# Reading Multiple and Non-Traditional Texts:

# New Opportunities and New Challenges

Ivar Bråten

University of Oslo, Norway

Jason L. G. Braasch

University of Memphis, USA

Ladislao Salmerón

University of Valencia, Spain

To appear in: E. B. Moje, P. Afflerbach, P. Enciso, & N. K. Lesaux (Eds.), *Handbook of Reading Research* (Vol. V). New York: Routledge.

## Introduction

The purpose of this chapter is to review theory and research on the reading of multiple and non-traditional texts, discuss implications for educational research and practice, and suggest directions for future theoretical and empirical work. Reading multiple texts involves trying to construct meaning from multiple textual resources that present consistent, componential (i.e., information across different texts is part of a larger whole not specified in any single text), or conflicting information on the same situation, issue, or phenomenon (Bråten, Anmarkrud, Brandmo, & Strømsø, 2014; Goldman, 2004). Such textual resources may be digital as well as printed. Compared to printed texts, digital texts afford new opportunities in terms of accessibility, coverage, and topicality, yet pose new challenges due to relaxed parameters for publishing and the consequential need to differentiate useful and reliable texts from those that are not (Britt & Gabrys, 2000; Leu & Maykel, 2016; Lucassen, Muilwijk, Noordzij, & Schraagen, 2013). Still, well into the 21st century, digital texts cannot be considered non-traditional in and of themselves. Accordingly, we will reserve the term non-traditional texts for digital texts embedded in social activity. More specifically, the reading of non-traditional texts is taken to involve forms of social interaction in digital contexts that have traditionally required face-to-face encounters, such as the reading of instant messages, web forums, blogs, and online comments (Bråten, Stadtler, & Salmerón, in press). Also, when reading such non-traditional texts, individuals typically engage with multiple texts dealing with the same situation, issue, or phenomenon, for example when reading several answers to a question posted on a web forum or reading a number of online comments to a particular newspaper article.

Our treatment of the reading of multiple and non-traditional texts thus spans reading contexts ranging from the reading of multiple traditional texts in print, as when a high school class reads documents distributed by their teacher to complete a history assignment, to the

reading of multiple non-traditional texts online, as when a couple reads conflicting evaluations of the same hotel on a travel forum website to decide on accommodations for their upcoming weekend trip. In a middle position, as it were, is the reading of multiple traditional texts online, as when an undergraduate student reads a set of published articles retrieved via the university library's website on his laptop to prepare a class presentation on a particular course-related issue. Of course, all these reading contexts are ubiquitous in the 21st century information society (Bråten & Braasch, in press; Goldman et al., 2011). It is therefore somewhat paradoxical that much, if not most, of what researchers know about reading is based on individuals reading a single text (cf., McNamara & Magliano, 2009). Given this state of affairs, it can be argued that increased attention to reading contexts involving multiple and non-traditional texts is required to improve the ecological validity of the work that we, as a field, produce. Accordingly, our discussion of emergent conceptualizations and empirical findings regarding the reading of multiple and non-traditional texts in this chapter highlights the need to better align the world of reading research with the world of real life reading, both in and out of school.

The remainder of this chapter is divided into three main sections. In the first, we provide a theoretical background by discussing relevant frameworks for understanding how the reading of multiple and non-traditional texts is similar to and differs from the reading of single and traditional texts. In the second, we review empirical work on the role of individual and contextual factors in multiple text comprehension, the similarities and differences between reading printed and digital texts, and the reading of non-traditional texts in digital contexts. Finally, in the third main section, we summarize the outcome of our conceptual and empirical analysis, discuss implications for conceptualization of the reading process and instructional practice, and note future work that is needed in this area of research.

## Theoretical Background

The past 15 years has seen an increased interest in theory development for the purposes of better understanding the affordances and challenges of reading to understand multiple and non-traditional texts. In this section, we present and discuss several prominent frameworks that have resulted from these efforts. They include the Documents Model Framework (DMF), the Multiple-Document Task-based Relevance Assessment and Content Extraction (MD-TRACE) model, the Disciplinary Literacy conceptual framework, the Semantics, Surface, and Source (3S) model of credibility evaluation, and the New Literacies framework.

**The Documents Model Framework**

The DMF is arguably the most influential framework for describing how readers mentally represent multiple, at times conflicting, messages in terms of the information sources conveying them (Britt, Perfetti, Sandak, & Rouet, 1999; Britt & Rouet, 2012; Britt, Rouet, & Braasch, 2013; Perfetti, Rouet, & Britt, 1999; Rouet, 2006). The framework specifies that readers of multiple texts will ideally create two additional mental structures above and beyond those described in models of single text comprehension (e.g., Kintsch, 1998; van den Broek, 2010). First, to optimize their understandings of the situation or phenomenon described by texts, readers should construct an *integrated mental model*, which is a mental representation of the global situation described in multiple texts as relationships among the semantic content (Britt & Rouet, 2012). An integrated mental model could entail ideas unique to single texts, ideas shared across multiple texts, and ideas offered by multiple texts that contradict one another. The DMF additionally proposes that readers should construct an *intertext model*, which is a mental representation that uses source features (e.g., authors, publication venues, perspectives, and so forth) as organizational components (Britt & Rouet, 2012). Intertext links are mentally represented as relationships between information sources – referred to as document nodes – and their respective content assertions (e.g., “Author A claims...”, “Author

B claims..."). Intertext links also function as connections between the document nodes themselves (e.g., "Author A disagrees with Author B"). In this way, the DMF describes how readers *ideally* comprehend multiple diverse texts, in terms of their respective information sources.

**The Multiple-Document Task-based Relevance Assessment and Content Extraction Model**

The MD-TRACE model specifies a general sequence of processes readers might cycle through when interacting with complex texts (including multiple or non-traditional texts) to complete an overarching reading task (Rouet & Britt, 2011). In Step 1, readers interpret task goals based on provided instructions (e.g., Write an essay on whether we should use products containing GMOs). Readers might also plan a set of procedures they could engage in to satisfy their task goals. The result is a "task model," a mental representation of the task that presumably guides inquiry into the topic (Rouet & Britt, 2011). In Step 2, readers assess information needs given the current states of their task products (their essays) (Rouet & Britt, 2011). Step 3 reflects a set of sub-processes including a) selecting a document, b) reading and comprehending the document, and c) integrating current ideas with those from prior-read documents. In Step 4, task products are created or updated. Finally, in Step 5, readers assess the sufficiency of their task products. As such, at any point in time, readers can cycle back through earlier steps if they perceive their products have not sufficiently addressed their task goals. For example, based on the current states of their task products, readers might decide there are additional informational needs. As a result, they may return to search engines to click on the titles of additional texts to evaluate whether they might provide additional supports for their GMO essays. Thus, decisions to return to earlier steps appear to be contingent on readers' perceptions about the adequacy of their final products.

The MD-TRACE model also outlines *internal* resources that readers should bring to

bear to optimally navigate the described sequence (Rouet & Britt, 2011). These include general world and specific domain knowledge, knowledge of which source characteristics are important to consider within the discipline, and appropriate search, processing, evaluation, and integration strategies. It additionally outlines *external* resources relevant to the processing sequence including task specifications, texts, search devices or organizers, and any products generated along the way (e.g., notes taken during reading) (Rouet & Britt, 2011).

**The Disciplinary Literacy Conceptual Framework**

Goldman et al.'s (2016) framework describes the discipline-specific nature of what students need to know about knowledge construction, representation, and communication. How multiple and non-traditional texts are read and knowledge represented in the discipline of science, for example, requires guidance from a different set of beliefs about the nature of knowledge (i.e., epistemic beliefs; Hofer & Bendixen, 2012) than do processes specific to other disciplines (e.g., history). Goldman et al. (2016) offered core constructs to improve articulation of knowledge in three disciplines (science, history, literature) that readers would ideally use to build multiple levels of textual representation previously specified in models of single and multiple text comprehension. Thus, their framework can be viewed as an extension of the DMF and MD-TRACE models that importantly highlights the ways that reading and literacy practices are similar and differ across various disciplines.

For example, readers' beliefs about knowledge in science might guide them towards reliable practices for finding and selecting relevant texts on the topic of GMOs. These beliefs might also direct their evaluations of textual information, including a primary text's arguments and any information that accompanies them (e.g., supporting and counter-arguments posted in a comments section). More specifically, readers' epistemic beliefs concerning science could lead them towards practices for evaluating whether available claims are valid or invalid, whether forms of evidence are reasonable or unreasonable, whether

authors' credentials make them knowledgeable, credible sources on the topic, and so forth. Ultimately these types of evaluation practices help determine whether readers will or will not integrate currently processed information with ideas from prior-read texts.

