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The Future of Reading Comprehension: Embracing Complexity and Expanding Theory

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Abstract
Successful reading comprehension relies on a complex set of skills and processes to derive meaning from text. These skills and processes have been articulated in extant accounts of reading comprehension in the context of both single and multiple texts. However, the increasingly complex digital ecosystem brought about by the Internet imposes additional challenges to our understanding of comprehension in authentic reading contexts. One such challenge is understanding the processes by which comprehension unfolds in collaborative contexts where multiple readers work together to understand a text. As a first step in addressing this challenge, we review prominent accounts of single- and multiple-text comprehension, which

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serve a basis for an initial proposal of the collaborative reading comprehension (CRC) framework. The goal of CRC is to provide a preliminary understanding of the representational and processing aspects of collaborative comprehension, as well as to stimulate future empirical work.

Keywords: Collaboration; Reading comprehension; Theory

1 Introduction

Reading comprehension is crucial for success in the 21st century. Young adults are expected to enter the workforce with the ability to comprehend complex texts and use information from texts to make important decisions. Unfortunately, despite increasing investments in reading research (e.g., *Reading for Understanding* initiative of $120 million) and instruction (Pearson et al., 2020), over a third of students already struggle with basic comprehension of texts by fourth grade in the United States (NAEP, 2019), a statistic that has remained unchanged for many years. The country's performance on international reading assessments has also remain unchanged for many years (OECD, 2019).

Improving comprehension outcomes requires a coordinated effort to identify the processes and skills involved in reading comprehension. Moreover, an extensive reading research program aimed to improve low reading performance must leverage our growing knowledge base regarding these processes and skills to produce evidence-based reading interventions for students and inform instructional curricula. This multi-prong approach to addressing poor reading comprehension outcomes has been a significant undertaking in educational research, as reading comprehension is an extremely complex and multidimensional skill. Indeed, reading comprehension requires a range of lower-level comprehension processes that allow students to decode and recognize words as well as connect words into sentences (Castles, Rastle, & Nation, 2018; Kendeou, Papadopoulos, & Kotzapoulou, 2013; National Reading Panel [NRP], 2000; Perfetti & Stafura, 2014). While these processes are necessary to comprehend texts, they are not sufficient. Students must also engage in higher-level comprehension processes that allow them to retrieve relevant background knowledge, make inferences, monitor comprehension, and identify different discourse structures (Kendeou, McMaster, & Christ, 2016; McNamara & Magliano, 2009).

Critical to our understanding of the skills and processes involved in comprehension are theoretical models of reading comprehension. Theoretical models of comprehension allow researchers to make testable predictions about the skills and processes involved in comprehension, making it possible to identify the reasons students may struggle to comprehend texts. To date, the complexity of reading comprehension has precluded the development of a comprehensive model of comprehension (Kendeou & O'Brien, 2018; Perfetti & Stafura, 2014). Instead, over the last several decades, researchers have developed many theoretical models of reading comprehension, each tapping on different aspects of reading. Each of these models in turn has served as the catalyst for important programs of research that have expanded the field's understanding of comprehension.

One consequence of extant reading comprehension models is the development of a widespread reading heuristic that has helped researchers categorize the different processes and skills required in reading comprehension. This heuristic, which has been proposed in an influential report by the Research and Development (RAND) Reading Study Group (2002), proposes that comprehension is situated within the interactions among the reader, the text,

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and the reading activity within the larger sociocultural context. Variations in readers' abilities, texts, and the reading tasks influence comprehension processes and outcomes. Additionally, reader, text, and task characteristics interact with each other and are shaped by the sociocultural context in which the reading activity takes place.

