Reading multiple texts about climate change: The relationship between memory for sources and text comprehension

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Abstract

In many situations, readers are asked to learn from multiple documents. Many studies have found that evaluating the trustworthiness and usefulness of document sources is an important skill in such learning situations. There has been, however, no direct evidence that attending to source information helps readers learn from and interpret a document’s content. In this study we examined whether students’ awareness of sources predicts their comprehension of documents, controlling for prior knowledge, interest and perceived comprehensibility of the texts. Participants read multiple texts that provided different perspectives on the causes and solutions of climate change. Deep comprehension was measured using both within-text and across-text inference verification tests. Source awareness was measured using a test of memory for sources. We found that memory for sources predicted both types of deep comprehension. These results, in combination with source training studies, suggest that improving students’ sourcing skills may benefit their learning of text content.

Keywords: Text comprehension; Sourcing skill; Multiple texts

1. Introduction

Should we pay attention to source information while reading a text? For most practical purposes it is our understanding of the content of a text that matters, not our awareness of the text’s source. Yet, text comprehension is often affected by other factors such as the reading situation or the reading task. Source awareness may be another such factor. Source information may trigger memories for related information by the same author, it may provide a larger argumentative context for a text, and it may signal that special vocabulary or word interpretations may be used. At a basic level, source information might provide simple elaboration for the information in the text that increases the memorability of the information (e.g., this text was written by a NASA scientist). At a more complex level, source information may bring a large amount of external information to the interpretation of the text (e.g., this speech was given by U.S. Vice-President Al Gore after deciding not to run for office).

Source awareness may be especially relevant to text comprehension for certain types of learning. A common way to learn about a topic, both in and outside of school, is to read several different texts about it. Throughout the last century, textbooks have retained a predominant role in both elementary (Johnsen, 1993; Paxton, 1999) and higher education (Mateos, Martín, Cuevas, & Villalón, 2004). Still, students often read supplementary materials (sometimes within the textbook itself) that expose them to different information sources about the same topic. The increasing use of the Internet during the last decades has also boosted students’ exposure to multiple information sources. Learning to manage multiple information sources is essential for good decision-making about both subject-related matters and other important matters in everyday life (Britt & Gabrys, 2001; Leu et al., 2007). In
particular, students must learn how to select reliable sources, both for accuracy and to reduce the information overload now characteristic of modern societies.

Sourcing skills can, in some cases, be of vital importance. For example, Jungermann, Püster, and Fischer (1996) described how a group of people living close to a major chemical plant had to decide which information sources to trust about risks in case of an accident. Whether they chose to trust information from the chemical plant, environmentalists, journalists, or the government, and acted according to it, could be of critical importance to their health and economic well-being. In such a situation it seems obvious that people will attend to source information, for example, to agents responsible for different kinds of information and their motives for offering the information. The case described by Jungermann et al. (1996) thus illustrates that there might be very good reasons for paying attention to source information when selecting which sources to trust. However, it may be that by attending to source information students may also understand the content of texts better. In the present research, therefore, the relationship between students’ source awareness and their comprehension of multiple texts was examined.

1.1. Source monitoring and memory for sources

In the present study, students’ memory for sources as a measure of their awareness of source information was used. However, there are many factors that affect how likely it is that someone will remember the source of a text. Perhaps the most systematic evaluation of the degree to which people attend to source information in a very general sense comes from the source monitoring literature. Researchers in this area have attempted to empirically analyze the features that enable people to identify the origin of a memory. Johnson, Hashtroudi, and Lindsay (1993) have identified three theoretically distinct types of source monitoring: reality-monitoring, internal source monitoring, and external source monitoring.

The present study regarded only the extent to which readers engage in this third type of source monitoring while reading; that is, to what extent do readers discriminate the origin of two or more texts? The growing set of findings on source monitoring suggests that people encode contextual features that enable them to accurately determine the origin of all types of source information. The factors shown to provide effective cues for a memory’s origin have mostly been perceptual and spatial. For example, research has shown that participants can distinguish actions they watched others perform from those that either they performed (Foley & Johnson, 1985) or they imagined performing (Foley, & Johnson, 1985; Foley et al., 1983; Hashtroudi et al., 1989; Johnson et al., 1995). Finally, even readers of literary short stories have source memory for narrators and characters (Græsser, Bowers, Olde, & Pomeroy, 1999).

According to the Source Monitoring Framework (SMF; see Mitchell & Johnson, 2000), source attribution judgments are based on both effortless heuristic processes and more deliberate, systematic processes. Any factors that influence the encoding of a stimulus (e.g., divided attention or high content overlap) will affect the probability that the content and source information will be initially stored. If one’s representation of either the content or the source is not adequately represented, one will be unable to connect the content to the appropriate source during reading. Thus, a requisite step to making these source attribution judgments is to properly encode both the content and the source. Given that the source and content have been stored, accurate source monitoring judgments also involves a decision-making process. This judgment will be influenced by factors such as source discriminability, importance of being accurate, time to make the decision, and attention available during the judgment task.

Although the SMF was primarily designed in the context of memory distortion research (Johnson, Hashtroudi, & Lindsay, 1993) and emphasizes perceptual distinctions among sources, we would expect similar processes to function in a reader’s source awareness for a text. Memory for the author of a pulp novel, for instance, may be purely incidental, based on characteristics such as the cover art and size of the authors name—the significance of such perceptual features does not escape the attention of book publishers and authors. At the other end of the spectrum is the deliberate, goal-driven gathering of source information that characterizes the expert historian. Furthermore, the coordination of information from multiple sources, what Britt, Perfetti, Sandak, and Rouet (1999; Perfetti, Rouet, & Britt, 1999) have referred to as a “Documents’ Model”, may be viewed as utilizing similar memory processes as those used to distinguish different characters in a narrative. For example, readers who attend to the motives of authors during encoding will likely have a more elaborated representation of the source. This type of elaboration should increase the likelihood that the source will be available later either during encoding of the content or at retrieval. Alternatively source-to-content connections can also be initiated from content. For example, when a reader encounters a controversial statement, the reader could look to the source as an explanation of the content. This encoding or reactivation of the source information will increase the probability that a source-to-content connection will be encoded.

