The Role of Epistemic Beliefs in the Comprehension of Multiple Expository Texts: Toward an Integrated Model

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The Role of Epistemic Beliefs in the Comprehension of Multiple Expository Texts: Toward an Integrated Model

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In present-day knowledge societies, competent reading involves the integration of information from multiple sources into a coherent, meaningful representation of a topic, issue, or situation. This article reviews research and theory concerning the comprehension of multiple textual resources, focusing especially on linkages recently established between dimensions of epistemic beliefs and multiple-text comprehension. Moreover, a proposed model incorporates epistemic beliefs into a theoretical framework for explaining multiple-text comprehension, specifying how and why different epistemic belief dimensions may be linked to the comprehension and integration of multiple texts. Also discussed is the need for further research concerning mediational mechanisms, causality, and generalizability.

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Are sun rays healthy or harmful? Can mobile phones actually cause brain cancer? Is global warming due to mankind’s activities or to natural causes? In present-day knowledge societies, individuals seeking to answer such questions, on behalf of themselves or others, indeed have a wealth of information resources to draw on. Those resources may be available through traditional print and broadcasting technologies or through new information and communication technologies, such as the Internet. In any case, attempts to provide well-founded answers require that individuals synthesize or integrate information from source materials expressing diverse and even contradictory viewpoints. This, however, seems to be a great challenge to most individuals regardless of age (Rouet, 2006). According to Wineburg (1998), the easiest thing a reader can do on encountering multiple and seemingly contradictory texts on a particular topic is to leave each text as is, “as an island unto itself” (p. 337). On the other hand, constructing coherent meaning from such “textual mélange” can be described as a “major cognitive achievement” (Wineburg, 1998, p. 337).

As demanding as this task may be, failure to coordinate and integrate multiple information sources may have serious consequences. On the personal level, a reader may come to be persuaded by strongly biased or unreliable information without considering conflicting viewpoints or scientific evidence, thereby underestimating risks that may be attached
to certain kinds of behavior (e.g., excessive sunbathing). On the level of society, readers’ ability to build integrated understandings from multiple information sources of such vital issues as global warming may be necessary for genuine participation in democratic discourse concerning their solution. In the field of education, even though the consequences may well appear less dramatic, the failure of students to integrate information from multiple sources into a coherent, meaningful representation of a topic, issue, or situation may lead to poorer learning in the individual and adversely affect society in the long run. Indeed, one of the most critical challenges for a knowledge society may be to cultivate human capital that can comprehend and integrate multiple, varied, and prolific information sources (Goldman, 2004).

Whereas there is a long and productive line of research on individuals trying to understand single texts, more systematic effort to research how people try to understand a topic by reading and making connections across multiple, diverse sources of information only dates back to the early 1990s. Thus, with only a few scattered attempts to attack that issue in the 1970s (e.g., Hayes-Roth & Thordyke, 1979) and the 1980s (e.g., Bazerman, 1985), research started to focus more explicitly on the reading of multiple texts in the 1990s (Spiro, Feltovich, Jacobson, & Coulson, 1991; Wineburg, 1991). However, because it seems that the single-text paradigm still dominates research on text-based learning and comprehension, it can be argued that research in this area is somewhat out of step with the intertextual reality encountering most readers in present-day society (Goldman, 2004). In particular, the higher order processes associated with the comprehension and integration of multiple textual resources have not been well understood (Bräten & Stromsø, 2010b). However, as we argue in this article, there is mounting evidence that readers’ beliefs about the nature of knowledge and knowing, that is, their epistemic beliefs, play an important role in the comprehension of multiple texts, with this having theoretical as well as instructional implications.

Since the seminal work of Schommer (1990), links have been established between epistemic beliefs and readers’ comprehension of single texts. Until recently, research on the relationship between epistemic beliefs and the reading of multiple texts has been essentially lacking. However, because epistemic beliefs may be particularly important when people work on complex learning tasks (Hartley & Bendixen, 2001; Spiro, Feltovich, & Coulson, 1996), and because the comprehension and integration of multiple texts can be described as a more complex task than the comprehension of one single text (Wineburg, 1998), the current extension of epistemic belief research to multiple-text comprehension and learning may enrich research on epistemic beliefs as well as on reading comprehension, broadening the research agenda in both areas and providing new understanding of what it takes to be a competent reader in the 21st century.

In the following, we first present a framework for thinking about the comprehension of multiple texts—the “documents model” originally proposed by Perfetti and colleagues (Britt, Perfetti, Sandak, & Rouet, 1999; Perfetti, Rouet, & Britt, 1999) and later further elaborated by Rouet (2006). In this section, we also expand the original documents model framework by discussing processes that seem to enable multiple-text comprehension. Second, we review empirical evidence for the role of epistemic beliefs in the comprehension of multiple texts, starting with the pioneer studies of Jacobson and Spiro (1995) and Rukavina and Daneman (1996), and continuing with recent findings from our own program of research (e.g., Bräten & Stromsø, 2006b, 2010a; Bräten, Stromsø, & Samuelstuen, 2008; Stromsø, Bräten, & Samuelstuen, 2008). Third, based on these findings, we discuss how and why epistemic belief dimensions may be related to components of the documents model. It should be noted that, to the best of our knowledge, this is the first comprehensive review of empirical links between epistemic belief dimensions and multiple-text comprehension. Likewise, the revision of the documents model to incorporate epistemic beliefs is unique to this article. In conclusion, we discuss some important issues for further research in the context of our proposal.
representation are constructed during the comprehension of a single text, specifically, the surface code, referring to the exact words and sentences, the textbase, referring to the text-internal meaning of the text, the situation model, referring to the interpretation of the situation described in the text, and the text genre, referring to the document type, for example, a newspaper article or a textbook chapter. According to Kintsch (1998), situation model construction is especially important for the ability to use text information productively in new contexts, which requires “that the text information be integrated with the reader’s prior knowledge and become a part of it, so that it can support comprehension and problem solving in new situations” (p. 290).

The documents model proposes that, in addition to these layers of representation for individual texts, an additional layer is required to capture what readers understand about relationships between sources, as well as from sources to text contents. This additional layer has been termed the intertext model (Britt et al., 1999; Perfetti et al., 1999). Although understanding of sources is certainly not irrelevant when trying to understand a single text (see text genre in Kintsch’s model), it can be assumed to play an essential role in the understanding of multiple texts representing different perspectives on a topic. According to Rouet (2006), source information simply cannot be ignored when trying to understand multiple documents, because “source information allows the reader to differentiate documents, and to evaluate the respective contribution of each document to a global representation of the situation” (p. 68). In essence, the documents model explains how a good reader trying to understand the contents of multiple documents dealing with the same event or topic from different perspectives builds a coherent mental representation of the situation described across documents, at the same time taking note of the sources of the different perspectives and understanding the relationships (e.g., similarities and differences) among them.

According to the documents model, sources are represented and connected through the intertext model. The intertext model includes a document node for each text that allows the reader to represent information about the author (e.g., name, credentials, and evaluation of author’s perspective), the document (e.g., date, publisher, and evaluation of document’s characteristics), rhetorical goals (intent, audience), and even some key information about the document’s content. For example, upon reading a passage about the natural causes of climate change, the reader may also encode the fact that the passage is written by an oil company executive who has posted a note on the news section of a climate change forum with the purpose of influencing the forum participants’ understanding of the phenomenon. The information that fills the slots in the document node may be very objective and verifiable, such as “an associate professor of geology” or “published in Nature,” or it may be a more subjective evaluation, such as “biased” or “high quality.” The reader can gather this information from various sources. The text may include much of this information, as is common in published books. In such cases, the reader could accept this information as true or attempt to verify its accuracy. In other instances, the reader may have to actually search for all or most of this information, as is common for information on the Web. Finally, some of the document node information may come from inferences, especially evaluative or subjective information.

The intertext model also allows for links from a document node to content (e.g., that the natural cause explanation was issued by the oil company executive) as well as connections between document nodes (e.g., that the executive contradicts the conclusions of the Intergovernmental Panel on Climate Change). A range of predicates can mark document to document links, such as “agrees with,” “disagrees with,” “supports,” or “opposes” (Perfetti et al., 1999). According to the documents model, these intertext links allow readers to achieve overall coherence in their situational understanding despite the inclusion of content that may be inconsistent and even contradictory. Of course, not all content will be marked with an intertext link from the document node to the content. Many factors can influence what content is marked with an intertext link and more research is required to determine those factors (Britt et al., 1999).

The second additional structure that will generally be considered when representing information from multiple documents is the situations model. Just as an individual text can be represented as a situation model, the integrated information across documents can be organized as a model of the combined situation. Such a model includes information uniquely presented in a single text as well as agreed upon or conflicting information from the various texts. According to Britt et al. (1999), readers may opt to not form an integrated situations model when one or more authors are judged to not be trustworthy, when there is too long of a delay between readings, or when instructed to keep them separate. According to Britt and Rouet (in press), one would also not want to integrate information that is uncertain or inconsistent. In such cases, the uncertain or inconsistent will only be integrated if it includes a marking or link to the source of the information. At the other extreme, in optimal circumstances, the reader may create a completely integrated representation including all, even unique, information. Even in cases where information is not integrated, such as when the author is judged to be biased, the reader may still find it valuable to read the document and try to come to an understanding of the author’s perspective and encapsulate this information as “according to this author.” Thus, successful integration could be defined as creating an organized and coherent representation of overlapping information while marking some information (agreed upon, inconsistent, questionable) as coming from a particular source. Although the correlation between within-and cross-text comprehension has been found to be substantial when readers try to understand multiple texts (Strømsø, Bråten, & Samuelstuen, 2007), it is still an open question to what extent readers construct entire text models for all
individual documents when constructing an integrated situations model.

It should be noted that the documents model makes no claim as to levels of representation. The framework merely discusses the types of additional structures that must be created to represent source information, links between sources and between sources and content, and integrated content from multiple perspectives. At this point, these additional structures are not viewed as hierarchical levels, however.

