Scientific Research Publishing

Psychology, 2026, 17(9), 883-902
https://www.scirp.org/journal/psych
ISSN Online: 2152-7199
ISSN Print: 2152-7180

# The Role of Metacognitive Prompting in Facilitating Integration across Multiple Texts

**Michele M. Dornisch[1], Seong Yeup Kim[2], Taylor Young[2], Rayne Sperling[2*]**

[1]Department of Teaching and Learning, Long Island University, Brookville, NY, USA
[2]Department of Educational Psychology, The Pennsylvania State University, State College, PA, USA
Email: *rsd7@psu.edu

**How to cite this paper:** Dornisch, M. M., Kim, S. Y., Young, T., & Sperling, R. (2026). The Role of Metacognitive Prompting in Facilitating Integration across Multiple Texts. *Psychology, 17,* 883-902.
https://doi.org/10.4236/psych.2026.179044

**Received:** March 7, 2026
**Accepted:** September 6, 2026
**Published:** September 9, 2026



## Abstract

This research examines the role of a metacognitive prompting intervention based on Winne and Hadwin's (1998) model of self-regulated learning. Using a pretest-posttest design, undergraduate learners were randomly assigned to one of three conditions: metacognitive prompting, metacognitive prompting with an integration reminder, and a control group. Learners in the treatment conditions received scaffolded prompts as they read three informational texts. Outcomes measured after learners engaged in study included a Metacognitive Awareness Inventory (MAI), a self-efficacy measure, a knowledge assessment, an adapted version of Bråten & Strømsø's (2011) Multiple-Text Strategy Inventory (MTSI), and an integrative essay. Learners' knowledge improved significantly from pretest to posttest across all conditions. However, after controlling for prior knowledge, the conditions did not differ significantly on any post-intervention outcome. Descriptively, the metacognitive prompting group tended to score at or above the other groups and the group receiving additional integration reminders tended to score lowest. Prior knowledge and self-reported strategic processing were the strongest correlates of comprehension and integration performance. Findings suggest that engaging learners in an integrative multiple-text task supports content learning regardless of prompting, and that individual differences in prior knowledge and strategic processing relate to integration performance.

## Keywords

Multiple-Text Integration, Self-Regulated Learning, Reading Intervention, Reading Strategies, Metacognition

## 1. Supporting Multiple Text Integration: The Role of Metacognitive Prompting in Reading Comprehension

With access to nearly endless resources, students and lay citizens alike are chal-

lenged to find ways to create a cohesive understanding of information from various sources. Whether researching a new medical diagnosis or looking for advice on gardening, people frequently search for multiple resources to learn more and make decisions. Reading multiple text sources to gain information is cognitively demanding because readers must go beyond understanding a single text to construct a coherent understanding by connecting ideas across sources. The complexity of knowledge integration tasks has increased with the availability of almost unlimited complementary and conflicting sources and is now further complicated by an increase in AI-generated content. To navigate this challenging landscape effectively, readers must develop strategies to manage and deepen their learning from multiple text sources.

In the context of student learning, learning from multiple texts is also important, as State and National reading standards emphasize source integration as a key component of reading comprehension and include related assessments that incorporate source evaluation and integration outcomes (e.g., PA State Standards (Pennsylvania Department of Education, 2013) and NAEP (National Assessment for Educational Progress, 2019)). Nonetheless, students often struggle with learning from multiple texts, including evaluating credibility and quality of sources (Anmarkrud et al., 2013; Brante & Strømsø, 2017), and they are particularly challenged with integrating content across texts (Barzilai et al., 2018; Mahlow et al., 2020).

Recent research has examined the role of reading comprehension strategies known to be effective in single text comprehension, such as summarization, as applied to multiple texts (e.g., Haverkamp et al., 2024; McNamara et al., 2024). Such strategy use is a component of effective self-regulated learning, and prior research supports that when learners engage with self-regulation strategies while reading, they perform better on learning outcomes (List & Alexander, 2019; McCrudden et al., 2010; Strømsø et al., 2008). Yet, the role of self-regulated learning (SRL) in facilitating learning from multiple texts specifically has been largely overlooked (Denton et al., 2020).

The existing multiple-text research explores interventions aimed to support processes and strategies to improve source evaluation (Braasch et al., 2013; Britt & Aglinskas, 2002; De La Paz et al., 2017; Rouet et al., 2021) and integration (Barzilai & Ka'adan, 2016; Boscolo et al., 2007; Darowski et al., 2016; Haverkamp et al., 2024; Firetto & Van Meter, 2018; McNamara et al., 2024). However, existing interventions to support students' integration of text sources are generally specific and lack a holistic focus on SRL components or grounding in SRL models. Although some scholars have explored specific SRL components, such as metacognition, within multiple-text contexts (e.g., Stadtler & Bromme, 2007, 2008), these efforts have not consistently used comprehensive SRL theoretical frameworks. Given the inherently goal-directed and strategic nature of integrating information across sources, multiple text research should develop and evaluate interventions that are explicitly aligned with established SRL models. Such work is essential to

advancing our understanding of how to scaffold student's regulation of cognitive, motivational, and behavioral processes during multiple-text reading.