Beyond the general features studied by source monitoring researchers, there are additional features that are specific to the situation of learning from multiple documents that may affect text comprehension. There are several features of sources that may affect whether the reader links source information to content, such as the nature of the topic and the texts, the
relation between the sources (e.g., conflicting, overlapping), the number of sources, and whether the topic is individually important (Britt et al., 1999; Kim & Millis, 2006). Similarly, there are reader characteristics, most notably domain expertise (Rouet, Favart, Britt, & Perfetti, 1997; Wineburg, 1991), that one would expect to affect awareness of source information and therefore memory for the text. However, our understanding of the possible relationship between source awareness and text comprehension is still restricted.

### 1.2. Source awareness of domain experts and novices

To our knowledge, few studies have directly looked at the relationship between source awareness and text comprehension. Results from studies comparing the reading behavior of experts and novices, however, indicate that experts use source details as important information in their interpretation of texts (Wineburg, 1991). Sourcing was originally identified by Wineburg (1991) as a heuristic employed by expert historians when they looked up and evaluated the source of a document, using this source information in their interpretation of the documents' content. As one historian in that study explained “Knowledge of the source helps you understand, helps you predict what you might find...how reliable it might be, or unreliable” (Wineburg, 1991, p. 79). In this case Wineburg refers to sourcing as providing an “anticipatory framework” that supports the reader in interpreting the text. Experts’ use of source information was also apparent in a study by Rouet et al. (1997). In that study, history graduates more frequently than psychology graduates used source characteristics as criteria when evaluating the usefulness of historical documents. Sourcing skills have also been observed in studies of experts in other domains, such as physics (Bazerman, 1985) and law (Lundeberg, 1987). Taken together, the results from these studies seem to support the notion that discipline experts pay attention to source information and actively use such information when interpreting and comprehending documents related to their domain (Rouet, 2006).

At the same time, several studies have found traces of sourcing among novices, at least among students in high school and higher education (Stahl, Hynd, Britton, McNish, & Bosquet, 1996; Wineburg, 1991). This is not surprising as sourcing is an important skill in tasks such as selecting which text to read, judging which text to trust, and keeping track of “who said what”. Although high-school students do not appear to use source information in the same active way as do experts, there are indications that some students at this level are, at least partly, aware of source information while reading multiple texts in the domain of history (Britt & Aglinskas, 2002; Stahl et al., 1996; Wineburg, 1991). Still, such information appears infrequently in these students’ references to the texts and does not seem to be central in ongoing processes of text comprehension. Thus, while sourcing does not ordinarily seem to play an important role in high-school students’ comprehension of history texts, those who are exposed to multiple texts during history instruction pay more attention to source information than students who read only single texts (Nokes, Dole, & Hacker, 2007).

In higher education, students show more awareness of source information (Britt & Aglinskas, 2002). For example, Rouet, Britt, Mason, and Perfetti (1996) found that undergraduates evaluated the trustworthiness of documents about the history of the Panama canal according to various criteria. A textbook excerpt was mostly evaluated by its content, primary documents were mostly evaluated by document type, and accounts written by characters directly involved in the events were frequently judged by characteristics of the author. The findings indicated that source information affected the students’ evaluation of document trustworthiness, and that they were aware of typical source characteristics such as type of text and author. In that study, another indication of the students’ awareness of source features was their use of references in essays that they wrote after reading the documents. Although they ranked the textbook excerpt as most trustworthy, no references were made to this text in the essays, whereas primary documents were referred to quite frequently. This indicates that the participants took advantage of source information while choosing sources to support their claims in the essays.

More recently, indications of undergraduates’ awareness of source information were found in a study by Bråten and Strømsø (submitted for publication). This study asked students to read and then evaluate the trustworthiness of seven different texts about the same topic. Generally, the students emphasized content as the most important criterion when judging the trustworthiness of the texts. However, different texts were evaluated by different source features, with the most salient difference being that students put relatively less emphasis on author and publisher and relatively more emphasis on document type when they evaluated a textbook excerpt than when they evaluated other texts. Thus, students at the undergraduate level are, to a certain extent, aware of source information.

### 1.3. Source awareness and text comprehension

Our own work has recently suggested that students’ source awareness may facilitate their comprehension of multiple texts. In a study by Bråten, Strømsø, and Britt (2009), students read multiple texts, rated the trustworthiness of the texts, and stated the importance of different rating criteria. Both trustworthiness ratings of the most reliable texts and the use of document type as a rating criterion independently predicted comprehension. One should note that source awareness here refers to students’ judgment of different sources’ trustworthiness and the criteria (e.g., author, document type) they emphasize in this process, while source awareness in the present study refers to students’ memory for sources.

The influence of source awareness on text comprehension, however, is not necessarily beneficial. Kim and Millis (2006) had undergraduates read 26 pairs of human-interest stories, with each story consisting of only two sentences. The sentence pairs were either related or unrelated and they were presented...
as news reports from one or two news agencies. The results indicated that readers did not seem to register from which specific source different information originated, only whether the two stories came from the same source or from two different sources. This distinction had a negative effect on the integration of information. Sentences attributed to different sources were integrated more poorly than sentences attributed to the same source. Thus, sourcing appears to have prompted segregation of information rather than integration. This result might be due to the large number of texts, the rather meaningless topics, and the very short length of each story.

The participants in Kim and Millis (2006) study appear to have paid only minimal attention to source information. They may have formed what is referred to as “separate representation models” that lack details of the specific source (see Britt et al., 1999). In this type of model, it is assumed that the reader fails to integrate information from multiple documents but instead constructs distinct representations. Britt et al. (1999) suggest that readers might construct this kind of representation when the content of multiple texts does not highly overlap conceptually. Readers pay more attention to source information when the sources “provide conflicting accounts of partially overlapping events” (p. 223). To try to confirm this assumption, Britt et al. (1999) had students read two texts presenting both conflicting and partially overlapping information about the history of the Panama canal. When assessing students’ memory for sources, they found that students were, to some extent, able to link sources and content. Specifically, students’ essays better represented information from a trustworthy than from a discredited source, indicating that participants had tagged at least some of the content for its source. Thus, it is important to recognize that source awareness can function as a way to differentiate information as well as to integrate it. This effect may be beneficial when it brings together potentially disparate sources of information, but it can also be detrimental when it serves to separate information that would otherwise be closely integrated.