Originally the documents model was developed within the domain of history and focused on reconciling different accounts of the same situation (e.g., the revolution in Panama). The revised documents model seeks to account for document presentation across domains, including the social and natural sciences. Accordingly, evidence brought to bear on the documents model framework is derived not only from research in history (e.g., Britt & Aglinskas, 2002; Nokes, Dole, & Hacker, 2007; Rouet, Britt, Mason, & Perfetti, 1996; Wolfe & Goldman, 2005) but also from research in several other domains, such as law (Strømsø & Bråten, 2002), medicine (Sanchez, Wiley, & Goldman, 2006; Stadtler & Bromme, 2008), biology (Cerdán & Vidal-Abarca, 2008), geology (Wiley et al., 2009), climatology (Bråten, Stromso, & Britt, 2009; Stromso, Bråten, & Britt, 2010), and psychology (Le Bigot & Rouet, 2007). Adaptation to these other domains requires a more general interpretation of a situations model. In these cases, the general organizational structure of the combined or integrated model would be based on an argument schema rather than a narrative structure.

Arguments can be represented by an argument schema (Britt & Larson, 2003; Chamblass, 1995; Chamblass & Murphy, 2002; M. Larson, Britt, & Larson, 2004). An argument, by definition, presents a claim supported by at least one reason through a frequently unstated logical support relation (Toulmin, 1958). For instance, “the world must act now to reduce greenhouse gas emissions (claim) because the harmful consequences could be substantially blunted by prompt action (reason).” In an argument schema, the claim holds the central position and all other information is organized as support (reasons), opposition (counters), or limitation (qualifiers and rebuttals) for this main proposition. When learning from multiple documents in the social or natural sciences, the situations model must be organized around such an argument schema. Students who are given primary documents and asked to construct arguments may learn more than those asked to construct a situations model organized around a summary or narrative (Wiley & Voss, 1999). However, arguments in science are particularly challenging for students and special supports may be needed for some students (Duschl & Osborne, 2002; Forman, Larreamendy-Joens, Stein, & Brown, 1998; Jimenez-Aleixandre, Rodrigues, & Duschl, 2000; Kelly, Druker, & Chen, 1998; Kuhn, 1993; A. Larson, Britt, & Kurby, 2009; M. Larson et al., 2004; Osborne, Erduran, & Simon, 2004; Takao & Kelly, 2003). For example, research by Gil, Bråten, Vidal-Abarca, and Strømsø (2010a, 2010b), using multiple documents on a science topic, indicated that only students with high prior knowledge about the topic were able to take advantage of instructions to construct arguments, whereas low knowledge readers actually seemed more hindered than helped by such task instructions.

Presumably, the processes that support the creation of the intertext model and the situations model will mostly be strategically controlled by the reader. Because it is rarely the case that a document set will include explicit intertextual citations that direct a reader how to connect the documents, creating a coherent representation will be up to the reader. Strategic processes supporting the comprehension of multiple documents are listed in Table 1.

The sourcing and corroboration heuristics identified by Wineburg (1991) seem most important in documents model construction. Sourcing is the process of attending to and evaluating the source of a document prior to reading the content of the document and then using this source information to help interpret document contents. As shown in Table 1, the sourcing heuristic allows readers not only to represent source information (i.e., create a document node) but also to create important intertext links between sources or from a document node to content. Whereas experts employ this sourcing process routinely and systematically (Wineburg, 1991), novices do so only under optimal circumstances (Rouet et al., 1996).

The corroboration heuristic is the process of comparing information across sources or to prior knowledge. As shown in Table 1, corroboration can help readers create an integrated situations model by strategically comparing perspectives and looking for consistencies or discrepancies among perspectives. Corroboration can also affect the creation of an intertext model. First, when this comparative process indicates a discrepancy or disagreement, it may facilitate attention to

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**TABLE 1**

<table>
<thead>
<tr>
<th>Strategic Processes That Support the Representation of Different Documents Model Components</th>
</tr>
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<tbody>
<tr>
<td><strong>Situation model</strong></td>
</tr>
<tr>
<td>• Corroboration to compare texts or passages within texts and look for consistencies or discrepancies among texts or passages.</td>
</tr>
<tr>
<td><strong>Document node information</strong></td>
</tr>
<tr>
<td>• Sourcing to locate source information prior to reading.</td>
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<tr>
<td>• Monitor evaluation of document and author characteristics.</td>
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<tr>
<td>• Sourcing facilitated by inconsistencies, agreement of important or previously uncertain information.</td>
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<tr>
<td><strong>Source-content links</strong></td>
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<tr>
<td>• Sourcing to connect source information to content and to use that information to interpret content.</td>
</tr>
<tr>
<td><strong>Source-source links</strong></td>
</tr>
<tr>
<td>• Corroboration to compare perspectives and look for consistencies or discrepancies among them.</td>
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</tbody>
</table>
source information (Rouet, Britt, Caroux, Nivet, & Le Bigot, 2009). In some cases, readers may evaluate the source more carefully or search for more information about the author. If readers come to the conclusion that one of the sources is untrustworthy or less knowledgeable, they may mark that author’s information as less trustworthy. In any case, such discrepancy should lead to the formation of important links such as “the authors disagree.” Such information may also be marked as less certain and in need of additional support. One prediction that falls from this situation is that after a discrepancy that is not resolvable, readers should judge that information to be less trustworthy and more memorable, because of the additional processing. In some cases, recognizing that important information is agreed upon will also lead to either an intertext link (e.g., “the authors agree”) or more trust assigned to the proposition.

Evaluating the bias of a source will help in creating a more complete document node and may prove useful in determining how to integrate information into a situations model. There are several factors that may signal bias, such as not including information that is counter to the author’s own thesis but obvious. This is one way corroboration can trigger an understanding that an author is biased. Perfetti, Britt, and Georgi (1995) found that although students were generally accurate at detecting bias when asked, this evaluation process did not occur spontaneously during reading. It is unclear what conditions would increase the likelihood of this evaluation process, which may support the creation of a more complete document node, aid in the interpretation of content, and influence the integration of information into a situations model. With respect to handling discrepancies, students may adopt various strategies. For example, Perfetti et al. (1995) found that students reading a set of very long chapters across several weeks (a) ignored new information, (b) reported only the most recently mentioned information, or (c) noted that the discrepancy occurred.

Whereas historians, reading within their discipline, regularly source and corroborate (Wineburg, 1991), high school and college students often fail to apply these strategies without specific training (Brem, Russell, & Weems, 2001; Britt & Aglinskas, 2002; Britt, Wiemer-Hasting, Larson, & Perfetti, 2004; S. Greene, 1994; Rouet et al., 1996; Wiley et al., 2009; Wineburg, 1991). This is not surprising given that such strategies take much effort, skill, and knowledge. Moreover, as we elaborate in later sections, students’ beliefs about knowledge and knowing seem to matter.

The MD-TRACE Model

Documents models are usually constructed in situations that involve (a) explicit or implicit task instructions, setting more or less specific goals for the reader (e.g., “write an essay about the history of the Panama Canal”); (b) a set of texts that are more or less closely related to the task purposes; and (c) a set of tools that facilitate the search and location of relevant texts or text passages (e.g., tables of contents, indexes, or search engines). The Multiple Documents—Task-based Relevance Assessment and Content Extraction (MD-TRACE) model has been proposed to explain the steps involved in using multiple documents when engaging in tasks such as “write an essay about the causes and consequences of climate change” (Rouet & Britt, in press).

As can be seen in Table 2, the MD-TRACE model considers that the comprehension of multiple documents involves five major steps that unfold in a cyclical way. In Step 1, the reader creates (and later updates) a task model, that is, a representation of the specifications, goals, and means to be used to complete the task. It can be argued that meaning construction during reading is always a goal-directed activity where people try to understand a text for a specific task or goal (McCrudden & Schraw, 2007). However, the goal-directed nature of reading becomes even more salient when readers work on multiple texts (Braten, Gil, & Stromso, in press; Goldman et al., 2010). Indeed, it seems almost inconceivable that readers should keep on studying a series of different, even contradictory, texts on a particular topic or issue without specific tasks or goals in mind. In Step 2, the reader assesses his or her need for information in the circumstances. This may result in the reader engaging in document search and selection, or in the decision to proceed otherwise (e.g., creating or updating a task product; see Step 4). Step 3 is a complex step that involves three distinct substeps: In Step 3a, the reader selects a document or a document passage based on features such as relevance or order; in Step 3b, the reader engages in reading and comprehension of the document contents; in Step 3c, the reader integrates the document at hand with information found in other documents, so as to create and update a documents model. The processes involved in Steps 3b and 3c are covered by the previous section. In Step 4, the reader creates (and later updates) a task product, that is, any explicit response that may be required in the task, such as an answer to a question or an essay. Finally, in Step 5, the reader assesses the level of completeness of his or her task product. This may lead the reader to consider the task complete and to quit, or to recycle through Steps 1, 2 or 4.

The MD-TRACE model acknowledges the importance of diverse cognitive resources that the reader has available to apply to this complex learning situation. In addition to general world knowledge, reading and search skills, and working memory ability, these internal resources will include discipline-specific knowledge. For example, the reader has to have knowledge of narrative and argument schema for organizing content for the integrated situations model. The reader also has to know what counts as evidence in the discipline (e.g., empirical results). Similarly, the reader has to have knowledge of source characteristics that are important in the discipline and how various features are evaluated (e.g., peer-reviewed articles, eye-witness accounts). In the
remainder of this article, however, we focus on the importance of epistemic beliefs to how students approach the complex task of making sense of a set of partly contradictory texts on a particular topic. Thus, we next review empirical research linking this individual difference variable to the comprehension of multiple expository texts. Afterward, we return to the documents model framework in an effort to explain the potential role of epistemic beliefs for multiple-text comprehension in terms of theory.