### 1.1. Theoretical Development of Multiple-Text Reading

The study of multiple-text reading has evolved considerably over the past two decades, moving from isolated examinations of comprehension processes from single text to more integrated investigations of how readers engage with multiple sources (i.e., texts, graphics, visuals). Multiple-text reading refers to the process of reading, evaluating, and integrating information from two or more texts, often with differing perspectives, sources, or rhetorical purposes (Perfetti et al., 1999; Wiley et al., 2009). Unlike single text comprehension, which primarily involves constructing a coherent mental model by integrating text information with readers' prior knowledge, multiple-text comprehension requires readers to engage in additional processes such as source evaluation and intertextual integration (Bråten et al., 2009; Barzilai & Zohar, 2012).

Early reading research was largely grounded in cognitive theories of reading comprehension, such as Kintsch's (1998) Construction-Integration mode, which emphasized the construction of mental representations of text meaning. This model provided a foundation for understanding how readers process individual texts but lacked a more authentic reading context where multiple texts regarding a single topic are more often accessed to study a topic. To address this limitation, the Document Model Framework (DMF; Britt et al., 1999; Rouet, 2006) posits that readers must not only construct a situation model for each text but also create a meta-representational structure that includes information about each source (e.g., author, reliability, date, text characteristic) to support readers in comparing and integrating multiple texts. A central feature of this model is the concept of sourcing, which refers to readers' ability to interrogate, evaluate, and use source information in constructing a coherent and accurate understanding across texts. Building on this work, the MD-TRACE model extends the DMF by emphasizing the goal-driven and task-based nature of multiple document comprehension (Rouet & Britt, 2011). It proposes that readers engage in cycles of assessing task relevance, selecting and processing documents, and integrating extracted content based on both text and task representations. Similarly, the RESOLV model provides a broader account of the situational and motivational factors that guide multiple document reading (Rouet et al., 2017). It highlights how readers construct dynamic representations not only of the documents themselves but also of the reading purpose or task, contextual constraints, and their own goals and beliefs during reading text and synthesis.

Some scholars have considered multiple-text reading within the broader theoretical SRL framework (Azevedo et al., 2005; Greene & Bråten, 2016; James & Goldman, 2020). From this perspective, reading across multiple texts is regarded as a goal-directed activity that requires regulation of cognitive, metacognitive, motivational, and behavioral processes. For example, students must set reading

goals, select relevant strategies, monitor their understanding, and revise their interpretations when they engage in multiple-text reading. While some work has considered the importance of SRL constructs within multiple source comprehension, in this work we specifically ground a multiple text integration intervention within an SRL model.

### 1.2. SRL in Multiple-Text Reading

SRL involves actively managing the learning process through strategic use of academic strategies, metacognition, and motivation directed toward achieving specific learning goals (Sperling et al., 2004; Zimmerman, 2001). Effective self-regulated learners select and implement appropriate strategies, monitor their comprehension and performance, make necessary adjustments, and reflect on their learning progress (Winne, 2001). The importance of self-regulated learning for multiple text integration tasks lies in learners developing an understanding of how to approach the task and then determining study techniques and learning strategies that would best support learning from the specific types of texts they are reading. Building on this importance, we argue that approaching interventions for multiple-text learning from an SRL perspective could support students' goal-directed learning.

Our study contributes to the broader literature on multiple-text learning by examining a metacognitive prompting intervention grounded in Winne and Hadwin's (1998) SRL model. While there are numerous models of SRL (Panadero, 2017; Puustinen & Pulkkinen, 2001), this study employs Winne and Hadwin's (1998) model of self-regulated learning (SRL), because it leans heavily on the metacognitive and strategic processing elements of SRL and focuses on how learners control their own learning process. The model gives attention to the learner's task and cognitive conditions and therefore aligns with multiple document models. The model focuses on four phases of self-regulated learning: task definition (where learners interpret the task and identify available resources); goal setting and planning (where learners establish goals and devise plans to reach them); enacting strategies (where learners implement their plans using cognitive and metacognitive strategies in their learning repertoire); and adaptation (where learners monitor and evaluate their progress and adapt strategies as necessary). Each phase incorporates processes rooted in information-processing theory (Atkinson & Shiffrin, 1968; Mayer, 2012; Simon, 1979).