To contrast, the same students' practices might look very different if tasked to write an essay on a history topic (e.g., What preconditions gave rise to the Arab Spring?) because such a task could be guided by a different set of beliefs about knowledge specific to that discipline. Readers' epistemic beliefs concerning history could lead them towards an altogether different set of reliable practices for evaluating whether available claims are valid or invalid, whether forms of evidence are reasonable or unreasonable, whether claims and evidence have been corroborated across multiple sources, in what ways status as primary versus secondary documents helps readers differentiate whether they should or should not to trust the information, and so forth (VanSledright & Maggioni, 2016). Thus, Goldman et al.'s (2016) framework emphasizes that there are distinctive characteristics of learners' epistemic thinking that guide all aspects of reading and representing information within a discipline, from initiating a task model to final assessments of whether the task product sufficiently addresses the overarching task goal.

**The Semantics, Surface, and Source Model of Credibility Evaluation**

The 3-S model of Lucassen and colleagues (2011, 2013) describes three strategies information seekers can use when making credibility assessments about information they find online. As such, this model focuses prominently on reading on the Internet and on reading of non-traditional texts. Regarding a first strategy, individuals may consider the semantic features of information, for example the accuracy of the information. Individuals verify available information against their relevant domain knowledge and use the extent to which information is verified as an index of credibility. Thus, with respect to establishing credibility via this strategy, domain expertise is the primary lens by which readers can decide upon the

factual accuracy of any information they come across (Lucassen & Schraagen, 2011; Lucassen, et al., 2013).

A second strategy involves a consideration of the "surface features" of online information including a website's design or aesthetics, the length of an article, and the number of embedded references, images, and links, to name but a few (e.g., "This information seems credible because it is long, looks serious, and has a lot of links"). By comparison, those with lower domain expertise tend to rely more heavily on surface features due to their inherent inability to disentangle what is factually accurate (Lucassen, et al., 2013).

According to a third strategy, information seekers can consider any relevant prior experience they may have had with particular sources (e.g., "This information seems credible because it was published by the BBC, which I consider to be a trustworthy source"). In using this strategy, individuals use source features found on websites such as the logo in the corner or a link with "about us" information as indices of credibility. Thus, whereas semantic and surface features involve the content of a website and its layout, respectively, source features inform on the information provider, or who has produced the information (Lucassen, et al., 2013). Taken together, information users rely on these three strategies in concert to help decide whether they will trust the texts they encounter.

**The New Literacies Framework**

On a surface level, the new literacies framework identifies a similar set of five component practices as the MD-TRACE model. However, whereas the MD-TRACE stems from a more traditional reading comprehension literature, the new literacies framework explicitly focuses on *online* reading comprehension and – in doing so – also highlights facets of problem-solving and question-answering specific to non-traditional types of texts found in online environments (Kinzer & Leu, 2017; Leu, Kinzer, Coiro, Castek, & Henry, 2013). In the first step, readers identify important problems to solve or questions they would like to answer

(rather than interpreting pre-specified task instructions, as in MD-TRACE). For example, a reader might set out to learn more about GMOs as a result of reading a scathing opinion article a friend posted via social media. In a second step, the individual reads for the purpose of locating information that might help in answering the question of interest. To find information on the topic, for example, the reader will need to a) generate key words that return useful websites, b) read a set of links returned from the search engine to infer which websites might be useful, and c) to skim and scan information presented within the websites (Leu, et al., 2013). In a third step, the reader decides upon which information is reliable by critically evaluating the available information (based on accuracy, reliability, potential biases, and so forth) (Leu, et al., 2013). In a fourth step, the individual synthesizes information deemed useful for answering the question into a coherent understanding of what was read. In a final step, the reader communicates the constructed response to an intended audience. To return to the example, the reader might leave a reply to the posting of the opinion article to share what was learned about GMOs based on the recent inquiry. Thus, in describing these five general practices, Leu and colleagues (2013) have also taken great strides in beginning to identify the new skills, strategies, dispositions, and social practices with which readers must be proficient to successfully conduct online inquiry.

As a caveat, many Internet reading experiences do not directly reflect the sequence of steps outlined by the new literacies framework. For example, readers do not always have concrete research questions in mind but may, rather, arrive at research questions in a more "bottom up" fashion. Thus, readers may sometimes rapidly toggle amongst several component processes – entering and revising search terms, skimming and scanning links and accessed texts – before a preliminary research question of interest materializes. Furthermore, in evaluating and synthesizing information during reading, readers may realize that there is not enough (reliable) information. This may guide them towards adapting the question to suit the

available information, or in choosing an altogether new query of interest. Thus, the new literacies framework richly describes a logical sequence of steps readers might go through to solve a problem. However, authentic reading experiences may follow different paths, different iterations amongst the steps, different entry points into the processes, and so forth. As additional empirical data are collected regarding readers' engagement with these component processes, patterns may emerge that warrant a need to revise the framework to account for more varied approaches towards reading in an information age.

**Summary**

To summarize, the reviewed models extend our understandings of multiple and non-traditional text reading. Taken together, they describe a set of processes, strategies, and skills that – when optimally functioning – could result in effective, efficient comprehension. The models do, however, differ in terms of the grain sizes with which they operate. For example, although both the DMF and MD-TRACE were developed from a rich history of research on single and traditional text comprehension, the former is more fine-grained in its description of multiple text reading processes compared to the latter. The DMF specifically describes how readers mentally represent multiple texts in terms of the information sources conveying them. The MD-TRACE is much broader in scope by offering a general sequence of processes that readers cycle through to complete an overarching reading task (of which constructing and modifying a documents model is but one facet). The Disciplinary Literacy conceptual framework can be viewed as an extension of these models that essentially highlights a) the ways reading and literacy practices are similar and differ across various disciplines, and b) the epistemic thinking within each discipline that guides multiple text processing and representation.

By comparison, the 3-S and new literacies frameworks explicitly focus on *online* reading comprehension and – in doing so – highlight the kinds of processes, strategies, and

skills that are described as uniquely important when reading non-traditional texts in online environments (for further discussion of such processes, strategies, and skills, see sections on the reading of digital and non-traditional texts below). These models also differ in terms of grain size. Whereas the 3-S is fine-grained in its specific description of three strategies that individuals can use when making credibility assessments about online information, the new literacies model is much broader in scope, offering a sequence of steps one could take when reading online to solve a problem or answer a question (of which evaluating websites for credibility is but one facet).Thus, the 3-S model might be considered a more constrained articulation of a sub-process falling within the broader conceptualization of online reading represented by the new literacies model.

Finally, we note that all reviewed models outline *internal* (i.e., individual) and *external* (i.e., contextual) resources relevant for successful multiple or non-traditional text comprehension. Important *internal* resources include prior knowledge, thinking about knowledge and knowing, and appropriate strategic processing. The models also agree that there are key *external* resources that can facilitate optimal reading and comprehension of multiple and non-traditional texts. Such resources include task specifications, textual materials, search devices  or organizers, and products generated along the way (e.g., self-generated text). In the next section, we review empirical evidence regarding a number of these individual and contextual factors with a focus on multiple text comprehension.

## Empirical Work

### The Role of Individual and Contextual Factors in Multiple Text Comprehension

Construction of meaning from multiple texts represents a great challenge for readers regardless of age. Theorists assume that how readers meet this challenge depends on individual as well as contextual factors. This assumption has considerable empirical backing. Moreover, emerging evidence suggests that interactions among individual and contextual

factors may affect multiple text comprehension.

**Individual factors in multiple text comprehension.** Since Wineburg's (1991) landmark study in the area of multiple text reading, a number of studies have provided evidence that what readers already know about the topic discussed across texts impacts their multiple text comprehension. Thus, while research in the 1990s (Rouet, Britt, Mason, & Perfetti, 1996; Stahl, Hynd, Britton, McNish, & Bosquet, 1996; Wineburg, 1991) indicated that students with limited prior knowledge may have difficulties integrating information across multiple historical texts, more recent research (Bråten, Anmarkrud, et al., 2014; Bråten & Strømsø, 2010a, 2010b; Bråten, Strømsø, & Britt, 2009; Gil, Bråten, Vidal-Abarca, & Strømsø, 2010a; Strømsø & Bråten, 2009; Strømsø, Bråten, & Britt, 2010) has shown that students' prior knowledge is a predictor of their comprehension when reading multiple texts on a scientific issue. Presumably, prior knowledge contributes to comprehension because it facilitates bridging inferences that create interconnection and coherence in complex, divergent text materials. Compared to the reading of single texts, multiple text reading may represent an added complexity in this regard because it requires the building of links and coherence not only within but also across texts (Britt & Rouet, 2012; Goldman, 2004).