### EPISTEMIC BELIEFS AND MULTIPLE-TEXT COMPREHENSION

In educational research, epistemic beliefs generally refer to students’ (and other individuals’) views about knowledge and knowing (i.e., about the epistemic; Bråten, 2010). There are several viable paradigmatic approaches to research in this area (Hofer, 2004c; Hofer & Pintrich, 2002). It can be argued, however, that the presently most widely accepted conceptualization of epistemic beliefs, at least among educational psychologists, is the one proposed by Hofer and Pintrich (1997) after an extensive review of the literature. This framework describes a system consisting of four belief dimensions—two concerning the nature of knowledge (what one believes knowledge is) and two concerning the nature of knowing (how one comes to know). Each dimension is considered to reflect a continuum.¹ The two dimensions concerning the nature of knowledge are *simplicity of knowledge*, ranging from the belief that knowledge consists of an accumulation of more or less isolated facts to the belief that knowledge consists of highly interrelated concepts, and *certainty of knowledge*, ranging from the belief that knowledge is absolute and unchanging to the belief that knowledge is tentative and evolving. The two dimensions concerning the nature of knowing are *source of knowledge*, ranging from the conception that knowledge originates outside the self and resides in external authority, from which it may be transmitted, to the conception that knowledge is actively constructed by the person in interaction with others, and *justification for knowing*, ranging from justification of knowledge claims through observation and authority, or on the basis of what feels right, to the use of rules of inquiry and the evaluation and integration of different sources. Although factor-analytic studies using measures created on the basis of Hofer and Pintrich’s (1997) multidimensional conceptualization (Bråten, Gil, et al., 2008; Bråten, Gil, Strømso, & Vidal-Abarca, 2009; Bråten, Strømso, & Samuelstuen, 2005; Hofer, 2000; Karabenick & Moosa, 2005; Kienhues, Bromme, & Stahl, 2008) have not consistently verified the four belief dimensions, use of qualitative methodologies such as observations and interviews (Hofer, 2004b; Schommer-Aikins, 2008) or think-aloud protocols (Hofer, 2004a) indicates that all of them are represented in students’ epistemic thinking. Moreover, there is a growing research base linking all four dimensions in the Hofer and Pintrich (1997) framework to the comprehension of multiple texts.

The issue of domain-generality versus domain-specificity of epistemic beliefs has been much debated, with most of the

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¹Although epistemic belief dimensions were originally considered to reflect continuums ranging from naïve (lower level) to sophisticated (higher level) beliefs (Hofer & Pintrich, 1997; Schommer, 1990), this terminology is problematic not least because epistemic beliefs that are adaptive in a particular context may not be adaptive in another context (e.g., Bråten, Strømso, et al., 2008; Hofer & Sinatra, 2010). Therefore, we decided to describe epistemic beliefs in more neutral terms (e.g., as beliefs in certain or tentative and evolving knowledge) rather than using more generic, value-laden terminology (i.e., naïve or sophisticated beliefs).
evidence indicating that students hold beliefs about knowledge and knowing in general as well as beliefs about knowledge and knowing in specific academic domains or disciplines (for reviews, see Buehl & Alexander, 2001; Muis, Bendixen, & Haaerle, 2006). In addition, recent evidence indicates that students also hold epistemic beliefs regarding specific topics or delimited subject areas within academic domains (Bråten, Gil, et al., 2009; Stahl & Bromme, 2007; Trautwein & Lüdtke, 2007). Thus, epistemic beliefs at different levels of specificity may be related to multiple-text comprehension.

Simplicity Beliefs and Multiple-Text Comprehension

In a pioneer study, Jacobson and Spiro (1995) found that students who believed in simple knowledge had problems handling the nonlinear and multidimensional nature of an ill-defined hypertext system. In that study, students holding epistemic beliefs involving an oversimplification of complex and ill-structured knowledge were not able to profit from the reading of multiple documents in the same way as students favoring content complexity, as evidenced by their performance with respect to deep-level comprehension of the topic (the impact of technology on 20th-century society and culture). Jacobson and Spiro (1995) measured epistemic beliefs with a Likert-type, domain-general questionnaire and comprehension with transfer tasks in the form of problem-solving essays. At about the same time, Rukavina and Daneman (1996) reported that high school and undergraduate students believing more in the complexity of knowledge were better equipped to integrate ideas across two separate texts representing competing theories about scientific problems than were those more likely to believe in simple knowledge. Rukavina and Daneman also assessed simplicity beliefs with a Likert-type, domain-general questionnaire, using both multiple-choice and short-answer questions addressing integrative understanding as dependent measures. Thus, two early studies provided preliminary evidence suggesting that believing knowledge to be complex rather than simple may be facilitative when readers try to build an integrated understanding across multiple texts.

A decade later, Bråten and Stromsø (2006b) presented new evidence indicating that college students may gain deep situational understandings from the reading of multiple conflicting texts on a particular topic (attention-deficit hyperactivity disorder) only to the extent that they hold adaptive epistemic beliefs, including beliefs in complex knowledge. With less adaptive beliefs, they may actually be better off when encountering the same content in an integrated textbook format. According to Bråten and Stromsø (2006a), the observed differences between readers holding more and less adaptive beliefs with respect to multiple-text comprehension could, at least in part, be explained by readers with adaptive beliefs engaging more in deep-level processing in the form of elaboration and monitoring. However, this research is limited by the fact that Bråten and Stromsø (2006a, 2006b) did not differentiate between dimensions but assessed epistemic beliefs globally, also including questionnaire items pertaining to beliefs about learning and intelligence (see Bråten, 2008, for a summary of these studies).

Consistent with the early studies of Jacobson and Spiro (1995) and Rukavina and Daneman (1996), Stromsø et al. (2008) recently demonstrated that education undergraduates’ beliefs concerning the simplicity of knowledge uniquely predicted both their intratextual (within-text) and intertextual (cross-text) comprehension after variance associated with gender, study experience, word decoding, and prior knowledge was accounted for, indicating that students believing knowledge about the topic of reading to be theoretical and complex were more likely to perform well on the comprehension measures than were students believing knowledge about the topic to consist of a loose collection of facts. Bråten and Stromsø (2010b), also controlling for prior knowledge, demonstrated a unique relationship between beliefs in complex knowledge and multiple-text comprehension in a sample of relatively experienced law students. In the same vein, Bråten and Stromsø (2010a) observed that education undergraduates believing that knowledge was complex profited more from the task of constructing elaborative summaries when trying to comprehend multiple, partly conflicting texts than did students believing in simple knowledge. Hagen, Stromsø, and Bråten (2009) reported that students’ strategic processing, as evidenced by their note-taking while reading multiple texts, seemed to reflect their epistemic beliefs concerning the simplicity of knowledge. Specifically, students believing knowledge to be theoretical and complex seemed more likely to produce within- and cross-text elaborations, whereas students believing knowledge to consist of a loose collection of facts seemed more likely to paraphrase simple, factual information from single texts. In turn, both students’ within- and cross-text elaborations, but not their paraphrases, were positively related to their intertextual comprehension performance. It should be noted that in their recent studies, Bråten and colleagues have used a questionnaire capturing four epistemic belief dimensions defined by Hofer and Pintrich (1997) at a topic-specific level, that is, in relation to a particular topic (climate change), while using yes/no verification tasks to assess both intratextual and intertextual comprehension of multiple documents dealing with the same topic. Moreover, participants’ scores on these four dimensions have been uncorrelated or only weakly correlated in their empirical work.

Finally, Pieschl, Stahl, and Bromme (2008) found that students who believed in complex knowledge were more able to self-regulate their learning in relation to task demands and gained more knowledge when reading hypertext on the topic of genetic fingerprinting. In particular, students believing in complex knowledge seemed to be more concerned with getting a global overview of the complex textual
materials and understanding interrelations among units of information. In that study, epistemic beliefs were assessed by a Likert-type domain-general questionnaire, self-regulation by log files indicating hypertext navigation, and knowledge gains by multiple-choice questions pertaining to main concepts explained in the hypertext.

Certainty Beliefs and Multiple-Text Comprehension

With respect to the other belief dimension concerning the nature of knowledge, certainty of knowledge, Strømsø et al. (2008) also found that such beliefs uniquely predicted multiple-text comprehension, indicating that readers believing knowledge about climate change to be absolute and unchanging. The unique predictability of certainty beliefs for multiple-text comprehension was not replicated by Strømsø and Bråten (2009) when using the same materials with a sample of high school students, however. Also focusing on epistemic beliefs concerning the certainty of knowledge, Strømsø and Bråten (2010a) found that the effect of reading task was moderated by undergraduate students’ beliefs, with students considering knowledge to be tentative more able to profit from argument tasks than were students considering knowledge to be certain. This suggests that instructing students to construct arguments from what they read, a task much applauded by educationalists (Wiley & Voss, 1996, 1999), is not necessarily optimal for every student, that is, regardless of their beliefs concerning the certainty of knowledge.

Similar results have been obtained in research on epistemic beliefs and multiple-text comprehension among Spanish undergraduates (Gil et al., 2010b; Gil, Vidal-Abarca, Bråten, & Strømsø, 2008) using Spanish versions of the materials originally developed by Bråten and colleagues in Norwegian. In that research, students holding that knowledge about the reading topic consists of unambiguous and unconditional truths have been found to be particularly hindered by argument tasks when reading multiple texts on the same topic, whereas students holding that knowledge about the topic is ambiguous and conditional have been found to perform as well in this challenging task condition as when asked to summarize information from the texts. Of note is that both essay and verification tasks have been used as dependent measures in the Spanish experiments.

In Pieschl et al.’s (2008) study, students holding the domain-general belief that knowledge is tentative processed a higher percentage of deeper level hypertext nodes about the topic of reading (genetic fingerprinting) than did students holding the belief that knowledge is absolute and exact, suggesting that the first-mentioned readers were also more likely to cover the most complex textual materials dealing with the topic more completely. At the same time, students holding the topic-specific belief that knowledge of genetics is variable over time were found to spend more time reading information concerning uncertain and problematic aspects of the topic than were students holding the belief that knowledge of genetics is stable, suggesting that the first-mentioned readers were also more likely to critically evaluate different perspectives on the topic. Pieschl et al. did not find that students differing on the certainty dimension (with respect to either domain-general of topic-specific beliefs) performed differently after having studied the hypertext, however, with a possible reason for this being that readers’ cross-text comprehension (i.e., documents model representation) was not really assessed in that study.