Winne and Hadwin categorize these processes using the acronym COPES (conditions, operations, products, evaluations, and standards). *Conditions* encompass the cognitive resources available to learners (e.g., knowledge of study tactics) and the situational factors affecting the task (e.g., time). *Operations* refer to specific cognitive processes—termed SMART processes (searching, monitoring, assembling, rehearsing, and translating)—that learners use to manipulate information. These operations result in *Products*, which are the tangible outcomes of each learning phase. To compare products against standards, learners engage in cogni-

tive evaluations through ongoing monitoring of their progress. *Standards* are the criteria learners set to guide their goals, and *evaluations* involve judgments about the extent to which these standards have been achieved.

The highly iterative, cyclical nature of the Winne and Hadwin (1998) model means that learners may cycle through these four phases multiple times as they refine their approaches to learning. In the current study, the treatment condition received prompts during study that targeted the four phases and COPES processes within each phase. The MP condition was developed to examine general metacognitive prompting. The MP + I condition included language to make task conditions explicit.

In this research, we investigated how a metacognitive prompting intervention impacts learning outcomes and SRL competencies using a pretest-posttest design with three conditions: metacognitive prompting (MP), metacognitive prompting with integration reminders (MP + I), and a control condition. We were particularly interested in how the intervention may impact an authentic integration task, like those expected in K-16 learning environments and those faced by adults in "real life" settings, where learners are engaged in understanding a topic across complementary texts about an important, relevant construct. This context contrasts with much of the existing multiple text and multiple source comprehension research that focuses on emotionally laden constructs (Danielson et al., 2023), non-text sources (Cromley et al., 2021), and/or refutational texts (Bråten & Braasch, 2018). Learners in this study were able to re-visit and access the texts to which they had been exposed as they completed an authentic essay task.

### 1.3. The Present Study

The current study addressed three main research questions. The first research question (RQ 1) was: Does students' knowledge improve after metacognitive intervention, and do these changes differ across intervention groups? With this question, we examined whether students demonstrated measurable learning after engaging in a multiple-text reading and integration task, considering the type of intervention received. We divided the question into two sub-questions:

RQ1a: Is there a significant main effect of time on knowledge?

RQ1b: Is there a significant interaction between time and instructional group?

We anticipated that the intervention would promote students' deeper comprehension of the topic, thereby enhancing learning outcomes. Specifically, we expected that the groups receiving metacognitive prompts would demonstrate more improvements and that the extent of these improvements would vary by group conditions. Investigating learning in this context provides insight into whether multiple-text integration tasks serve not only as an assessment tool but also as an effective instructional strategy.

The second research question (RQ 2) was: What are the differences in knowledge, self-efficacy, metacognitive awareness, strategic processing, and integration scores across instructional groups? We expected that groups receiving metacognitive in-

terventions would outperform the control group, with those receiving both metacognitive and integrative prompts (i.e., MP + I) realizing the highest levels of knowledge, self-efficacy, strategic processing, and metacognitive awareness at post-test. By comparing different groups exposed to varied instructional methods, this question examines how specific interventions influence students' strategic processing and their efficacy in navigating complex reading tasks. Understanding these differences can provide valuable insights into which instructional approaches most effectively support students' engagement and performance in multiple-text integration.

The third research question (RQ 3) was: What factors are associated with students' multiple-text comprehension and integration? This research question investigates the cognitive, metacognitive, and motivational factors that relate to students' success in comprehending and integrating information across multiple sources. Specifically, it examines how variables such as prior knowledge, self-efficacy, and metacognitive awareness are associated with reading comprehension and integration performance. We anticipated that these variables would be related to students' multiple-text comprehension and integration based on evidence from prior studies (Demir et al., 2024; Lee & List, 2021; List, 2025). Clarifying these relationships provides both theoretical and practical implications, supporting the development of more tailored instructional strategies.

## 2. Method

### 2.1. Participants

Undergraduates enrolled in educational psychology courses at a large research university were randomly assigned to conditions outside of instructional time. The project was approved by the Institutional Review Board at the corresponding author's university. Participants received extra course credit for completing the study. A total of 466 students completed the pretest before the intervention, and following the pretest, participants were randomly assigned to one of three conditions. Consistent with the demanding, multi-stage nature of the task, attrition was higher in the two intervention conditions over control condition and occurred primarily during and after the intervention with many more students completing the pre-survey items. Because the integrative essay was the study's primary outcome, students who did not submit an essay were treated as non-completers ($n$ = 266). Completed essay responses were obtained from 200 students (control = 79, MP = 60, MP + I = 61 students respectively), and 6 of these were excluded due to incomplete responses. We applied listwise deletion for the missing data, so only data for those who completed the study ($n$ = 194) were included in the final analyses. To evaluate whether listwise deletion biased the results, we compared completers with non-completers on all baseline measures. The groups did not significantly differ on any pretest measure: metacognitive awareness (M = 69.5 vs. 69.4; t = 0.06, $p$ = 0.95, d = 0.01), pretest self-efficacy (M = 72.9 vs. 73.6; t = −0.46, $p$ = 0.64, d = −0.04), or pretest knowledge (M = 12.7 vs. 13.0; t = −0.85, $p$ = 0.39, d =

−0.09). The sample was primarily first and second year students (79%), female (81%) and White (78%). Descriptive statistics for all primary variables by condition are found in Table 1.