The “Documents’ Model” suggested by Britt et al. (Britt et al., 1999; Perfetti et al., 1999) describes how sources may function to both separate and integrate information in a multiple-document learning context. According to this model, a skilled reader will construct a mental representation of texts that includes the content, divided into information units, the relationships among the texts, and relevant source information. Information units can have both within-text and between-text connections with other information units and may be associated, or “tagged”, with source information. In this way, the reader constructs not only a representation of the central information in the texts, but also a representation of where the different information units come from and how they are inter-related. Consistent with this view, a reader paying less attention to source information might find it harder to judge how information units are related and which information units to emphasize in the construction of a coherent representation of the content.

In particular, when reading contradicting texts, the reader might find it hard to comprehend the content without paying attention to source attributes such as the authority of the authors, rhetorical goals, or type of document. One reason for this is that with contradicting texts on a complex topic, readers who are struggling to construct a coherent representation may benefit from ruling out less trustworthy or useful information to reach that goal. It is conceivable, then, that it is first and foremost when the reader is inclined to construct two or more alternative models of the content of the texts, and therefore has to judge which information to give priority to in the comprehension process, that source information becomes beneficial. Specifically, in such instances readers of multiple texts probably benefit most from constructing mental representations of both the content of the texts and the relationships between texts and their attributes (Perfetti et al., 1999). However, this assumption about a positive relationship between students’ source awareness and text comprehension still lacks a solid empirical foundation.

1.4. The present study

It was argued above that students’ awareness of source information could predict their comprehension of multiple texts dealing with complex topics. In the present study this argument was tested by examining whether students’ source awareness, operationalized as memory for sources, would predict their deep-level comprehension of multiple and partly conflicting texts on the complex topic of climate change. By doing this, prior research was extended in several ways.

First, the relationship between memory for sources and multiple-text comprehension has only been indirectly examined in prior research (Britt et al., 1999; Kim & Millis, 2006). The aim of the present study was to scrutinize this relationship with students’ deep-level comprehension both within and across texts.

Second, as results from previous research indicate that prior knowledge is related to both students’ sourcing skills (Britt & Aglinskas, 2002; Rouet et al., 1997; Wineburg, 1991) and their multiple-text comprehension (Britt & Aglinskas, 2002; Bråten & Strømsø, 2006; Bråten et al., 2009; Strømsø, Bråten, & Samuelstuen, 2008), the potential contribution of prior knowledge was investigated.

Third, the possible relationship between topic interest and multiple-text comprehension in this study was also investigated. It has been documented that well-developed personal interest in an area facilitates single-text comprehension (Hidi, 2001). There is also some indication that personal interest affects the quality of text-based learning by leading to more elaborate and deeper text processing (Kropp, 1999; Schiefele, 1998, 1999), qualities often needed when a reader tries to integrate information across different sources.

Fourth, the possible effect of participants’ perceived comprehensibility of the texts, as this variable has also been shown to predict students’ use of source features in prior research (Strømsø, Bråten, & Britt, submitted for publication) were investigated.

Finally, the potential effect of gender was investigated. Since 1991 several studies have demonstrated gender
differences with respect to text comprehension among Norwegian youth, with girls outperforming boys (Kjærnsli, Lie, Olsen, & Roe, 2007; Roe & Taube, 2003). However, it has also been demonstrated that when older students read texts in the domain of natural science, males seem to outperform females (Strømsø et al., submitted for publication, 2008), and it was expected that to be the case in the present study as well.

In summary, our main research question concerned whether students’ memory for sources contributed to their comprehension of multiple texts on a complex topic when prior knowledge, topic interest, perceived comprehensibility, and gender were controlled for. The participants read a set of partly conflicting texts on the topic of climate change and comprehension was assessed with two different inference verification tasks. One aimed to assess students’ deep-level within-text (i.e., intratextual) comprehension. The other aimed at assessing students’ comprehension across texts (i.e., intertextual comprehension). Two more specific research questions therefore addressed the unique relationship between (a) memory for sources and intratextual comprehension, and (b) the relationship between memory for sources and intertextual comprehension.

In relation to the above research questions, our hypotheses were that memory for sources would be related to both intratextual and intertextual comprehension independent of gender, prior knowledge, topic interest, and perceived comprehensibility (Hypothesis 1). However, we expected memory for sources to be more strongly related to intertextual comprehension than to intratextual comprehension (Hypothesis 2). Consistent with Perfetti et al. (1999), when reading multiple texts providing conflicting accounts of partially overlapping events, source information may play a particularly important role in the construction of mental representations integrating content across texts.

2. Method

2.1. Participants

Participants were 233 students from four different schools in southeast Norway, attending the last year of upper secondary school. They had a mean age of 18 years and 6 months, and included 55.4% females and 44.6% males. Compulsory primary and lower secondary schooling in Norway lasts for 10 years and children start school the year they become six. Upper secondary education comprises all courses leading to qualifications above the lower secondary level and below the level of higher education, and it normally lasts for three years. All four schools included in the study were public schools. In Norway, public schools are free and only approximately 6% of the upper secondary students attend private schools (Ministry of Education and Research, 2007). The majority of the students (206) were native-born Norwegians having Norwegian as their first language. The rest of the students (27) were bilingual, grown up in Norway, but with parents from different parts of the world (Europe, Africa, and Asia).

2.2. Materials

2.2.1. Texts

The participants read seven separate texts about different aspects of climate change. The first text was a 362-word text about global warming was obtained from a textbook in nature studies for upper secondary education. This text (Text 1) explained the natural greenhouse effect and the manmade greenhouse effect in relatively neutral, academic terms. The second text was a 251-word popular science text published by the Center for International Climate and Environmental Research at the University of Oslo. This text (Text 2) focused on the causes of the manmade greenhouse effect, that is, on the manmade discharges of climate gases into the atmosphere and their contribution to observed climate changes. The third text was a 277-word popular science article taken from a research magazine, where a professor of theoretical astrophysics argued that climate changes to a large extent are steered by astronomical conditions and therefore due to natural causes rather than mankind’s activities (Text 3). The fourth text was a 302-word newspaper article written by a journalist in a Norwegian liberal daily, describing the negative consequences of global warming in terms of a potential weakening of ocean currents in the North Atlantic and a melting of ice around the poles (Text 4). The fifth text was a 231-word newspaper article written by a journalist in a Norwegian conservative daily, describing the positive consequences of a warmer climate in northerly regions in terms of an ice-free sea route through the Northwest Passage and the access to natural resources now concealed under the Arctic ice (Text 5). The sixth text was a 276-word public information text published by the Norwegian Pollution Control Authority, discussing international cooperation within the framework of the UN as a way to reduce the discharges of climate gases (Text 6). Finally, the seventh text was a 303-word project presentation published by a large oil company, describing new technology that could reduce the discharges of carbon dioxide into the atmosphere (Text 7).