Source Beliefs and Multiple-Text Comprehension

With respect to the epistemic belief dimension concerning the source of knowledge, Strømsø et al. (2008) found that scores on this dimension uniquely predicted students’ intratextual but not their intertextual comprehension of multiple texts. Somewhat surprisingly, beliefs that the knower is an active constructor of meaning negatively predicted deeper comprehension of single texts in that study. Following up on the Strømsø et al. (2008) study, Bråten, Strømsø, et al. (2008) documented that students viewing knowledge as transmitted from experts actually obtained better multiple-text comprehension (both intratextual and intertextual) than did students viewing knowledge as constructed by the self.

Based on their findings, Bråten, Strømsø, et al. (2008) posited that when readers are required to learn from multiple expository texts dealing with a complex, relatively unfamiliar topic, which is quite common both in and out of school, viewing knowledge as personal construction rather than transmitted from experts may be maladaptive because readers concentrate too much on subjective interpretation at the expense of figuring out precisely what the authors and texts say. In addition, Bråten, Strømsø, et al. (2008) showed that readers believing knowledge to be transmitted from experts and, simultaneously, believing knowledge to be complex were at a particular advantage with respect to multiple-text comprehension.

Justification Beliefs and Multiple-Text Comprehension

According to J. A. Greene, Azevedo, and Torney-Purta (2008), it can be argued that beliefs concerning the justification for knowing are the least well developed of the four dimensions of the Hofer and Pintrich (1997) framework. At the same time, J. A. Greene et al. (2008) argued that because justification is the central question of philosophical epistemology, this dimension should be elaborated and differentiated and assigned a pivotal role also in educational research on epistemic beliefs or cognition. (In fact, J. A. Greene et al. argued, based on philosophical epistemology, that beliefs or
As reviewed by Buehl (2008), the justification dimension has seldom appeared in factor-analytic studies, and evidence linking this dimension to any kind of learning outcome is sparse. Moreover, although some qualitative studies conducted by multidimensionalists (Hofer, 2004a, 2004b; Schommer-Aikins, 2008) seem to provide evidence for the justification dimension, they do not add much to our knowledge about potential linkages between such beliefs and learning or comprehension. With respect to reading, it is theoretically plausible that individuals who believe that knowledge claims need to be justified would also be better off when trying to construct meaning from multiple texts containing diverse and even contradictory perspectives. However, at least to our knowledge, there was no empirical underpinning for that hunch until Bråten and Strømsø (2010b) showed that some justification beliefs may, indeed, be linked to better multiple-text comprehension. In that study, using a sample of relatively experienced law students, the justification dimension reflected a continuum where high scores represented the belief that knowledge claims should be based on rules of inquiry and the evaluation and integration of multiple knowledge sources, and low scores represented the belief that knowledge claims can be justified through own opinion, firsthand experience, or common sense. Of note is that epistemic beliefs again were measured with respect to a particular topic (i.e., justification for knowing about climate change) and that students read multiple texts dealing with the same topic. In this complex reading-task context, it was found that a belief in justification through rules of inquiry and cross-checking of knowledge sources predicted students’ meaning construction independent of their prior knowledge about the topic.

Bråten and Strømsø (2010b) considered it reasonable that the belief dimension concerning justification of knowledge claims became more salient and played a more important role among relatively experienced law students than among the education undergraduates participating in their prior research, where data did not demonstrate that justification beliefs played a unique role in determining multiple-text comprehension (Strømsø et al., 2008). One reason for this might be the very strong emphasis on the evaluation and integration of various source documents in the law degree program. Moreover, because the law students were reading multiple texts on a scientific topic, Bråten and Strømsø’s (2010b) findings could be said to indicate an extension or transfer of skills in handling multiple law documents to the comprehension of complex science information.

However, when Strømsø and Bråten (2009) examined the role of topic-specific beliefs concerning the justification for knowing in the comprehension of multiple texts among Norwegian high school students, they found the contribution of justification beliefs to override the contribution of topic knowledge as well as topic interest to both within- and cross-text comprehension. Thus, although justification beliefs are presumably considerably more vague and undeveloped in high school than in law students, the Strømsø and Bråten (2009) study actually suggests that even the multiple-text comprehension of students in preundergraduate education may be facilitated by beliefs in the need to critically examine, evaluate, and integrate multiple information sources when encountering knowledge claims.

Also, in a study of the relationship between Internet-specific epistemic beliefs (i.e., beliefs concerning what knowledge and knowing are like on the Internet) and self-regulated, Internet-based learning, Strømsø and Bråten (2010) found that beliefs related to the justification for knowing uniquely predicted the use of metacognitive strategies, such as planning, monitoring, and regulating, among physics undergraduates. Specifically, students tending to believe that Internet-based knowledge claims need to be checked against other sources, reason, or prior knowledge, were also more likely to use metacognitive strategies when dealing with course-related information on the Internet.

It should be noted that our empirical work builds on a somewhat broader conceptualization of the justification for knowing dimension than what has been common in the literature on epistemic belief dimensions. Thus, as part of this dimension, we have counted beliefs in justification through own opinion, firsthand experience, and common sense at one end of the continuum, and beliefs in justification through reason (i.e., critical thinking), prior domain knowledge, scientific inquiry, and cross-checking of sources at the other end of the continuum. There is no clear parallel to this dimension in Schommer’s (1990) early multidimensional conceptualization of personal epistemology. Moreover, our conceptualization of the justification dimension also seems to include a larger range of epistemic beliefs than what is found in Hofer and Pintrich’s (1997) influential framework (see earlier).

Epistemic Beliefs and Source Evaluation

Finally, Strømsø, Bråten, and Britt (in press) examined whether undergraduates’ topic-specific epistemic beliefs uniquely predicted their judgments of texts’ trustworthiness as well as which criteria (i.e., source characteristics) they used in this process. In that study, two texts concerning climate change were used: a popular science text published by the Center for Climate and Environmental Research and a newspaper article written by a journalist in a conservative daily (see Figure 1). First, it was found that the more students believed that knowledge claims about climate change should be based on reason, scientific inquiry, and the evaluation and integration of multiple sources, the more trustworthy they judged the popular science text to be; and the more complex they believed knowledge about this topic to be, the less they trusted the information in the newspaper article. In addition, the more they believed that knowledge is transmitted by experts, the more they trusted the information in both texts.
Second, the more they believed in justification through the use of reason, scientific inquiry, and multiple sources, the more criteria students used when judging the trustworthiness of the popular science text. In addition, the more students believed knowledge to be transmitted from experts, the more they based their trustworthiness judgments of the popular science text on its content and the less they based their trustworthiness judgments of both texts on their own opinion about the issue of global warming.

Summary

In this section of the article we have shown that there is amounting empirical evidence that beliefs concerning the nature of knowledge and knowing are linked to the comprehension of multiple texts. Thus, as summarized in Table 3, all four epistemic belief dimensions figuring in Hofer and Pintrich’s (1997) framework have been shown to play a role when students try to make sense of diverse texts presenting partly conflicting views on a particular topic or issue.

We believe these findings are far from trivial, as the individual prerequisites of this ubiquitous task are critical for contemporary educationalists to understand. However, for us, as researchers, it is also important to understand how the relationship between epistemic beliefs and multiple-text comprehension works in terms of theory, not least because a theoretical framing of the findings may initiate further empirical research that, in turn, may refine our current theorizing on the issue. Therefore, we try next to make sense of the findings reported in this section and summarized in Table 3 by suggesting how each of the four belief dimensions might be related to components of the documents model.

EPISTEMIC BELIEFS AND DOCUMENTS MODEL CONSTRUCTION

Here we propose a model that builds on the documents model of multiple-text comprehension while being informed by recent research on the role of epistemic beliefs when students...
read multiple texts. Specifically, we propose an extension and refinement of the documents model by incorporating epistemic beliefs into that model, trying to describe not only how but also why dimensions of epistemic beliefs are related to components of the documents model. We will use a simple documents model that might be constructed from the reading of four texts about climate change for illustrative purposes when describing the model incorporating epistemic beliefs (see, e.g., Bråten, Strømsø, et al., 2009, for a detailed description of these texts). The four texts contain partly conflicting information, with two texts presenting different views on the causes of global warming (mammade vs. natural) and two texts presenting different views on the consequences of global warming (negative vs. positive). In Figure 1, the situations model is depicted by boxes representing the content of the texts and solid lines representing integration of content across texts (i.e., content-content links). The intertext model is illustrated by ovals representing information about the sources and broken lines representing relationships between source information and content (i.e., source-content links) as well as relationships between sources (i.e., source-source links). A reader who has built an integrated understanding from these texts understands that there are arguments and evidence for natural (astronomical conditions) as well as mammade (discharges of climate gases) causes of global warming. In addition, he or she would have gained the understanding that notwithstanding the cause, the consequences of global warming are likely to be mainly negative (e.g., more extreme weather and raising ocean levels) but some of them may actually be considered positive (e.g., an ice-free sea route through the Northwest Passage and access to natural resources concealed under the Arctic ice). As can be seen in Figure 1, content included in the situations model is tagged for its source, indicating that the reader remembers from which source a piece of information originates as well as some characteristics of that source. That content in the situations model is linked to source information in the intertext model allows the reader to consider the trustworthiness of the content in light of characteristics of the source. For example, the reader may downplay the role of positive consequences of global warming in his or her interpretation of the situation described across texts because he or she doubts the trustworthiness of the source, believing that the conservative newspaper may have a political agenda. Thus, even though all the texts in the example contribute to the reader's overall comprehension of the issue, the weight and position that content linked to a source is assigned in the situational representation are affected by how the reader judge the trustworthiness of that source. Finally, the source-source links displayed in Figure 1 indicate that the reader has recognized that the texts authored by the climate research center and the astrophysicist disagree on the causes of global warming but also understands that their differing explanations may be seen as complementing each other. Likewise, they illustrate that the reader has noted that the liberal and the conservative newspaper present opposing views on the consequences of global warming but also that it is not necessary to view the consequences of global warming as either negative or positive. Before specifying how and why each belief dimension may be linked to the documents model, we briefly highlight main empirical findings regarding that dimension and multiple-text comprehension.