Early accounts of comprehension have largely conceptualized reading comprehension as a cognitive activity where a single reader extracts meaning from a single text. This conceptualization of reading comprehension that has been prominent in the literature does not capture the complexities and demands of reading comprehension as it unfolds in real-world contexts. As such, more recent models have begun to account for the complexity of single readers engaging with *multiple* texts or documents. Despite this progress, the current digital ecosystem brought about by the Internet age imposes additional challenges that requires us to consider more complex, naturalistic forms of reading that involve interaction with complex, nonlinear texts and multiple sources in traditional and non-traditional environments. For example, readers turning to the Internet to learn about a controversial topic may have to navigate through hyperlinks, access information across multiple platforms (e.g., social media, websites), consider information from different perspectives, and assess the credibility of the information they encounter. Additionally, the digital ecosystem has made it increasingly possible for readers to interact with one another in extracting meaning from text(s). These aspects of reading, in turn, call for more theorizing to expand our current understanding of reading comprehension (Coiro, 2020; Pearson et al., 2020).

In this article, our aim is to contribute to the expanding theoretical landscape by introducing *collaborative reading comprehension* as a fruitful forward-looking direction. In doing so, first we provide a brief overview of the theoretical landscape of reading comprehension and describe how the landscape has changed over time. This brief review illustrates how progress toward more complex conceptualizations of reading comprehension has already been made possible by researchers who have elaborated on and amended initial theoretical models. Next, we introduce collaborative reading comprehension as one important extension of reading comprehension and describe how we can draw on extant reading comprehension models to inform the development of it as a theoretical framework. Finally, we discuss the implications of this new theoretical framework for research and practice.

2 Current theoretical landscape

Extant comprehension models and frameworks elaborate on the cognitive and linguistic processes involved in reading comprehension. As mentioned earlier, different theoretical models focus on different aspects of the comprehension process. A detailed description of these models as well as their similarities and differences is beyond the scope of this article (see McNamara & Magliano, 2009, for a review). Nevertheless, most comprehension models explicitly state that the goal of comprehension is to create a *coherent mental representation* of the information presented in the text. This mental representation, frequently called the "situation model," reflects the readers' interpretation of the text content. The situation model includes information from the text, memory contents related to the text, and the inferences readers generate as they read the text (Kintsch, 1988). Readers make inferences by connecting current information they are reading to prior information in the text (i.e., bridging inferences) or to their prior knowledge (i.e., knowledge-based inferences). Thus, one reader's situation model may not be the same as another reader's situation model, even when they read the

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same text (Kintsch, 1994). The situation model is the basis of comprehension, learning, and problem-solving in new contexts (Kintsch, 1998).

To date, the most influential model of reading comprehension processes is the Construction-Integration Model (C-I Model; Kintsch, 1988; Kintsch & van Dijk, 1978; van Dijk & Kintsch, 1983). The C-I Model describes comprehension as a two-stage process: (a) knowledge construction and (b) knowledge integration. During the construction phase, information from the text and related knowledge become activated. Information that is activated can be both relevant and irrelevant to the information in the text. The activated information is conceived as a network of nodes that represent different concepts, words, or ideas and links between them. During the integration phase, concepts in the network are constrained through a spreading activation mechanism. Only concepts that are highly connected to one another remain in the network while less connected, peripheral concepts lose activation. The resulting network constitutes a reader's situation model. The construction and integration process occurs cyclically (every couple of sentences) throughout the text until a reader completes reading and ends up with a situation model of the text.

3 Early theoretical accounts

The C-I model has served as a foundation for subsequent models of reading comprehension that have focused on different aspects of situation model construction. For example, the Event-Indexing Model (Zwaan, Langston, & Graesser, 1995) elaborates on the dimensions of situation model construction that occurs as readers process narrative texts. According to this model, readers closely monitor and represent information about narrative events along five dimensions: the agents or protagonists in the event, time (i.e., when the event occurs), space (i.e., where the event occurs), causality (i.e., the event's causal relation to a prior event), and motivation (i.e., the agent's goals). For each subsequent event in a narrative, readers assess whether any of the index of these dimensions need to be updated. For example, if a new event in the text introduces a new protagonist, readers will have to update the protagonist index. By focusing on narrative texts, the Event-Indexing model highlights the important contribution of text-based (i.e., bridging) inferences related to the five event dimensions to situation model construction in addition to the knowledge-based inferences specified in the C-I model.