Apart from the more neutral textbook excerpt (Text 1), Texts 2–7 contained partly conflicting information, with two texts (Text 2 and Text 3) presenting different views on the causes of global warming (manmade versus natural), two texts (Text 4 and Text 5) presenting different views on the consequences of global warming (negative versus positive), and two texts (Text 6 and Text 7) presenting different views on the solutions to global warming (international cooperation versus new technology).

Each text was printed on one separate sheet of paper, and the source, author’s name and credentials, and date of publication were presented in the upper left corner on the first page of each text, while a title headed the text. The seven texts were presented to the participants in random order, and they could read them in any order they preferred.

2.3. Measures

2.3.1. Prior knowledge

As a means of assessing students’ prior knowledge, we used a multiple-choice test composed of 15 items. The content of
the items referred to concepts and information central to the issue of climate change that were discussed in the texts that they read. In designing the measure of prior knowledge, the two Norwegian authors and a third Norwegian collaborator in the project independently selected key concepts and information from the texts and together wrote items to cover the concepts and information agreed upon by all three test constructors (e.g., global warming, the greenhouse effect, climate gases, and the Kyoto Protocol).

To insure a reasonable degree of content validity, we also read extensively on the topic in textbooks and reference works, as well as on the Internet, to verify that the concepts and information included in the measure were really central to the issue of climate change. A climate researcher at the University of Oslo, who was not part of the project, reviewed a preliminary version of the prior knowledge measure, with this resulting in only small modifications of the options of a few items. Taken together, the 15 items of the measure assessed both factual knowledge and conceptual understanding with respect to climate change. It should also be noted that diverse aspects of the topic were covered by the prior knowledge measure, with items referring to both scientific (e.g., the greenhouse effect) and political (e.g., the Kyoto Protocol) aspects of the topic.

Participants’ prior knowledge score was the number of correct responses (i.e., one point for each correct response) out of the 15 items.

Scores on the prior knowledge measure yielded an internal consistency reliability, Cronbach’s $\alpha = .65$.

2.3.2. Topic interest

To measure participants’ personal interest and engagement in issues and activities concerning climate change, we developed a 12-item measure, where participants indicated their level of interest or engagement by rating each item on a 10-point Likert-type scale ranging from 1 (not at all true of me) to 10 (very true of me). Half of the items allowed participants to express their interest in the topic without obligation, that is, without reporting any active engagement or involvement in addressing the problem of climate change (e.g., “I am interested in what conditions influence the Earth’s climate”; “Global warming is an issue that interests me”). However, the other half of the items focused more on participants’ active engagement and involvement in the issue, thus reflecting their willingness to act for the benefit of the Earth’s climate (e.g., “I am concerned with how I myself can contribute to the reduction of environmental pollution”; “I try to convince others that we must reduce the discharges of climate gases”).

In a recent study, the underlying structure of this measure was explored in samples of undergraduates from both Norway and Spain, with the results indicating that all the 12 items loaded on only one factor in both data sets (Bråten, Gil, Strømsø, & Vidal-Abarca, submitted for publication). Hence, we used a sum score based on all the 12 items to gauge participants’ interest in the topic of climate change. Scores on the topic interest measure yielded an internal consistency reliability, Cronbach’s $\alpha = .93$.

2.3.3. Multiple-text comprehension

Following Royer, Carlo, Dufresne, and Mestre (1996), an intratextual inference verification task (IntraIVT) was developed for the measurement of the participants’ deeper, situational understanding of single texts. This task involved the presentation of 25 inference test sentences, with each sentence constructed by combining information from different sentences within one of the seven texts to form either a valid or an invalid inference. For example, the item “Storage of carbon dioxide under the seabed is most likely a very unsafe form of storage” combined information from two sentences in the text published by a large oil company to form an invalid inference. Among the 25 sentences of the test, there were 14 valid and 11 invalid inferences. The participants were instructed to mark with Yes those sentences that could be inferred from material presented in one of the texts, and to mark with No those sentences that could not be inferred from material presented in one of the texts. Royer et al. (1996) have shown construct validity of such an inference verification task, and it has recently been used effectively by several other researchers (e.g., Bråten & Strømsø, 2006; Ozgungor & Guthrie, 2004; Wiley & Voss, 1999) to measure deep-level, situational text comprehension.

The participants’ score on the IntraIVT was the number of correct responses (i.e., one point for each correct response) out of the 25 items.

The internal consistency reliability for the scores on the IntraIVT was Cronbach’s $\alpha = .70$.

A limitation with the IntraIVT, when used after multiple-text reading (Bråten & Strømsø, 2006; Wiley & Voss, 1999), is that it does not really measure readers’ ability to draw inferences across texts. Given this limitation, we also used an intertextual inference verification task (InterIVT) to measure the ability to make intertextual inferences, with this involving taking pieces of information presented in different texts and drawing inferences that connect them. For example, the item “Mankind’s discharges of carbon dioxide amount to only a small part of the quantity of climate gases released into the atmosphere, and these discharges are therefore not included in the international cooperation within the framework of the UN’s convention”, combined information from the text focusing on the causes of the manmade greenhouse effect with information from the text discussing international cooperation within the framework of the UN to form an invalid inference. The participants were thus instructed in writing that each of the test sentences consisted of a statement that could “reasonably be inferred by combining information from at least two of the texts” they had just read, or of a statement that “could not reasonably be inferred by combining information from at least two of the seven texts.” In constructing the measure, we took care to insure that an item could not be answered correctly by judging the validity of only one piece of information at a time, that is, without considering the whole, integrated meaning of the statement. Taken together, the InterIVT consisted of 20 items, 10 valid and 10 invalid inferences, and the participants were instructed to mark with Yes those statements that could be inferred by combining.
information from at least two of the seven texts, and to mark with No those statements that could not be inferred by combining information from at least two of the seven texts. The participants were not allowed to turn back to the texts when they answered this task. Information about the validity of the InterIVT, as well as a number of sample items for the two types of verification tasks used in the present study, are contained in prior work (Bra˚ten & Strømsø, in press; Strømsø et al., submitted for publication, 2008).

The participants’ score on the InterIVT was the number of correct responses (i.e., one point for each correct response) out of the 20 items.