Table 1. Descriptive statistics by condition.

| | *n* | Pre_K | Post_K | Pre_MAI | Post_MAI | Pre_SE | Post_SE |
|---|---|---|---|---|---|---|---|
| Control | 77 | 12.82 (2.72) | 15.14 (4.30) | 71.30 (11.74) | 71.97 (11.55) | 73.69 (16.97) | 78.71 (16.87) |
| MP | 57 | 13.14 (3.31) | 14.65 (4.78) | 70.33 (12.30) | 73.68 (12.16) | 72.63 (16.52) | 79.44 (14.73) |
| MP + I | 60 | 12.15 (3.48) | 14.23 (4.24) | 65.85 (11.76) | 68.33 (11.64) | 71.45 (13.81) | 75.20 (16.21) |

## 2.2. Procedure

This study was presented to participants using Qualtrics. All participants signed an informed consent form prior to entering the study materials. At pretest, participants completed the shortened Metacognitive Awareness Inventory (MAI; Harrison & Vallin, 2018; Schraw & Dennison, 1994), a self-efficacy inventory for learning from multiple sources inventory, and a knowledge assessment. Learners were then assigned to one of three conditions and completed the multiple-text learning task. Instructions were consistent across conditions. Learners (a) read the task and writing prompt, (b) were given as much time as needed to learn from the three texts, and (c) completed the final questionnaires. Participants were provided with three texts, one at a time, in the same order regardless of condition. Throughout the learning task, the treatment conditions received their respective metacognitive prompts. At post-test, learners completed the shortened MAI, the self-efficacy measure, a knowledge assessment, wrote a short integrative essay response, completed an adapted version of Bråten & Strømsø's (2011) Multiple-Text Strategy Inventory (MTSI), and answered demographic questions.

## 2.3. Materials

### 2.3.1. Texts

Participants read three texts about the importance of sleep (i.e., Explaining Sleep, Sleep Stages, and Sleep Quality) modified for the study from authentic and trustworthy information found on the Internet. Texts were similar in length and readability (see Table 2). Readability levels were deliberately chosen to ensure that participants would be able to engage reasonably with the texts. Each text represented various aspects of the topic, but their relationship was complementary.

### 2.3.2. Intervention

Intervention materials included metacognitive prompts grounded in the four phases of Winne and Hadwin's (1998) model. As learners progressed through the learning task, both intervention conditions received prompts at four points that corresponded to the model's phases: (1) *task definition*, in which learners restated the task in their own words; (2) *goal setting and planning*, in which learners described the strategies they would use; (3) *enacting strategies*, in which, after read-

ing each of the three texts, learners rated their comprehension and elaborated on how the text connected to their knowledge; and (4) *adaptation*, in which, after drafting the essay, learners evaluated how well their response met their goals and reflected on what they would repeat or change in the future. The number, type, and placement of prompts were identical across the two intervention conditions; the conditions differed only in the wording of the prompts.

**Table 2.** Sleep text word counts and readability.

| | Topic | Words | F-K Grade Level | Original Sources |
|---|---|---|---|---|
| Text 1 | Explaining Sleep | 481 | 8.7 | https://www.ninds.nih.gov/health-information/public-education/brain-basics/brain-basics-understanding-sleep<br>https://www.nhlbi.nih.gov/health/sleep-deprivation |
| Text 2 | Sleep Stages | 453 | 8.1 | https://www.thensf.org/what-are-the-sleep-stages/ |
| Text 3 | Sleep Quality | 468 | 8.5 | https://www.thensf.org/what-is-sleep-quality/ |

In the MP (i.e., general metacognitive prompting) condition, prompts used general self-regulatory language. For example, at the task-definition prompt, learners were asked, "The directions above describe your learning task. Put your task in your own words," and during reading they were asked, "How does this text connect to your knowledge or experiences with sleep?"

