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Reading Contexts, Goals and Decisions: Text Comprehension as a Situated Activity

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Abstract

The spread of digital technology has prompted an increase in the amount of written text that gets produced and disseminated daily, together with a diversification of reading contexts and purposes. In this paper, we propose that modern reading increasingly relies on readers' ability to set up and manage their own reading goals and decisions. We outline our RESOLV theory of purposeful reading and we reflect on students' preparedness for reading in out-of-school contexts. We stress the importance of reading strategies for disciplinary learning, but also their limited transfer to out-of-school reading activities. We illustrate this point with an examination of the decisions involved in the reading of fake news. We conclude that students need to be trained to monitor information quality in contexts where neither the reading goal nor the genre and contents of the texts to be read can be expected a priori, which characterizes many current uses of the Web.

Keywords

context, decision, fake news, learning, reading, source, strategy, task, Web

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Reading Contexts, Goals and Decisions: Text Comprehension as a Situated Activity

As of September 2021, the World Wide Web contained an estimated 3.3 billion indexed pages (de Kunder, 2021), with hundreds of thousands added daily. In addition, cell phone users send over 500 billion short messages every day and social network users spend an average of two hours per day on their favorite apps (statista.com, 2021). These numbers are up from virtually zero just a couple decades ago, yet few readers of this paper are likely to be impressed by them. This is because, just like about half the human population, we have become used to living in a world of digital information systems, which we use all day long for an ever-increasing range of purposes and needs.

Digital devices have become increasingly diverse and versatile, from giant commercial boards and road signs to smartphones, from digital pads to 30-some inch computer screens. Consequently, text—once largely confined to physical printed matter in homes, offices and libraries—has become integrated into our daily routines and social interactions like never before. In 2021, 31% of American adults reported they are "almost constantly online" (Perrin & Atske, 2021) and another 48% said they are online "several times a day". What people read and how they read it, however, is very different from what it used to be in the pre-internet era. Although many people continue to read printed books or magazines at least occasionally, digital technology has introduced a large array of new types of texts, as well as new forms and uses of reading. For instance, people send each other written electronic messages regardless of distance—often within the same room or vehicle. They take part in written conversations with groups of relatives or friends over WhatsApp™ and other social networking applications. They learn about the world by attending to not just one, but a range of information sources through news aggregators and “feeds” crafted by social media companies. Digital media have also impacted reading practices in academic settings. Laptops and digital pads are part of the average grade-school student's working

environment. Teachers in secondary and higher education routinely assign homework through dedicated intranets or social networks. They also assign Internet searches as part of content-area classes. Thus, students acquire knowledge not just from attending classes and reading textbooks, but from an increasingly diverse range of sources whose competence, accuracy and benevolence vary to a great extent.

Our world has become a world of readers, with literacy rates increasing worldwide despite persisting geopolitical and gender gaps (UNESCO, 2017). But today's readers are very different from pre-Internet readers. Whereas reading used to be understood as the act of processing a single text from top to bottom with the goal of understanding the text's contents, this has become just one of the many ways of making sense from written texts. The question "What have you read lately?" no longer means "name the latest novel, essay or paper you have read" but "when did you last reach out to your device for messages, news, gossip, a piece of practical information, or maybe even a digital book."

Moreover, these contemporary forms of reading are neither trivial nor easier, from a cognitive standpoint, than reading in the traditional sense. Fifteen-year-old students, for instance, had trouble retrieving, interpreting and evaluating written information to the same extent in 2018 as in 2000, despite the inclusion of digital text genres, tasks and interfaces in the assessment (OECD, 2019). In fact, the ways in which written texts can challenge the reader have multiplied along with the diversity of text types and text uses. In order to understand and to teach reading in today's world, theorists and educators need to identify the many dimensions of change and incorporate them in their models of reading and reading instruction.

In the present paper, we focus on the diversity of reading contexts that have been enabled or facilitated by the advent of digital text technologies. Our main hypothesis is that the versatility of digital reading has placed a stronger emphasis on problem solving and

decision making while reading. More often than before, readers have to decide when and how to engage with written texts (whether fiction, news, explanation, argument or simple messages). They need to decide how to process text (e.g., whether they should scan, skim, skip, or slow down, read at a deeper level, reflect, assess, compare and contrast contents within and between texts). Across situations and tasks, readers always read for a purpose—sometimes a vague or unimportant one, sometimes a precise one with high stakes. In fact, modern readers seldom read texts entirely (Magliano et al., 2019). Instead, as they go through search engine results, news threads, online forums or academic papers, readers constantly, if not explicitly, ask themselves what they need to read, how they should read it, and whether they have read enough to move on to their next goal. As they read, they monitor whether the information is relevant, whether they should keep going, start over again, or just quit. They ask whether they can believe what they read, whether they should forward the information, store it for later, challenge it, or just ignore it.

The role of reading purposes and goals in shaping text comprehension has been a recurrent theme in the research literature over the past 40 years. In this paper, we examine the contextual and psychological drivers that affect reading purposes and decisions. We start with a brief discussion of the construct of "reading context" and our theory of reading as problem solving (RESOLV; Britt, Rouet, & Durik, 2018a; Rouet, Britt, & Durik, 2017). Then we discuss reading decisions in two different situations: the reading of discipline-specific documents as part of schooling and the reading of fake news.

Contextual dimensions of reading

The view that "reading does not occur in a vacuum" (Snow et al., 2002) makes sense intuitively. However, cognitive theories of reading have long focused on a restricted range of situations and tasks, in which the reader sets out to read a single text (or passage of text)

entirely, from top to bottom, in order to form a broad understanding of its content. In contrast, Snow et al. (2002) emphasized that reading is done for a wide range of purposes that are embedded in physical and social contexts, with some purposes more typical of some contexts than others. For example, reading a science textbook in order to fill in a worksheet is typical of a school context, whereas reading a novel for enjoyment is more typical of a personal context. Snow et al. further proposed that "the purpose is influenced by a cluster of motivational variables, including interest and prior knowledge" (p. 15). An important point underlying this vision is that there are many ways for a reader to engage with text. Reading a single text from top to bottom in order to form a broad understanding is just one of them. In many situations, readers engage with one or several texts selectively, as a function of their purposes and other situational constraints, such as the time available. Thus, reading processes are as much determined by readers' understanding of the context (why, what and how to read) as they are determined by the structure and content of the text(s). RESOLV places readers at the center of their reading activity because readers define the task for themselves.