The internal consistency reliability for the scores on the IntraIVT was Cronbach’s $\alpha = .58$. The reliability is lower than desirable but can still be considered acceptable given the research purpose of the instrument (e.g., Kerlinger & Lee, 2000; Nunnally, 1978).

2.3.4. Memory for sources

The memory for sources measure, partly inspired by Britt et al. (1999), included seven text sentences, one from each text, and seven distractors. Each of the seven text sentences contained information that was central and unique to one of the texts. First, the two Norwegian authors independently chose one key sentence from each text. When choices were not in agreement, the choice of sentence was reached through discussion. The seven distractors were related to the topic of climate change but their content was not covered in any of the texts. Each of the 14 sentences was accompanied by eight letters (A–H), with the first seven (A–G) representing one of the texts and the last (H) representing the alternative that the content of the sentence did not originate from any of the texts. The eight optional letters were explained in the instructions by linking each of them to one of the publication channels or to information not found in any of the texts (e.g., A: Textbook from Cappelen publishing company; D: Dagbladet (newspaper); G: Text from oil company’s website; H: Information not located in any of the texts.). The students were instructed to mark a letter (A–G) for each key text sentence to indicate which text the information came from, or, alternatively, to mark a sentence H if the information was not located in any of the texts.

For the seven text sentences, students received two points for each correct answer. For the seven distractor sentences, they received one point if they correctly marked that a sentence did not originate from any of the texts. The reason for scoring correct answers on key text sentences with two points and correct answers on distractor sentences with one point was to reflect that it was obviously more difficult to answer correctly on the text sentences. While the possibility of choosing the right alternative by chance was only 12.5% for the text sentences, it was 50% for the distractor sentences. Participants’ memory for sources score was the sum of points for all 14 items.

The internal consistency reliability for the scores on the memory for sources task was Cronbach’s $\alpha = .76$.

2.3.5. Comprehensibility

To assess the perceived comprehensibility of the texts, the participants were asked to rate how difficult they thought each text was to understand. They were first presented with the title of the text and a one-sentence summary of the content, and then asked to indicate how difficult they thought the text was using a 10-point Likert-type scale ranging from 1 (very easy) to 10 (very difficult). We used a sum score based on students’ ratings for all seven texts.

The internal consistency reliability for students’ perceived comprehensibility scores was Cronbach’s $\alpha = .76$.

2.4. Procedure

All the measures were group administered to the participants in the middle of the spring term by the first and the second author and three trained research assistants, who collected the data during two regular 45-min class periods with no break. Each participant received a folder with the experimental tasks, and they were orally instructed to work with the tasks in the order they were presented in the folder. The order of the tasks was as follows: (a) prior knowledge measure, (b) topic interest measure, (c) texts, (d) text comprehension measures, (e) memory for sources measure, and (f) perceived comprehensibility measure. There were short written instructions at the beginning of each task. Only the instructions for text reading varied among participants, with participants randomly assigned to the task conditions of reading to construct arguments, to construct a global understanding, or to summarize information, respectively. However, because preliminary analysis showed that there were no statistically significant differences between participants in the three task conditions on the comprehension measures, the three groups were combined for further statistical analyses. All the participants were informed that they could read the texts in the order they preferred, and they were not allowed to look back to the texts while answering the tasks following reading. The participants were allowed as much time as they needed to complete all of the tasks. However, there did not

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1 We also carried out separate analyses with a source memory measure including only key text sentences (and not the distractor sentences). The results were quite similar to those described in the result section, with the same significant relationships. This could be explained by the high shared variance among the two memory measures ($r = .87$). As we believe that the measure including both key text sentences and distractor sentences best represents participants’ memory for sources, we decided to use this measure in the following analyses.

2 A one-way ANOVA showed no significant effect of task on the InterIVT, $F(2, 232) = .96, p = .38$, or on the IntraIVT, $F(2, 233) = 1.03, p = .36$. Nor did Scheffé post hoc comparisons show any significant differences between comprehension scores in the three task conditions, with a mean score on the IntraIVT in the argument condition of 17.19 (SD = 4.16), in the global understanding condition of 17.91 (SD = 3.25), and in the summary condition of 17.21 (SD = 3.70). The mean score on the InterIVT was 13.04 (SD = 3.21) in the argument condition, 13.56 (SD = 2.89) in global understanding condition, and 12.92 (SD = 2.74) in the summary condition.
seem to be large variation in how long the participants worked on the tasks. Participation in the data collection was voluntary and all data were treated anonymously and confidentially.

3. Results

We first computed Levene’s test of homogeneity for gender on the two dependent measures (i.e., IntraIVT and InterIVT, the two comprehension measures) with the results indicating that the variance was equal for the two genders on the IntraIVT, $F(1, 228) = 0.51$, ns, and on the InterIVT, $F(1, 228) = 3.7$, ns. The means and standard deviations for all measures are reported in Table 1 together with zero-order correlations among the measures.

As expected, memory for sources score correlated positively with both IntraIVT and InterIVT scores. The results also indicated positive relationships between the control variables of prior knowledge and topic interest and between those variables and both IntraIVT and InterIVT scores. Perceived comprehensibility score was negatively related to both IntraIVT and InterIVT scores, indicating that the more difficult the participants perceived the texts to be, the poorer their comprehension performance. Gender correlated positively with IntraIVT-scores but not with InterIVT-scores. Thus, males were more likely to display better within-text comprehension ($M = 18.25, SD = 3.60$) than females ($M = 16.80, SD = 3.75$), while the same was not found for across-text comprehension ($M = 13.56, SD = 3.18$ and $M = 12.93, SD = 2.71$, for males and females, respectively).

Next, hierarchical regression analyses were performed, first, with the IntraIVT scores and, second, with the InterIVT scores as dependent variables. In each analysis, gender was entered into the equation in Step 1, while prior knowledge, topic interest, and perceived comprehension were entered in Step 2. Finally, memory for sources was entered into the equation in Step 3. Table 2 shows the results of the first hierarchical regression analysis for variables predicting the IntraIVT task.