### Simplicity Beliefs and the Documents Model

There are consistent findings supporting the notion that believing knowledge to be complex rather that simple may be facilitative when readers try to build an integrated understanding across texts (e.g., Bråten & Strømsø, 2010b; Rukavina & Daneman, 1996; Strømsø et al., 2008). Moreover, some preliminary evidence suggests that beliefs in complex knowledge may be related to self-regulated and deeper level processing in the form of overview generation and cross-text elaborations when students read multiple texts (Hagen et al., 2009; Pieschl et al., 2008). Finally, students believing knowledge in an area to be complex may rely less on information from sources that often simplify rather than elaborate upon complex issues, such as a newspaper (Strømsø et al., in press).

As depicted in Figure 1, our proposal for an integrated model implies that beliefs concerning the simplicity of knowledge are mainly related to situations-model construction, that is, to the integration of information across texts. There are several reasons for this that may be related to
different phases of the multiple-text comprehension process, with this view also consistent with Muis’s (2007) framework concerning the role of epistemic beliefs in self-regulated learning. First, whether given or setting themselves the task of comprehending a set of texts containing conflicting information about a topic or issue, readers differing with respect to the simplicity of knowledge dimension may generate quite different perceptions of the task. Thus, a reader believing knowledge concerning the domain or topic of reading to be complex and consist of highly interrelated concepts or ideas is likely to define the task as one requiring the integration of information across texts. In contrast, a reader viewing knowledge in the area to consist of more or less isolated facts seems more likely to define the task as one of accumulating or gathering as many pieces of factual information as possible from the texts.

Second, these different task definitions may lead to quite different goals or standards for task completion. Based on a task definition emphasizing demand for integration, a reader may set the goal of constructing a global, coherent representation of the issue discussed in the texts. In other words, this reader’s standard of global coherence could therefore be described as quite low. In terms of the MD-TRACE model (see Table 2), such differences in situations-model construction concern Step 1, that is, the creation of the task model.

**TABLE 4**

<table>
<thead>
<tr>
<th>Simplicity Dimension</th>
<th>Certainty Dimension</th>
<th>Source Dimension</th>
<th>Justification Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Situations-model construction</td>
<td>Complex: Defines task as integration; aims at coherent representation; engages in overview generation, cross-text elaboration, and monitoring (corroboration); accepts coherent, integrated understanding.</td>
<td>Tentative and evolving: Corroborates to create representation based on argument schema. Certain: Processes information superficially in single text to locate correct answer.</td>
<td>Transmitted by experts: Gives prominence to trustworthy information in overall representation; corroborates in search for expert knowledge and evidence. Constructed by self: Differentiates less between trustworthy and untrustworthy information; builds on poorer textbase representations; corroborates less.</td>
</tr>
<tr>
<td>Intertext-model construction</td>
<td>Complex: Mistrusts and downplays information from simplifying sources. Simple: Trusts and gives prominence to simplifying sources.</td>
<td>Tentative and evolving: Defines task as exploring different sources; aims at understanding different perspectives; pays attention to uncertainties, and establishes source-content and source-source links; accepts understanding of breadth and diversity; uses argument schema. Certain: Defines task as finding true answer; aims at reproducing indisputable solution; searches for truth in single source and avoids reading more when this is located; accepts identification of correct information.</td>
<td>Transmitted by experts: Defines task as understanding experts’ views; realizes (or overestimates) need for external resources; pays attention to relevant source characteristics; distinguishes more or less trustworthy sources; establishes source-content links; accepts overview of expert knowledge. Constructed by self: Defines task as forming (or confirming) own view; underestimates need for external resources; relies less on external resources; pays less attention to source content and more to own opinion; fails to distinguish more or less trustworthy sources; accepts own opinion.</td>
</tr>
</tbody>
</table>

Note. Adaptive beliefs on the justification dimension indicate beliefs in the need to justify knowledge claims through reason, rules of inquiry, and the evaluation and integration of multiple sources; maladaptive beliefs on this dimension indicate beliefs in justification through own opinion, firsthand experience, and common sense.
Third, these different goals and standards for task completion will probably translate into different strategic approaches to the task. Most likely, a reader setting out with the goal of constructing a global, coherent understanding of text contents will try to self-regulate his or her processing to fit the complexity of the task, seeking to create an overview of the materials and engaging in cross-text elaboration and monitoring to try to meet the high standard of global coherence. Presumably, by carrying out such deeper level intertextual linking strategies while reading, individuals believing knowledge to be complex also increase their chances of constructing the bridging inferences necessary to build a coherent representation from texts that differ and even contradict each other. There does not seem to be any good reason for a reader setting out to produce a list of unrelated facts to bother much about how he or she should proceed to piece together an integrated representation from diverse texts, however. Instead, he or she could be expected to rely more on superficial strategies such as rehearsing or paraphrasing factual information to memorize as much as possible from the texts, without considering relationships among facts. Indeed, it seems highly reasonable that such a reader would be at a particular disadvantage when trying to make sense of multiple texts discussing different perspectives on a particular topic or issue. In terms of our previous discussion of strategies supporting documents model construction and the steps of this process, intertextual integration through corroboration seems to be especially facilitated by beliefs in complex knowledge (see Step 3c in the MD-TRACE model).

Finally, when readers evaluate their text processing and comprehension in relation to the standards they set, either during or after reading the texts, these standards will affect what kind of processing and representation they judge to be acceptable. A reader operating with a standard based on a belief in complex and interrelated knowledge may want to carry on until he or she has constructed a coherent, integrated understanding of the issue, whereas a reader operating with a standard based on a belief in simple knowledge may well be happy with a fragmentary, superficial understanding of the issue. Thus, readers differing on the simplicity dimension are also likely to differ in terms of Step 5 in the MD-TRACE model (i.e., assessment of product completeness/quality).

As can be seen in Figure 1, although we posit that beliefs concerning the simplicity of knowledge primarily play a role in situations-model construction, our proposal also relates the simplicity dimension to the intertext component of the documents model. For example, by relying less on sources representing a simplified view on an issue, readers believing knowledge to be complex may downplay information stemming from such sources in their global understanding of the issue, whereas sources presenting simple factual information instead of discussing the issue in its complexity may be trusted more and given more prominence in the representation constructed by readers believing knowledge to be simple. Thus, the sourcing heuristic described in Table 1 and included in Step 3c of the MD-TRACE model may seem to be facilitated by beliefs in complex knowledge. Moreover, because the construction of a coherent, integrated representation of multiple documents seems to require attention to what said what (i.e., source-content links) as well as relationships among sources (i.e., source-source links), at least when the documents contradict each other (see our earlier discussion of the documents model), one could also assume that beliefs in complex knowledge would facilitate the construction of the intertext model.

In sum, then, beliefs in complex rather than simple knowledge seem to support the application of several of the steps involved in the construction of a documents model (see Table 2). In addition, such beliefs help explain the employment of facilitative strategic processes (see Table 1). Table 4 summarizes the specific relationships that we propose between beliefs concerning the simplicity of knowledge and documents model construction.

**Certainty Beliefs and the Documents Model**

With respect to the certainty dimension, beliefs in tentative and evolving rather than certain knowledge seem to play a particularly important role when students are trying to construct arguments based on what they read (Bråten & Strømsø, 2010a; Gil et al., 2010b), with those believing more in tentative and evolving knowledge seemingly more likely to study the materials in full breadth and dig into even the more problematic and controversial aspects of the issue they read about in multiple documents (Pieschl et al., 2008).

As illustrated in Figure 1, our proposal for an integrated theoretical model between epistemic beliefs and multiple-text comprehension suggests that beliefs related to the certainty of knowledge primarily play a role in intertext-model construction. Again, one reason may be that individuals differing with respect to this dimension may generate quite different perceptions of the task when reading multiple texts on a topic or issue. A reader who believes that knowledge pertaining to the issue is tentative and evolving will presumably define the task as one requiring the exploration and representation of contrasting points of view located in different sources. However, a reader who believes that knowledge in the area is absolute and unchanging will presumably define the task as one of identifying the correct answer or solution to the problem at hand. In turn, a reader activating the belief that knowledge is tentative and evolving may try to achieve the goal of understanding different perspectives or potential solutions when encountering multiple texts, as well as how and why those perspectives or solutions differ (or coincide) in the way they do. Moreover, to achieve that goal, readers probably have to engage in active constructive processing of the texts, paying close attention to the intricacies and uncertainties of the issue, noting who said what for what reason, and trying to establish relationships among the different sources. In contrast, a reader activating the belief that knowledge is
absolute and unchanging is more likely to pursue the goal of reproducing an approved or, even better, indisputable solution to the issue from the source materials. And, in trying to achieve this, such a reader will probably engage in more superficial strategic processing, trying to search for and locate the “truth” about the issue in a particular text without paying much attention to who said what or relationships among sources. Indeed, trying to identify truth amidst a multitude of viewpoints may seem like a very confusing and frustrating experience for a reader believing in certain knowledge, who may want to escape this fuzzy and noisy reading environment as soon as a piece of information is located that can function as a plausible solution. Thus, readers differing with respect to beliefs concerning the certainty of knowledge can be assumed to differ not only regarding task model creation (i.e., Step 1 of the MD-TRACE model) but also regarding strategic processes involved in documents model construction (i.e., Step 3e of the MD-TRACE model), in particular regarding the kind of sourcing summarized in Table 1. Finally, whereas a reader working toward the goal of understanding different perspectives in relation to their sources may not evaluate his or her processing and representation as satisfactory unless he or she has understood the breadth and diversity of the source materials, a reader seeking an accurate or stable answer or solution to the issue may evaluate his or her performance by considering whether the correct piece of information has been identified or not. However, the last-mentioned reader’s own evaluation notwithstanding, when competent external feedback is provided in this complex reading-task context, the reader will more often than not be disappointed whatever single answer or solution he or she has come up with. In terms of the MD-TRACE model, this final point concerns differences located in Step 5 of that model, dealing with the assessment of product completeness or quality.