In order to theorize about the influence of the reading context it is necessary to face the challenge of defining the context itself. The term suggests a broad array of parameters that are hardly amenable to categorization. Following Snow et al. (2002), context may be analyzed along physical, social and individual dimensions. Roughly speaking, physical context refers to the place, time and material conditions of reading. Social context refers to the inclusion of reading as part of social groups, roles and activities (e.g., reading as a student, as a worker, as a customer or as a private person). In particular, the social context determines the participation of other people with various roles and statuses into the reading process. For instance, some reading situations are assigned by a teacher and may be conducted in cooperation with peers. Individual context refers to the reader herself, with dimensions such as motivation, interest and ability. It is important to note that the physical,

social and individual dimensions of the context are not independent from each other. They combine to enable the acquisition of cognitive schemata. Thus, experienced students can consistently describe and categorize the typical reading situations they experience (Lorch et al., 1993). Experienced readers can also simulate various reading contexts, with observable consequences on their reading processes and outcomes.

In our theory of purposeful reading (Britt et al., 2018a), we described dimensions of the context in terms of external and internal resources. External resources roughly correspond to the construct of a physical and social context, whereas internal resources correspond to readers' dispositions toward reading, their understanding of the task, as well as their cognitive and language ability. Readers' understanding of the task is vital to the decisions they make regarding what to read and how to read it. In their oft-cited study, Pichert and Anderson (1977) asked college-level students to read the description of a house from the perspective of a burglar, from that of a home buyer, or from no particular perspective (control condition). Participants recalled more information relevant to their assigned perspective than to the other perspective or the control condition. Pichert and Anderson offered two non-exclusive interpretations of this effect. One interpretation was that the perspective instructions activated a "schema" that was then used to selectively encode the story elements that matched corresponding slots in the schema. The other was that the schema drove readers' attention to those story elements, which were then processed more deeply. Key to their manipulation was the assumption that readers would easily generate the implicit schema elements that were needed to assess the task-relevance of text units. For instance, being asked to read as a burglar would prompt participants to generate the information needs of a burglar (e.g., possible ways to enter the house, best day and time to break in, and so forth). Van den Broek et al. (1995, 2001) proposed that simulated contexts influence readers' standards for coherence, that is, the amount and type of inferences that support their achievement of

reading goals. Indeed, participants given instructions to read as if to prepare for an exam generated qualitatively distinct inferences from those asked to read as they would for entertainment. Again, participants were assumed to generate the goals relevant to the situation as described in the instructions based on their prior familiarity with the "exam" vs. "entertainment" contexts. Interestingly, van den Broek et al.'s (2001) manipulation also included physical features of the respective contexts (e.g., being seated at a desk with textbooks for the exam condition and seated on a couch with magazines displayed on the table for the entertainment condition) to help simulate the appropriate context. This additional precaution suggests that verbal instructions alone may not always be sufficient for readers to generate a complete simulation, i.e., goals and decisions that reflect what they would do if placed in the actual context.

Thus, research using simulated reading perspectives or contexts suggests that mature readers can derive context-appropriate reading goals and strategies and use these to guide how they read. The goal-focusing framework of McCrudden and Schraw (2007) provides a typology of typical task settings to which most western readers would respond, based on prior knowledge or familiarity. Indeed, most studies have used task instructions that referred to situations familiar enough for participants to elicit the key constraints and affordances of the simulated context. However, the instrumental dimensions of the context as well as the behavior that was supposed to be enacted were left implicit. The RESOLV Model proposed by Britt et al. (2018a) attempts to identify those dimensions and to specify their connection with readers' generation of reading goals and standards and their actual decisions.

Reading purposes and decisions: the RESOLV theory

The RESOLV theory of purposeful reading (Britt et al., 2018a; Rouet et al., 2017) attempts to explain how situational and individual factors determine reading goals, and how reading

goals inform reading decisions. RESOLV extends the earlier MD-TRACE model (Rouet & Britt, 2011) and attempts to overcome some of its limitations. MD-TRACE was focused on the comprehension of multiple documents, had a limited description of readers' representation of the task, and was based on just three coarse-grain decisions (“is information needed?”, “is the text relevant?”, and “does the product meet goals?”). MD-TRACE also did not consider the role of motivation and values in shaping reading strategies. RESOLV was designed with a broader perspective on reading and the intent to support more specific hypotheses about the potential influences of contextual parameters on reading decisions. A full presentation of the theory is beyond the scope of this paper. Interested readers may refer to the aforementioned sources, or to Britt et al. (2018b) or Rouet et al. (2019) for overviews and discussions. For the purposes of the present paper, we will focus on the constructs of context and task models and their role in reading decision-making (Britt et al, 2018a, chapter 6).

According to RESOLV, readers create a representation of a reading task by evaluating a request within their physical-social context and scope of their own cognitive and motivational resources. This internal representation, called a *context model*, includes information about the request (the explicit task statement, criteria, hints), the requester (the person/authority making the request), the audience (whomever is intended to receive the product), supports or obstacles (external resources available potentially or explicitly that could aid or hinder request completion), and the self (an assessment of one's own skill, knowledge and interest, and an assessment of the perceived costs and benefits of the activity). In most situations, readers are not expected to depend on an explicit analysis of the context to construct their context model. Instead, they activate a context schema based on their familiarity with the situation (e.g., "read as if to prepare for an exam").

From their initial context model, the reader creates a task model, which is what the reader intends to achieve within the context, how they plan to go about it, and why. It

includes an interpretation of the goal of the request (i.e., the expected product of reading, such as obtaining knowledge or writing an answer to a question), how to achieve it (e.g., the type of information needed, resources to be called upon), and the subjective value of achieving the goal (e.g., relieving boredom, keep up with friends and bonding, getting a good grade in class) which can be affected by perceived stakes associated with its success or failure.