As shown from the results of the first hierarchical regression analysis gender explained a statistically significant amount of the variance (4%) in scores on the IntraIVT in Step 1, $R^2 = .04, F(1, 229) = 8.58, p = .004$, indicating that males outperformed females on this task. After removing the variance associated with gender, the variables entered in Step 2 accounted for 23% additional variance, $R^2 = .27, \Delta R^2 = .23, \Delta F(3, 226) = 24.27, p < .001$. A significant positive relationship was found for prior knowledge in Step 2, $\beta = .35, p < .001$, with this indicating that students’ prior knowledge about different issues related to climate change predicted their scores on the IntraIVT. We also found that perceived comprehensibility negatively predicted the IntraIVT scores, $\beta = -.23, p < .001$. Thus, the more difficult students found the texts to be, the lower they scored on the IntraIVT. No significant relationship was found between topic interest and the IntraIVT scores. However, the addition of memory for sources in the third step resulted in a statistically significant 7% increment in the explained variance, $R^2 = .34, \Delta R^2 = .07, \Delta F(1, 225) = 24.32, p < .001$, with memory for sources ($\beta = .29, p < .001$) and prior knowledge ($\beta = .31, p < .001$) positively predicting the IntraIVT scores in this step and with perceived comprehensibility ($\beta = -.15, p = .014$) as a negative predictor.

These results confirmed Hypothesis 1 in that students’ memory for sources positively predicted their intratextual comprehension independent of gender, prior knowledge, topic interest, and perceived comprehensibility.

As shown from the results of the second hierarchical regression analysis (see Table 3), gender did not explain a statistically significant amount of the variance in Step 1, $R^2 = .01, F(1, 230) = 2.3, ns$. In Step 2, with prior knowledge, topic interest, and perceived comprehensibility added to the equation, there was a 22% significant increment in the explained variance, $R^2 = .23, \Delta R^2 = .22, \Delta F(3, 227) = 21.99, p < .001$. Prior knowledge positively predicted students’ scores on the InterIVT, $\beta = .29, p < .001$, indicating that students’ prior knowledge regarding the topic of climate change facilitated their intertextual understanding of the seven texts. Likewise, topic interest positively predicted the InterIVT scores, $\beta = .13, p = .04$, while perceived comprehensibility, again, was a negative predictor, $\beta = -.25, p < .001$. Thus, students more interested in issues related to climate change were more likely to display good intertextual understanding, while students’ intertextual understanding was likely to decrease the more difficult they perceived the texts to be. The addition of memory for sources in Step 3 resulted in a statistically significant 6% increment in the explained variance, $R^2 = .29, \Delta R^2 = .06, \Delta F(1, 226) = 19.80, p < .001$, with perceived comprehensibility negatively predicting the InterIVT scores, $\beta = -.17, p = .007$, and both prior knowledge ($\beta = .25, p < .001$) and memory for sources ($\beta = .27, p < .001$) positively predicting the InterIVT scores in this step.

Thus, these results confirmed Hypothesis 1 in that students’ memory for sources positively predicted intertextual comprehension independent of gender, prior knowledge, topic interest, and perceived comprehensibility.

However, it was also expected (Hypothesis 2) a stronger relationship between memory for sources and the InterIVT scores than between memory for sources and the IntraIVT scores. Hypothesis 2 was not confirmed in our study.

4. Discussion

The main purpose of the present study was to investigate the relationship between students’ memory for sources, as an indication of their source awareness, and their understanding of a set of partly contradictory texts about a complex topic. The results clearly indicated that memory for sources positively predicted both students’ within- and across-text comprehension. This is partly in line with prior research on multiple-text reading, at the same time providing new evidence by demonstrating an explicit relationship between memory for sources and multiple-text comprehension.

The first research question concerned the relationship between memory for sources and students’ scores on an
IntraIVT task. Most previous studies of students’ sourcing skills have included the reading of multiple texts without focusing on how participants comprehend each single text. On the IntraIVT task, students were asked to judge whether a statement could be inferred from the content of one of the texts. The predictability of memory for sources for scores on this task could imply that students’ awareness of source information may generate some kind of anticipatory framework facilitating comprehension. Consider one of the experts in Wineburg’s (1991) study, who explicitly stated that source knowledge “helps you predict what you find” (p. 79). Likewise, the majority of the experts in a study by Lundberg (1987), who were reading a law case, paid attention to information about the type of court, date, and the name of the judge who wrote the opinion, before they engaged in more analytical reading. Whereas this kind of source information generated certain expectations about the content and the structure of the text among the experts, it was noticed by only one of the 10 participating novices in law. Other research has shown that readers’ awareness of text genre and structure may facilitate text comprehension (Goldman & Rakestraw, 2000), and source information, for example regarding text type and publisher, can be considered an important indication of a text’s genre and structure. Finally, the use of source information was identified as a reading strategy in Pressley and Afflerbach’s (1995) extensive review of think-aloud studies, with good predictions about the meaning of the text. In this way, source awareness could be described as facilitating meta-cognitive planning (Brown, 1987; Davidson & Sternberg, 1998), and, accordingly, one possible explanation for the positive relationship between memory for sources and within-text comprehension in the present study could be that awareness of source information facilitated the anticipating, hypothesizing, and predicting involved in the planning of text reading. Presumably, such activities are related not only to the activation of prior knowledge but also to the ongoing monitoring of text comprehension (i.e., to “planning-in-action”; Brown, 1987).

However, it should be noted that each text was presented in the context of six other texts, and one can therefore speculate that awareness of source information may also have prevented students from mixing up unrelated information across texts. In other words, source information might have helped students in constructing a distinguishable understanding of each single text. It is conceivable, moreover, that such within-text comprehension is an important premise for the construction of a more integrated comprehension of the content of the different texts.

The second research question concerned the relationship between memory for sources and students’ intertextual comprehension. In accordance with our expectation, this relationship also turned out to be positive and significant. The IntraIVT task required students to compare and integrate comprehension of the content of the different texts. On the IntraIVT task, students were asked to compare and integrate comprehension of the content of the different texts.

### Table 1

Descriptive statistics and zero-order correlations for all variables.