In addition to individual differences with respect to prior knowledge about the topic or domain, individual differences with respect to readers' beliefs about that topic or domain knowledge, that is their epistemic beliefs, seem to matter in terms of multiple text comprehension (for reviews, see Bråten, Britt, Strømsø, & Rouet, 2011; Bråten, Strømsø, & Ferguson, 2016). There is thus a growing research base indicating that beliefs concerning the certainty, simplicity, and source of knowledge, as well as regarding the justification of knowledge claims, are related to readers' ability to construct integrated understandings from the reading of multiple texts (Barzilai & Ka'adan, in press; Barzilai & Zohar, 2012; Bråten, Ferguson, Strømsø, & Anmarkrud, 2013; Bråten, Ferguson, Strømsø, & Anmarkrud, 2014;

Bråten & Strømsø, 2010b; Bråten, Strømsø, & Samuelstuen, 2008; Kammerer, Bråten, Gerjets, & Strømsø, 2013; Mason, Ariasi, & Boldrin, 2011; Mason, Boldrin, & Ariasi, 2010; Pieschl, Stahl, & Bromme, 2008; Strømsø & Bråten, 2009; Strømsø, Bråten, & Samuelstuen, 2008). In general, this body of research has shown that viewing knowledge as tentative rather than certain, complex rather than simple, originating in expert authors rather than the reader, and justified by rules of inquiry and cross-checking of knowledge sources rather than own opinion and experience predict students' abilities to synthesize information from expository texts expressing diverse and even contradictory viewpoints on a particular topic. Basically, adaptive epistemic beliefs in the context of multiple text reading seem well aligned with the open, ill-structured problem that trying to construct meaning from multiple, often conflicting, texts represents.

Arguably, prior knowledge and adaptive epistemic beliefs may have limited value to readers if they cannot motivate themselves to apply those resources in the service of multiple text comprehension. Accordingly, there is evidence to suggest that individual differences in motivation play a role in the context of multiple text reading (Bråten, Ferguson, Anmarkrud, & Strømsø, 2013: Strømsø & Bråten, 2009; Strømsø et al., 2010). For example, Strømsø and Bråten (2009) found that topic interest, specifically students' self-reported individual interest and engagement in issues and activities concerning the topic of climate change, uniquely explained variance in multiple text comprehension when entered into a regression equation together with measures of prior knowledge and epistemic beliefs concerning the same topic. Moreover, Bråten, Ferguson, Anmarkrud, et al. (2013) demonstrated that readers' beliefs in their capabilities to understand what they read in science, that is their science reading self-efficacy, was a unique positive predictor of multiple text comprehension when several other relevant individual difference variables were controlled for. Because readers must persist in reading several texts on the same topic and engage in building coherence across those texts, it

may generally require more energy and engagement to learn from and comprehend multiple texts than to work with one coherent text on the same topic (Bråten, Ferguson, Anmarkrud, et al., 2013). The role of reading motivation therefore may be more pronounced in multiple text than in single text contexts.

Compared to the individual difference variables discussed above, strategic processing may be conceived of as a more proximal contributor to multiple text comprehension, that is, as a contributor through which those other individual difference variables work (Bråten, Anmarkrud, et al., 2014). Again, this area of research owes much to Wineburg (1991), who found that historians heavily relied on a strategic approach including "corroboration" and "sourcing" when trying to comprehend multiple texts on a historical event. While corroboration involved comparing across texts and examining potential discrepancies among them, sourcing involved noting and using information about the source of a text (e.g., its author or text genre). Whereas the historians used these strategies to piece together a coherent interpretation of the event described across texts, high school students participating in Wineburg's study seldom used corroboration and sourcing when reading the same texts.

Building on Wineburg's (1991) seminal work, many researchers have provided evidence for a link between deeper-level intertextual processing during reading and multiple text comprehension, using methodologies ranging from verbal protocols (Anmarkrud, Bråten, & Strømsø, 2014; Goldman, Braasch, Wiley, Graesser, & Brodowinska, 2012; Strømsø, Bråten, & Samuelstuen, 2003; Wolfe & Goldman, 2005) to note taking (Britt & Sommer, 2004; Hagen, Braasch, & Bråten, 2014; Kobayashi, 2009a, 2009b), reading patterns (i.e., linear vs. nonlinear reading; Bråten, Ferguson, Anmarkrud, et al., 2013; Salmerón, Gil, Bråten, & Strømsø, 2010), and task-specific self-reported multiple text comprehension strategies (Bråten, Anmarkrud, et al., 2014; Bråten & Strømsø, 2011). The sourcing strategy initially described by Wineburg has been given particular attention by researchers in the last

decade. Thus, quite a few correlational studies have demonstrated that the extent to which students consider trustworthiness based on source features may predict their learning and comprehension when reading about controversial issues in multiple texts (Anmarkrud et al., 2014; Barzilai & Eshet-Alkalai, 2015; Barzilai, Tzadok, & Eshet-Alkalai, 2015; Bråten et al., 2009; Goldman et al., 2012; List, Alexander, & Stephens, 2017; Strømsø et al., 2010; Wiley et al., 2009). In addition, recent intervention work has strengthened the idea that students' consideration of source feature information during reading promotes comprehension of multiple texts (Barzilai & Ka'adan, in press; Braasch, Bråten, Strømsø, Anmarkrud, & Ferguson, 2013; Mason, Junyent, & Tornatora, 2014; Wiley et al., 2009).

Several studies indicate that readers' strategic processing mediates the effects of prior knowledge, epistemic beliefs, and motivation on multiple text comprehension (Barzilai & Eshet-Alkalai, 2015; Barzilai et al., 2015; Bråten, Anmarkrud, et al., 2014; Kobayashi, 2009b). For example, Bråten, Anmarkrud, et al. (2014), in a path analytic study, found that readers' knowledge about the topic of the texts, beliefs about the justification of knowledge claims, and reading motivation indirectly affected their multiple text comprehension through their use of deeper-level intertextual strategies. Of note is that such strategies involve intentional attempts to control and modify meaning construction during multiple text reading (cf., Afflerbach, Pearson, & Paris, 2008). Presumably, when there is a high amount of content overlap between texts, automatic, bottom-up resonance (i.e., associative) processes (O'Brian & Myers, 1999) may drive intertextual integration during reading (Beker, Jolles, Lorch, & van den Brock, 2016); otherwise, top-down strategic processing may be necessary (Kurby, Britt, & Magliano, 2005).

**Contextual factors in multiple text comprehension**. Readers' processing and comprehension of multiple texts have been shown to be influenced by the reading task (for review, see Bråten, Gil, & Strømsø, 2011). Most empirical work on this issue concerns the

effects of "general purpose instructions" (McCrudden & Schraw, 2007) to construct arguments based on textual content versus other general purpose instructions, most notably to summarize information across texts (Bråten & Strømsø, 2010a; Gil et al., 2010a, Gil, Bråten, Vidal-Abarca, & Strømsø, 2010b; Hagen et al., 2014; Le Bigot & Rouet, 2007; Naumann, Wechsung, & Krems, 2009; Stadtler, Scharrer, Skodzik, & Bromme, 2014; Wiley et al., 2009; Wiley & Voss, 1999). In general, this body of research indicates that argument tasks can lead to more elaborative processing and deeper understanding than summary tasks. As discussed below, such positive effects of argument tasks may be moderated by individual difference variables, however.

In addition to the reading task, several aspects of the nature of the textual materials seem to influence multiple text processing and comprehension. These include the type of texts that readers encounter, such as primary versus secondary source texts (Rouet et al., 1996), informational versus policy-related texts (i.e., explanatory texts with and without recommendations for personal and public policy changes; Blaum, Griffin, Wiley, & Britt, in press), and popular and social media texts versus textbooks or scholarly essays (Bråten, Braasch, Strømsø, & Ferguson, 2015; List et al., 2017). In particular, research has focused on the role of conflicting information across sources in promoting strategic multiple text processing and comprehension, with a number of studies (Braasch, Rouet, Vibert, & Britt, 2012; Ferguson, Bråten, Strømsø, & Anmarkrud, 2013; Kammerer & Gerjets, 2014; Kammerer, Kalbfell, & Gerjets, 2016; Rouet, Le Bigot, de Pereyra, & Britt, 2016; Salmerón, Macedo-Rouet, & Rouet, 2016; Saux, Britt, Le Bigot, Vibert, Burin, & Rouet, 2017; Strømsø, Bråten, Britt, & Ferguson, 2013) indicating that the presence of conflicts may increase not only adaptive text processing, especially sourcing, but also integration of information across texts (for review, see Braasch & Bråten, 2016).

**Interacting factors in multiple text comprehension.** Importantly, individual and

contextual factors seem to affect multiple text processing and comprehension interactively as well as independently. For example, research has indicated that argument tasks, such as instructions to read for the purpose of constructing arguments, may not be equally beneficial for all readers of multiple texts. Rather, their effects may be moderated by readers' prior knowledge about the topic of the texts (Gil et al., 2010a, 2010b) as well as their epistemic beliefs concerning the certainty of knowledge (Bråten, Gil, et al., 2011; Bråten & Strømsø, 2010a; Gil et al., 2010b). In brief, readers lacking prior knowledge or believing that knowledge about the topic is certain rather than tentative and evolving may have a hard time trying to construct arguments from multiple texts and actually be better off when given the simpler task of summarizing information presented in a set of texts. In the same vein, research by Kobayashi (2009a) and Hagen et al. (2014) suggests that elaborative intertextual processing plays a more pronounced role when readers are tasked to identify or construct arguments than when they are given other reading tasks, such as producing a summary.