In the MP + I condition, each prompt was reframed to make the cross-text integration goal explicit while holding the prompt's metacognitive function constant. For example, the parallel task-definition prompt asked, "The directions above describe your learning task. Put your task that is focused on making connections across texts in your own words." and the during-reading prompts asked learners to connect each text not only to prior knowledge but also to "what you learned in the previous text(s)" (e.g., "How does this text connect to what you learned in the previous text and your knowledge or experiences with sleep?"). The full set of prompts for each condition mapped to the four phases of Winne and Hadwin's (1998) model.

## 2.4. Measures

Multiple-text learning and SRL outcomes were of interest. Reliability coefficients for instruments are measures of internal consistency reported as Cronbach's alpha.

### 2.4.1. Knowledge

At pretest and post-test, learners completed a 24-item 4-point, multiple-choice researcher-developed measure that assessed declarative ($n$ = 14) and conceptual ($n$ = 10) knowledge. As anticipated, the measure demonstrated weak reliability at pretest (Cronbach's $\alpha = 0.521$), because learners lacked essential prior knowledge, but stronger reliability at posttest (Cronbach's $\alpha = 0.765$).

#### 2.4.2. Metacognitive Awareness

At pretest and posttest, learners completed the shortened 19-item Metacognitive Awareness Inventory (MAI) (Harrison & Vallin, 2018; Schraw & Dennison, 1994). The widely administered and established MAI assesses learners' knowledge of cognition (KOC) and regulation of cognition (ROC). Reliability was strong at pretest (Cronbach's α = 0.925) and at posttest (Cronbach's α = 0.94).

#### 2.4.3. Self-Efficacy

Guidelines for the development of self-efficacy scales were implemented (Bandura, 2006) and at pretest and posttest, learners completed a 9-item researcher-developed self-efficacy measure in which they rated their confidence on aspects of reading and understanding texts about sleep. For example, learners were asked to rate their confidence levels for comprehending all tests, relating texts to prior knowledge, evaluating information from the texts, synthesizing across texts, and generating unique connections from the texts. Reliability was strong at pretest (Cronbach's α = 0.94) and at posttest (Cronbach's α = 0.96).

#### 2.4.4. Strategy Use

At posttest, learners completed an adapted version of Bråten and Strømsø's (2011) MTSI, rating the extent to which they used each strategy during study on a 10-point scale. The MTSI measures two types of multiple-text strategy use: accumulation and cross-text elaboration and is widely administered in multiple text integration studies (Bråten et al., 2014; List et al., 2019a, 2019b; Tarchi et al., 2024). Consistent with previous practice (e.g., Follmer & Tise, 2022), we revised six items to align the MTSI with content-specific references from texts in the items. Reliability for this measure was strong (α = 0.96).

#### 2.4.5. Integrative Essay Measures

After reading the multiple texts and the intervening prompts, students wrote an integrative essay following a writing prompt (i.e., "Write an essay making connections across all three texts you read. Describe the relationship among sleep, sleep stages, and sleep quality. Cite the texts in your essay"). They could access the texts while writing the essay and also could use any notes they had taken while reading. Students' integrative understanding of multiple texts was evaluated using a 4-point analytic rubric designed to capture both the depth of content integration and the quality of cross-textual reasoning holistically. The rubric assessed essays with respect to the extent to which students incorporated information from the source texts, cited or referenced those texts, and meaningfully demonstrated relationships among them (see **Table 3** for the entire rubric). Scores ranged from 0 (No Integration) to 3 (Full Integration), with the following criteria.

Essays at the 0-point level demonstrated little to no effort in responding to the integration task. In such responses, no citations or references to specific texts were provided. Students made no explicit relationships among texts and offered no evidence of integration. Responses at this level were often superficial, off-topic, or fragmentary. Essays at the 1-point level included some textual information, but

the content was minimal and lacked elaboration. These responses also provided no citations or references to specific sources. The structure of the essays was strictly linear, typically presenting information from each text in isolation without connecting ideas or demonstrating synthesis.

**Table 3.** Essay scoring rubric.

| Score | Criteria (Updated) |
|---|---|
| 0 (No integration) | • Little to no effort in writing the integration essay<br>• No citations or references to specific texts provided<br>• No explicit relationships among texts<br>• No demonstration of integration |
| 1 (Minimal Integration) | • Some information from the texts is included, but the information provided is minimal<br>• No citations or references provided<br>• Essay follows a linear structure without integration (e.g., summarizing texts separately rather than connecting ideas) |
| 2 (Partial integration) | • Information from all three texts is clearly provided<br>• Citations (or at least references to specific texts) are provided<br>• There is some integration between at least two texts, but most of the essay follows a linear structure<br>• Limited demonstration of relationships between texts (i.e., what relationships are being made are very general) |
| 3 (Full integration) | • Essay is written in a coherent and well-structured manner<br>• Citations (or at least references to specific texts) are provided<br>• STRONG demonstration of relationships across texts, with ideas meaningfully connected (some examples: tying multiple texts together and citing not linearly; providing introduction and/or conclusion that reflects relationships between the texts; specific language that refers to the relationship between texts; a universal idea or leveraging sentence that ties things together) |

Essays at the 2-point level drew on content from all three texts, with at least some citations or textual references included. While some integration was demonstrated, typically between two texts, the overall structure remained mostly linear. Connections across texts were general and lacked specificity or depth, with limited use of language that highlighted explicit relationships.