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<tbody>
<tr>
<td>Gendera</td>
<td>–</td>
<td>.33**</td>
<td>–</td>
<td>–</td>
<td>.31**</td>
<td>–</td>
<td>–</td>
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<tr>
<td>Prior knowledge</td>
<td>–.03</td>
<td>.24**</td>
<td>–.02</td>
<td>.23**</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Topic interest</td>
<td>–</td>
<td>.19**</td>
<td>–.23**</td>
<td>–.34**</td>
<td>–.20**</td>
<td>–.33**</td>
<td>–</td>
</tr>
<tr>
<td>Memory for sources</td>
<td>–</td>
<td>.10</td>
<td>.46**</td>
<td>.23**</td>
<td>.42**</td>
<td>–.38**</td>
<td>–</td>
</tr>
<tr>
<td>Comprehensibility</td>
<td>–</td>
<td>.19**</td>
<td>.27**</td>
<td>.41**</td>
<td>–.36**</td>
<td>.57**</td>
<td>–</td>
</tr>
<tr>
<td>InterIVT</td>
<td>–</td>
<td>.10</td>
<td>.40**</td>
<td>.27**</td>
<td>.41**</td>
<td>–.36**</td>
<td>–</td>
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<tr>
<td>M</td>
<td>7.86</td>
<td>4.79</td>
<td>7.89</td>
<td>3.72</td>
<td>17.43</td>
<td>13.18</td>
<td>13.18</td>
</tr>
<tr>
<td>SD</td>
<td>2.56</td>
<td>1.82</td>
<td>4.45</td>
<td>1.82</td>
<td>3.74</td>
<td>2.95</td>
<td>2.95</td>
</tr>
</tbody>
</table>

* p < .05, ** p < .01; two-tailed.

### Table 2

Results of hierarchical regression analysis for variables predicting performance on the IntraIVT.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Step 1</th>
<th></th>
<th>Step 2</th>
<th></th>
<th>Step 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>beta</td>
<td>T</td>
<td>Beta</td>
<td>T</td>
<td>Beta</td>
<td>T</td>
</tr>
<tr>
<td>Gender</td>
<td>.19***</td>
<td>2.93</td>
<td>.02</td>
<td>.37</td>
<td>.06</td>
<td>1.03</td>
</tr>
<tr>
<td>Prior knowledge</td>
<td>.35***</td>
<td>5.33</td>
<td>5.33</td>
<td>.31***</td>
<td>4.85</td>
<td></td>
</tr>
<tr>
<td>Topic interest</td>
<td>.08</td>
<td>1.26</td>
<td>.04</td>
<td>.72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comprehensibility</td>
<td>–.23***</td>
<td>–.37</td>
<td>–.37</td>
<td>–.15*</td>
<td>–.248</td>
<td></td>
</tr>
<tr>
<td>Memory for sources</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>4.93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>.04</td>
<td>.27</td>
<td>.34</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta R^2$</td>
<td>.07</td>
<td>.07</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$F(1, 229) = 8.58, p &lt; .01$</td>
<td>24.27, $p &lt; .001$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta F(3, 226) = 24.27, p &lt; .001$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < .05, ** p < .01, *** p < .001.
information may facilitate rather than inhibit students’ construction of integrated mental representations. Confronted with diverse perspectives on a complex topic such as climate change, readers have to choose which information to include in an overall understanding of the phenomenon described across texts. One criterion for choosing which information to include is probably trustworthiness, with other studies (Jungemann et al., 1996; Rouet et al., 1996) indicating that different source features are important to readers’ decisions about which information to trust. Source information may also contribute to the comprehension process by providing clues to how information units from different texts may be related. Take, for example, the two popular science texts included in the present study, both published by scientific institutions but conflicting in their explanations of the causes of global warming. In trying to define the exact nature of the conflict—or the relationship—between the two different explanations, the reader might find support in source information, specifically, in the information that one text was published by a climate research center and the other by a professor in theoretical astrophysics. Perfetti et al. (1999) suggest that readers’ representation of such relationships between different texts is an important attribute of their “documents’ model”. In line with this, one possible explanation for the findings of the present study is that readers’ interpretation of relationships between texts, based on source features, facilitates the construction of a coherent representation of the texts’ content.

The assumption that memory for sources would be more important to intertextual than to intratextual comprehension was not confirmed. Memory for sources contributed approximately equally to performance on the two comprehension measures. The reason for our expectation was that the importance of memory for sources might be greater when readers struggle to compare and integrate information across texts than when they try to comprehend the content of single texts. The fact that memory for sources predicted scores on the IntraIVT and the InterIVT at approximately the same level could, however, be explained by considering source awareness to support both readers’ “anticipatory framework” (Wineburg, 1991), facilitating single-text comprehension, and their representation of relations among texts (Perfetti et al., 1999), facilitating multiple-texts comprehension.

Though no on-line data was collected in the present study, one could speculate on how source awareness might affect participants’ comprehension by looking at the sample item from the IntraIVT. The item combines information from two sentences in the text published by the oil company to form an invalid inference: “Storage of carbon dioxide under the seabed is most likely a very safe form of storage.” The content of the text reveals that the oil company is actually storing carbon dioxide under the seabed and is arguing that this is a very safe form of storage. Given that the reader is aware of the source (an oil company) of the content of the item such awareness could possibly increase the probability of the reader judging the item to be invalid.

Regarding the relationship between source awareness and intertextual comprehension, one might exemplify by using the sample item from the InterIVT: “Mankind’s discharges of carbon dioxide amount to only a small part of the quantity of climate gases released into the atmosphere, and these discharges are therefore not included in the international cooperation within the framework of the UN’s convention”. The item combines information from the text by the climate research center and information from the text by the pollution control authority text. If readers are able to remember the sources of these two pieces of information, they will also know that there is an agreement between the two sources in the need for international cooperation about a reduction of discharges, and thereby that “mankind’s discharges” should be included in the framework of the UN’s convention. These interpretations of the possible relationships between source awareness and students’ comprehension of both single and multiple texts are of course speculative, as we have no data on how students tag pieces of information to specific sources. More studies including on-line data are therefore needed to reveal how source awareness might affect text comprehension. The results of the present study only indicate that there is a positive relationship between students’ source awareness and text comprehension.