Several processes assist in creating a task model. Cues from the context model may be selected based on bottom-up salience or top-down importance. Then the request must be interpreted into a goal or hierarchical set of goals based on experience with the type of task (task schema). The means for achieving the goal(s) can then be selected, or at least an initial step identified. These means could be thought of as actions (e.g., do a google search, open next book), cognitive processes (e.g., search memory, make an inference), genre strategies (e.g., look for other-side information, make sure reasons support the author's claims), or discipline-specific strategies (e.g., figure out the source's credibility, figure out what part of the theory this study supports). The point to note here is that strategies or means for achieving the goal(s) go beyond typical text processing strategies (e.g., paraphrase, and bridging or elaborative inferences) and they are not restricted to good reading strategies (e.g., get author's main point, slow down when confused, think about events in my life that the text reminds me of, ask myself questions during/after reading to test my understanding). This process of selecting means of achieving goals and subgoals is affected by one's task schema but also by one's value for the selected goals (e.g., "I can only spend one hour on this task", "I want to impress friends with my sleuthing").

Whereas the typical context model is expected to be a relatively stable, experience-based knowledge representation, the task model is a dynamic structure that gets updated during the reading task. The initial task model will be updated when goals have been satisfied

and actions are needed to handle obstacles and impasses (Rouet et al., 2017, Table 2). For instance, a student asked to find three ways humans contribute to global warming may find one such way in a text and subsequently update their task model to "find two more ways". Or the student may set out to read a science paper on climate change and realize that the language is too technical and that they need an easier source. Or the student may have the goal to find another side to the argument and drop that goal from their task model because they cannot find one.

The theoretical constructs of a context model and a task model come with several assumptions (Britt et al., 2018a, Chapter 3; see Table 1 below) and the model proposes that these assumptions are true across points in the reading process. The examples in Table 1 show a cognition or behavior that could result from each assumption. For example, the *limited processing resource assumption* posits that readers' active memory and attentional control are limited. The limitation is critical because purposeful reading is essentially a dual task situation where readers engage in meta-cognitive activities—creating, updating and monitoring goal achievement—at the same time that they employ the processes involved with representing content. Thus, without prior experience with the task or external supports, readers will focus only on the most salient (top-down or bottom-up) features of the situation in their context model and this will impact the elaboration of the task model that is created (minimal task elaboration hypothesis, Britt et al., 2018a, chapter 7). Limited resources will also impact the amount of monitoring and updating performed during reading, along with the decisions that are made *en route*.

Table 1. Five assumptions regarding Context and Task models in the RESOLV theory of purposeful reading (adapted from Britt et al., 2018a, Table 3.1).

Assumption	Definition	Illustration, example
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Adaptive reading behavior	Readers set goals and goals drive reading engagement and processes	A person wants to check a medication leaflet to find out whether a drug has any side effects before taking the drug.
Limited resources	Active memory and attentional resources are limited	A student forgets the question that drove their search for information in text and answers a different question instead.
Feeling of knowing evaluation	Readers assess the need to read based on their self-assessment of goal attainment.	A student decides not to study a science textbook passage because they believe they can readily explain what determines climate change.
Decisions thresholds	Reading decisions are made when monitored evaluations reach an activation threshold.	A reader decides to re-read a passage upon getting disrupted because they detect a lack of global coherence in their representation of the text.
Benefit-cost analysis	Readers balance the expected benefits with the costs of enacting the decision.	A reader decides to re-read because they are preparing for a test that will require them to demonstrate accurate comprehension of the material.

The view of reading as a goal-management activity under limited resources is complemented by the assumption that readers evaluate their feeling of knowing with respect to their self-identified goals and engage in reading or re-reading when they experience a gap. Two additional assumptions, the *decision thresholds assumption* and the *benefit-cost analysis assumption*, have the greatest impact on reading decisions. RESOLV proposes that readers

decide to change their reading behavior when certain monitored evaluations reach some threshold value. The threshold is partially determined by an analysis of the potential benefits relative to the cost of the action (benefit-cost analysis assumption). This analysis is based on Brehm and Self's theory (1989) that effort will be affected by the value of the goal (i.e., benefit) and both the perceived difficulty of goal achievement and the assessment that the person can achieve the goal. While much of the time decision thresholds could have a default value, some features of the situation may lead to an increase in that threshold (e.g., high stakes may lead to a higher performance standard) or a decrease in the threshold (e.g., low value of the task or low assessment of possible success). The benefit-cost analysis and decision thresholds are highly related and mostly affect how much effort will be exerted towards goal achievement and persisting with an action (vs changing it) at any point in time.

In sum, according to RESOLV, readers actively make decisions toward achieving goals during reading and thus must assess their progress towards those goals, their motivation to apply effort toward each goal, and, when necessary, to detect and deal with obstacles to those goals.

The task model is a regulatory structure that guides readers' decisions and actions. But what kind of decisions are involved in reading? RESOLV defines two classes of decisions (Table 2): routine and non-routine. Routine decisions are those already considered in Rouet and Britt's (2011) MD-TRACE: "Do I need external information?", "Is this information Relevant?", and "Am I Done?". These are considered routine because they form part of any goal-directed processing. With some training on tasks, readers will acquire schemata that direct goal structures and make these decisions occur with reduced attentional demands. Note, however, that the outcome of a routine decision is not necessarily optimal. For instance, a student may decide that they are done studying a piece of text when in fact

they should keep reading. Nevertheless, the decision to read vs. not read is a routine part of purposeful reading.

Table 2. An overview of reading decisions in the RESOLV theory of purposeful reading.

Decisions	Explanation and example
Routine decisions	Decisions that pertain to any reading situation.
Need to read?	A person engages in reading when they need to do so. For instance, a student reaches out to their textbook because they need to retrieve some details of a history lesson.
Information relevant?	A person keeps reading to the extent that the information is relevant to their goal(s). A student reading in order to answer a question will speed up or skip passages that they deem irrelevant, irrespective of their structural importance in the text.
Done reading?	A person quits reading when they decide that they have achieved their purpose, or that reading is no longer a means to achieve their current goal. A person may stop reading a novel because they have no interest in the story.
Non-routine decisions	Decisions that need to be made upon facing obstacles or impasses.
Get/Change/Select action	A reader may ask themselves what or what else to do when their current action does not lead to goal completion. For instance, a student may ask what else to do when they reach the end of a textbook section and still can't answer the question they were asked.