In addition to such interactions between reading task instructions and individual factors, a few multiple text studies have indicated interactions between the nature of the reading materials and individual factors (Barzilai & Eseth-Alkalai, 2015; Trevors, Feyzi-Behnagh, Azevedo, & Bouchet, 2016), between different individual factors (Ferguson & Bråten, 2013), and between different contextual factors (Stadtler et al., 2014). As an example of interactions between the nature of the reading materials and individual differences, Barzilai and Eseth-Alkalai (2015) found that presenting conflicting information across texts promoted sourcing only among readers believing in uncertain knowledge and the need to justify knowledge claims through critical thinking and evidence. In turn, readers' sourcing activities predicted their integration of information from multiple texts in written arguments.

Moreover, there is also some evidence to suggest that different individual difference variables may interactively affect multiple text comprehension. For example, Ferguson and

Bråten (2013) used cluster analysis to investigate interactions between students' prior knowledge about the topic of the texts and their epistemic beliefs when reading multiple conflicting texts on a socio-scientific topic. These authors found that students who had high prior knowledge and, at the same time, believed that knowledge claims should be justified by checking multiple external sources for consistency rather than relying on their own personal opinions were particularly well positioned to construct integrated understandings from the texts.

Finally, different contextual factors may interact to affect multiple text comprehension. Stadtler et al. (2014) compared the effects of argument and summary reading tasks, using reading materials that either signaled the existence of conflicting claims across texts through rhetorical means (e.g., by starting a text with the following phrase: "Contrary to what some health professionals argue, …") or not. In that study, beneficial effects of an argument task on readers' sourcing were observed only among participants presented with reading materials in which intertextual conflicts were explicitly signaled.

**Reading Printed versus Digital Texts**

Four decades ago, research on the similarities and differences between reading printed and digital texts was initiated with a focus on ergonomic aspects, such as the colors of text and background and the size of the screen (for a review, see Dillon, 1992). This research raised strong concerns about potential drawbacks of digital reading as compared to print reading, for example about digital texts being slower to read. For several reasons, it is difficult to extrapolate from the early findings to the current situation. First, the rise of the Internet and the proliferation of mobile devices in the late 1990s have profoundly affected the availability and interconnectedness of digital texts. Second, current readers are not unfamiliar with digital texts, as was the case when the early comparison studies were conducted (Dillon, 1992). Finally, the improved quality of digital screens has brought the visual experience of reading

digital and printed texts much closer (Benedetto, Drai-Zerbib, Pedrotti, Tissier, & Baccino, 2013).

From a psychological perspective, comparisons of how readers process printed and digital texts have addressed three main issues in the last decades. These concern preference, comprehension, and self-regulation of reading. Regarding preference, the extent to which readers prefer digital rather than printed texts has been found to depend on their age. Thus, when interviewed in small scale studies, middle and high school students born around 2000 (so-called 'millenials') have expressed a clear preference for reading using digital media, such as e-books or tablets, as opposed to reading printed books (Jones & Brown, 2011; Moje, Overby, Tysvaer, & Morris, 2008; Tveit, & Mangen, 2014). When asked to explain their experiences with different media, students from 3rd to 10th grade seem to associate digital reading with more positive and less negative affect (e.g., more fun, less tiring) and perceive that it improves their cognitive processing (e.g., increased attention, better memory; Tveit, & Mangen, 2014). This perception of improved cognitive processing is not necessarily associated with better performance, however (see below). Presumably due to their preference for digital media, digital reading may also increase reading engagement for young students, particularly for struggling readers (Fletcher, & Nicholas, 2016; Maynard, 2010). A note of caution is needed when interpreting such findings, however, because there may be a novelty effect underlying young students' preference for digital devices (cf., Clark, 1983). Interestingly, a large scale study with young British students that focused on their actual reading experiences found that those who read only digital texts reportedly enjoyed reading much less than those who read only printed or both types of texts (Picton, 2014).

That reader preference may depend on age is evidenced by the fact that older, undergraduate readers (born in the mid-1990s) have been shown to display an opposite pattern compared to younger readers, with adult readers strongly preferring printed rather than digital

texts (Rowlands, Nicholas, Jamali, & Huntington, 2007). Moreover, this preference for printed texts among adult readers seems to be consistent across countries, ranging from USA to Germany and Japan (Baron, 2015; Kurata, Ishita, Miyata, & Minami, 2016), across levels of experience with digital reading, ranging from 'digital immigrants' to 'digital natives' (Kretzschmar et al., 2013; Kurata et al., 2016), and across reading purposes, ranging from study-related reading to reading for pleasure (Baron, 2015; Kurata et al., 2016). In fact, even people who spend more time reading on screen than on paper have been shown to clearly prefer reading printed texts (Kurata et al., 2016). At this point, we can only speculate about the reasons that adults prefer reading printed texts. However, small scale studies have suggested that adult readers perceive that print reading facilitates concentration, memory, and comprehension, compared to digital reading (Baron, 2015). With respect to the reading of narratives, in particular, it has been argued that print reading facilitates readers' immersion in fictional worlds (i.e., phenomenological immersion) to a greater extent than does digital reading (Mangen, 2008). It is thus possible that more experience with reading both printed and digital texts may have led adult readers to prefer the former.

Regarding the issue of whether print reading actually improves comprehension compared to digital reading, results are mixed, however. Thus, while some research comparing print and digital reading has not found any difference in terms of comprehension performance (Holzinger et al, 2011; Kretzschmar et al., 2013: Margolin, Driscoll, Toland, & Kegler, 2013; Singer & Alexander, 2017), other studies have indicated that digital reading may have negative effects on comprehension (Ackerman & Goldsmith, 2011; Mangen, Walgermo, & Brønnick, 2013). Attempts to clarify this issue have investigated variables that might moderate the relationship between students' reading and their comprehension performance. In particular, it has been suggested that reading digital compared to printed texts may affect the way readers' perceive their current understanding of the texts as well as their

subsequent regulation of study time (Ackerman & Goldsmith, 2011; Ackerman & Lauterman, 2012; Lauterman & Ackerman, 2014), with digital reading possibly generating a false feeling of knowing, which, in turn, could have detrimental effects on comprehension. Accordingly, in a series of studies comparing undergraduates' reading of identical printed or digital texts, Ackerman and colleagues (Ackerman & Goldsmith, 2011, Exp. 1; Lauterman & Ackerman, 2014) found that when reading digital texts, students tended to overestimate their understanding. As a likely result of this overestimation, students also spent less time reading and achieved poorer comprehension when reading digital texts (Ackerman & Goldsmith, 2011, Exp. 2). Such difficulties monitoring and regulating their digital reading have been found to be particularly pronounced among students preferring reading on paper (Lauterman & Ackerman, 2014), which suggests that motivational aspects linked to media preferences can influence students' self-regulation during reading. Of note is, however, that Singer and Alexander (2017) failed to replicate the findings reported by Ackerman and colleagues in a follow-up study.

Finally, the reading of hypertext has received particular attention from researchers interested in digital reading. Hypertext denotes a digital document that includes links to related documents, creating a network of information. Hypertext therefore requires that readers choose which links to navigate and which to ignore during reading, which allows them to adjust reading experience to their needs and potentially improve comprehension, to a greater extent than when reading non-navigable documents (Fesel, Segers, Clariana, & Verhoeven, 2015). For successful comprehension to occur, however, readers need to navigate between conceptually related units of information and simultaneously pay attention to those units in order to integrate them (van den Broek & Kendeou, 2015). In contrast, if readers navigate documents in an incoherent sequence (Salmerón, Cañas, Kintsch, & Fajardo, 2005) or overuse a quick scanning of the documents (Salmerón, Naumann, García, & Fajardo,

2016), comprehension difficulties may occur. To prevent such difficulties, hypertexts typically include overviews, that is, navigable graphical representations that display the structure of the hypertext. Such overviews can scaffold comprehension by facilitating readers' organization of their mental hypertext representations (Amadieu & Salmerón, 2014), especially if readers pay close attention to overviews at the beginning of reading sessions (Salmerón, Baccino, Cañas, Madrid, & Fajardo, 2009; Salmerón & García, 2011).

## Reading Non-Traditional Texts in Digital Contexts

Much reading on the Internet takes the form of social activity that mimics face-to-face interaction. In Web 2.0, authors tend to adopt a style closer to oral than written language (Warschauer & Grimes, 2007). Readers, for their part, are expected to participate in "dialogues" by sharing (at least some of) what they read or comment on the writings of others. These features of non-traditional texts may have consequences for digital reading that we address in the following sub-sections.

**Language in non-traditional texts.** Web blogs and forums are major digital spaces for social interactions in Web 2.0. In such spaces, people typically share information and provide comments. In the context of schooling, blogs and forums might be seen as empowering students in the sense of giving them independent access to academic content. Popular examples are scientific blogs, which often present complex scientific content from the school curriculum in simplified ways. Even when such blogs contain high-quality content, they may come with certain costs, however. This is because blogs tend to use less academic language, with most sentences starting with pronouns, verbs referring to actions rather than relations, and long sentences sequencing rather than embedding information (Snow, 2010). In this way, extensive blog use may limit students' exposure to helpful models of academic language, essential to comprehend academic texts and the phenomena under study (Snow, 2010).

