOVA on task interest scores. The main effects and interaction effect were not significant ( $p$ 's  $> .10$ ). Thus, task instructions did not affect students’ self-reported task interest.



Table 1. Dependent measure means and standard deviations for each condition.

Task instruction condition	Rationale	Evidence	Rationale & Evidence	Control
<i>n</i>	14	13	10	8
Dependent measures	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
<i>Topic beliefs</i>				
Pre-reading	7.3 (0.8)	7.2 (0.7)	6.8 (0.6)	6.8 (0.7)
Post-reading	6.5 (1.8)	5.6 (1.5)	6.2 (2.3)	7.1 (1.0)
<i>Supporting ideas</i>				
Pre-reading	2.9 (1.6)	3.2 (1.1)	2.1 (1.1)	2.8 (1.6)
Post-reading	3.1 (2.0)	1.5 (1.7)	2.2 (1.5)	3.0 (1.8)
<i>Opposing ideas</i>				
Pre-reading	0.3 (0.6)	0.0 (0.0)	0.3 (0.7)	1.0 (1.1)
Post-reading	2.3 (2.3)	1.7 (1.6)	1.0 (1.7)	1.1 (0.8)
<i>Task interest</i>	3.5 (0.7)	3.5 (0.8)	3.1 (0.8)	3.7 (0.7)

*Notes:* Topic beliefs are the average scores on the belief scale. Supporting ideas are the average number of ideas included in the belief justification that indicated support for widening of the tunnel. Opposing ideas are the average number of ideas included in the belief justification that indicated opposition towards the widening of the tunnel. Task interest is the average score on the interest questionnaire.

## **7. Analysis of belief justification data and formation of qualitative groups**

I used extreme-case sampling which is a form of purposive sampling, employed in mixed methods research for comparing different cases along a designated dimension to provide information about a topic of interest (Teddlie & Yu, 2007). This type of comparison helps determine an aspect of interest, identify a distribution of cases or individuals along that dimension, and then locate the extreme cases. Our primary dimension of interest was belief change. After reading, some participants' topic beliefs became weaker, whereas others became stronger. Therefore, I identified participants whose beliefs became either weaker or stronger to evaluate how they engaged with the text and why they included various pieces of supporting and opposing information in their post-reading justification scores.

As a reminder, all of the participants included in the quantitative phase supported widening the tunnel. I identified two distinct groups based on topic belief scores. The first group consisted of students whose post-reading beliefs were lower than their pre-reading beliefs. The second group consisted of students whose post-reading beliefs were higher than their pre-reading beliefs.

## **8. Qualitative phase**

Qualitative research is often used by researchers to follow-up or explain initial experimental findings (Creswell & Plano Clark, 2007; Igo et al. 2009). With respect to the present study, I used the qualitative data to further explore how readers responded to the task instructions (Igo et al., 2009; McCrudden et al., 2010; Takshori & Teddlie 1998). As is characteristic with this method, I first analyzed the qualitative data set prior to mixing the quantitative and qualitative data sets, which were mixed later to investigate the trends observed during the quantitative phase. The purpose of the qualitative phase was to explain why some students' topic beliefs became weaker after reading, whereas other students' topic beliefs became stronger after reading. I collected and analyzed interview data from a subset of students in each qualitative group to meet this purpose.

## **9. Method**

### *9.1. Participants*

Of the students who participated in the experiment, 32 met the sampling criteria described previously; 22 had lower topic belief scores after reading, whereas 10 had higher topic belief scores after reading. I interviewed and analyzed the data of five participants who had lower scores and three participants who had higher scores.

### *9.2. Materials*

#### *9.2.1. Interview protocol*

I used previous research on task instructions (McCrudden et al., 2010) to develop the interview protocol (see Appendix F). The interview protocol was designed to elicit readers' descriptions of their approach to the reading task and why they included/excluded information that was and was not consistent with their beliefs.

#### *9.2.2. Procedure*

I undertook individual interviews within seven days after the quantitative experiment, using the interview protocol, so that participants' recollections were as recent as possible, in order to capture as accurately as possible their reflections of the experience. The primary researcher conducted individual interviews which were audiotaped and lasted approximately 10-15 minutes.

I used participant member checks to triangulate the data. After the interview data were analyzed, the primary researcher gave the students a description of what they had reported using the student's own words. He then invited the participants to clarify or add any information to the summary. The students were asked to confirm whether the summary was complete and correct or if they would like to make further changes or additions. This process was included to ensure that the interviewer had understood the students' perspectives, to ensure the interviewer's description of the participants' comments were credible, and to increase the trustworthiness of the interpretations.

### 9.3. *Interview data analysis and results*

Verbatim transcriptions of the audio-taped interviews were scored using a four-stage process with the transcriptions. The first stage was broad holistic scoring. The researcher listened to all of the recorded interviews and read the interview transcriptions to get an ‘overall view’ of the data (Igo, Bruning, & Riccomini, 2009; Shank, 2006) Then the researcher extracted descriptive phrases that pertained to why participants included and excluded belief-consistent and belief-inconsistent information in their belief justifications. For example, C5 said “I decided on supporting the widening because I thought that would be what I most like. I regularly use the tunnel for car transport and sometimes walking.” The second stage involved identifying common descriptive responses from all of the extracted phrases. For example, C5 said, “We get stuck in traffic and it’s hard to get home” and C14 said “The tunnel gets congested.” The third stage involved classifying descriptive responses into broader thematic categories of non-repetitive themes. For example, C15’s statement “I concentrated on the ‘for’ arguments because it was more convincing,” and C14’s statement “The supporting text seemed more reasonable to me,” were classified as ‘weighing’. Other thematic categories included ‘reading task-relevant information’, ‘critical evaluation’, and ‘rebutting’. The fourth stage involved generating two broad response categories from the thematic categories in order to generate an overarching picture of participants’ criteria for including and excluding information in their position papers. The two broad response categories were belief-reflection and belief-protection. Table 2 provides a summary of readers’ strategies for engaging in belief-reflection and belief-protection, and exemplar quotes.