Get/Change/Select goal	A reader may need to change their goal when they find that the current goal cannot be completed. For instance, a reader may decide to get only a rough idea of the remaining portion of a long text upon realizing that they are running out of time.
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For the “Need external?” decision, the reader assesses whether the active goal in their task model can be achieved from a search of memory (based on a feeling of knowing decision) or whether reading is needed. This routine decision might occur multiple times during a typical task. Factors that can lead to the decision for reading include a low feeling of knowing, when a benefit-cost judgement determines that the information to be gained is necessary, and the value outweighs the effort (e.g., when reader has high performance standards, trusts in own ability to obtain the information through external resources, and the external cost is low).

For the "Information relevance" decision, the reader assesses whether information from the current text, search list or sentence is useful for achieving one or more open goals. Just as goals are not given but are interpreted and taken on by a reader, relevance judgments are not simply a characteristic of the document or paragraph. We assume that readers make relevance judgements through an evaluation process based on their own goals given their context model and based on an evaluation of whether the current action moves them closer to achieving their goals. This type of decision may be rather effortless, such as when the current goals are well-matched with the organizational structure of the text and the reader is skilled in reading for that goal. It might be more challenging when these features do not align, and consequently the reader ends up relying more on semantic or conceptual overlap or source reliability judgements. Like other reading decisions, relevance assessments are made

throughout the reading situation and at times will result in a “not-relevant” decision which could result in the reader stopping their reading of the current text. This decision would be most salient when a search list or new document is begun and at segment breaks (e.g., paragraph, headers). A “not-relevant” decision could also arise when the perceived cost outweighs the perceived benefit. In this case, an expert, for whom reading a complex text might come at a lower cost, could judge a document as relevant, but a novice, for whom the text is difficult, might not. When the decision is made that the current document or text is indeed relevant, the reader would more likely continue reading.

For the "Done" decision, the reader assesses the current representation in memory of the content against the goal state to determine whether it satisfies a goal. If the final goal state is achieved based on this judgment, the reader will view the task as complete, otherwise another subgoal becomes the current goal. The reader may simply make this judgement based on coming to the end of a document and not reactivate the goals and not directly and exhaustively compare the representation to the goals. The exhaustiveness and deliberativeness of this decision will be highly affected by one’s benefit-cost analysis and the decision thresholds. The reader may also decide to stop reading because they find that reading is no longer an effective means to achieve their purpose.

For these routine decisions, the reader must gain skill in applying a schema to create appropriate goal structures and use them to build a representation of the content. These schemata also have to be activated by information in the situations. Finally, the reader has to learn what goal-completeness looks like for the given task and learn to appropriately monitor for that.

The second type of decisions are called non-routine and were not proposed in MD-TRACE. Non-Routine is closer to true problem solving because these decisions are made when the reader does not immediately have an action that will achieve the goal(s) (Newell &

Simon, 1972). These decisions arise when the current goals do not have actions or strategies connected to them in memory (e.g., a novel problem) or when obstacles or unanticipated situations arise that require a new solution path. In this case, the reader must update the task model, rather than allowing the current task model to guide reading decisions. Thus, non-routine decisions will result in the reader selecting a goal or action and applying it to the task model itself.

First consider what is needed to set an active goal. In cases where experts read within their own area of expertise, they may have a very well-practiced and efficient use of hierarchical goal structures with several subgoals retrievable when the schema is activated. Such readers can immediately plan a course of action. However, readers can encounter a situation where they do not have an active goal and need to come up with one. This can occur because they do not have a schema for this type of assignment or because they hit an impasse and don't immediately see an action that would take them closer to their goal. If the reader decides they have not achieved the goal state (i.e., routine "Done?" decision), then they may need a new goal. In other cases, they may have a goal that they cannot currently achieve. In this case, they will have to change goals or propose subgoals. Finally, there may be multiple competing goals and the reader has to select which goal/subgoal to pursue next. The creation, selection and change of goals will likely be affected by the reader's benefit-cost assessment and their decision thresholds that are affected by motivation and standards.

Similar issues arise when the reader has a goal but doesn't know which action to take next. This might occur because the current action they are pursuing is failing, they don't perceive that any available action would move them nearer to the goal, or they might see multiple actions but are not sure which to pursue. To the extent that the reader has a well-defined schema for the task, action creation and selection or ordering will be less challenging.

Otherwise, action selection could be based on what is quickest or easiest or even quasi-random features (e.g., read the first document in the search list).

Purposeful reading in discipline learning contexts

We have outlined a theory of reading that proposes that competent learners set up and manage situational goals, and reading represents one of the means available to achieve these goals. This depiction raises the question of whether the reading activities that students are assigned as part of primary and secondary education effectively prepare them for independent purposeful reading. In other words, students need reading experiences that help them know how to approach different kinds of text genres, in order to adopt appropriate goals and strategies, evaluate their efficacy, and perceive sufficient value to outweigh the cost required to engage.

During the elementary grades most school systems focus on the basic components of reading: acquiring fluent decoding, increasing and deepening one's vocabulary, and developing strategies in order to construct integrated content representations of typical text genres (e.g., narratives) through processes such as mapping and inferences (McNamara & Magliano, 2009). Such training is undoubtedly necessary.

Things change, however, when educators begin to rely on students' reading skills as part of instruction in disciplines such as history and science. As early as grade 4, most students are assigned tasks that require them to read one or several texts in order to answer questions. Rouet et al. (2018), for instance, describe a scenario in which a Grade 5 student is given three short documents (including a picture, a first-hand account and a textbook passage) in order to reflect on the cultural, political and economic consequences of the Crusades as part of a lesson in European medieval history. This type of scenario is typical of

an average middle school student's school day and makes up a large portion of their homework assignments in disciplines such as literature, social or life sciences.

Of course, the types of questions that students learn to deal with vary to a large extent. This variation depends on the discipline, text genres, reading contexts and purposes for reading. Even though the questions vary, they also share a number of dimensions that can be characterized in terms of the RESOLV model.