Essays receiving the highest score were coherent, well-structured, and demonstrated strong integration of ideas across all three texts. Citations or specific references to the source materials were present. Students clearly conveyed relationships among texts through cross-textual reasoning (e.g., linking ideas across multiple sources within or across paragraphs), intertextual connections (e.g., "In contrast to…"), conceptual synthesis (e.g., identifying a unifying contents), and integrative framing (e.g., introductory or concluding statements that reflect holistic understanding of relationships among texts).

Two raters (i.e., the first and second authors), both of whom were blind to participants' condition assignment, independently scored the essays after completing a training and calibration process. During training, both raters reviewed and discussed exemplar essays representing each score level to ensure shared interpreta-

tion of the rubric. Then the two raters scored the first 20 essays independently, each recording a written justification, and met to resolve discrepancies and refine their shared interpretation of the criteria before scoring the remaining essays. Across the full set of essays, the two raters agreed exactly on 55.8% of essays and were within one scale point on 97.8%. Discrepancies greater than two scale points ($n$ = 8) were reconciled through discussion with the corresponding author, with reference to the written justifications and the rubric criteria. The intraclass correlation coefficient between two raters was 0.74, indicating good agreement.

#### 2.4.6. Data Analysis

For RQ 1, we conducted repeated measures to compare students' pre- and post-knowledge scores. This analysis allowed us to examine whether students indicated overall learning gains over time regardless of condition group, and whether there were significant main effects of intervention condition, as well as an interaction effect between time and intervention type. For RQ 2, we employed a Multivariate Analysis of Covariance (MANCOVA) to compare students' post-intervention scores on knowledge, self-efficacy, metacognitive awareness, strategic processing, and integration across intervention groups, while controlling for prior knowledge. We selected prior knowledge as the sole covariate because prior knowledge is widely recognized and consistently identified as one of the most influential predictors of both learning processes and outcomes of multiple-text reading (Hagen et al., 2014; List & Alexander, 2019). Therefore, it was included as a covariate to ensure that group differences in post-intervention performance were not confounded by initial knowledge levels. We retained this single, theoretically motivated covariate, rather than matching each posttest outcome to its own pretest score, to maintain a parsimonious model applied consistently across all dependent variables. For RQ 3, we conducted multiple regression to examine how prior knowledge, self-efficacy, metacognitive awareness, and strategic processing were associated with students' multiple-text comprehension and integration performance. Because strategic processing and the comprehension and integration outcomes were all assessed within the same posttest session, we interpret these relationships as concurrent associations rather than as prediction in a temporal or causal sense. To determine whether these associations were independent of the experimental manipulation, we also entered instructional condition (dummy-coded, with the control group as the reference) as a covariate in each model.

## 3. Results

### 3.1. Learning Occurred Regardless of Group Conditions (RQ 1)

A repeated-measure ANOVA was conducted to examine the effect of instructional condition on students' knowledge scores measured at two different time points (i.e., pre-test and post-test). Box's M test indicated homogeneity of covariance matrices across groups ($p$ = 0.25).

A significant main effect for time was observed, indicating that students' knowledge significantly increased from pre ($M$ = 12.71, $SD$ = 3.16) to post ($M$ =

14.72, $SD = 4.42$), $F(1, 191) = 59.73$, $p < 0.001$, partial $\eta^2 = 0.238$. Students showed significant gains in learning from multiple sources regardless of condition. However, there was no significant main effect for intervention type (Control: $n = 77$, MP: $n = 57$, MP + I: $n = 60$); ($F(2, 191) = 1.02$, $p = 0.36$; partial $\eta^2 = 0.011$), suggesting that the magnitude of knowledge gains did not differ significantly across the three groups. Furthermore, there was also no interaction between time and condition ($F(2, 191) = 0.90$, $p = 0.41$; partial $\eta^2 = 0.009$).

### 3.2. Differences across Instructional Types (RQ 2)

A MANCOVA was conducted to examine differences in students' post-intervention knowledge, self-efficacy, metacognitive awareness, multiple-text strategic processing, and integration scores across the three instructional conditions, while controlling for pre-intervention knowledge scores. The assumption of equality of covariance matrices among the groups was satisfied (Box's M = 31.04, $p = 0.47$). At the multivariate level, the omnibus effect of instructional condition was not statistically significant, Wilks' $\Lambda = 0.93$, $F(10, 372) = 1.46$, $p = 0.15$, partial $\eta^2 = 0.04$. Because the multivariate test did not indicate reliable differences among conditions, we interpreted univariate and pairwise results with caution.