The interview data showed that readers engaged similarities and differences in how readers interacted with the text. Readers within both the belief-reflection and belief-protection groups described 1) reading the belief-consistent and belief-inconsistent information, 2) critically-evaluating belief-inconsistent information, and 3) weighing belief-consistent and belief-inconsistent arguments. However, readers differed in how they reacted to belief-inconsistent information.

Readers in the belief-reflection group ( $n = 3$  from the rationale condition,  $n = 2$  from the evidence condition) updated their topic beliefs by incorporating belief-inconsistent arguments into their beliefs. For example, E15 said “The evidence instructions asked me to focus hard on all the evidence and I just found that the ‘opposing’ evidence was more convincing it had a bit more fact and was more understandable than the ‘supporting’ text.” Other students provided similar descriptions. E8 said, “I looked closely at the evidence to decide which point of view had more valid points and the ‘opposing’ evidence did.” These statements and others like them indicated that belief-reflection readers used the instructions to evaluate supporting and opposing information, and in doing so, found the opposing arguments to be persuasive.

Conversely, readers in the belief-protection group, all from the control group ( $n = 3$ ) rebutted belief consistent arguments and maintained their beliefs by reaffirming their prior knowledge and personal experiences. For example, C14 said, “The general instructions told me to explain whether I think the tunnel should be widened and I thought the ‘opposing’ ideas seemed senseless, like how it would contribute to global warming because cars cause gas; but cars that get stuck longer in traffic cause more gas. I learnt this in Social Studies.” C5 said, “I was for the tunnel. We get stuck in traffic all the time. It is my personal experience.” These statements and others like them, indicate that belief-protection readers tended to rebut or challenge belief-incompatible information.

Table 2  
Summary of Each Qualitative Group

Qualitative group	Belief-reflection	Belief-protection
<i>Goals:</i>	Actively question belief	Actively defend belief
<i>Strategies for accomplishing goals:</i>	1) Read task-relevant information (i.e., belief-consistent and belief-inconsistent information) 2) Critically-evaluate belief-inconsistent information 3) Weigh belief-consistent and belief-inconsistent arguments 4) Updating (i.e., incorporate belief-inconsistent arguments into topic belief)	1) Read task-relevant information (i.e., belief-consistent and belief-inconsistent information) 2) Critically-evaluate belief-inconsistent information 3) Weigh belief-consistent and belief-inconsistent arguments 4) Rebut belief-inconsistent arguments
<i>Exemplar quotes:</i>	<p>“I focused hard on the evidence. I found that the opposing evidence was like more convincing, it had a bit more fact and was more understandable than the supporting text.”</p> <p>“I looked closely at the evidence to decide which point of view had more valid points and the ‘opposing’ evidence did.”</p>	<p>“I thought the ‘opposing’ ideas seemed senseless, like how it would contribute to global warming because cars cause gas; but cars that get stuck longer in traffic cause more gas.”</p> <p>“I didn’t really like the opposing arguments they didn’t seem as strong as the supporting arguments and I was for the tunnel because I use it, so I stuck with that view.”</p>

## **10. Mixing of qualitative and quantitative data**

The initial quantitative analysis revealed that task instructions affected topic beliefs and topic belief justifications. I was interested in further explaining why some students had weaker beliefs after reading, whereas other students had stronger beliefs after reading. Follow-up qualitative interviews revealed two general approaches to reading: belief-reflection and belief-protection. I combined the results of the quantitative (i.e., topic beliefs and topic belief justifications) and qualitative (i.e., interviews) analyses to provide a more comprehensive description of the effect of task instructions on topic beliefs and topic belief justifications. Table 3 reveals several key findings.

Students' reported approaches to reading were reflected in their use of supporting and opposing information. Students whose topic beliefs were weaker after reading a) included fewer supporting ideas in the post-reading belief justifications than in their pre-reading justifications, and b) included more opposing information in their post-reading belief justifications than in their pre-reading justifications. (Of the 22 students, whose topic beliefs were weaker after reading, 10 were from the evidence condition, 8 were from the rationale condition, 3 were from the rationale and evidence condition, and 1 was from the control condition). Conversely, students whose topic beliefs were stronger after reading include more supporting ideas in the post-reading belief justifications than in their pre-reading justifications. The interview data could be used to explain these differences: students whose topic beliefs became weaker indicated described updating their beliefs, whereas students whose topic beliefs became stronger described protecting their beliefs. (Of the 10 students, whose topic beliefs were stronger after reading, 2 were from the evidence condition, 2 were from the rationale condition, 2 were from the rationale and evidence condition, and 4 were from the control condition).

Readers in the belief-reflection group appeared to focus deliberately on belief-inconsistent information, which in turn led them to consider an alternative perspective and affected their topic beliefs. For example, E15 said, "The instructions told what you really needed to focus on, to focus hard on the evidence when reading so I focused hard on the evidence. I found that



the opposing evidence was like more convincing, it had a bit more fact and was more understandable than the supporting text.” Thus, students in the belief-reflection goal group indicated that the task instructions helped them focus their attention while they read which may have influenced belief change. This suggests that these students may have been unfamiliar with belief-inconsistent arguments and were more inclined to modify their beliefs after considering these arguments.

Readers in the belief-protection group appeared to read belief-inconsistent information, but focused primarily on familiar and personally-relevant information. For example, C14 said, “The general instructions just told me what to do, to read it and decide what your view is and explain the reasons why. I was for the tunnel because my sister does gymnastics at the Wellington Rugby Club and we get stuck in traffic all the time. It was my personal experience and what I agree with. I decided to support the tunnel because it was like personal experience and just what I agree with.”