It seems reasonable that beliefs related to the certainty of knowledge play a particularly important role when readers are told to construct arguments from what they read, specifically, to express and justify their own opinion on a particular issue based on the contents of multiple conflicting texts. In this task condition, realizing the tentative and ambiguous nature of knowledge may clearly facilitate the use of an argument schema to guide representation, as such beliefs may involve a greater openness toward different positions and sides with respect to an issue and, therefore, help readers construct their own arguments by relating and transforming the different viewpoints presented in the texts. Another, related, possibility is that readers’ beliefs in the tentative and evolving nature of knowledge may authorize them to express and justify their own opinion through active constructive processing of the different arguments and the supporting evidence contained in the texts, transforming those argument and the evidence into pros and cons when generating their own opinion of the issue. In brief, the requirements of the challenging argument task seem to match the mindset created by an activation of beliefs in tentative and evolving knowledge when students read multiple texts. It also stands to reason that task instruction to construct arguments from multiple conflicting texts may constrain rather than facilitate the performance of readers activating beliefs in certain knowledge. Indeed, in such instances there seems to be a clear mismatch between the assignment and readers’ own frame of reference.

Figure 1 also illustrates that beliefs concerning the certainty of knowledge are supposed to play a, albeit secondary, role in situations-model construction. Especially when individuals read multiple texts to express and justify their own opinion on a controversial issue, those believing in tentative and evolving knowledge may engage more in complex, cross-text processing to relate and transform explanations and arguments in the texts, with this, in turn, leading to a more integrated understanding of the situation described across texts. This assumption, of course, links beliefs in tentative and evolving knowledge to greater use of the corroboration heuristic discussed earlier (see Table 1). In contrast, those holding the belief that knowledge is certain may engage more in superficial processing of information in single texts and not bother to read more texts than they deem necessary to identify the “correct” answer. Finally, because the source-content and source-source links of the intertext model are considered necessary to construct a coherent mental representation of the situation described across documents when confronted with contrasting or conflicting perspectives, it can be posited that believing in tentative and evolving knowledge may facilitate construction of the situations model through its influence on intertext-model construction.

Again, beliefs in tentative and evolving knowledge thus seem to support steps involved in the construction of a documents model according to Rouet and Britt’s (in press) MD-TRACE model and positively influence the types of strategic processing deemed important for representing (primarily) intertext and (secondarily) situations model components (see Table 1). Table 4 summarizes the specific relationships proposed between beliefs concerning the certainty of knowledge and documents model construction.

Source Beliefs and the Documents Model

When students are reading multiple expository texts on a relatively unfamiliar topic there is currently some evidence that viewing knowledge to be transmitted by authorities and experts may be adaptive (Bråten, Strømsø, et al., 2008; Strømsø et al., 2008). Such beliefs have also been found to be related to more trust in information students encounter in external sources, less emphasis on personal opinion as a criterion for judging the trustworthiness of sources, and more attention to content when judging the trustworthiness of presumably reliable sources, such as a well-known and highly respected research center (Strømsø et al., in press). Thus, in the complex and challenging reading-task context discussed in this article, accepting the authority of informed authors and focusing on
their intended messages as well as on the texts’ ideas seem to be the wiser strategy.

As depicted in Figure 1, our proposal for an integrated model implies that beliefs concerning the source of knowledge are mainly related to the intertext component of the documents model. We posit that the reason for this is that readers’ source evaluation, that is, their evaluation of the trustworthiness of information based on attention to relevant source characteristics, such as what kind of document it is or its main ideas, may suffer when readers believe too strongly or one-sidedly in the self as a constructor of knowledge.

Evaluating document information in light of relevant characteristics of the source is an important part of the construction of source-content links, which plays a central role in intertext-model construction. In this process, it seems essential that readers are able to distinguish the wheat from the tares and rely on more trustworthy sources at the expense of discredited or strongly biased ones. For example, one advantage may be that readers who appreciate the importance of trustworthy sources will spend extra cognitive resources on trying to understand them deeply. To the extent that those sources discuss content that is central to the topic of reading in some breadth, good comprehension performance may follow from assigning them more weight and reading them in a more active, strategic way. However, when readers believe that knowledge about the topic of reading is personally constructed rather than transmitted from authorities and experts, they may be generally more sceptical to external information sources and fail to distinguish between more or less trustworthy sources.

Moreover, to be able to determine which sources deserve to be trusted, readers need to attend to relevant characteristics of the source. In particular, basing one’s trustworthiness judgments on the source characteristic of document type (e.g., a tabloid vs. an encyclopaedia article) has been considered an advanced stance in source evaluation (Bråten, Stømsø, et al., 2009; Rouet et al., 1996; Wineburg, 1991). However, when readers have limited documentary expertise, it may also be a wise strategy to carefully consider the contents of the documents when evaluating their trustworthiness (Bråten, Stømsø, et al., 2009; Bråten, Stømsø, & Salmeron, 2011). It is therefore problematic that readers holding the belief that knowledge is personally constructed may be less likely to base their trustworthiness judgments on the source characteristic of content even when they lack experience and skill in handling multiple documents (i.e., documentary expertise). Presumably, those readers’ disproportionately strong attention to the subjective aspect of knowing may lead them to disregard the more objective aspect of knowing represented by the content of the texts (see Bråten, Stømsø, et al., 2008).

As argued by Bråten, Stømsø, et al. (2009), to be able to justify one’s trustworthiness judgments in terms of relevant source characteristics, such as document type or content, may indicate a more advanced and reflective stance on sourcing than just being able to judge trustworthiness more globally without awareness of the most useful source characteristics given the task. To the extent that readers viewing knowledge as personal construction downplay the role of content and put more emphasis on their own personal opinion as a criterion when deciding which sources to trust and which to mistrust, this may indicate an inability to distinguish between more and less relevant source characteristics that does not bode well for the kind of multiple-text comprehension discussed in this article. However, evaluating sources on the basis of one’s personal opinion about the issue seems understandable given a belief in the subjective aspect of knowing.

In terms of the strategic processes involved in documents model construction and the MD-TRACE model (Rouet & Britt, in press) discussed earlier, adaptive source of knowledge beliefs thus seem to be especially facilitative for processes related to sourcing (see Table 1), which, in particular, support Step 3c in the MD-TRACE model (see Table 2). However, readers differing with respect to source of knowledge beliefs may also differ with respect to other steps in the MD-TRACE model. For example, in relation to task-model generation (i.e., Step 1), readers believing knowledge to be transmitted by experts may perceive the task as understanding experts’ views, whereas those viewing knowledge as constructed by the self may perceive it as forming or confirming their own view of the issue; in relation to assessment of information needs (i.e., Step 2), readers believing knowledge to be transmitted from experts may realize (and sometimes overestimate) their need for external resources, whereas those viewing knowledge as constructed by the self may underestimate their need for external resources; and in relation to assessment of product (i.e., Step 5), readers believing knowledge to be transmitted by experts may accept an overview of expert knowledge, whereas those viewing knowledge as constructed by the self may regard the task as completed when they have read enough to form or confirm a personal opinion on the issue.

Moreover, although our proposal implies that beliefs concerning the source of knowledge primarily play a role in intertext-model construction, such beliefs are also supposed to be related to the situations component of the documents model (see Figure 1). One reason is that the source evaluation involved in intertext-model construction may also be associated with the building of an integrated situational understanding of the topic or issue. For example, giving prominence to information from trustworthy sources in the overall representation built from multiple texts is likely to result in a more appropriate mental model of the situation. Likewise, the ability to subordinate or devaluate information from discredited or strongly biased sources may be linked to the construction of a higher quality overall representation of the situation. Less adequate source evaluation associated with strong beliefs in the self as a source of knowledge may thus constrain situations-model construction as well. In addition, it can be assumed that when reading multiple texts presenting contrasting views on a relatively unfamiliar topic, too
much emphasis on the self as a knowledge constructor rather than a knowledge extractor carefully trying to grasp the ideas contained in the different texts may come at the expense of accurate, solid, and coherent textbase representations. Thus, in the context of this complex reading task, the situations model that such readers try to construct by drawing inferences across texts may be too loosely grounded in the meanings of the texts themselves (Bråten, Strømsø, et al., 2008; see also, Maggioni & Fox, 2009). Therefore, processes and steps in documents model construction that are mainly directed toward situations-level representations (see Tables 1 and 2), in particular intertextual integration and corroboration, may also be facilitated by more adaptive beliefs about the source of knowledge. For example, it seems plausible that readers viewing knowledge as transmitted by experts are more likely to engage in corroboration in search of expert knowledge and evidence.

It should be noted that a belief in personal construction of knowledge per se may not be maladaptive when learning from multiple texts as long as it does not override a belief in the need to conscientiously extract the authors’ intended messages and the texts’ ideas. Moreover, relying on personal construction of knowledge seems to constrain multiple-text comprehension less when readers, at the same time, realize that knowledge is theoretical and complex rather than factual and simple (Bråten, Strømsø, et al., 2008). Finally, the detrimental effects of viewing the process of knowing as inherently subjective may well be limited to the reading of expository texts, as there is some evidence that such a view may facilitate the comprehension of narrative, albeit single, texts (Mason, Scirica, & Salvi, 2006; Schraw, 2000).

The specific relations we propose between epistemic beliefs concerning the source of knowledge and documents model construction are summarized in Table 4.

### Justification Beliefs and the Documents Model

With respect to the justification for knowing dimension, believing that knowledge claims need to be justified through reason, rules of inquiry, and the evaluation and integration of multiple information sources have been found to uniquely predict multiple-text comprehension (Bråten & Strømsø, 2010b; Strømsø & Bråten, 2009), with such beliefs also linked to metacognitive strategies such as planning, monitoring, and regulating (Strømsø & Bråten, 2010). Not surprisingly, such justification beliefs have also been linked to trust in research-based sources and attention to different source characteristics when evaluating such sources (Strømsø et al., in press).