Routine decisions are guided by an accurate and complete task model. One example that is consistent with creating a “good” task model from the start is a skilled adult reader reading a simple narrative text for comprehension. Much of the first 50 years of text processing research examined this exact situation, where the reader is skilled at representing the type of text they are given and that text is well-structured with supportive transitions. There are many studies showing readers can use a schema to represent information from such texts (e.g., Anderson et al., 1983; Bransford & Johnson, 1972; Meyer & Ray, 2011). RESOLV proposes that not only do people acquire genre schemata to aid the semantic representation of such texts, but also task schemata for dealing with common reading requests and situations. According to RESOLV’s goal-structures hypothesis, tasks activate task schemata (Schank & Abelson, 1977; van Dijk & Kintsch, 1983) which not only provide information about the goal state (e.g., what a narrative structure looks like) but also knowledge of the strategies for achieving the goal state. In the story case, an experienced reader will understand the goal of representing a narrative and will have available strategies for achieving that goal (e.g., bridging and elaborative inferences for coherence). This schematic knowledge guides reading decisions by activating goals and strategies within a Task Model. Because the initial task model will be achievable from the text structure, there should be no obstacles or impasses that trigger non-routine decisions (i.e., no new goals or strategies are required).

This is, likewise, the situation of a skilled reader in a particular school discipline (e.g., science, history) who is reading a single text that is organized in a typically structured way for the discipline. Again, there are many studies showing that training in a discipline helps readers acquire discipline-specific schemata (Goldman, 2018; Goldman et al., 2016; Shanahan & Shanahan, 2008). When a reader has a schema for the reading task they encounter, according to RESOLV, the reader will be better able to use situational cues in their context model to activate appropriate goals and to select strategies for achieving those goals.

Having a clear schema for a task will also help the reader evaluate their own resources and values in the situation which will lead to a better benefit-cost analysis for success with the task. Expertise makes many actions less effortful, including triggering an appropriate context model representation of the task, creating an appropriate goal state and strategies, and monitoring the routine decisions. The reader will have clarity about what is required in the task, which should also affect both factors of the expectancy–value theory (Eccles & Wigfield, 2002). Specifically, having prior experience and clarity with the genre provides greater certainty in estimates regarding expectancies for success, which will positively impact the choice to exert effort on a task. Student’s motivation for a task will also be affected by their perceived value for the task itself (e.g., importance to self, intrinsic value, perceived belief in utility of the task) which is balanced with the relative cost or negatives associated with the task (e.g., time, stress). Our application of this theory to RESOLV is that specifying the relevant schema should increase students’ confidence that they will be able to succeed (expectancy for success). Moreover, students with a more robust schema may also be able to perceive more value in what they are doing because they can see how their actions could apply beyond the current situation. In fact, they might actually create a more detailed initial Task Model because they value schema-relevant goals.

In contrast, readers in situations where they don't have a well-practiced schema will have more difficulty interpreting the task, setting appropriate goals, and selecting strategies for achieving those goals. According to RESOLV's minimal task-elaboration hypothesis, readers without a schema will be much more opportunistic about their decisions and will not invest much effort or time to create their initial task model. Indeed, they will have little to guide them. In this case, their task model will likely be very incomplete and highly dependent on cues that happen to be salient in the situation.

One example is reading a psychology textbook. In a recent study, Higgs et al. (Aug. 2021) had introductory psychology students read excerpts from their textbook and answer multiple choice questions. They also reported their use of discipline-specific reading strategies as a measure of the extent to which they hold discipline-appropriate task models for reading in psychology (e.g., focusing on causal mechanisms, data from studies, and understanding how evidence supports theory). The strategy survey asked students to rate their use of 12 discipline-specific reading actions (e.g., "I tried to figure out what the studies provided evidence for specifically", "I tried to explain to myself how the different parts of the theory fit together") and 8 general strategies (e.g., "I used my related knowledge to help me make sense of the text", "I tried to explain the text to myself to deepen my understanding", "I was summarizing what I read") on 6-point Likert-type scale of whether they used them when reading the textbook excerpt. They found that students' reported use of discipline-specific reading strategies positively predicted comprehension performance while their use of general reading strategies negatively predicted comprehension. Although there is a large literature showing that a general self-explanation or summarization strategy helps comprehension (e.g., see McNamara, 2017), in this case this general strategy is being contrasted to the use of those type of strategies in the absence of attention to the content of the strategy for the discipline.

This is not to say that general strategies harm comprehension, but rather explicit knowledge of what the strategy is targeting (if appropriate) may be more diagnostic of comprehension.

These results suggest that students who have a more discipline-appropriate task model (as opposed to just having general strategies) may be positioned to better comprehend their textbooks and that helping students develop discipline-appropriate task models and reading strategies in introductory college courses may be an effective way to support students. While many introductory courses do begin with a section on methods and epistemology within their discipline, we expect that few students can spontaneously turn that information into specific goals for reading in the discipline. That connection and the corresponding strategies have to be explicitly taught. Similarly, students may have general reading strategies, but being able to use them for comprehending texts from each different discipline may require significant modifications based on the goals for reading in that discipline (e.g., using self-explanations to understand an historical argument vs. theory and evidence in a psychology textbook).

There is some degree of continuity across grades in the tasks and materials teachers assign to their students in their respective disciplines. For instance, in both the 5th grade history homework assignment reported in Rouet et al. (2019) and the 12th grade AP history assignment used in Wineburg's (1991) study, the task involved describing a complex situation from a set of diverse textual and pictorial sources, with sources contributing in different ways depending on core features such as date, author, and genre. Therefore, a reasonable assumption is that most students will develop schemata for the typical reading assignments they receive in disciplines such as literature, history or science. Of course, developing these schemata and task models will not necessarily translate to understanding and evaluating other types of texts, such as claims and arguments presented on the web.