The role of causality in situation model construction is also emphasized in the Causal Network Model (Trabasso, van den Broek, & Suh, 1989). According to this model, constructing a coherent mental representation of a text requires readers to identify and infer causal relations between different events and ideas described in the text. The model outlines temporal priority, operativity, necessity, and sufficiency as four central properties of causality (van den Broek, 1990). The temporal priority principle states that a cause cannot occur after the outcome. The operativity property states that the cause must occur at the same time as the outcome, and the outcome cannot be explained by any other prior event. The necessity principle states that the cause must be necessary given the information provided in the text. This principle can be tested by counterfactual reasoning (i.e., if A had not occurred B could not occur). Finally, the sufficiency principle states that a cause is sufficient enough for the outcome to occur, taking into consideration the other potential causes that precede the outcome. These properties guide the type and strength of causal inferences that readers will generate (e.g., physical, motivational, psychological). Like the Event-Indexing Model, the

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Causal Network Model has been instrumental in understanding how readers comprehend narratives or event-based texts.

Early comprehension models also differ in the extent to which they emphasize the role of bottom-up, memory-based retrieval or top-down, controlled processes in generating inferences. For example, in the Constructionist Model (Graesser, Singer, & Trabasso, 1994), it is theorized that readers strategically and actively search their long-term memory for information that can help them maintain coherence. In contrast, in the Resonance Model (Myers & O'Brien, 1998) it is theorized that the information necessary for readers to maintain local and global coherence will only be available through a passive memory activation process (O'Brien & Cook, 2015). Specifically, information currently active in readers' working memory serves as a signal to all content in readers' long-term memory. Only the elements that "resonate" strongly in response to this signal will be activated and drawn back into working memory, where they can influence comprehension processes.

Some models have attempted to explicitly integrate top-down and bottom-up factors that support comprehension. For example, the Landscape Model (van den Broek, Young, Tzeng, & Linderholm, 1999) describes the comprehension process as the fluctuation in activation of text concepts or ideas. This process is influenced by and influences readers' standards of what constitutes good comprehension. In every reading cycle, new text concepts are activated, carried over from the previous cycle, or removed. Two mechanisms are provided to account for changes in concept fluctuation over time: cohort activation and coherence-based retrieval. Cohort activation occurs when the activation of one concept is accompanied by the activation of connected concepts. Coherence-based retrieval involves the retrieval of information that is driven by the readers' standards of coherence. Readers' standards of coherence are the explicit and/or implicit criteria readers adopt to determine whether they have sufficiently comprehended the text (van den Broek, Bohn-Gettler, Kendeou, Carlson, & White, 2011). For example, readers' standards of coherence are easily met if readers are only interested in obtaining a superficial understanding of the text, whereas standards of coherence are more demanding when readers want to engage in deep comprehension of the text (Linderholm, Virtue, Tzeng, & van den Broek, 2004). Thus, in the Landscape Model cohort activation represents a more passive, bottom-up comprehension process while coherent-based retrieval represents a more strategic, top-down comprehension process.

In summary, early comprehension models elaborate on how individual readers are able to comprehend information from a single text. Comprehending a text requires readers to construct a coherent situation model of the events or ideas in the text. Each of the models described above outlines important reader, text, and task characteristics that influence situation model construction. To date, the fundamental processes involved in situation model construction continue to be the best approximation of reading comprehension processes.

4 Multiple text comprehension

The aforementioned theoretical models are useful in understanding the processes involved in the comprehension of a single text. However, researchers have subsequently begun to embrace more complex conceptions of reading. Namely, reading in authentic contexts (e.g., searching for information on the Internet) often requires readers to identify and synthesize information across multiple texts, especially when they are learning about a complex topic.

Although the notion of a situation model remains central to multiple-text comprehension, multiple-text comprehension departs from single-text comprehension in at least two ways

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(Braasch, Rouet, Vibert, & Britt, 2012; Britt, Perfetti, Sandak, & Rouet, 1999; Rouet & Britt, 2011). First, multiple-text comprehension requires the construction of a situation model that incorporates information from different texts *and* sources. Second, the ability to identify and evaluate sources is an important component of multiple-text comprehension because different texts may provide contradicting perspectives or information on the same topic.