Consistent with the non-significant omnibus test, the follow-up univariate ANCOVAs demonstrated no significant effect of intervention condition on any outcome after adjusting for prior knowledge: post-knowledge, ($F(2, 190) = 0.79$, $p = 0.46$), partial $\eta^2 = 0.01$ (adjusted $M$s = 15.05, 14.27, and 14.71 for the Control, MP, and MP + I groups, respectively); self-efficacy, $F(2, 190) = 0.66$, $p = 0.52$, partial $\eta^2 = 0.01$ (adjusted $M$s = 78.57, 78.88, 75.92); metacognitive awareness, $F(2, 190) = 2.65$, $p = 0.073$, partial $\eta^2 = 0.03$ (adjusted $M$s = 71.92, 73.47, 68.60); strategic processing, $F(2, 190) = 2.25$, $p = 0.11$, partial $\eta^2 = 0.02$ (adjusted $M$s = 114.51, 116.12, 106.71); and integration, $F(2, 190) = 2.79$, $p = 0.064$, partial $\eta^2 = 0.03$ (adjusted $M$s = 1.90, 1.91, 1.54).

Bonferroni-corrected pairwise comparisons of the adjusted means yielded no significant differences between any pair of conditions on any outcome (all corrected $p$s > 0.07). The largest differences were small-to-moderate and consistently involved the MP + I group scoring lower than the MP group: on metacognitive awareness (MP vs. MP + I, adjusted mean difference = 4.87, $d = 0.42$, $p = 0.079$) and on integration (Control vs. MP + I, difference = 0.36, $d = 0.36$, $p = 0.11$; MP vs. MP + I, difference = 0.37, $d = 0.38$, $p = 0.13$).

Overall, after controlling for prior knowledge, the three intervention conditions did not differ significantly on any post-intervention outcome. However, the descriptive pattern was broadly consistent with the MP group scoring at or above the other conditions and the MP + I group scoring lowest.

### 3.3. Factors Influencing Students' Multiple-Text Integration (RQ 3)

A multiple regression analysis was conducted to investigate how pre-intervention

knowledge (Pre_K), self-efficacy (Pre_SE), metacognitive awareness (Pre_MAI), and post-intervention multiple-text strategic process (MTSI) were associated with students' comprehension score (i.e., Post_K) and integration essay performance. Correlation analysis revealed that all variables were significantly correlated with one another and with the integration score (see Table 4), confirming theoretical associations between these constructs and the outcome of integration performance. The regression models were statistically significant for both outcome variables (see Table 5).

Table 4. Correlations among primary variables.

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1. Integration | - | | | | |
| 2. Pre_Metacognitive awareness | 0.12* | - | | | |
| 3. Pre_Self-efficacy | 0.11* | 0.59*** | - | | |
| 4. Pre_Knowledge | 0.25*** | 0.15* | 0.15* | - | |
| 5. MTSI | 0.25*** | 0.59*** | 0.45*** | 0.17* | - |

*$p < 0.05$, ***$p < 0.001$.

Table 5. Multiple regression results for the outcomes.

| Predictor | Unstandardized Coefficient | | Standardized Coefficient | $t$ | $p$ value |
|---|---|---|---|---|---|
| | $B$ | SE $B$ | β | | |
| | | | Dependent: Post-Knowledge | | |
| (Constant) | 2.05 | 1.68 | - | 1.22 | 0.225 |
| Pre_K | 0.83 | 0.080 | 0.59*** | 10.36 | <0.001 |
| Pre_MAI | −0.01 | 0.03 | −0.03 | −0.39 | 0.699 |
| Pre_SE | −0.02 | 0.02 | −0.06 | −0.79 | 0.429 |
| Post_MTSI | 0.04 | 0.01 | 0.22** | 3.07 | 0.002 |
| | | | Dependent: Integration | | |
| (Constant) | 0.12 | 0.48 | - | 0.24 | 0.81 |
| Pre_K | 0.07 | 0.02 | 0.22** | 3.11 | 0.002 |
| Pre_MAI | −0.01 | 0.01 | −0.08 | −0.83 | 0.406 |
| Pre_SE | 0.00 | 0.01 | 0.04 | 0.43 | 0.669 |
| Post_MTSI | 0.01 | 0.00 | 0.25** | 2.84 | 0.005 |

Note: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. Post-knowledge: $F(4, 189) = 32.69$***, $R^2 = 0.409$ ($\Delta R^2 = 0.396$); Integration: $F(4, 189) = 5.93$***, $R^2 = 0.111$ ($\Delta R^2 = 0.093$).