Table 3. Qualitative Groups and Dependent Measure Means and Standard Deviations

Qualitative group	Belief-reflection	Belief-protection
<i>N</i>	22	10
Dependent measures	<i>M (SD)</i>	<i>M (SD)</i>
<i>Topic beliefs</i>		
Pre-reading	7.0 (0.8)	6.7 (0.5)
Post-reading	4.9 (1.4)	7.9 (0.6)
<i>Supporting ideas</i>		
Pre-reading	2.9 (1.3)	2.4 (1.8)
Post-reading	1.4 (1.5)	3.4 (1.4)
<i>Opposing ideas</i>		
Pre-reading	0.3 (0.6)	0.5 (1.1)
Post-reading	2.7 (1.9)	0.8 (0.9)
<i>Task interest</i>	3.5 (0.7)	3.6 (0.6)

*Notes:* Topic beliefs are the average scores on the belief scale. Supporting ideas are the average number of ideas included in the belief justification that indicated support for widening of the tunnel. Opposing ideas are the average number of ideas included in the belief justification that indicated opposition towards the widening of the tunnel. Task interest is the average score on the interest questionnaire.

## 11. Discussion

Although there is considerable evidence that task instructions affect reading processes and memory, little is known about the effect of task instructions on topic beliefs. Our focus on the impact of rational and evidence task instructions provided a basis for extending previous research on task instructions. The mixed method design allowed us to examine in detail how rational and evidence task instructions affected topic beliefs when students read a text about a controversial topic.

The purpose of the present study was to investigate whether task instructions affect topic beliefs, topic belief justifications, and task interest when students read about a controversial topic. Before reading, participants completed a topic beliefs scale and justified their beliefs. Then they were randomly assigned to one of four pre-reading task instruction conditions before reading a text that presented arguments that supported and opposed the widening of the tunnel. The first condition received rationale instructions. The second condition received evidence instructions. The third condition received both evidence and rationale instructions. The fourth condition the control condition was asked to read for a general purpose. After reading, participants again completed the topic beliefs scale and topic belief justification. I posed three main research questions.

Our first research question was: Do task instructions affect topic beliefs? Participants in the evidence only condition reported significantly lower topic belief scores after reading. Thus, task instructions affected topic beliefs. Although no other conditions differed significantly on their pre-reading and post-reading topic beliefs, there was a general trend for participants in the experimental conditions to report numerically lower topic belief scores, whereas participants who received control instructions reported numerically higher topic belief scores.

Our second research question was: Do task instructions affect topic belief justifications? Participants in the evidence only and rationale only conditions included more opposing ideas in their post-reading topic belief justifications. Thus, task instructions affected topic belief justifications.

Our third research question was: Do task instructions affect task interest? There were no differences in task interest across conditions, which suggest that task instructions did not affect task interest. Further, it is possible to rule out task interest as an explanation for changes in topic beliefs and topic belief justifications. In sum, the quantitative results showed that task instructions affected topic beliefs and topic belief justifications, and supported the alternative hypothesis which stated that task instructions will affect how students seek or interpret belief-inconsistent information.

Inspection of the topic belief scores indicated that some students' post-reading topic beliefs were lower than their pre-reading beliefs, whereas other students' post-reading beliefs were higher than their pre-reading beliefs. I interviewed students who met these criteria to explain why these differences occurred. The qualitative data indicated that students' approaches fell into one of two groups: belief-reflection or belief-protection. There were similarities and differences in how students in both of these groups approached the text. They were similar in that they both described reading belief-consistent and belief-inconsistent information, critically-evaluating belief-inconsistent information, and weighing belief-consistent and belief-inconsistent arguments. However, readers differed in how they reacted to belief-inconsistent information. Readers in the belief-reflection group updated their beliefs by incorporating belief-inconsistent arguments into their beliefs. Conversely, readers in the belief-protection group rebutted belief consistent arguments and maintained their beliefs by reaffirming their prior knowledge and personal experiences.

When I mixed the quantitative and qualitative data, a more complete picture emerged. Students' reported approaches to reading were reflected in their use of supporting and opposing information before and after reading. Students whose topic beliefs were weaker after reading, a) included fewer supporting ideas in the post-reading belief justifications than in their pre-reading justifications, and b), included more opposing information in their post-reading belief justifications than in their pre-reading justifications. Conversely, students whose topic beliefs were stronger after reading included

more supporting ideas in the post-reading belief justifications than in their pre-reading justifications. The interview data could be used to explain these differences: students whose topic beliefs became weaker described updating their beliefs, whereas students whose topic beliefs became stronger described protecting their beliefs. Thus, the quantitative and qualitative data were complementary and provided a more comprehensive description of the belief change than either data set alone.

One explanation for the results is that task instructions that encourage readers to focus specifically on evidence or why they should consider both sides of controversy may help students develop a better understanding of the topic than less specific task instructions. This explanation is consistent with previous research which has shown that in the absence of specific task instructions, readers tend to focus on familiar or personally-relevant information (McCrudden, Magliano, & Schraw, 2011) and readers tend to rely on prior knowledge and personal relevance to justify their arguments (Gil et al., 2009; Stromso, Braten & Britt, 2010). As a result, general task instructions may reinforce readers' beliefs, whereas specific task instructions, such as the ones used in the present study, may encourage readers to focus on less familiar information and update their beliefs about the topic. Thus, task instructions may alter belief justifications because they direct readers' attention to evidence contained within the text and this mitigates readers' reliance on prior knowledge and personal relevance.