The same concern applies to web forums, where any user can post questions and receive answers and recommendations from other users. Such forums are used for a variety of purposes, asking for advice on class assignments as well as personal problems (Shah & Kitzie, 2012). However, an additional concern about web forums is that comments vary greatly in terms of authors' competence and the quality of the information they provide. On the positive side, recent research has indicated that students, from early elementary school onward, are rather unwilling to accept information provided by non-expert authors in web forums, at least when expert sources also participate in the discussions (Salmerón et al., 2016; Winter & Krämer, 2012). More problematic, however, is the argumentative style of many forum comments. Academic texts typically present reasons and evidence to support claims and dismiss purely personal views as unreliable. In contrast, authors in web forums often provide personal anecdotal experiences in support of their claims (Betsch, Ulshöfer, Renkewitz, & Betsch, 2011; Warschauer & Grimes, 2007). This argumentative style seems particularly appealing to younger students. For example, Salmerón et al. (2016) found that fifth- and sixth-graders were more likely to recommend expert messages referring to personal experiences than expert messages referring to other information resources (e.g., a hospital web page) in support of author claims. The same study showed that even eight- and ninth-graders recommended messages referring to personal experiences to the same extent as messages referring to other information sources. In sum, despite the new opportunities they represent, encouraging the use of blogs and forums in order to increase students' engagement with curricular content may require that teachers provide additional instruction targeting academic vocabulary and the rhetoric of academic language and argumentation (Snow, 2010).

**Social interaction in reading non-traditional texts.** Somewhat ironically, engaging in different forms of social interaction during reading may sometimes result in communication problems. We discuss such effects in relation to two typical online social

contexts: micro-blogging (e.g., Twitter) and news comments. On micro-blogging sites, users share brief comments, which can be grouped by topic by means of hashtags. Readers decide whether or not they will repost a comment to share it with their connections. One might argue that such decision-making regarding reposting is likely to engage readers in deeper processing of messages, which, in turn, will boost comprehension. Alternatively, this decision-making process might come with a cognitive cost that is detrimental to comprehension. Recently, Jiang, Hou, and Wang (2016) tried to clarify this issue by having two groups of undergraduate students read a series of messages dealing with controversial topics on a micro-blogging site. In one group, participants could repost any messages they wanted, whereas in the other group, participants just read the messages with no social actions allowed. Results showed that participants in the "reposting group" reported higher cognitive load during reading and obtained lower scores on a comprehension test, particularly with respect to the messages they actually reposted. Sparrow, Liu, and Wegner (2011) found that users who expected to have future access to information (e.g., because they thought the information was stored in a computer) had poorer recall for that information than for information that could not be stored. One possibility is that the social act of sharing induces a perception of 'storage' because readers expect connected users to respond to the shared information, with this resulting in a more shallow encoding of the information.

Another social context relevant to the reading of non-traditional texts involves online news. In this scenario, readers can comment on particular pieces of news and potentially use such comments to expand the information provided in the news in order to form an educated opinion on the issues in question. In a large scale study including a sample representative of the US population, Anderson, Brossard, Scheufele, Xenos, and Ladwig (2014) presented participants with an online newspaper article on the pros and cons of nanotechnology, which was followed by either civil (polite) or uncivil (insulting) comments. In Western media,

uncivil online comments are quite frequent (Coe, Kenski, & Rains, 2014). Anderson et al. (2014) found that uncivil comments led to more polarized attitudes among participants. Thus, in a non-traditional reading scenario involving intense social discussion, readers may disregard balanced views presented in original articles and instead move closer towards extreme views voiced by uncivil agents in online comments.

## Conclusions, Implications, and Future Directions

The theoretical and empirical work discussed in this chapter highlights the relevance and importance of focusing on multiple and non-traditional texts within reading research. Thus, our discussion of several viable theoretical frameworks as well as related empirical evidence indicates that multiple and non-traditional texts, while offering many new opportunities in terms of engagement, integrated understanding, and social interaction, also pose a range of new challenges compared to the reading of single traditional texts. Current conceptualizations address the increased complexity involved in dealing with such texts, most notably with respect to searching for information, attending to sources, evaluating the relevance and credibility of information, and integrating information across texts. Accordingly, empirical work confirms that effective and efficient processing and comprehension of multiple and non-traditional texts demand much of readers regardless of age, with this burgeoning research base indicating that a range of individual and contextual factors, as well as their interaction, affect how well readers are able to reap the potential benefits of the new literacy landscape.

Despite the remarkable progress that has been made in this area of reading research in this century, however, there is much to be explicated and investigated regarding the reading of multiple and non-traditional texts. In terms of theory, it is a clear need to expand well-established conceptualizations of the reading process and reading comprehension, rooted in the single-text paradigm (McNamara & Magliano, 2009), to encompass the reading of

multiple and non-traditional texts. Thus, although several frameworks relevant to the reading of multiple and non-traditional texts already exist (Britt et al., 2013; Goldman et al., 2016; Leu et al., 2013; Lucassen et al., 2013; Rouet & Britt, 2011), those frameworks may deal with only some aspects of these forms of reading or lack the explanatory power and specificity necessary to derive specific, testable hypotheses from them. Attempts to forge a more coherent theory from the promising, albeit somewhat rudimentary, frameworks that currently exist is thus an important agenda for future reading research. Of note is that such a theory also needs to build on and incorporate basic insights gained from research on single-text reading. Moreover, further theoretical clarification and refinement need to proceed in parallel with empirical work aiming to confirm (or disconfirm) specific relationships and effects initially postulated. Presumably, intervention work will be an important element of these efforts.

In addition to its implications for (re-)conceptualizing reading within reading research, a shift of emphasis towards multiple and non-traditional texts also has instructional implications. While school-based intervention work targeting multiple-text processing and comprehension has produced promising results (for review, see Bråten & Braasch, in press; Bråten et al., in press), there is need for much more experimental work that meets "best evidence" criteria (Slavin, 1986) and, thus, allows for causal inferences. And, while many students use a lot of time engaging with non-traditional texts in digital contexts outside school (Naumann, 2015), challenges involved in processing and interpretation of such texts are not systematically addressed within reading instruction in school, if attended to at all. This gap between reading instruction in school and students' reading out of school may have serious consequences because students are not really trained to become competent readers in the online social contexts where they do much, if not most, of their reading, with research-based knowledge of whether or how students transfer what they learn in schooled reading contexts to unschooled contexts essentially lacking. Recent research has suggested, however, that time

spent on online reading involving social interactions may be negatively related to students' print reading skills (Duncan, McGeown, Griffiths, Stothard, & Dobai, 2015; Naumann, 2015).

Take, for example, the crucial 21st century literacy skills of sourcing and critical evaluation of knowledge claims by considering the reasons and evidence presented in support of those claims (Alexander & the Disciplined Reading and Learning Laboratory, 2012; Bråten & Braasch, in press). To the extent that such competencies are taught in school, for example within disciplinary literacy practices in history and science (Britt, Richter, & Rouet, 2014; Goldman et al., 2016), it is an open question whether this will have any consequences for how students engage and cope with multiple and non-traditional texts out of school. The risk is, therefore, that students, unaffected by the school's efforts to teach them such critical reading skills, will disregard essential features of source credibility (i.e., expertise and trustworthiness) and rely on claims justified by personal opinions and experiences rather than reasons and evidence when reading in online social contexts out of school. Moreover, such "uncritical habits of mind" may continue into adult life, potentially influencing not only individual attitude formation, knowledge generation, and action tendencies, but also democratic discourse at the level of society. The most pertinent issue, then, is how the school's reading instruction can be brought to life in the sense of addressing and targeting students' real life reading of multiple and non-traditional texts in ways that matter for their development as critical readers and learners both in and out of school. Importantly, this seems to require that students' reading of non-traditional texts in digital contexts, hitherto representing an essentially out-of-school activity, is no longer proceeding parallel to and largely unaffected by instructional efforts to promote reading skills but, rather, given due attention within the school's reading instruction. It goes without saying that designing and evaluating the effects of instructional efforts to address this issue are a formidable challenge to future reading researchers.

In addition to the broad implications for theory and instruction discussed above, and the calls for further theoretical and empirical work accompanying those implications, several more specific issues are in need of future research. These include (but are not limited to) interactions among individual and contextual factors in the processing and comprehension of not only multiple but also non-traditional texts, effects of print versus digital reading on self-regulation and comprehension, and effects of the social process of sharing textual information on depth of processing and comprehension performance. The exponential increase in the availability and accessibility of multiple and non-traditional texts on almost any topic has changed the landscape of reading in the last decades. Hopefully, this chapter will contribute to bringing the reading of multiple and non-traditional texts to the forefront of reading research as well.

## References

Ackerman, R., & Goldsmith, M. (2011). Metacognitive regulation of text learning: On screen versus on paper. *Journal of Experimental Psychology: Applied, 17*, 18-32.