Reading within a discipline will be aided by knowledge, skill and buying into the discipline-specific epistemology (Bråten et al., 2011; Bråten & Stromso, 2009; Griffin et al.,

2012; Wiley et al., 2020). These combine to help students acquire the standard schemata and, to the extent they are practiced, automatize many routine decisions. Nevertheless, there are cases when these may not apply. For example, the student may have a schema for learning about theory and evidence in their psychology textbook, but what happens when the textbook author makes presentation decisions based on interest, entertainment and connections to everyday life rather than clarity of what the theory says and how a study supports the theory? In this case, the student may have to turn to other resources (e.g., another textbook, the teacher or the web). Thus, even for those who have acquired a schema, there will be occasions when non-routine decisions are required. This approach suggests that students may need help learning to identify the conditions for schema activation so that the appropriate goals are set up even if the text does not trigger them, and to learn how to get around impasses and problems when the initial goals or strategies do not work out.

In order to assess the extent to which school systems effectively prepare students for reading at large, it is helpful to compare these dimensions of school reading with the dimensions of reading for out-of-school purposes. A complete review is far beyond the scope of this paper, due to the huge diversity of social, personal and occupational contexts and purposes in which people may need to read. So, in the next section, we examine a case where schooling seemingly does not adequately prepare students: that of reading fake news. This topic is both currently relevant and serves as an illustration of the similarities and differences between reading in an academic context and reading for personal purposes.

Goals and decisions in reading the news, which might be fake news

What types of challenges do readers encounter when reading for purposes outside of school? Today's readers are inundated with information, on the one hand, yet information bubbles and social media algorithms also limit access to some types of information that one might

have previously encountered before the internet. Then there is the challenge of actual misinformation and disinformation. Fringe ideas and deceptive claims that once received limited attention due to publishing costs are now ubiquitous in an environment where publishing is virtually free and fortunes are to be made simply by getting people to visit a web page. Such information requires expertise on the part of the reader to evaluate and dismiss (e.g., Britt et al., 2019). These reading challenges arrive at a time when demands on attention are greater than ever. People are expected to inform themselves on numerous topics in order to make consequential decisions, both personal (e.g., retirement, investments, health care) and societal (e.g., climate change, voting), as Western society becomes increasingly complex and shifts more responsibility away from institutions to the individual. Thus, strategic search and reading skills have important consequences.

Consider the reading skills and knowledge required for lay readers using the internet and social media during the COVID-19 pandemic. The information environment surrounding the pandemic is a perfect storm where an immediate health emergency, complex science and public health policy mixes with pre-existing distrust of government and political tribalism to give rise to an ad-funded industry of misinformation and disinformation that competes with the vital, accurate information people need. In the U.S., the Centers for Disease Control and Prevention (CDC) has recently included a page on their web site defining misinformation and disinformation (distinguished by intent to mislead); explaining their effects on COVID-19 (in terms of vaccine confidence and rates as well as COVID-19 denialism); and most importantly, offering strategies for communicating accurate information about COVID-19 vaccines, responding to gaps in information, and confronting misinformation with evidence-based messaging from credible sources. Other official sites are also trying to help inform the public and those dealing with the public about how to combat mis- and disinformation. For example, Table 3 shows excerpts from strategies recommended by Johns Hopkins for reading

during COVID-19 (JHU, 2021). The strategies emphasize readers' awareness of and attention to the quality of information sources and readers' ability to monitor the accuracy of information (Note that other national and international organizations provide similar lists of strategies for supporting readers. See UNICEF Regional Office for Europe and Central Asia, 2020 for another example list).

Clearly, in the current context, information search, comprehension and evaluation is much more effortful and requires more strategic control than in the past. We argue that it requires readers to have a routine sub-goal involving vigilance for evaluating source and information credibility that can be triggered by the environment when needed. This sub-goal, at least temporarily, becomes a primary goal replacing whatever goal the reader had for reading initially. The extent to which the reader understands the goal of evaluating information, is skilled with the strategies (such as those in Table 3), and values them enough to set them as a goal, the better able the reader will be to protect themselves from mis- or disinformation when it matters. However, for those not skilled in these strategies, the web tends to reduce the effort needed for finding poor quality or misleading information, thus making it preferable to readers who can't really tell the difference. For these readers, the decision to set these goals and enact strategies for dealing with mis- or disinformation are often non-routine decisions because their initial task model does not include monitoring for vigilance as a goal.

Table 3. Example of published strategies for reading online for mis- or disinformation
(source : “How can individuals learn how to identify mis- or disinformation online?” from Johns Hopkins Bloomberg School of Public Health).

If you see false information online

- Don't repeat or retweet the lie, even with a correction!

- If you don't know the source or know if the source is legitimate, limit direct engagement.
- Report it to social media companies.
- Provide true information.

(...)

Ways to check for false information

- Use web-based tools and services that can provide unbiased assessment of source credibility.
- Verify the information with other news sources, trusted people in your network, or cross-referencing with the best information available.
- Ensure that the source is known, credible, and trusted by taking a close look at the social media account, web URL, or layout that might suggest lack of editorial oversight.
- Think twice about messages that seem designed to appeal to emotions.
- Increase awareness of disinformation campaign tactics and personal biases that influence judgment of sources and information, as well as one's capacity to change opinion when presented with new evidence.

To illustrate the need for decisions and goals during reading, let's consider a situation where a person's friend sends them a Facebook post about ivermectin (a drug used to treat river blindness that is purported to treat COVID-19 by some internet users) and COVID -19 shown in Figure 1.



Figure 1. Initial Facebook post from friend with name redacted. The original figure can be found at c19ivermectin.com. The bars above the middle line were bright green and the ones below were red. For printing in grey scale, the colors have been changed. Note the contrast between the brevity of the message, the salience of the conclusion in the figure, and factors that make it difficult to evaluate the evidence (e.g., small font, illegibility of the axes, not marking of the sources information).

Consider the two cases presented in Table 4. For Case 1, the reader may have a context model that a friend with shared values requested that they look at a graphic about ivermectin (Table 4). The reader does not trust the government and knows that the friend is connected to a group that helps to identify government activities that are suspicious (i.e., a conspiracy group). The reader's initial task model could have as an initial goal to figure out what is interesting about the post and possibly whether it should be reposted. This initial task model does not have any of the strategies from Table 3, and the reader may not encode the axes, the data or the source (i.e., C19ivermectin.com in Figure 1). Given the goal, strategies and values, it is expected that without a bottom-up reason to trigger a revised task model, the

current task model would affect reading by leading to only skimming the words to figure out the main point of the post and whether it was interesting, not the details. Therefore, the reader might read “what the mainstream media doesn’t want us to know” and see “66% improvement” from ivermectin for COVID-19. They do not possess the skills required to make sense of the graph itself. The eventual representation might be only that “the science proves ivermectin works, but mainstream media is hiding these findings.” In this case, the content can fit the goal state and there are no impasses for achieving the goal so this could be handled by routine decisions alone.