The present study adds to the literature on task instructions in two ways. First, these data demonstrate that task instructions can affect topic beliefs. Although previous research has shown that prior beliefs affect how people process belief-consistent and belief-inconsistent information, much of this research has shown that peoples' beliefs tend to become more polarized after reading about two opposing views. For instance, in Lord et al. (1979), people who either supported or opposed capital punishment developed stronger beliefs after reading balanced evidence on the deterrent and non-deterrent effect of capital punishment. That is, when people who supported capital punishment read about its non-deterrent effect, they indicated that they

felt more strongly about capital punishment. The term to describe this outcome is attitude polarization. Although I found evidence of attitude polarization in the present study, I also found the opposite; attitude or belief de-polarization.

Second, I found evidence that beliefs are related to belief justifications. Participants in the evidence only condition showed a concomitant change in beliefs and use of information in the post-reading justifications that were initially belief-inconsistent. Similarly, participants in the control condition showed neither a change in their topic beliefs nor in their use of belief-inconsistent information. A confirmation bias occurs when people tend to only seek out belief-consistent information (Nickerson, 1998). These data indicate that task instructions can reduce the impact of confirmation bias.

There were six limitations of the study. First, there was a lower sample size ( $n = 45$ ) for a  $2 \times 2$  factorial design, which makes conclusions drawn from this study tentative. Future researchers should seek to replicate the findings using a larger sample size. Second, there was not a comparable number of participants who opposed the widening of the tunnel. Therefore, it is not possible to determine whether task instructions would have the same effect on topic beliefs and topic belief justifications for students who held different views on the topic. For instance, it is possible that people who oppose the widening of the tunnel are more informed about the topic and less willing to update their beliefs on the basis of task instructions. Future research should attempt to include comparable numbers of participants on two sides of a controversial topic and should include a measure of prior knowledge to evaluate the effects of topic stance (i.e., support or oppose) and prior knowledge on topic beliefs. Third, all of the participants were male. It is not possible to draw conclusions about the effect to task instructions on females, although I have no obvious reason to believe that gender played a role in our findings. Nonetheless, future research should incorporate both male and female participants. Fourth, the findings may be limited to topic and text materials used in the present study. Thus, future researchers should seek to replicate the design using different materials. Fifth, anecdotal evidence from

participants in the evidence and rationale condition, which received both of the experimental task instructions, indicated that the instructions were lengthy, which may have minimized the combined effect of the instructions. Thus, it may be necessary to consider the word length of task instructions in future studies, especially for younger readers. Lastly, I wanted to investigate whether different task instructions would affect task interest, as separate from topic interest. Therefore, I did not use a pre-experiment measure to topic interest. It is possible topic interest, as separate from task interest, may have influenced students attitudes towards the task. This may have had a bearing on their reaction to the task instructions. Future researchers should measure topic interest and task interest individually.

The main educational implication of the present study is that teachers should assign students a reading purpose before reading to help them adjust their approach to reading. Further, teachers should provide explicit task instructions, and check students' perceptions of those instructions, to ensure greater correspondence between teacher and student expected outcomes for assigned reading tasks (Broekkamp et al., 2002).

## APPENDICES

### Appendix A

#### *Rationale instructions*

- You will read a text that provides multiple viewpoints about whether the Mt. Victoria tunnel should be widened. Reading multiple viewpoints about a controversial topic is useful because it helps you see a topic from different angles.
- Students who have read about the multiple viewpoints featured in this text have reported that it helped them gain a broader and more in-depth understanding of the topic. This helped them develop their positions on controversial topics and helped them explain the reasons behind their positions. Essentially, they created much stronger arguments to support their positions.
- Reading about this topic may not be much fun for some of you. Nonetheless, today's lesson will help you carefully read and evaluate a number of different perspectives which should help you write a more well-informed essay and improve your grades in the future. This may help you obtain better qualifications. This is the reason why you are being asked to concentrate, persevere, and try hard in this lesson.

After reading, you will be asked to indicate whether you believe the Mt. Victoria Tunnel should be widened, and you will be asked to explain the reasons behind your position on this topic.

- ❖ Write "yes" on this line to indicate that you understand the instructions:

\_\_\_\_\_

## Appendix B

### *Evidence instructions*

- You will read a text that provides multiple viewpoints about whether the Mt. Victoria tunnel should be widened. Please pay *close* attention to the evidence and reasons that are used to support each both positions on this issue. Evidence and reasons are types of information that is used to support and justify a position. To illustrate, consider a different situation.
- Suppose a person needs to decide whether noise levels at Wellington Airport should be reduced. A local resident says, “I think noise levels should be reduced because the noise has caused me hearing loss.” In this situation, the person’s position is that noise levels should be reduced, and the evidence/reasoning he provides is that the noise levels have caused his hearing loss. As you read, be sure to focus on the evidence/reasons used to support each position.

After reading, you will be asked to indicate whether you believe the Mt. Victoria Tunnel should be widened, and you will be asked to explain the reasons behind your position on this topic.

- ❖ Write “yes” on this line to indicate that you understand the instructions:

\_\_\_\_\_



## Appendix C

### *Control instructions*

- You will read a text that provides multiple viewpoints about whether the Mt. Victoria tunnel should be widened. After reading, you will be asked to indicate whether you believe the Mt. Victoria Tunnel should be widened, and you will be asked to explain the reasons behind your position on this topic.
- ❖ Write “yes” on this line to indicate that you understand the instructions:  
\_\_\_\_\_

### *Rationale instructions*

- You will read a text that provides multiple viewpoints about whether the Mt. Victoria tunnel should be widened. Reading multiple viewpoints about a controversial topic is useful because it helps you see a topic from different angles.
- Students who have read about the multiple viewpoints featured in this text have reported that it helped them gain a broader and more in-depth understanding of the topic. This helped them develop their positions on controversial topics and helped them explain the reasons behind their positions. Essentially, they created much stronger arguments to support their positions.
- Reading about this topic may not be much fun for some of you. Nonetheless, today’s lesson will help you carefully read and evaluate a number of different perspectives which should help you write a more well-informed essay and improve your grades in the future. This may help you obtain better qualifications. This is the reason why you are being asked to concentrate, persevere, and try hard in this lesson.