Ackerman, R., & Lauterman, T. (2012). Taking reading comprehension exams on screen or on paper? A metacognitive analysis of learning texts under time pressure. *Computers in Human Behavior*, *28*, 1816-1828.

Afflerbach, P., Pearson, P.D., & Paris, S.G. (2008). Clarifying differences between reading skills and reading strategies. *The Reading Teacher, 61*, 364-373.

Alexander, P.A., & the Disciplined Reading and Learning Research Laboratory (2012). Reading into the future: Competence for the 21st century. *Educational Psychologist, 47*, 259-280.

Amadieu, F., & Salmerón, L. (2014). Concept maps for comprehension and navigation of hypertexts. In R. Hanewald & D. Ifenthaler (Eds), *Digital knowledge maps in education* (pp. 41-59). New York: Springer.

Anderson, A.A., Brossard, D., Scheufele, D.A., Xenos, M.A., & Ladwig, P. (2014). The "Nasty effect:" Online incivility and risk perceptions of emerging technologies. *Journal of Computer-Mediated Communication, 19,* 373-387.

Anmarkrud, Ø., Bråten, I., & Strømsø, H.I. (2014). Multiple-documents literacy: Strategic processing, source awareness, and argumentation when reading multiple conflicting documents. *Learning and Individual Differences, 30,* 64-76.

Baron, N.S. (2015). *Words onscreen: The fate of reading in a digital world*. New York: Oxford University Press.

Barzilai, S., & Eseth-Alkalai, Y. (2015). The role of epistemic perspectives in comprehension of multiple author viewpoints. *Learning and Instruction, 36,* 86-103.

Barzilai, S., & Ka'adan, I. (in press). Learning to integrate divergent information sources: The interplay of epistemic cognition and epistemic metacognition. *Metacognition and Learning*.

Barzilai, S., Tzadok, E., Eshet-Alkalai, Y. (2015). Sourcing while reading divergent expert accounts: Pathways from views of knowing to written argumentation. *Instructional Science, 43,* 737-766.

Barzilai, S., & Zohar, A. (2012). Epistemic thinking in action: Evaluating and integrating online sources. *Cognition and Instruction, 30,* 39-85.

Beker, K., Jolles, D., Lorch, R. F., & van den Broek, P. (2016). Learning from texts: activation of information from previous texts during reading. *Reading and Writing, 29,* 1161-1178.

Benedetto, S., Drai-Zerbib, V., Pedrotti, M., Tissier, G., & Baccino, T. (2013). E-readers and visual fatigue. *PLoS ONE, 8*(12), e83676.

Betsch, C., Ulshöfer, C., Renkewitz, F., & Betsch, T. (2011). The influence of narrative vs.

statistical information on perceiving vaccination risks. *Medical Decision Making, 31,* 742-753.

Blaum, D., Griffin, T.D., Wiley, J., & Britt, M.A. (in press). Thinking about global warming: Effect of policy-related documents and prompts on learning about causes of climate change. *Discourse Processes*.

Braasch, J.L.G., & Bråten, I. (2016). *The Discrepancy-Induced Source Comprehension (D-ISC) model: Basic assumptions and preliminary evidence*. Submitted manuscript.

Braasch, J.L.G., Bråten, I., Strømsø, H.I., Anmarkrud, Ø., & Ferguson, L.E. (2013). Promoting secondary school students' evaluation of source features of multiple documents. *Contemporary Educational Psychology, 38,* 180-195.

Braasch, J.L.G., Rouet, J.F., Vibert, N., & Britt, M.A. (2012). Readers' use of source information in text comprehension. *Memory & Cognition, 40,* 450-465.

Bråten, I., Anmarkrud, Ø., Brandmo, C., & Strømsø, H.I. (2014). Developing and testing a model of direct and indirect relationships between individual differences, processing, and multiple-text comprehension. *Learning and Instruction, 30,* 9-24.

Bråten, I., & Braasch, J.L.G. (in press). Key issues in research on students' critical reading and learning in the 21st century information society. In C. Ng & B. Bartlett (Eds.), *Improving reading in the 21st century: International research and innovations.* Dordrecht, The Netherlands: Springer.

Bråten, I., Braasch, J.L.G., Strømsø, H.I., & Ferguson, L.E. (2015). Establishing trustworthiness when students read multiple documents containing conflicting scientific evidence. *Reading Psychology, 36,* 315-349.

Bråten, I., Britt, M.A., Strømsø, H.I., & Rouet, J.F. (2011). The role of epistemic beliefs in the comprehension of multiple expository texts: Toward an integrated model. *Educational Psychologist, 46,* 48-70.

Bråten, I., Ferguson, L.E., Anmarkrud, Ø., & Strømsø, H.I. (2013). Prediction of learning and comprehension when adolescents read multiple texts: The roles of word-level processing, strategic approach, and reading motivation. *Reading and Writing, 26,* 321-348.

Bråten, I., Ferguson, L.E., Strømsø, H.I., & Anmarkrud, Ø. (2013). Justification beliefs and multiple-documents comprehension. *European Journal of Psychology of Education, 28,* 879-902.

Bråten, I., Ferguson, L.E., Strømsø, H.I., & Anmarkrud, Ø. (2014). Students working with multiple conflicting documents on a scientific issue: Relations between epistemic cognition while reading and sourcing and argumentation in essays. *British Journal of Educational Psychology, 84,* 58-85.

Bråten, I., Gil, L., & Strømsø, H.I. (2011). The role of different task instructions and reader characteristics when learning from multiple expository texts. In M.T. McCrudden, J.P. Magliano, & G. Schraw (Eds.), *Text relevance and learning from text* (pp. 95-122). Greenwich, CT: Information Age.

Bråten, I., Stadtler, M., & Salmerón, L. (in press). The role of sourcing in discourse comprehension. In M.F. Schober, M.A. Britt, & D.N. Rapp (Eds.), *Handbook of discourse processes* (2nd. ed.). New York: Routledge.

Bråten, I., & Strømsø, H. I. (2010a). Effects of task instruction and personal epistemology on the understanding of multiple texts about climate change. *Discourse Processes, 47,* 1-31.

Bråten, I., & Strømsø, H.I. (2010b). When law students read multiple documents about global warming: Examining the role of topic-specific beliefs about the nature of knowledge and knowing. *Instructional Science, 38,* 635-657.

Bråten, I., & Strømsø, H.I. (2011). Measuring strategic processing when students read

multiple texts. *Metacognition and Learning, 6,* 111-130.

Bråten, I., Strømsø, H.I., & Britt, M.A. (2009). Trust matters: Examining the role of source evaluation in students' construction of meaning within and across multiple texts. *Reading Research Quarterly, 44,* 6-28.

Bråten, I., Strømsø, H.I., & Ferguson, L.E. (2016). The role of epistemic beliefs in the comprehension of single and multiple texts. In P. Afflerbach (Ed.), *Handbook of individual differences in reading: Reader, text, and context* (pp. 67-79). New York: Routledge.

Bråten, I., Strømsø, H.I., & Samuelstuen, M.S. (2008). Are sophisticated students always better? The role of topic-specific personal epistemology in the understanding of multiple expository texts. *Contemporary Educational Psychology, 33,* 814-840.

Britt, M.A., & Gabrys, G.L. (2000). Teaching advanced literacy skills for the World Wide Web. In C.R. Wolfe (Ed.), *Learning and teaching on the World Wide Web* (pp. 73-90). San Diego, CA: Academic Press.

Britt, M.A., Perfetti, C.A., Sandak, R., & Rouet, J.F. (1999). Content integration and source separation in learning from multiple texts. In S.R. Goldman, A.C. Graesser, & P. van den Broek (Eds.), *Narrative, comprehension, causality, and coherence: Essays in honor of Tom Trabasso* (pp. 209-233). Mahwah, NJ: Erlbaum.

Britt, M.A., Richter, T., & Rouet, J.F. (2014). Scientific literacy: The role of goal-directed reading and evaluation in understanding scientific information. *Educational Psychologist, 49,* 104-122.

Britt, M.A., & Rouet, J.F. (2012). Learning with multiple documents: Component skills and their acquisition. In J.R. Kirby & M.J. Lawson (Eds.), *Enhancing the quality of learning: Dispositions, instruction, and learning processes* (pp. 276-314). New York: Cambridge University Press.

Britt, M.A., Rouet, J.F., & Braasch, J.L.G. (2013). Documents as entities: Extending the situation model theory of comprehension. In M.A. Britt, S.R. Goldman, & J.F. Rouet (Eds.), *Reading: From words to multiple texts* (pp. 160–179). New York: Routledge.

Britt, M.A., & Sommer, J. (2004). Facilitating textual integration with macro-structure focusing tasks. *Reading Psychology, 25,* 313-339.

Clark, R.E. (1983). Reconsidering research on learning from media. *Review of Educational Research, 53,* 445-459.

Coe, K., Kenski, K., & Rains, S.A. (2014). Online and uncivil? Patterns and determinants of incivility in newspaper website comments. *Journal of Communication, 64,* 658-679.