The Documents Model Framework (Perfetti, Rouet, & Britt, 1999) is the earliest and perhaps most prominent account of how readers represent information from multiple texts or documents. In this context, readers construct a documents model, which consists of two core sub-components. The first is the situations model or integrated model. The situations model is a representation of the contents of multiple texts. Depending on the reading task and context, the extent to which readers integrate content across texts may vary. On one hand, readers may choose to construct one integrated representation of the different situations described in the texts. On the other hand, readers may choose to construct an independent representation for each text (i.e., a separate-representations model). However, skilled readers are thought to construct a representation that is more akin to the former. The second component is the intertext model. The intertext model includes information about the relations among the texts and sources (i.e., Source A supports Source B), as well as connections between each text and content. More specifically, the intertext model consists of individual document nodes that may be connected to one another. Each document node includes source information (i.e., authors, setting, document type), the document's rhetorical goal (e.g., author's intent), and the main point or thesis or the document. Readers are thought to create a coherent documents model when the situations model integrates content across all texts, which is then linked with the information sources, thereby allowing readers to understand both who said what and the interrelations among the texts' contents.

More recent models of multiple-text comprehension expanded theorizing about multiple text comprehension by specifying the nature of readers' goals and the reading task before and during comprehension of multiple documents. For example, The REading as problem SOLVing model (RESOLV; Rouet, Britt, & Durik, 2017) assumes that readers construct two distinct mental models in addition to the situations model: a context model and a task model. The context model is a representation of the situation in which the reading activity occurs. It includes elements such as task instructions, reading resources, performance criteria, time constraints, and the student's assessment of themselves as a reader. Based on the context model, readers develop a task model that represents their reading goal as well as the steps they can take to achieve that goal. While the context model is relatively stable over the course of reading, the task model is dynamic and constantly updated as students move toward their reading goal.

5 Digital reading and literacy

Systematic investigation into multiple text comprehension has been concomitant with the emergence of the Internet and social media and a shift in attention toward digital reading and literacy. Digital reading has been defined as "a range of multifaceted meaning-making experiences whereby readers engage with multiple texts for particular purposes that are situated in diverse contexts" (Coiro, 2020, p. 4). As digital reading is a broad construct, it is important for researchers to describe in detail the experience and context. Moreover, digital reading is situated within digital literacy, which emphasizes digital reading as an activity that

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takes place in a specific cultural and social context (Coiro, 2020; Frankel, Becker, Rowe, & Pearson, 2016).

Reading in a digital context often requires readers to navigate through an ill-defined digital problem space to find relevant information, interact with nonlinear multiple texts (i.e., hypertexts) on different digital platforms, and engage with multimedia (i.e., texts and graphics). Thus, research on multiple text comprehension can enhance our understanding of digital reading and literacy as comprehending multiple texts requires readers to engage in similar tasks, such as selecting what texts to read, analyzing and integrating information across texts, and evaluating source information (Afflerbach, Cho, & Kim, 2014). However, while comprehension in digital contexts still requires the same processes specified in multiple and single text comprehension models, research on digital reading must also consider how different medium, digital texts, and additional affordances of digital contexts may influence those comprehension processes.

Digital reading research represents the field's gradual and continuous progress toward understanding more authentic and complex forms of reading. Still, the digital reading literature has been characterized by tensions between embracing the complexity of reading as it occurs in digital contexts and oversimplifying it (see Coiro, 2020 for an excellent review). Despite the field's progress, the majority of digital reading research has focused on the medium of text delivery (print vs. digital) or has oversimplified the scope of digital reading (e.g., reading a single hypertext) in an effort to investigate digital reading processes and skills in controlled experiments (Singer & Alexander, 2017). Most important in this context, the affordances of different environments and digital reading situations and their influence on reading comprehension processes and/or outcomes (Barzillai, Thomson, Schroeder, & van den Broek, 2018) has not been fully integrated. Thus, more research is needed to understand deeper how reading comprehension occurs in complex digital contexts and how this complexity influences both processes and outcomes.