After reading, you will be asked to indicate whether you believe the Mt. Victoria Tunnel should be widened, and you will be asked to explain the reasons behind your position on this topic.

- ❖ Write “yes” on this line to indicate that you understand the instructions:  
\_\_\_\_\_

### *Evidence instructions*

- You will read a text that provides multiple viewpoints about whether the Mt. Victoria tunnel should be widened. Please pay *close* attention to the evidence and reasons that are used to support each both positions on this issue. Evidence and reasons are types of information that is used to support and justify a position. To illustrate, consider a different situation.
- Suppose a person needs to decide whether noise levels at Wellington Airport should be reduced. A local resident says, “I think noise levels should be reduced because the noise has caused me hearing loss.” In this situation, the person’s position is that noise levels should be reduced, and the

evidence/reasoning he provides is that the noise levels have caused his hearing loss. As you read, be sure to focus on the evidence/reasons used to support each position.

After reading, you will be asked to indicate whether you believe the Mt. Victoria Tunnel should be widened, and you will be asked to explain the reasons behind your position on this topic.

❖ Write “yes” on this line to indicate that you understand the instructions:

\_\_\_\_\_

## Appendix D

### Topic: Should the Mt. Victoria Tunnel be widened?

The Mt. Victoria tunnel is a vital link in the Wellington region's transport network. The tunnel currently is a traffic bottleneck in the morning peak from around 7.30 to 9.00am on the Hataitai side with traffic sometimes backing up over 1 km and in the afternoon peak between 5 and 6pm on the city side with queuing back around 0.5 km. Recently, there has been a great deal of debate about whether the Mt. Victoria tunnel should be widened. There are people with opinions on both sides of the issue. Some people support the widening the tunnel, whereas others oppose widening the tunnel. This text presents some of those opinions.

Those who support widening the tunnel argue that traffic congestion in the tunnel will get worse because of Wellington's growing population. On a daily basis, about 40,000 vehicles (20,000 in each direction) use the tunnel. The number of vehicles that use the tunnel is expected to increase by at least 5% (2000 cars each way). During peak traffic times, such as "rush hour" in the mornings and evenings Monday to Friday or on Saturdays when there is a sporting event on, the tunnel is already operating at full capacity. At peak traffic times such as these, the tunnel and nearby roads get congested with bumper-to-bumper traffic that moves well below the speed limit. An expected increase in traffic will lead to even longer traffic delays unless a new tunnel is built.

Those who oppose widening the tunnel argue that building motorways in urban areas does not solve congestion problems. Motorways can actually make congestion worse because they can displace inner suburbs where people can still walk, cycle, and use public transport. Thus, more people have to live outside of the city. Similarly, many people do not like living next to a busy motorway. Because of this, more people move away from areas in the city near the motorway. As a result, more people live outside of the city, which actually increases traffic congestion.

Those who support widening the tunnel argue that traffic congestion caused by the tunnel leads to an increase in costs and a decrease in profits for businesses. There are many businesses in the eastern suburbs that supply goods and services to customers throughout the city. When business vehicles are stuck in traffic congestion, the vehicles are wasting fuel. As a result, fuel costs for the business rise. For example, one large business that manufactures and delivers asphalt around Wellington has indicated that it is losing profits because traffic congestion causes an increase in fuel costs. It cannot afford to have its delivery trucks stuck in traffic. If the tunnel is not widened, it is faced with either making staff redundant or increasing the cost of its product so that it does not lose revenue from fuel costs. Other businesses have indicated they are also thinking about relocating if something isn't done soon about congestion.

Those who oppose widening the tunnel argue that building highways contributes to climate change. The gas emissions from cars include vast amounts of carbon monoxide, one of the four deadly greenhouse gases. New motorways encourage people to drive cars as their primary means for transportation. If more people are driving cars, carbon monoxide emissions increase, which in turn contributes to global warming. Global warming leads to climate change, which can have devastating results for New Zealand. For example, global warming melts the ice

caps, which can raise the sea level, posing a threat to coastal cities. Further, global warming can lead to more extreme weather, including stronger winds and more rain, which can cause erosion. Erosion makes land unstable and reduces the amount of land available for growing crops and raising farm animals. In a country like New Zealand, whose economy is primarily based on agriculture, this could lead to fewer exports and could weaken the economy, which would lower overall standards of living. Habitat loss can lead to reduction or even extinction of species that are needed to support eco-systems.

Those who support widening the tunnel argue that traffic congestion caused by the tunnel leads to an increase in the cost of goods and services to customers. When businesses deliver goods and services to customers, they use part of profits to pay for fuel costs. However, if fuel costs increase, businesses have to increase the prices of their goods or services, or they risk going out of business. As a result, customers end up paying more for goods and services. For example, one company that purchases auto parts from a distributor that uses the tunnel has had to pay almost 10% higher prices. When they asked the company why the prices increased, the company replied that they had to keep up with rising fuel costs.

Those who oppose widening the tunnel argue that land in the Green Belt, which is now being used for recreation, will be taken away to relieve congestion. This recreational land will never be replaced. This means there will be less parkland available within the city for people to enjoy. They will be forced to drive out of the city to find places for recreation, causing traffic congestion somewhere else. In addition to this Badminton Hall, also located on the Green Belt, would be demolished to make way for the expanded highway that will accompany the tunnel. It is the only specialised facility of its kind in the city. It will be a huge loss to the many people who play badminton, most of whom play to stay fit, maintain health and meet friends. There are no plans for its replacement.