Dillon, A. (1992) Reading from paper versus screens: A critical review of the empirical literature. *Ergonomics, 35,* 1297-1326.

Duncan, L.G., McGeown, S.P., Griffiths, Y.M., Stothard, S.E., & Dobai, A. (2015). Adolescent reading skill and engagement with digital and traditional literacies as predictors of reading comprehension. *British Journal of Psychology,* 107, 209-238.

Ferguson, L.E., & Bråten, I. (2013). Student profiles of knowledge and epistemic beliefs: Changes and relations to multiple-text comprehension. *Learning and Instruction, 25,* 49-61.

Ferguson, L.E., Bråten, I., Strømsø, H.I., & Anmarkrud, Ø. (2013). Epistemic beliefs and comprehension in the context of reading multiple documents: Examining the role of conflict. *International Journal of Educational Research, 62,* 100-114.

Fesel, S.S., Segers, E., Clariana, R.B., & Verhoeven, L. (2015). Quality of children's knowledge representations in digital text comprehension: Evidence from pathfinder networks. *Computers in Human Behavior, 48,* 135-146.

Fletcher, J., & Nicholas, K. (2016). Reading for 11–13-year-old students in the digital age: New Zealand case studies. *Education 3-13,* 1-12.

Gil, L., Bråten, I., Vidal-Abarca, E., & Strømsø, H.I. (2010a). Summary versus argument tasks when working with multiple documents: Which is better for whom? *Contemporary Educational Psychology, 35,* 157-173.

Gil, L., Bråten, I., Vidal-Abarca, E., & Strømsø, H.I. (2010b). Understanding and integrating multiple science texts: Summary tasks are sometimes better than argument tasks. *Reading Psychology, 31*, 30-68.

Goldman, S.R. (2004). Cognitive aspects of constructing meaning through and across multiple texts. In N. Shuart-Faris & D. Bloome (Eds.), *Uses of intertextuality in classroom and educational research* (pp. 317-351). Greenwich, CT: Information Age.

Goldman, S.R., Braasch, J.L.G., Wiley, J., Graesser, A.C., & Brodowinska. K.M. (2012). Comprehending and learning from Internet sources: Processing patterns of better and poorer learners. *Reading Research Quarterly, 47*, 356–381.

Goldman, S.R., Britt, M.A., Brown, W., Cribb, G., George, M., Greenleaf, C., … Project READI (2016). Disciplinary literacies and learning to read for understanding: A conceptual framework for disciplinary literacy. *Educational Psychologist, 51*, 219-246.

Goldman, S.R., Ozuru, Y., Braasch, J.L.G., Manning, F.H., Lawless, K.A., Gomez, K.W., & Slanovits, M.J. (2011). Literacies for learning: A multiple source comprehension illustration. In N.L. Stein & S.W. Raudenbush (Eds.), *Developmental cognitive science goes to school* (pp. 30-44). New York: Routledge.

Hagen, Å.M., Braasch, J.L.G., & Bråten, I. (2014). Relationships between spontaneous note-taking, self-reported strategies, and comprehension when reading multiple texts in different task conditions. *Journal of Research in Reading, 37,* 141-157.

Hofer, B.K., & Bendixen, L.D. (2012). Personal epistemology: Theory, research, and future directions. In K.R. Harris, S. Graham, & T. Urdan (Eds.), *APA Educational*

*Psychology Handbook: Vol. 1. Theories, constructs, and critical issues* (pp. 227-256). Washington, DC: American Psychological Association.

Holzinger, A., Baernthaler, M., Pammer, W., Katz, H., Bjelic-Radisic, V., & Ziefle, M. (2011). Investigating paper vs. screen in real-life hospital workflows: Performance contradicts perceived superiority of paper in the user experience. *International Journal of Human-Computer Studies, 69*, 563-570.

Jiang, T., Hou, Y., & Wang, Q. (2016). Does micro-blogging make us "shallow"? Sharing information online interferes with information comprehension. *Computers in Human Behavior, 59*, 210-214.

Jones, T., & Brown, C. (2011). Reading engagement: A comparison between E-books and traditional print books in an elementary classroom. *International Journal of Instruction, 4,* 1308-1470.

Kammerer, Y., Bråten, I., Gerjets, P., & Strømsø, H.I. (2013). The role of Internet-specific epistemic beliefs in laypersons' source evaluations and decisions during Web search on a medical issue. *Computers in Human Behavior, 29,* 1193-1203.

Kammerer, Y., & Gerjets, P. (2014). Quellenbewertungen und Quellenverweise beim Lesen und Zusammenfassen wissenschaftsbezogener Informationen aus multiplen Webseiten [Source evaluations and source references when reading and summarizing science-related information from multiple web pages]. *Unterrichtswissenschaft, 42,* 7-23.

Kammerer, Y., Kalbfell, E., & Gerjets, P. (2016). Is this information source commercially biased? How contradictions between web pages stimulate the consideration of source information. *Discourse Processes,* 53, 430-456.

Kintsch, W. (1998). *Comprehension: A paradigm for cognition.* New York: Cambridge University Press.

Kinzer, C.K., & Leu, D.J. (2017). New Literacies and new literacies within changing

digital environments. In M.A. Peters (Ed.), *Encyclopedia of educational philosophy and theory*. Singapore: Springer.

Kobayashi, K. (2009a). Comprehension of relations among controversial texts: Effects of external strategy use. *Instructional Science, 37*, 311-324.

Kobayashi, K. (2009b). The influence of topic knowledge, external strategy use, and college experience on students' comprehension of controversial texts. *Learning and Individual Differences, 19*, 130-134.

Kretzschmar, F., Pleimling, D., Hosemann, J., Füssel, S., Bornkessel-Schlesewsky, I., & Schlesewsky, M. (2013). Subjective impressions do not mirror online reading effort: Concurrent EEG-eyetracking evidence from the reading of books and digital media. *PloS ONE, 8*(2), e56178.

Kurata, K., Ishita, E., Miyata, Y., & Minami, Y. (in press). Print or digital? Reading behavior and preferences in Japan. *Journal of the Association for Information Science and Technology*.

Kurby, C.A., Britt, M.A., & Magliano, J.P. (2005). The role of top-down and bottom-up processes in between-text integration. *Reading Psychology, 26*, 335-362.

Lauterman, T., & Ackerman, R. (2014). Overcoming screen inferiority in learning and calibration. *Computers in Human Behavior, 35*, 455-463.

Le Bigot, L., & Rouet, J.F. (2007). The impact of presentation format, task assignment, and prior knowledge on students' comprehension of multiple online documents. *Journal of Literacy Research, 39*, 445-470.

Leu, D.J., Kinzer, C.K., Coiro, J., Castek, J., & Henry, L.A. (2013). New literacies: A dual-level theory of the changing nature of literacy, instruction, and assessment. In D.E. Alvermann, N.J. Unrau, & R.B. Ruddell (Eds.), *Theoretical models and processes of reading* (6th ed., pp. 1150-1181). Newark, DE: International Reading Association.

Leu, D.J., & Maykel, C. (2016). Thinking in new ways and in new times about reading. *Literacy Research and Instruction, 55,* 122-127.

List, A., Alexander, P.A., & Stephens, L.A. (2017). Trust but verify: Examining the association between students' sourcing behaviors and ratings of text trustworthiness. *Discourse Processes, 54,* 83-104.

Lucassen, T., Muilwijk, R., Noordzij, M.L., & Schraagen, J.M. (2013). Topic familiarity and information skills in online credibility evaluation. *Journal of the American Society for Information Science and Technology, 64,* 254-264.

Lucassen, T., & Schraagen, J.M. (2011). Factual accuracy and trust in information: The role of expertise. *Journal of the American Society for Information Science and Technology, 62,* 1232-1242.

Macedo-Rouet, M., Braasch, J.L.G., Britt, M.A., & Rouet, J.F. (2013). Teaching fourth and fifth graders to evaluate information sources during text comprehension. *Cognition and Instruction, 31,* 204-226.

Mangen, A. (2008). Hypertext fiction reading: Haptics and immersion. *Journal of Research in Reading, 31,* 404-419.

Mangen, A., Walgermo, B.R., & Brønnick, K. (2013). Reading linear texts on paper versus computer screen: Effects on reading comprehension. *International Journal of Educational Research, 58,* 61-68.

Margolin, S.J., Driscoll, C., Toland, M.J., & Kegler, J.L. (2013). E-readers, computer screens, or paper: Does reading comprehension change across media platforms? *Applied Cognitive Psychology, 27,* 512-519.

Mason, L., Ariasi, N., & Boldrin, A. (2011). Epistemic beliefs in action: Spontaneous reflections about knowledge and knowing during online information searching and their influence on learning. *Learning and Instruction, 21,* 137-151.

Mason, L., Boldrin, A., & Ariasi, N. (2010). Searching the Web to learn about a controversial topic: Are students epistemically active? *Instructional Science, 38,* 607-633.

Mason, L., Junyent, A.A., & Tornatora, M.C. (2014). Epistemic evaluation and comprehension of web-source information on controversial science-related topics: Effects of a short-term instructional intervention. *Computers & Education, 76,* 143-157.