Recently, Coiro (2020) introduced a multifaceted heuristic of digital reading that outlines the text factors, reading activities, reader characteristics, and contextual features that may characterize the spectrum of digital reading experiences. One important contextual feature that is mentioned in the heuristic involves interactions between readers to accomplish reading tasks in digital or nondigital contexts. Several studies have already begun to examine interactions between readers as they evaluate and write essays about texts (Kiili, 2012; Kiili, Laurinen, Marttunen, & Leu, 2012). Central to these investigations is an expansion of traditional notions of "context," "text," and "reader," as well as their respective interactions. These reader interactions have implications for the representational and processing aspects of what we term "collaborative text comprehension." Understanding these aspects of collaborative comprehension will be crucial for advancing this new area as it will help us identify important factors that influence collaborative comprehension processes and outcomes and make predictions that can be testable in empirical research.

6 Future directions: collaborative reading comprehension

Collaborative reading comprehension is an important future direction for advancing theories of reading for several reasons. First, we contend that collaborative reading is already happening in the classroom. Students frequently seek help and work with one another in a classroom environment, even when the teacher does not explicitly ask students to collaborate (Newman, 2002; Newman & Schwager, 1995). Collaborative reading provides an opportunity

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for multiple readers of different reading levels to work together to facilitate comprehension of single or multiple texts. Indeed, there is some evidence that having students read together in groups can improve their reading comprehension strategies by promoting students' engagement with the text (Klingner, Vaughn, & Schumm, 1998; Palinscar & Brown, 1984, 1986). However, there has been *no systematic effort to investigate the actual cognitive and social processes underlying collaborative comprehension of text(s)*. There is a greater need to investigate such processes in order to determine the conditions under which collaborative reading facilitates comprehension and learning.

Second, we contend that collaborative reading is a domain-specific instance of collaborative problem-solving, an essential skill in the 21st century (Graesser et al., 2018). Successful collaborative problem-solving requires many competencies, including the ability to construct shared knowledge, negotiate and coordinate behavior, and maintain team functions (Sun et al., 2020). It follows that understanding collaborative reading comprehension processes would provide valuable insight into how people construct shared knowledge, the conditions under which people negotiate and coordinate behaviors, and how people maintain team functions.

Third, we contend that research on collaborative reading comprehension can begin to address core empirical and theoretical gaps in the study of reading comprehension in authentic environments. Specifically, developing a collaborative reading comprehension model would allow us to make a significant advancement toward understanding complex forms of reading that accounts for both multiple texts and multiple readers – often the case in digital platforms, social media, and online learning environments. Further, a collaborative reading comprehension model would allow us to systematically examine the affordances of different technologies in reading comprehension and improve upon current design features. Indeed, collaborative reading is being increasingly mediated by technology. Instructors are leveraging Learning Management Systems (e.g., Canvas, Moodle, Hypothes.is, Slack, etc.) to instruct students in both traditional and nontraditional educational settings, which has in turn changed the way students usually interact and communicate with one another about text(s). As the use and number of Learning Management Systems (LMS) in secondary and higher education increases, it will be important for researchers to evaluate LMS design features and affordances in student learning. Collaborative reading comprehension research should evaluate how using technology to mediate or scaffold readers' interactions will influence collaborative comprehension processes and outcomes.

To summarize, we propose the development of a new theoretical model that outlines the representational and processing aspects of collaborative reading comprehension. This endeavor will require us to draw on existing theoretical models and frameworks and conceptualize collaborative reading comprehension in the context of these models. We describe this initial conceptualization next.

7 The collaborative reading comprehension (CRC) framework

We build upon the extant aforementioned theories and models to propose an initial collaborative reading comprehension (CRC) framework. Although multiple readers may collaborate to comprehend multiple texts, in the interest of parsimony the scope of the initial framework has been narrowed to collaborative comprehension of a single text.