Table 4. Context and task models representing two situations in which a person is being forwarded a post about the effects of ivermectin on Covid-19.

	Case 1	Case 2
Initial context model		
Request	Email “look at this”, some scientific-looking graphic	Email “look at this”, a scientific study on ivermectin
Requester	Conspiracy group friend	Friend
Audience	Self, friend, group, family	Self
Support, obstacles	?	?
Self	Little prior knowledge about ivermectin Works at a grocery store in a high covid region	Little prior knowledge about ivermectin Works at a grocery store in a high covid region

	Low graphicacy skills, interested in discussing anti-masking and anti-vaccine information, not really concerned about COVID, anti-gov't/establishment; wants to be part of this group – strong feeling of belonging to something big.	Higher graphicacy skills, proficient sourcer of science information, interested in health information, concerned about COVID, high trust in science and medical experts.
Initial task model		
Goal state	To find out whether this is interesting	To learn about ivermectin efficacy
Strategies	Skim contents to see if they fit prior beliefs	To evaluate details of the graph to understand how the graphic supports the conclusion in the text
Values/interest	To confirm/strengthen prior beliefs; No value to examining the data graph.	To acquire knowledge High value to examining the data for oneself.

Let's now consider Case 2 in Table 4, where a person's friend sends them a Facebook post about ivermectin and Covid-19 shown in Figure 1. The person, however, is skilled at reading graphs. The reader may have a context model at this point that the friend sent a "scientific"

graphic about ivermectin in order to be informed. The reader's initial task model could have as an initial goal to "learn about ivermectin efficacy" and consider using it prophylactically.

Again, the initial task model does not have any of the strategies from Table 3 but in this case the reader will encode the axes and the data. However, in comparing the statement "65 ivermectin COVID-19 controlled studies, 32 RCTs, 65% improvement for early treatment" with the data in the graphic, several bottom-up triggers may lead to an impasse. First, even when trying to zoom in on the image, the reader would not be able to read the axes. Second, the friend's comment about "what the mainstream media doesn't want us to know..." may trigger the reader to question whether this comes from a non-mainstream site and might be doctored or misinformation. Third, they might compare the conclusion that ivermectin is effective with their vague prior knowledge that it has not been shown yet to be effective. Their updated task model now has an important new goal and strategy to get a version of the figure that can be read in detail. In this case, they may scan the graphic to notice the source (i.e., C19ivermectin.com) and go to this source to better evaluate the details of the data. Here is a possible non-routine decision of creating a new goal and new action:

Revised task model

Goal state: evaluate what the data really says

Strategies: go to the site and read the data in detail, see if this is really valid

Value: high value for evaluating the key studies

Going to the actual C19ivermectin.com site, the reader will view impressive data and that may prompt them to think: "Wow – this data is impressive, why isn't the mainstream media reporting it!". This could prompt another revision of the active goal state and strategies:

Revised task model

Goal state: evaluate the credentials (trustworthiness and expertise) for the source of the data

Strategies: search cite for source information

Value: high value to knowing where data come from

After some clicking around on the C19ivermectin.com site, the reader might find at the bottom of the page, in very light font, a link labelled “faq”. This faq link (<https://c19hcq.com/faq.html>) provides answers to several questions including who is @CpvodAnalysis, which would require an inference that the authors of the C19ivermectin.com site are called “@CovidAnalysis”. Here is the answer provided:

“Who is @CovidAnalysis? We are PhD researchers, scientists, people who hope to make a contribution, even if it is only very minor. You can find our research in journals like *Science* and *Nature*. We have little interest in adding to our publication lists, being in the news, or being on TV (we have done all of these things before but feel there are more important things in life now).”

This blurb of the site author’s looks very good. The authors are experts (researchers, scientists) who publish in the top journals (*Science* and *Nature*) and who are beneficent (hope to make a contribution). But our reader is skilled at sourcing and realizes that they are no more knowledgeable about who the author of this site is than before it became their goal to figure this out. They would hit an impasse for this goal. At this point, they could create an alternative goal and strategy to the extent that it would have high enough value for them.

Revised task model

Goal state: seek corroboration from trusted sources

Strategies: find other important sources that should report effectiveness studies

Value: intrigued by conflict and sense of the main site hiding the source

When searching memory to find corroboration, the reader might remember a tweet from the U.S. Food and Drug Administration saying something like ‘you are not a horse. You are not a cow. Seriously, y’all. Stop it.’ (U.S. FDA, 2021). The reader might then also find out that the drug is made by Merck so they find the press release from the company (see Figure 2).



[Media](#) > [Company statements](#) > [Company statement](#)

Merck Statement on Ivermectin use During the COVID-19 Pandemic

February 4, 2021 11:45 am ET

KENILWORTH, N.J., Feb. 4, 2021 – Merck (NYSE: MRK), known as MSD outside the United States and Canada, today affirmed its position regarding use of ivermectin during the COVID-19 pandemic. Company scientists continue to carefully examine the findings of all available and emerging studies of ivermectin for the treatment of COVID-19 for evidence of efficacy and safety. It is important to note that, to-date, our analysis has identified:

- No scientific basis for a potential therapeutic effect against COVID-19 from pre-clinical studies;
- No meaningful evidence for clinical activity or clinical efficacy in patients with COVID-19 disease, and;
- A concerning lack of safety data in the majority of studies.

We do not believe that the data available support the safety and efficacy of ivermectin beyond the doses and populations indicated in the regulatory agency-approved prescribing information.

Indications and Usage for STROMEKTOL® (ivermectin)

Figure 2. Merck press release about Ivermectin in Feb 2021.