Figure 1 shows that our proposal for an integrated theoretical model between epistemic beliefs and multiple-text comprehension suggests that beliefs related to the justification for knowing primarily play a role in situations-model construction. There are several indications in the literature that the construction of an integrated representation of a topic or issue from the reading of multiple documents is associated with the use of deeper level metacognitive strategies (e.g., Aflerbach & Cho, 2009; Azevedo, Greene, & Moos, 2007; Bråten & Strømsø, 2003, 2006a; Stadtler & Bromme, 2008; Strømsø, Bråten, & Samuelstuen, 2003), and such strategies may, in turn, be promoted by adaptive beliefs concerning the justification of knowledge claims (Strømsø & Bråten, 2010). In other words, it seems likely that readers who believe that knowledge claims need to be justified through the use of critical thinking, rules of inquiry, and the evaluation and integration of various information sources will also engage in more metacognitive thinking when encountering opposing claims located in different texts. In such a situation, those readers may be expected to more systematically plan their approach to the task (e.g., in which order they should study the texts, whether they should jump back and forth between the texts, whether they should take intertextual notes, etc.), more carefully monitor the chosen approach and their emerging understanding of the issue, and more actively regulate their approach to the task in response to the results of the monitoring process. In brief, the way readers believing in justification through critical thinking, scientific inquiry, and the use of multiple sources can be expected to scrutinize and evaluate knowledge claims across texts through extensive metacognitive processing also lead us to expect that they will succeed more in bridging different perspectives and piecing together a coherent representation of the situation.

It should also be noted that when Wineburg (1991) described the corroboration heuristic much used by expert historians when working with multiple documents, he actually described an approach to multiple-text reading that seems to presuppose adaptive beliefs on the justification dimension. In essence, corroboration involves the cross-checking of information by parallel reading and establishment of relations among descriptions and explanations contained in different documents. Presumably, such corroboration of information across documents will engage readers in bridging inferential processing that may help them see patterns and, thus, construct a more complete and interconnected mental model of the situation.

With respect to the steps and processes of documents model construction described earlier, the corroboration heuristic supporting cross-text integration (i.e., situations model construction) thus seems to be particularly facilitated by beliefs in justification through reason, rules of inquiry, and cross-checking of knowledge sources. In addition, such justification beliefs may facilitate other important metacognitive processes related to planning, monitoring, and regulation, which were not highlighted in the documents model framework. It can also be assumed that more adaptive beliefs on the justification dimension will facilitate the use of an argument schema to organize an integrated situations model. This proposed link between adaptive justification beliefs and the use of argument schema is also supported by Kuhn’s (1991) research on the relation between an evaluativist epistemology emphasizing justification through rules of inquiry and...
argumentative reasoning or skill (see also Mason & Scirica, 2006).

As shown in Figure 1, our proposal also relates beliefs concerning the justification for knowing to the intertext component of the documents model. One reason is that the corroboration heuristic presumably fuelled by adaptive justification beliefs may also have an impact on the source evaluation involved in intertext-model construction (see Table 1). Specifically, checking the consistency of the content of a source with the contents of other sources may play an important role in judging its trustworthiness (Bråten, Strømsø et al., 2009). Corroborating content across sources may thus inform readers which content is agreed on, which is uniquely mentioned, and which is discrepant. Presumably, this may help readers judge the trustworthiness of a source; for example, strengthening their trust when the source contains information in agreement with other sources and weakening it when it contains unique and discrepant information (see also Britt & Aglinskas, 2002).

Wineburg (1991) himself considered the comparison of content across documents (i.e., corroboration) to be a heuristic distinct from sourcing. In his view, the sourcing heuristic involves attention to source information (e.g., author, text genre, and place and date of document generation) prior to reading the content and using that information to evaluate the trustworthiness of the document. The reason justification beliefs have been linked to reliance on trustworthy sources and use of diverse source characteristics in the evaluation process (Strømsø et al., in press) may thus be that readers who see the need to critically evaluate the knowledge claims they encounter in multiple documents pay more strategic attention to document sources. The source heuristic, as described by Wineburg (1991), can obviously be seen as essential in intertext-model construction.

In sum, then, adaptive justification for knowing beliefs may also positively influence intertext model construction by facilitating both corroboration and sourcing heuristics, consistent with our previous discussion of strategic processes supporting the representation of documents model components (see Table 1).

Finally, according to the documents model, a coherent mental representation cannot be constructed from multiple documents presenting divergent or contradictory perspectives without the representation of sources. It is therefore theoretically implausible that beliefs in the justification of knowledge claims through reason, scientific evidence, and the cross-checking of sources should exert their positive influence solely on the situations model. In other words, the potentially facilitative effect of such beliefs on the integration of information across texts is most likely coupled with some facilitation of intertext-model construction. Table 4 summarizes the specific relations that we propose between beliefs concerning the justification for knowing and documents model construction.

DIRECTIONS FOR FURTHER RESEARCH

The purpose of this article is to highlight how two important lines of research within educational psychology have intersected in recent years: one concerning how individuals comprehend and learn from and with multiple texts or documents, and the other concerning the role of beliefs about knowledge and knowing in cognition and performance. This intersection has resulted in a body of research indicating that not only individuals’ knowledge about the topic of reading itself but also their beliefs about knowledge and the process of knowing are linked to their comprehension of multiple texts. However, the demonstration of empirical relationships among phenomena, as important as it may be, is only one aspect of the research enterprise, with a theoretical framework for understanding how and why epistemic beliefs are related to multiple-text comprehension heretofore mostly conspicuous by its absence.

After having conducted a sizeable portion of the empirical work supporting relations between epistemic beliefs and multiple-text comprehension, we certainly felt a need to summarize and reflect on this work. Even more important, however, was our wish to make up some of the theoretical deficit that has developed in the area by providing more elaborate explanations for the empirical findings. In trying to do so, we presented a model of how and why each of the four epistemic belief dimensions of the Hofer and Pintrich (1997) framework might facilitate or constrain the construction of the kind of documents model originally described by Perfetti and colleagues (Britt et al., 1999; Perfetti et al., 1999) to account for multiple-text comprehension. It should be noted that other research considering epistemic beliefs in the context of dealing with multiple documents (Hofer, 2004a; Mason, Ariasi, & Boldrin, 2011; Mason, Boldrin, & Ariasi, 2010a, 2010b) has been concerned with online information search rather than the reading and comprehension of multiple documents, and learners’ cross-text comprehension (i.e., documents model representation) has not been assessed in that research (see also Maggioni & Fox, 2009). Likewise, other research on multiple-text comprehension utilizing the documents model framework (Britt & Aglinskas, 2002; Nokes et al., 2007; Wiley et al., 2009; Wolfe & Goldman, 2005) has not considered the potential role played by epistemic belief dimensions in documents model construction. By focusing on research exceeding both limitations and tying empirical links established between epistemic belief dimensions and multiple-text comprehension into an expanded documents model framework, our contribution is unique to the field in providing a more comprehensive theoretical perspective from which the complex literacy competencies required in a knowledge society can be analyzed. Moreover, the expanded theoretical perspective that we propose may alert educators to the fact that promoting multiple-documents literacy in students in some instances may have to involve the development of
more adaptive epistemic beliefs regarding the domains and topics of reading.

Although the proposed model builds on previous theorizing and research on both epistemic beliefs and multiple-text comprehension (as well as their intersection), we, of course, acknowledge that it is still somewhat speculative at this stage. However, we sincerely believe that this potential weakness is more than outweighed by its heuristic value. There are thus a host of specific hypotheses for further empirical research that can be derived from our proposal, with this work, in turn, having the potential to refine and extend our theoretical framework. For example, our proposal suggests that individuals differing with respect to simplicity beliefs will generate different perceptions of the task and set themselves different goals when reading multiple texts to learn about a particular topic or issue, also specifying what those different task perceptions and goals might look like. With respect to certainty beliefs, it suggests, for example, that individuals believing knowledge to be absolute or unchanging will experience more confusion and frustration and, if possible, read less than individuals believing knowledge to be tentative and evolving. Moreover, beliefs in the self as a constructor of knowledge are supposed to constrain textbase representation, and differences with respect to justification beliefs are supposed to be associated with differences in planning, monitoring, regulating, and corroborating when individuals encounter opposing claims about a topic or issue that are located in multiple texts. These are just a few examples of the many testable hypotheses included in our integrative theoretical framework. However, in the following, rather than listing a multitude of specific relations that need to be tested to further strengthen (or weaken) our description of how and why epistemic beliefs may be related to multiple-text comprehension, we concentrate our suggestions for further research on a few broader issues that must be addressed in the context of our proposal. Among the heuristic advantages of our integrated model is that it may spark subsequent empirical research on the issues of meditational mechanisms, causality, and generalizability. We hope that it will also spur further conceptual work to clarify such issues as the demarcation between epistemic beliefs and other mental representations and processes and the role of epistemic beliefs in single- and multiple-text comprehension, respectively. The following sections discuss the need for further empirical and conceptual work on these issues.

**Mediation Mechanisms**

First, much more research is needed to understand the meditational mechanisms by which different epistemic belief dimensions may influence multiple-text comprehension. Only a few studies have so far addressed this issue directly, through the investigation of students’ note taking (Hagen et al., 2009) and log-filed navigation (Pieschl et al., 2008), respectively. Those studies have thus started to move beyond survey data by employing trace methodology as described by Winne and colleagues (Winne, Jamieson-Noel, & Muis, 2002; Winne & Perry, 2000). Another possibility is to use online think-aloud protocols (Ericsson & Simon, 1980) to gain more information of how readers differing with respect to epistemic beliefs differ in their use and processing of multiple texts, with such a line of research recently initiated by Maggioni and Fox (2009).

In a project now in progress at the University of Oslo, focusing on epistemic thinking, strategic processing, sourcing, and comprehension performance when students read multiple documents containing conflicting scientific evidence in a Google-like environment, we have chosen to combine trace and think-aloud methodologies. Thus, by combining software-logged data (e.g., reading times, movements within and across documents) with concurrent verbal reports, we hope to provide new evidence regarding the role of epistemic beliefs in the processing of both source information and content within and across documents. It should be noted that this approach to examining epistemic beliefs in the context of multiple-text reading also gives us the opportunity to study epistemic beliefs not only as self-reported beliefs on a questionnaire but as epistemic beliefs in action, that is, as ongoing epistemic judgments and monitoring as assessed through think alouds (cf. Hofer, 2004a; Mason & Boldrin, 2008; Mason, Ariasi, et al., 2011; Mason, Boldrin, et al., 2010b). At the same time, the methodology chosen for our work in progress allows for an increased focus on the role of noncognitive meditational mechanisms, such as motivations, emotions, and values, in the understanding of multiple conflicting texts on a controversial topic, with that issue also not addressed in the literature. Finally, to avoid a mono-operation bias (Cook & Campbell, 1979) when assessing multiple-text comprehension, we recommend that comprehension questionnaires are supplemented with essay tasks that can be used to analyze both the intertext and the situations component of documents models in relation to epistemic beliefs.