CRC specifies the construction of two collaborative models, the collaborative task model and the collaborative situation model. CRC is driven by the assigned goal or task for reading

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(see Figure 1 for overview). This common goal or task requires the readers to construct a collaborative task model. This aspect of the framework has been informed by multiple text comprehension theories (e.g., RESOLV). Specifically, readers must construct and integrate their context and task models. The context model includes reader's perceived information about the reading context (e.g., time constraints, explicit instruction, digital or face-to-face interaction, group size), and it informs the reader's task model, which outlines the reader's perceived goals and the steps they plan to take to achieve those goals. Creating a collaborative task model requires core activation and integration processes, but readers may focus on different aspects of the reading context or reading goals. Readers' perceived goals and the optimal steps to take to achieve those goals may conflict. Thus, negotiation will be a key aspect of collaborative task model construction.

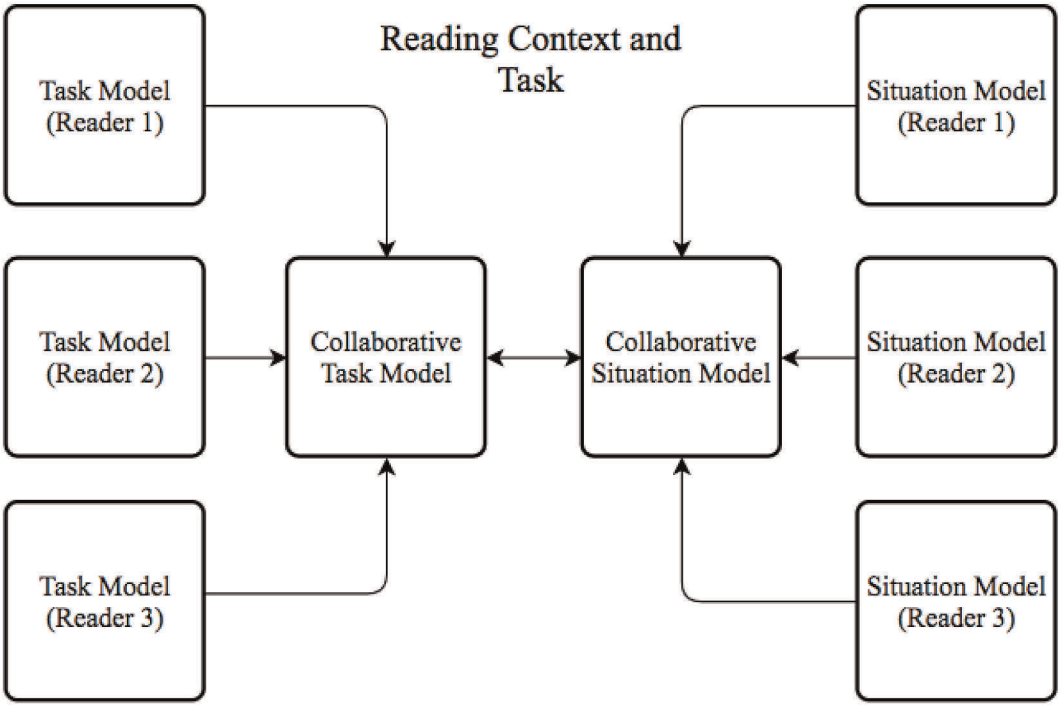

Figure 1: Overview of the CRC framework with multiple readers. Note. The time course of the iterative processes involved in the construction of the collaborative task and situation models will depend on when the reading and negotiation takes place (synchronous vs. asynchronous).

Consistent with the extant literature, the concept of a situation model remains crucial for this framework and the construction of a collaborative situation model. To reiterate, a situation model is a representation of the events described in the texts through the lenses of a reader's background knowledge. In any given collaborative reading context, each individual in the group will create a situation model of the target text as outlined in existing models of single and/or multiple text comprehension. Given individual differences in readers' motivation and prior knowledge, one reader's situation model will not necessarily be the same as another reader's situation model (Kintsch, 1994). Therefore, successful collaborative

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reading comprehension will require each member in the group not only to construct their own situation model of the target text, but also work together to integrate their respective situation models, and in the process co-construct what is termed the "collaborative situation model." The processes involved in the creation of readers' individual and collaborative situation models can be serial when the collaborative and reading components of the task are asynchronous. In this context, all readers enter the collaborative setting with individual situation models informed by different reading contexts and tasks. An example of asynchronous collaborative reading is when students read the same text at different times and contexts but eventually come together in the same digital or physical space to discuss the text. The processes involved in the creation of individual and collaborative situation models can also be parallel when the collaborative and reading components of the task occur synchronously. An example of synchronous collaborative reading is when students read the same text as they work together in real time to complete a task.