At this point, the reader could realize that more than half of the studies on that figure your friend sent were done before this press release from Merck! If all these studies showed that its drug was effective, why would Merck put out a release that there was no evidence of effectiveness? Searching a little further, the reader finds an article from October 2021 saying

that Merck is seeking U.S. approval for a different antiviral drug to be used to reduce hospitalizations and death due to COVID-19. Clearly if they had all those great studies, why would they not have asked for approval for Ivermectin? At this point, the reader would have satisfied the main goal (determining it is not effective) and then would need to decide if they have a new goal (e.g., inform the friend) or if they should stop.

Across a number of studies investigating readers' attention to and memory for information sources (i.e., who says what), we observed low rates of source memory and citing of sources in essays (Braasch et al., 2012, de Pereyra et al., 2014, Rouet et al., 2016; Saux et al., 2018). We expect that sourcing is a non-routine subgoal that gets triggered by discrepancies across documents or with one's prior beliefs or knowledge. Another non-routine subgoal is to seek out disconfirming evidence or perspectives, which is a sub-goal often not optimally pursued (Wolfe et al., 2009). Both of these can be made a goal in the initial task model under several conditions: (1) the hints or request explicitly calls for it and if the reader accepts that as a goal or subgoal in their task model (de Pereyra et al., 2014), (2) the materials allow for it to be achieved and not relaxed, (3) the person values that goal and knows how to do it, and (4) the benefit-cost analysis and decision thresholds support the effort this goal takes to achieve.

The case studies presented in this section highlights the complexities of updating one's knowledge and beliefs through participation in social networks and the reading of online news, an apparently simple reading activity that many adults perform on a daily basis. We have highlighted that even this simple form of reading entails a hierarchy of goals and subgoals, and one's ability to make decisions in order to fulfill them. What people read and how they read it seems strongly contingent on their monitoring of both goal attainment and decision outcomes. In sum, everyday reading is best seen as a form of ill-structured problem solving in which the texts are part of the problem space just as requesters, peers and

audiences. This contrasts with the high level of structuring found in reading assignments in school, as suggested in the previous section. A tentative conclusion may be that as reading becomes the dominant form of social interaction, there is a widening gap between the reading skills that students learn through educational curricula and standards, on the one hand, and the reading skills that are required to participate in out-of-school activities.

Discussion and implications

In this paper, we have discussed reading as a context-dependent, goal-driven activity. Our main point is that although (or perhaps, because) reading rests on a set of generalized abilities such as word decoding (Perfetti, 1985), fluent readers adjust their reading strategies as a function of the purposes they want to achieve. Moreover, the dissemination of digital technologies have only increased the range of contexts and purposes in which people may undertake some form of reading, making the use of strategies even more critical than before. Our RESOLV model posits that reading is a task that is always situated in a context and is dependent on readers' goals. Readers use any given instructions and their context to construct an initial task model. The quality of the task model (and its later updating) contributes to task performance, adding to a long list of situational and internal factors.

This approach has several important implications for a science of reading. First, research should focus on how readers construe the contexts and tasks they are subjected to, either as part of experimental settings or during naturalistic reading experiences. Even standard reading instructions such as "read for comprehension" may be subject to individual interpretations, based on readers' inferences and attributions regarding the situation, the requester, the stakes and so forth. This dimension of reading has been surprisingly under-researched (although see Lorch et al., 1993; van den Broek et al., 1995). Second, readers' interpretation of the reading context (i.e., their task model) will determine part of their

reading behavior and eventually their performance. Key to our theoretical assumptions is the possibility to predict the occurrence of routine and nonroutine decisions based on an understanding of a reader's task model. This points to a research agenda that would attempt to elicit the goals readers are attempting to fulfill and the connection between these goals and the decisions they make, especially when the pathway toward the goal is nontrivial. We must admit that so far there is only a small number of published studies to support that claim, but initial data appear promising (see e.g., Cerdán et al., 2019; Schoor et al., 2021). Third, readers' interpretation of the context may also affect their use of text information, beyond the traditional definition of comprehension. The extent to which readers seek to monitor, verify and validate information may vary as a function of their task models, although this assumption largely remains to be documented (but see de Pereyra et al., 2014).

This approach also has important implications for instruction because it provides direction on how to foster students' reading strategies. Our model of purposeful reading places a new perspective on when and how purposeful reading strategies ought to be taught. One may expect that children learn to master a core set of reading and comprehension skills during the early grades. However, students' ability to construct task models and to fine-tune reading decisions accordingly probably need to be nurtured throughout the whole educational curriculum. A starting point is to help readers realize that setting goals for reading is something that they can and should do. Instructors may be able to facilitate this by making explicit to students the goals, purposes, and strategies that are on target for given tasks. For instance, there is emerging evidence that Fifth graders' search within documents can be made more effective by helping them articulate the requirements of search questions (Ayroles et al., 2021). We suggest that constructing discipline-appropriate task models is actually part of what it means to learn in a discipline and needs to be explicitly taught. Direct instruction to prompt students to be aware of their goals and strategies for reading is even more important

as students receive increasingly diverse and complex types of reading assignments during secondary education. These complexities are nuanced by discipline and students need to learn the respective control structures (e.g., forming a goal state, making routine and non-routine decisions, and why it matters). We think that a powerful tool for this may be reflection activities during learning. These may help students to not just complete tasks, but build up appropriate task models and attend to the context in a helpful way. Without directed attention, what is learned for these control structures will be based on salience.

As is highlighted by the examples earlier, this approach is as important in formal as it is in informal reading contexts, although formal instruction may help students develop higher-level control strategies that help them select useful strategies for different contexts and purposes. For example, teenagers' ability to acknowledge source expertise and benevolence (a skill that is vital to text posted on social network sites) benefits from classroom interventions that focus explicitly on source dimensions (Pérez et al., 2018). However, these interventions are difficult to implement within the disciplinary organization of school curricula, and their relative disconnection with out-of-school contexts and tasks. A promising research avenue consists of working in close connection with educators in order to create synergies across disciplines (Goldman et al., 2019). This broadens the lens focused on reading tasks in order to make meaningful comparisons across contexts and genres, which can give rise to the kind of advanced functional skills needed for modern reading.

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