Those who support widening the tunnel argue that by widening the tunnel, people will avoid unpleasant consequences of being late. For example, senior high school students say that their travel time to and from school has increased by up to an hour each day compared to when they began high school. They are now late to school more often which annoys teachers and gets them into trouble. Workers in the eastern suburbs who have been held up in traffic report they have been warned by their bosses for lateness and told their wages will be docked if the lateness continues.

Those who oppose widening the tunnel argue that people who live on Wellington Rd will need to move. Several of the residents affected say that whilst they will be compensated for having to relocate, they would prefer to stay where they are. However, they have been given no choice and must move if the tunnel widening project is approved. Uprooting these families from their community and friends causes them anxiety and stress. The parents will lose their support networks and this could result in them having to pay for childcare. Their children will lose their friends when they change schools and moving to a new school could diminish their performance at their new school.

Those who support widening the tunnel argue that widening the tunnel will make transport through and around the tunnel safer. The existing road is not safe. A senior student has witnessed several accidents this year, whereas he had seen none

in his previous years at high school. Similarly, a taxi driver confirmed this, and said that she had seen several accidents this year, two of which required an ambulance. She said the traffic problems have increased the number of accidents on this stretch of road, making it unsafe because people get frustrated sitting in traffic and make poor decisions. She worries that it won't be long before a motorist is killed.

Those who oppose widening the tunnel argue that widening the tunnel includes the destruction of historic homes and buildings, some of which were built in the late 1800's. Mt Victoria is one of the oldest settlements in Wellington. It is rich in history and the destruction of these houses means that we lose a vital part of the city's heritage that can never be replaced. Motorways have already destroyed large parts of the city's pioneering history and if this continues there will be nothing left for future generations to see. Preserving the past helps us to understand who we are and where we came from.

Either way, it seems that the topic of whether the Mt. Victoria tunnel should be widened will continue to be a controversial issue.

## Appendix E

### *Interest Questionnaire*

In this part I want you to rate how you responded to the activity overall. Please indicate how strongly you agree or disagree with each statement using the 5-point scale shown below. Please circle the appropriate number beside each item.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
1	2	3	4	5	
					SD D N A SA
1. The task instructions made the activity interesting.					1 2 3 4 5
2. I got caught-up in the activity without trying to.					1 2 3 4 5
3. I would like to do more of this type of activity in the future.					1 2 3 4 5
4. The activity was one of the most interesting school-related activities I've done in a long time.					1 2 3 4 5
5. The activity really grabbed my attention.					1 2 3 4 5

## Appendix F

### *Interview protocol*

1. Describe how you decided what information from the texts to focus on while you read.
2. (Student is given a copy of the respective reading instructions.) Were these instructions useful for doing the task? (Wait for answer). Please explain.
3. Would you please describe your interpretation of these instructions?
4. Describe the extent to which the reading instructions affected how you did the activity.
5. (Student is given a copy of his position paper and the texts. Researcher points to evidence included in student's response.). Why did you include this information in your paper? What criteria did you use for deciding what to include in your paper?
6. (Researcher provides examples of evidence that are absent from student's response and the texts). Why didn't you include this information in your paper? What criteria did you use for deciding what not to include in your paper?
7. (Student is given a copy of the texts.) Were there any texts that you remember reading, and would you describe what you were thinking while you were reading those texts?

## Appendix G

### Parental/Caregiver Information Sheet and Consent Form



**Project Title:** What's in it for me? Do rationale and evidence instructions influence students' reasoning and interest when reading multiple texts?

Ethics Application #: 19460

My name is Phil Sparks and I am a teacher at Rongotai College completing my Master's in Education at the School of Educational Psychology and Pedagogy at Victoria University of Wellington in New Zealand. The purpose of this study is to examine how instructions influence reading comprehension. The topic I have chosen is "Should the Mt Victoria tunnel be widened?" We hope that this investigation will help us to design better reading instructions and to improve reading comprehension and interest when reading.

**Participation:** If you choose to allow your child to participate in this study, he will complete a short questionnaire on his beliefs about a controversial topic (e.g., whether the Mt Victoria tunnel should be widened). Then he will read seven short texts about the Mt Victoria tunnel. The information in the texts will be part of their regular classroom content. After reading they will write a short justification (approx. 150 words) about whether the Mt Victoria tunnel should be widened) and complete an interest questionnaire. The questionnaire asks students to circle responses that show their interest in the reading task. Some students will be invited to participate in an interview based on their written justifications. If your child chooses to participate in the interview, he will be asked to describe the strategies he used while he read and to explain why he decided to include the information that he provided in his written justification. The study will take approximately 1 hour to complete. The researcher will hand out and explain information sheets and consent forms prior to commencing the research.

Participation in this study is strictly voluntary. If you choose not to agree to allow your child to participate your decision will not affect your or your child's present or future relationship with Victoria University of Wellington or your child's school. If you decide to allow your child to participate, you have the right to withdraw your consent at any time and discontinue your child's participation. Your decision to discontinue your child's participation will not affect your or your child's present or future relationship with Victoria University of Wellington or your child's school.

**Confidentiality:** Any information that can be identified with you child will remain confidential. The results of this project will be presented in written and oral reports, but your child's name will not be used in any written or oral reports. We will not provide any personal information that could be used to identify your child in any reports.

**Data Storage and Deletion:** Once the study is finished the data collected in the study will be entered into a computer belonging to the investigators for this project. These data will not be identifiable in any way. The data will be stored in a locked office in the Faculty of Education building for 3 years after the completion of the study and will then be destroyed.