The Source Monitoring Framework (Mitchell & Johnson, 2000) presents a memory-based view of how people make

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Table 3
Results of hierarchical regression analysis for variables predicting performance on the InterIVT.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Variable Measure</th>
<th>Step 1 beta</th>
<th>Step 1 T</th>
<th>Step 2 beta</th>
<th>Step 2 T</th>
<th>Step 3 beta</th>
<th>Step 3 T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td>.10</td>
<td>1.52</td>
<td>-.05</td>
<td>-.80</td>
<td>-.02</td>
<td>-.26</td>
</tr>
<tr>
<td>Prior knowledge</td>
<td></td>
<td>.29***</td>
<td>4.33</td>
<td>.25***</td>
<td>3.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topic interest</td>
<td></td>
<td>.13*</td>
<td>2.06</td>
<td>.10</td>
<td>1.57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comprehensibility</td>
<td></td>
<td>-.25***</td>
<td>3.90</td>
<td>-.17***</td>
<td>2.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory for sources</td>
<td></td>
<td>.01</td>
<td>.23</td>
<td>.27***</td>
<td>4.45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( R^2 )</td>
<td></td>
<td>.22</td>
<td>.22</td>
<td>.06</td>
<td></td>
<td>.29</td>
<td></td>
</tr>
<tr>
<td>( \Delta R^2 )</td>
<td></td>
<td></td>
<td>F(1, 230) = 2.30, ns</td>
<td></td>
<td></td>
<td>F(5, 226) = 18.88, p &lt; .001</td>
<td></td>
</tr>
<tr>
<td>( \Delta F(3, 227) = 21.99, p &lt; .001 )</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

\* \( p < .05 \) *** \( p < .01 \) **** \( p < .001 \).
decisions about the source of a statement. This framework is especially useful for identifying factors that could influence either encoding or decision-making processes. One limit of the current Source Monitoring Framework is that the focus has been on perceptual distinctions and episodic memory. Discipline-based sourcing, however, is more dependent on source-driven inferences and elaborations in interpreting content. Future research should expand the current Source Monitoring Framework to deal with distinctions made based on semantic memory rather than more perceptual features. Enhanced source-to-content connections can be driven by either the source or the content. If a reader has or is given detailed information about the source, this can influence the interpretation of the content by providing information that can be used to make inferences and elaborations. Conversely, a reader may not initially consider the source information until content makes the source more salient. For example, if the document presents information that conflicts with or contradicts information known to the reader, this may increase the salience of source information. In such a case, the reader may not attend deeply to features of the source until content draws one’s attention to it. In addition to contradiction, another factor that may influence content-driven source elaborations is the absence of certain well-established facts or events in the document. If an author omits important facts that the reader is aware of, this may increase the salience of the source. In both cases, one may attempt to understand if the discrepancy or omission is due to bias or lack of knowledge. Future research should begin to examine more systematically how the source influences inferences and elaborations of the content as well as how features of the content that influence re-evaluation or elaboration of source information. We expect that features of the task, materials, or person that increase integration will also increase source salience. The Source Monitoring Framework should provide insights into potential memory-based processes that may enhance or reduce source-to-content connections.

In the present study the potential contributions of gender, prior knowledge, topic interest, and perceived comprehensibility to comprehension performance were controlled for. Gender did predict the scores on the intratextual inference verification task until the other control variables were entered into the analysis. This result corroborates previous research with undergraduates reading about climate change (Strømsø et al., submitted for publication, 2008), with males tending to do better than females on the comprehension measures. However, the relationship between gender and text comprehension did not survive our control for prior knowledge and perceived comprehensibility in this study. Prior knowledge turned out to be a significant predictor for both comprehension measures. This is not surprising, as prior knowledge — or expertise — seems to facilitate multiple-text reading (Rouet, 2006), also predicting multiple-texts comprehension in our prior research (e.g., Bråten & Strømsø, 2006; Strømsø et al., submitted for publication, 2008). Topic interest predicted intertextual inference verification, but only until memory for sources was included in the analysis. The fact that the participants rated their interest in the topic of climate change to be only moderate could explain why this variable was not significantly related to the comprehension measures when examined together with the other predictors. Students’ perceived comprehensibility of the texts negatively predicted their scores on both comprehension measures, indicating that the more difficult students considered the texts to be, the poorer their comprehension performance. Of course, the possibility exists that students’ ratings of perceived comprehensibility were only mirroring their degree of actual text comprehension. However, one should also note that other research has shown that students’ perceived difficulty of school tasks might be related to their agency beliefs in effort and ability (Malmberg & Little, 2007). This suggests that perceived comprehensibility, at least in part, measures students’ beliefs about their competence in comprehending the texts. Another possibility is that students in some degree trust texts according to their comprehensibility (Jungermann et al., 1996), with the result that texts perceived as difficult are trusted less and thereby given less attention.

Although the present study demonstrated a positive relationship between memory for sources and comprehension of multiple texts, this issue should be examined rigorously in future studies. When measuring memory for sources by asking participants to link content from the texts to sources, the sources were referred to in terms of their publishing channel. To more broadly assess students’ awareness of source information, however, one would have to include references to other source features such as author, setting, and form (Perfetti et al., 1999).

Moreover, memory for sources was measured as an indication of awareness of source information after the students had read all the texts. An interesting alternative could be to observe, for example by means of eye-tracking or think alouds, whether students pay attention to source information as they read. Several other questions regarding students’ awareness of source information also remain unanswered. For example, does the setting affect students’ awareness of source information? And, what about the topic? At this stage of research, one could speculate that students reading multiple texts to write an essay would pay more attention to source information than students involved in leisure time reading, and that controversial issues raise awareness of sources more than other issues. It is therefore important that future research addresses such questions empirically.

Future studies should also pay more attention to participants’ study time, as we in the present study cannot rule out that individual differences in time on task were related to their comprehension performance. Though we did not note large variations in the amount of time students worked with the documents, study time may be a suitable control when examining the unique predictability of memory for sources for multiple-text comprehension.

In conclusion, we believe that the present study indicates that awareness of source information, as measured by memory for sources, may play a unique role in the comprehension of multiple texts on a complex topic. As it is known from other studies (Britt & Aglinskas, 2002; Wineburg, 1991) that students even at this level often pay very little attention to source information, more effort should be allocated to the instructional task of raising students’ source awareness.
Results from studies including high-school students and undergraduates have indicated that computer-based environments designed to train sourcing skills may facilitate students’ sourcing and essay writing (Britt & Aglinskas, 2002; Britt, Wiemer-Hastings, Larson, & Perfetti, 2004), although having students spend sufficient time in the training program seems to be critical in determining the outcome (Graesser et al., 2007).

In elementary school, VanSledrigth (2002) demonstrated that even fifth graders may profit from more explicit teaching of sourcing and how to evaluate different kinds of documents. In the Introduction section it was emphasized that students need to learn to handle multiple information sources to be able to select which sources to trust. In the present study we have provided evidence that an additional reason why students should pay attention to source information is that this may facilitate their text comprehension. Thus, there are at least two good reasons why teachers should focus more explicitly on developing students’ sourcing skills.

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