In order to integrate their situation models, readers must establish shared knowledge by communicating and negotiating with one another. Integration of situation models will likely be driven by both bottom-up and top-down processes, akin to those implicated in situation model construction by contemporary single text comprehension models. For example, it is likely that the most highly connected concepts or ideas in readers' situation models (e.g., causal information) will also be expressed in their verbal (e.g., discussion) and non-verbal communication (e.g., gestures) during the integration phase. Moreover, readers will also attempt to resolve any coherence gaps between and/or within their situation models through discussion with other readers. The extent to which reader's resolve coherence gaps in their situation models will also be driven by their individual standards of coherence and overall the reading task. This process for integrating situation models is iterative and the final product is a collaborative situation model. We theorize that it is the readers' collaborative situation model and not the readers' individual situation model that will be crucial for readers to complete a collaborative reading task and work cohesively towards a common goal.

Finally, the extent to which the group accomplishes the reading task will depend on their ability to link context in their collaborative situation model to fulfill the reading goals and tasks specified in the collaborative task model. This is a dynamic process, as the collaborative situation model and the collaborative task model will be updated continuously throughout the reading activity. Readers will have to continuously monitor this process. Moreover, if the task requires readers to create an external product (i.e., essay), readers will have to evaluate the quality of this product based on the content and goals specified in their collaborative situation and task models.

8 Concluding remarks

In this chapter, we provided an overview of the theoretical landscape of reading comprehension and illustrated how each iteration of comprehension models has attempted to address more complex and naturalistic forms of reading. Despite remarkable achievements and progress over the last decade, current theories do not yet fully address the complexities of reading comprehension that have been introduced by the digital age. We argue that further advances in our knowledge of reading comprehension requires us to reconceptualize and investigate reading comprehension as it occurs in natural contexts. In the process, researchers must continue to build and revise theories that describe the representational and processing aspects of naturalistic reading comprehension. These theories, although by default will be

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imperfect, will allow us to make predictions about the factors that influence reading comprehension processes and outcomes and expand our understanding of learning in naturalistic settings. An understanding of these factors is important in identifying malleability and thus potential targets for educational interventions.

As a first step toward embracing more complex forms of reading, we introduced an initial conceptualization of a framework that outlined the representational and processing aspects of collaborative reading in synchronous and asynchronous contexts. The decision to propose a framework that address collaborative reading comprehension was informed by emerging research evaluating interaction between readers (Kiili, 2012; Kiili et al., 2012) and an important observation that current formal and informal learning environments, digital or face-to-face, afford interactions between multiple readers (Coiro, 2020). The idea that reading in groups improves students' comprehension outcomes is not new (Klingner et al., 1998; Palinscar & Brown, 1984, 1986). However, it is important to understand how readers work *together* to extract meaning from texts. This understanding has important educational implications as it can help instructors leverage peer groups in strategic ways to improve reading comprehension outcomes. This understanding is also critical in the context of digital reading and learning.

The core elements of this initial framework were drawn from prior theoretical models that have already specified the important representations and processing mechanisms involved in reading comprehension. Further theory building will require us to test the assumptions we have made in this initial framework as well as its applicability in synchronous and asynchronous collaborative contexts. This endeavor will require an iterative, design-based approach that involves testing preliminary hypothesis about the processes involved in constructing collaborative representations and integrating feedback from targeted experiments to refine the framework. Despite its preliminary nature, the development of this initial framework is important as it begins to account for the inherent complexities of reading comprehension in the 21st century.

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