**Causality**

Second, more work is needed to further clarify the issue of causality. The studies reviewed in this article are limited by the fact that they have used correlational data, measuring epistemic beliefs on different dimensions and then testing the unique contribution of those dimensions to the comprehension of multiple texts independent of prior knowledge and other relevant control variables. Although relationships have been observed that are consistent with the assumption that epistemic beliefs are causal predictors of multiple-text comprehension, it should be acknowledged that more definite causal statements regarding those relationships must await further experimental (i.e., interventional) work.

To the best of our knowledge, no studies have thus far tried to clarify cause-and-effect relationships by examining whether interventions aimed at (and successful in)
changing epistemic beliefs have had the expected consequences for multiple-text comprehension. Although preliminary evidence indicates that interventions can effectively promote changes in epistemic beliefs (Kienhues et al., 2008; Valanides & Angeli, 2005), it remains to be seen whether such interventions may, in turn, affect students’ multiple-text comprehension positively, as suggested by our theoretical framework. At the same time, relations between epistemic beliefs and learning with multiple texts may well be bidirectional rather than unidirectional, with the reading of multiple texts discussing contrasting perspectives on a topic or issue being particularly effective for promoting epistemic belief changes, possibly through the mechanisms of epistemic doubt, epistemic volition, and resolution strategies described by Bendixen and Rule (2004). We would also suggest, however, that the promotion of more adaptive epistemic beliefs through multiple-text reading may depend on readers’ working memory resources, with the complexity of the task requiring that readers simultaneously store and process the different viewpoints expressed in the texts while also reflecting on their own epistemic beliefs in relation to those viewpoints. In any case, even though our model focuses on how epistemic beliefs influence (facilitate or constrain) multiple-text comprehension, occasions where working with multiple texts may influence epistemic beliefs also need to be examined by future research.

Related to the issue of causality is the issue of whether the different epistemic belief dimensions have only main effects on multiple-text comprehension or whether interactions between different dimensions may also determine performance. Regarding this issue, Bråten and Stømsø (2007) presented preliminary findings suggesting an interaction effect of certainty beliefs with source beliefs on multiple-text comprehension, with students believing that knowledge consists of unambiguous truths and, simultaneously, relying on their own personal judgments and interpretations of the text content being at a particular disadvantage with respect to both intratextual and intertextual deep-level comprehension. In the same vein, Bråten, Stømsø, et al. (2008) observed that students considering knowledge to be complex and, at the same time, believing that knowledge is transmitted from experts performed particularly well with respect to multiple-text comprehension. Notably, in that study, there was also an indication that the detrimental effect of believing that knowledge is constructed by the self to some extent may be neutralized when combined with beliefs in the complexity of knowledge. In our view, such potential interactions between epistemic beliefs should be further investigated in future work.

Generalizability

Third, more research is needed to test the generalizability of the relations found between epistemic beliefs and multiple-text comprehension and, thereby, of our extension of the documents model to account for this research. As noted previously, the documents model framework has recently been supported by research in several domains (e.g., Britt & Aglin-skas, 2002; Bråten, Stømsø, et al., 2009; Stadtler & Bromme, 2008; Wiley et al., 2009). However, although relations between epistemic beliefs and multiple-text comprehension have been established with samples from different student populations in different countries (e.g., Bråten & Stømsø, 2010b; Gil et al., 2010b; Pieschl et al., 2008; Rukavina & Daneman, 1996; Stømsø & Bråten, 2009; Stømsø et al., 2008), this research has so far been limited to rather few topics. It is therefore not clear to what extent relations observed when students read about the topics of climate change (Stømsø et al., 2008) and genetic fingerprinting (Pieschl et al., 2008) are generalizable to other scientific topics or to specific topics in other content areas (see, however, Bråten & Stømsø, 2006b; Jacobson & Spiro, 1995; Rukavina & Daneman, 1996). As argued by Bråten, Stømsø, et al. (2011), topics concerning unsettled or controversial issues that are also related to people’s health or safety may be particularly well suited to activate epistemic beliefs (see also Jungerman, Pfister, & Fischer, 1996; Kolsto, 2001), and, therefore, epistemic beliefs may play a more important role when reading about those topics than when reading about other topics. To try to determine the generalizability of the findings reported on in this article, future research should examine the importance of epistemic beliefs to the comprehension of multiple texts regarding diverse topics within and across domains. Of course, such research would also address the issue of domain generality versus domain specificity of our proposed integrative framework.

In our view, future work on epistemic beliefs and multiple-text comprehension should also encompass other populations varying with respect to both prior knowledge and documentary expertise, preferably from other cultural contexts as well. In particular, examining potential interactions of epistemic beliefs with other reader variables on multiple-text comprehension seems like an area wide open for future research (see Bråten & Stømsø, 2010b, for elaboration). In addition, more research on potential interactions of reader characteristics with task instructions is needed (cf. Gil et al., 2010a), with such research, preferably, also encompassing different topics of reading.

Need for Theoretical Clarification

Among the issues in need for further theoretical clarification is the demarcation between epistemic beliefs and mental representations and processes related to those beliefs. In discussing relationships between epistemic beliefs and documents model construction, we have related epistemic beliefs to mental representations of tasks, goals, and standards for task completion, which we, in accordance with other authors (Muis, 2007; Winne & Hadwin, 1998), have regarded as falling outside the epistemic realm. At the same time,
however, we have linked epistemic beliefs to forms of strategic processing that could well be considered metacognitive epistemic strategies, such as the key processes involved in documents model construction—corroboration and sourcing. In the case of corroboration, this terminology seems suitable because readers can be seen as comparing and contrasting information across texts to validate content information or knowledge (cf. Richter & Schmid, 2010). In the case of sourcing, the categorization of this strategy as a metacognitive epistemic strategy may be appropriate because it involves noting and evaluating source information and using such information to qualify (i.e., validate) content knowledge. The reason epistemic beliefs in our view can be regarded as separate from such epistemic strategies is that holding a particular belief, for example, that knowledge claims should be justified through evaluation and integration of several knowledge sources, does not mean that a reader will necessarily employ a metacognitive epistemic strategy such as corroboration when actually working with multiple documents. It should be noted that we have also discussed the role of epistemic beliefs in kinds of processing that are less clearly epistemic in nature, such as assessing information need and product completion and quality. At this early point in theory development, it is, therefore, our position that both nonepistemic and epistemic representations and processes that may facilitate documents model construction are affected by epistemic beliefs. Still, we acknowledge that much further theoretical work is needed before we can adequately conceptualize this issue.

Another issue in need for clarification at this stage is how to explain the predictability of epistemic beliefs for single- and multiple-text comprehension, respectively. There is empirical evidence that all four dimensions of the Hofer and Pintrich (1997) framework may also predict single-text comprehension (e.g., Bråten & Stromso, 2010b; Buehl & Alexander, 2005; Schommer, 1990; Schraw, 2000), presumably through their effects on situation model construction. Although this does not undermine the importance of demonstrating and discussing the role played by epistemic beliefs in multiple-text comprehension, it raises the issue of exactly how epistemic beliefs work in the two different reading-task contexts. It seems plausible that the relation between epistemic beliefs and multiple-text comprehension is, in part, mediated by comprehension of each single text. However, it is still an open theoretical issue how readers interact with each text when working with multiple texts, for example whether they analyze and synthesize within each individual text as they would do it when reading them in isolation (cf. Goldman et al., 2010). And, if that is not the case, epistemic beliefs may possibly relate to multiple-text comprehension both because they facilitate (or constrain) a particular type of single-text reading that is adaptive in the context of reading multiple texts, and because they facilitate (or constrain) processes that are uniquely involved in multiple-text reading, such as corroboration and sourcing to create an intertext model. In our view, further theoretical clarification of this issue needs to proceed in parallel with the development of models of multiple-text comprehension that more adequately specify the processing and representation of each individual text during documents-model construction.

CONCLUSION

In our time of abundant information sources, both traditional printed media and new digital media make available multiple textual representations on almost every conceivable topic or issue. Of course, this situation affords unique learning opportunities. At the same time, however, it represents unique challenges because high-quality learning requires not only locating and comprehending separate textual resources, as this by itself may well lead to more confusion than insight. In addition, to capitalize on the whole range of materials, learners need to integrate information across sources to construct a more complete representation of the topic or issue than any single resource can afford (Van Meter & Firetto, 2008). Whereas research has suggested that several kinds of higher order processes and skills play a role in that process, this article focused especially on the importance of readers’ beliefs about knowledge and knowing. In doing this, we not only reviewed existing research demonstrating linkages between epistemic beliefs and the comprehension of multiple expository texts but also ventured beyond safe empirical territory to explore how those linkages might be explained in terms of theory. Acknowledging that the integrated model between epistemic beliefs and multiple-text comprehension that we proposed represents but a first step toward filling the theoretical gap existing in this area, we hope that our modest contribution may inspire future researchers to test hypotheses derived from our proposal and, thereby, advance our understanding of this important topic. At the same time, it should be acknowledged that our proposal does not address interesting issues concerning how other belief systems, such as religious or political ideologies, may influence or interact with epistemic beliefs during meaning making. In the case of global warming, it is conceivable that for some individuals, political affiliation or ideology may strongly influence their beliefs about knowledge and knowing concerning the topic, for example, leading them to believe that a particular piece of information is certain and indisputable. On the other hand, it is also conceivable that for some individuals, beliefs about knowledge and knowing concerning the topic of global warming may influence their political affiliation. Although the question of how other belief systems independent of, mediated by, or interacting with epistemic beliefs may influence how individuals come to understand a controversial issue is, indeed, beyond the scope of this article, this question highlights that the issues we discuss are embedded in and evoke even more complex issues regarding the role of beliefs in the construction of meaning.
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