Maynard, S. (2010). The impact of e-books on young children's reading habits. *Publishing Research Quarterly, 26,* 236–248.

McCrudden, M. T., & Schraw, G. (2007). Relevance and goal-focusing in text processing. *Educational Psychology Review, 19,* 113-139.

McNamara, D.S., & Magliano, J. (2009). Toward a comprehensive model of comprehension. *Psychology of Learning and Motivation, 51,* 297-384.

Moje, E.B., Overby, M., Tysvaer, N., & Morris, K. (2008). The complex world of adolescent literacy: Myths, motivations, and mysteries. *Harvard Educational Review, 78,* 107-154.

Naumann, A.B., Wechsung, I., & Krems, J.F. (2009). How to support learning from multiple hypertext sources. *Behavior Research Methods, 41,* 639-646.

Naumann, J. (2015). A model of online reading engagement: Linking engagement, navigation, and performance in digital reading. *Computers in Human Behavior, 53,* 263-277.

O'Brien, E.J., & Myers, J.L. (1999). Text comprehension: A view from the bottom up. In S.R. Goldman, A.C. Graesser, & P. van den Broek (Eds.), *Narrative, comprehension, causality, and coherence: Essays in honor of Tom Trabasso* (pp. 35-54). Mahwah, NJ: Erlbaum.

Perfetti, C.A., Rouet, J.F., & Britt, M.A. (1999). Towards a theory of documents representation. In H. van Oostendorp & S.R. Goldman (Eds.), *The construction of mental representations during reading* (pp. 99–122). Mahwah, NJ: Erlbaum.

Picton, I. (2014). *The impact of ebooks on the reading motivation and reading skills of children and young people: A rapid literature review*. London: National Literacy Trust.

Pieschl, S., Stahl, E., & Bromme, R. (2008). Epistemological beliefs and self-regulated learning with hypertext. *Metacognition and Learning*, *3*, 17-37.

Rouet, J.F. (2006). *The skills of document use*. Mahwah, NJ: Erlbaum.

Rouet, J.F., & Britt, M.A. (2011). Relevance processes in multiple document comprehension. In M.T. McCrudden, J.P. Magliano, & G. Schraw (Eds.), *Text relevance and learning from text* (pp. 19-52). Greenwich, CT: Information Age.

Rouet, J.F., Britt, M.A., Mason, R.A., & Perfetti, C.A. (1996). Using multiple sources of evidence to reason about history. *Journal of Educational Psychology, 88,* 478–493.

Rouet, J.F., Le Bigot, L., de Pereyra, G., & Britt, M.A. (2016). Whose story is this? Discrepancy triggers readers' attention to source information in short narratives. *Reading and Writing*, *29*, 1549-1570.

Rowlands, I., Nicholas, D., Jamali, H.R., & Huntington, P. (2007). What do faculty and students really think about e-books? *Aslib Proceedings, 59*, 489-511.

Salmerón, L., Baccino, T., Cañas, J.J., Madrid, R.I., & Fajardo, I. (2009). Do graphical overviews facilitate or hinder comprehension in hypertext? *Computers & Education, 53*, 1308-1319.

Salmerón, L., Cañas, J.J., Kintsch, W., & Fajardo, I. (2005). Reading strategies and hypertext comprehension. *Discourse Processes, 40*, 171-191.

Salmerón, L., & García, V. (2011). Reading skills and children's navigation strategies in

hypertext. *Computers in Human Behavior, 27,* 1143–1151.

Salmerón, L., Gil, L., Bråten, I., & Strømsø, H.I. (2010). Comprehension effects of signalling relationships between documents in search engines. *Computers in Human Behavior, 26,* 419-426.

Salmerón, L., Macedo-Rouet, M., & Rouet, J.F. (2016). Multiple viewpoints increase students' attention to source features in social question and answer forum messages. *Journal of the Association for Information Science and Technology, 67,* 2404-2419.

Salmerón, L., Naumann, J., García, V., & Fajardo, I. (in press). Scanning and deep processing of information in hypertext: An eye-tracking and cued retrospective think-aloud study. *Journal of Computer Assisted Learning*.

Saux, G., Britt, A., Le Bigot, L., & Vibert, N., Burin, D., & Rouet, J.F. (2017). Conflicting but close: Readers' integration of information sources as a function of their disagreement. *Memory and Cognition, 45,* 151-167.

Shah, C., & Kitzie, V. (2012). Social Q&A and virtual reference—comparing apples and oranges with the help of experts and users. *Journal of the American Society for Information Science and Technology*, *63*, 2020–2036.

Singer, L.M., & Alexander, P.A. (2017). Reading across mediums: Effects of reading digital and print texts on comprehension and calibration. *Journal of Experimental Education, 85*, 155-172.

Slavin, R.E. (1986). Best-evidence synthesis: An alternative to meta-analytic and traditional reviews. *Educational Researcher, 15*, 5-11.

Snow, .E. (2010). Academic language and the challenge of reading for learning about science. S*cience, 328*, 450-452.

Sparrow, B., Liu, J., & Wegner, D.M. (2011). Google effects on memory: Cognitive consequences of having information at our fingertips. *Science, 333*, 776–778.

Stadtler, M., Scharrer, L., Skodzik, T., & Bromme, R. (2014). Comprehending multiple documents on scientific controversies: Effects of reading goals and signaling rhetorical relationships. *Discourse Processes, 51*, 93-116.

Stahl, S.A., Hynd, C.R., Britton, B.K., McNish, M.M., & Bosquet, D. (1996). What happens when students read multiple source documents in history? *Reading Research Quarterly, 31*, 430-456.

Strømsø, H.I., & Bråten, I. (2009). Beliefs about knowledge and knowing and multiple-text comprehension among upper secondary students. *Educational Psychology, 29,* 425-445.

Strømsø, H.I., & Bråten, I., & Britt, M.A. (2010). Reading multiple texts about climate change: The relationship between memory for sources and text comprehension. *Learning and Instruction, 18*, 513-527.

Strømsø, H.I., Bråten, I., Britt, M.A., & Ferguson, L.E. (2013). Spontaneous sourcing among students reading multiple documents. *Cognition and Instruction, 31,* 176-203.

Strømsø, H.I., Bråten, I., & Samuelstuen, M.S. (2003). Students' strategic use of multiple sources during expository text reading. *Cognition and Instruction, 21,* 113-147.

Strømsø, H.I., Bråten, I., & Samuelstuen, M.S. (2008). Dimensions of topic-specific epistemological beliefs as predictors of multiple text understanding. *Learning and Instruction, 18*, 513-527.

Trevors, G., Feyzi-Behnagh, R., Azevedo, R., & Bouchet, F. (2016). Self-regulated learning processes vary as a function of epistemic beliefs and contexts: Mixed method evidence from eye tracking and concurrent and retrospective reports. *Learning and Instruction, 42,* 31-46.

Tveit, Å.K., & Mangen, A. (2014). A joker in the class: Teenage readers' attitudes and

preferences to reading on different devices. *Library & Information Science Research, 36,* 179-184.

van den Broek, P. (2010). Using texts in science education: Cognitive processes and knowledge representation. *Science, 328,* 453-456.

van den Broek, P., & Kendeou, P. (2015). Building coherence in web-based and other non-traditional reading environments: Cognitive opportunities and challenges. In R.J. Spiro, M. DeSchryver, M.S. Hagerman, P.M. Morsink, & P. Thompson (Eds.), *Reading at a crossroads? Disjunctures and continuities in current conceptions and practices* (pp. 104-114). New York: Routledge.

VanSledright, B., & Maggioni, L. (2016). Epistemic cognition in history. In J.A. Greene, W.A. Sandoval, & I. Bråten (Eds.), *Handbook of epistemic cognition* (pp. 128-146). New York: Routledge.

Warschauer, M., & Grimes, D. (2007). Audience, authorship, and artifact: The emergent semiotics of Web 2.0. *Annual Review of Applied Linguistics, 27,* 1-23.

Wiley, J., Goldman, S. R., Graesser, A. C., Sanchez, C. A., Ash, I. K., & Hemmerick, J. (2009). Source evaluation, comprehension, and learning in internet science inquiry tasks. *American Educational Research Association Journal, 46,* 1060-1106.

Wiley, J., & Voss, J.F. (1999). Constructing arguments from multiple sources: Tasks that promote understanding and not just memory for text. *Journal of Educational Psychology, 91,* 301–311.

Wineburg, S. (1991). Historical problem solving: A study of the cognitive processes used in the evaluation of documentary and pictorial evidence. *Journal of Educational Psychology, 83,* 73-87.

Winter, S., & Krämer, N.C. (2012). Selecting science information in Web 2.0: How source

cues, message sidedness, and need for cognition influence users' exposure to blog posts. *Journal of Computer-Mediated Communication, 18,* 80-96

Wolfe, M.B.W., & Goldman, S.R. (2005). Relations between adolescents' text processing and reasoning. *Cognition and Instruction, 23,* 467-502.