**Reporting/Dissemination:** The results of this study will be submitted for publication in research journals and may be presented at a conference. A copy of the final report will be given to the school Principal and made available in the Library, to read. A summary of the findings can be obtained by inserting your email or home mail address on the attached consent form.



**Ethics:** This research has been assessed and approved by Victoria University Faculty of Education Ethics Committee. If at any time you have any questions or concerns about your child's treatment as a research participant in this study, contact Dr Allison Kirkman, who is current Chair of the university ethics committee (telephone: +64 4 463 5676).

If you have any questions about the study now or at any time in the future, please feel free to contact me or my supervisor using the following contact information: Phil Sparks or Dr Matt McCrudden, Senior Lecturer, School of Educational Psychology and Pedagogy, Faculty of Education, Victoria University of Wellington, PO Box 17-310, Karori, Wellington, NZ, +64 4 463 5179, [phillip.sparks@vuw.ac.nz](mailto:phillip.sparks@vuw.ac.nz) or [matt.mccrudden@vuw.ac.nz](mailto:matt.mccrudden@vuw.ac.nz)

Sincerely,

Phil Sparks

### Consent form (parent/caregiver)

Project Title: What's in it for me? Do clear and specific rationale and evidence instructions, influence students' reasoning and interest when reading multiple texts?  
Ethics Application #: 19389

I agree that my child may take part in the above research. I have had the project explained to me and I have had a chance to ask questions. I understand that agreeing to this means that I will be willing to do the following: **(please tick box)**

- I agree to allow my child to take part in this research project and to allow his answers to be collected and analyzed.
- I understand that my child does not have to take part in the research and that he may withdraw from this project without having to give a reason.
- I understand that any information my child provides will be kept confidential to the researcher and that he will not be identified in the research or any reports on the project or to any party.
- I understand that any information from this project will be destroyed after three years.
- I understand that my child will be asked to complete a questionnaire on his beliefs about a controversial topic before reading.
- I understand that my child will be asked to write a short justification (approx. 150 words) in which he will be asked to justify his stance on the controversial topic.
- I understand that my child will be asked to complete a questionnaire on his interest in the reading activity.
- I understand that my child may be asked to participate in an interview to describe the strategies he used while he read and to explain why he decided to include the information that he provided in his written justification.
- I would like a copy of the findings of this study. My email OR mailing address is:

Child's name: \_\_\_\_\_

Caregiver's name: \_\_\_\_\_

Date: \_\_\_\_\_

Caregiver's signature: \_\_\_\_\_

## Appendix H

### Participant Information Sheet and Consent Form



**Project Title:** What's in it for me? Do rationale and evidence instructions influence students' reasoning and interest when reading multiple texts?  
**Ethics Application #:** 19460

My name is Phil Sparks and I am a teacher at Rongotai College completing my Master's in Education at the School of Educational Psychology and Pedagogy at Victoria University of Wellington in New Zealand. The purpose of this study is to examine how instructions influence reading comprehension. The topic I have chosen is "Should the Mt Victoria tunnel be widened?" We hope that this investigation will help us to design better reading instructions and to improve reading comprehension and interest when reading.

**Participation:** If you choose to participate in this study, you will complete a short questionnaire on his beliefs about a controversial topic (e.g., whether the Mt Victoria tunnel should be widened). Then you will read seven short texts about the Mt Victoria tunnel. After reading you will write a short justification (approx. 150 words) about whether the Mt Victoria tunnel should be widened) and complete an interest questionnaire. Some participants will be invited to participate in an interview based on their essay responses. If you choose to participate in the interview, you will be asked to describe the strategies you used while you read and to explain why you decided to include the information that you provided in your written justification. The study will take approximately 1 hour to complete. The researcher will hand out and explain information sheets and consent forms prior to commencing the research.

Participation in this study is strictly voluntary. If you choose not to agree to participate your decision will not affect your present or future relationship with Victoria University of Wellington or your school. If you decide to participate, you have the right to withdraw your consent at any time and discontinue your participation. Your decision to discontinue participation will not affect your present or future relationship with Victoria University of Wellington or your school.

**Confidentiality:** Any information that can be identified with you will remain confidential. The results of this project will be presented in written and oral reports, but we will not use your name in any written or oral reports. We will not provide any personal information that would enable anyone to identify you in any reports.

**Data Storage and Deletion:** Once the study is finished the data collected in the study will be entered into a computer belonging to the investigators for this project. These data will not be identifiable in any way. The data will be stored in a locked office in the Faculty of Education building for 3 years after the completion of the study and will then be destroyed.

**Reporting/Dissemination:** The results of this study will be submitted for publication in a Master's thesis, research journals and may be presented at a conference. A copy of the final report will be given to the school Principal and made available in the Library, to read. A summary of the findings can be obtained by inserting your email or home mail address on the attached consent form.

**Ethics:** This research has been assessed and approved by Victoria University Faculty of

Education Ethics Committee. If at any time you have any questions or concerns about your treatment as a research participant in this study, contact Dr Allison Kirkman, who is current Chair of the university ethics committee (telephone: +64 4 463 5676).

If you have any questions about the study now or at any time in the future, please feel free to contact me or my supervisor using the following contact information: Phil Sparks or Dr Matt McCrudden, Senior Lecturer, School of Educational Psychology and Pedagogy, Faculty of Education, Victoria University of Wellington, PO Box 17-310, Karori, Wellington, NZ, +64 4 463 5179, [phillip.sparks@vuw.ac.nz](mailto:phillip.sparks@vuw.ac.nz) or [matt.mccrudden@vuw.ac.nz](mailto:matt.mccrudden@vuw.ac.nz)

Sincerely,

Phil Sparks

### Participant consent form

Project Title: What's in it for me? Do rationale and evidence instructions, influence students' reasoning and interest when reading multiple texts?  
Ethics Application #:

I agree to take part in the above research. I have had the project explained to me and I have had a chance to ask questions. I understand that agreeing to this means that I will be willing to do the following: **(please tick box)**

- I agree to take part in this research project and to allow my answers to be collected and analyzed.
- I understand that I don't have to take part in the research and that I may withdraw from this project without having to give a reason.
- I understand that any information I provide will be kept confidential to the researcher and that I will not be identified in the research or any reports on the project.
- I understand that any information from this project will be destroyed after three years.
- I understand that I will be asked to complete a questionnaire on my beliefs about a controversial topic before reading.
- I understand that I will be asked to write a short justification (approx. 150 words) in which I will be asked to justify my stance on a controversial topic.
- I understand that I will be asked to complete a questionnaire on my interest in the reading activity.
- I understand that I may be asked to participate in an interview to describe the strategies I used while I read and to explain why I decided to include the information that I provided in my written justification.
- I would like a copy of the findings of this study. My email OR mailing address is:

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

## Appendix I

### Principal Information Sheet and Consent Form



**Project Title:** What's in it for me? Do rationale and evidence instructions influence students' reasoning and interest when reading multiple texts?

**Ethics Application #:** 19460

My name is Phil Sparks and I am a Master's in Education student in the School of Educational Psychology and Pedagogy at Victoria University of Wellington in New Zealand. The purpose of this study is to examine how instructions influence reading comprehension. We hope that this investigation will help us to design better reading instructions and to improve reading comprehension and interest when reading.

**Participation:** If you choose to allow this study to be conducted in your school, students will complete a short questionnaire on their beliefs about a controversial topic (e.g., whether the Mt Victoria tunnel should be widened). Then they will read seven short texts about the Mt Victoria tunnel. The information in the texts will be part of their regular classroom content. After reading they will write a short justification (approx. 150 words) about whether the Mt Victoria tunnel should be widened) and complete an interest questionnaire. The questionnaire asks students to circle responses that most closely correspond to why they were interested in doing the reading task. Some students will be invited to participate in an interview based on their writing justifications. If they agree to participate in the interview, they will be asked to describe the strategies they used while they read and to explain why they decided to include the information provided in their written justifications. The study will take approximately 1 hour to complete. The researcher will hand out and explain information sheets and consent forms prior to commencing the research. Staff will not be required to help with the study lesson. However, they may be required to release students from class, for a short, 10-minute interview during regular class time. Twenty students in total will be interviewed. The interviews will take place in the Deans interview room opposite the school's administration office.

Please note that you are not required to allow this study to be conducted in your school. Your decision about whether you want this study to be conducted in your school will not affect your present or future relationship with Victoria University of Wellington or with your school. If you decide to allow this study at your school, you have the right to withdraw your consent at any time and discontinue your school's participation in this study. Your decision to discontinue your school's participation will not affect your present or future relationship with Victoria University of Wellington or with your school.

Throughout the project, all attempts will be made to minimise the disruptive impact on your students' learning. However, as this study is part of a regular lesson, should any parent choose not to allow their child to participate in this investigation they will do the same work as the other students but their work will not be included in the study.

**Data Storage and Deletion:** Once the study is finished the information collected in the study will be entered into a computer belonging to the investigators for this project. These data will not be identifiable in any way. The data will be stored in a locked office in the Faculty of Education building for 3 years after the completion of the study and will then be destroyed.

**Reporting/Dissemination:** The results of this study will be submitted for publication in a Master's thesis, research journals, and may be presented at a conference. If you are interested in receiving a copy of the final report from this study then please contact Phil Sparks.

**Ethics:** This research has been assessed and approved by Victoria University Faculty of Education Ethics Committee. If at any time you have any questions or concerns about your treatment, or that of your staff or students, in regards to this study, contact Dr Allison Kirkman, who is current Chair of the university ethics committee (telephone: +64 4 463 5676).

If you any questions about the study or require further information please feel free to contact me using the following contact information: Phil Sparks, School of Educational Psychology and Pedagogy, Faculty of Education, Victoria University of Wellington, PO Box 17-310, Karori, Wellington, NZ, +64 4 463 5233 ext. 8127, phil.sparks@vuw.ac.nz or my supervisor Dr Matt McCrudden, Associate Professor, School of Educational Psychology and Pedagogy, Faculty of Education, Victoria University of Wellington, PO Box 17-310, Karori, Wellington, NZ, +64 4 463 5179, matt.mccrudden@vuw.ac.nz

Sincerely,

Phil Sparks

## Principal Consent Form

Project Title: What's in it for me? Do rationale and evidence instructions influence students' reasoning and interest when reading multiple texts?

Ethics Application #:

I agree to allow the above research to be conducted in my school. I have had the project explained to me and I have had a chance to ask questions. I understand that agreeing to this means that I will be willing to do the following: **(please tick box)**

- I agree to allow staff at my school to take part in this research project.
- I understand that I do not have to agree to allow this research to be conducted in my school and that I may withdraw the school from this project without having to give a reason.
- I understand that any information obtained from this study will be kept confidential to the researcher and that neither I nor the school, or any staff or students, will be identified in the research or any reports on the project or to any party.
- I understand that any information from this project will be destroyed after three years.
- I understand that students will be asked to complete a questionnaire on their beliefs about a controversial topic before reading.
- I understand that students will be asked to write a short justification (approx. 150 words) in which they will be asked to justify their stance on the controversial topic.
- I understand that students will be asked to complete a questionnaire on their interest about a controversial topic after reading.
- I understand that *some* students will be asked to participate in an interview to describe the strategies they used while they read and to explain why they decided to include in their written justifications.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_



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