The overall model for post-knowledge was statistically significant, $F(4, 189) = 32.69$, $p < 0.001$, with an explained variance of $R^2 = 0.409$ ($\Delta R^2 = 0.396$), indicating that approximately 41% of the variance in post-knowledge scores was accounted for by the four predictors. Among them, prior knowledge was the strongest cor-

relate (β = 0.59, $p < 0.001$), followed by strategic processing (β = 0.22, $p = 0.002$). Neither metacognitive awareness (β = –0.03, $p = 0.699$) nor self-efficacy (β = –0.06, $p = 0.429$) was significantly associated with post-knowledge. The Durbin-Watson statistic was 2.06, indicating no serious concern for autocorrelation, and there was no multicollinearity observed. When instructional condition was added as a covariate, this pattern was unchanged (prior knowledge β = 0.60, $p < 0.001$; strategic processing β = 0.22, $p = 0.002$; $R^2 = 0.42$). Also, condition was not significantly associated with post-knowledge (MP vs. control: β = –0.20, $p = 0.15$; MP + I vs. control: β = –0.03, $p = 0.83$).

The regression model for integration was also significant, $F(4, 189) = 5.93$, $p < 0.001$, accounting for 11.1% of the variance ($R^2 = 0.111$; $\Delta R^2 = 0.093$). Both prior knowledge (β = 0.22, $p = 0.002$) and strategic processing (β = 0.25, $p = 0.005$) were significantly associated with integration performance. Metacognitive awareness (β = –0.08, $p = 0.406$) and self-efficacy (β = 0.04, $p = 0.669$) were not significantly associated. The Durbin-Watson statistic was 2.24, suggesting no violation of independence assumptions and no multicollinearity was observed. Adding instructional condition as a covariate left these associations essentially unchanged (prior knowledge β = 0.20, $p = 0.004$; strategic processing β = 0.23, $p = 0.008$; $R^2 = 0.13$). Also, condition itself was not significantly associated with integration (MP vs. control: β = –0.01, $p = 0.97$; MP + I vs. control: β = –0.32, $p = 0.056$).

## 4. Discussion

For RQ 1, learning gains were observed across all groups, indicating that the multiple-text integration task itself fostered knowledge gains, regardless of instructional condition. This supports the pedagogical value of integrative reading and writing as a generative learning activity may be inherently valuable for promoting content learning, consistent with theories of active and constructive learning (Chi, 2021).

For RQ 2, after controlling for prior knowledge, the three conditions did not differ significantly on any post-intervention outcome, and the multivariate omnibus test was likewise non-significant. Thus, contrary to our expectations, providing metacognitive prompts did not yield measurable advantages over the control condition on knowledge, metacognitive awareness, self-efficacy, strategic processing, or integration. The descriptive pattern was suggestive of small differences, with the MP group tending to score at or above the other groups and the MP + I group tending to score lowest. One tentative interpretation of the consistently lower MP + I means is that layering integration reminders onto the metacognitive prompts may have raised processing demands without a commensurate benefit. Given the absence of significant effects, however, this remains a hypothesis for future research. Considered alongside the null time-by-condition interaction in RQ 1, these findings indicate that the integrative multiple-text task supported learning across conditions, but that the prompting manipulations, as implemented, did not differentially enhance outcomes.

For RQ 3, the regression results highlight the strong association of prior knowledge and strategic processing with both knowledge acquisition and integrative understanding from multiple text sources. Prior knowledge demonstrated the strongest association with post-knowledge scores, underscoring the well-established notion that learning is more efficient and effective when new information can be anchored to an existing knowledge base (Alexander, 2017; Chi, 2023). These associations were independent of instructional condition, which was not significantly related to either outcome.

Strategic processing, as measured by the MTSI, was also significantly associated with both outcome measures, suggesting that students who actively monitor, plan, and evaluate their learning processes also tend to demonstrate deeper integration of information. This finding aligns with the literature on self-regulated learning (Pintrich, 2000), which emphasizes the importance of active cognitive engagement in tasks that require synthesis and integration.

## 5. Conclusions, Limitations, and Future Directions

In this study we found that college students, when provided multiple text sources and an integration task, learned from the sources regardless of instructional condition. Further intervention, which included prompting, did not benefit learning, integration, nor reported strategic processing and indeed resulted in poorer outcomes. We attribute this finding to the likelihood that the additional prompting resulted in cognitive load challenges as students engaged with the already challenging multiple integration task. One conclusion is that metacognitive prompting may suffice in supporting students as intervention during multiple text comprehension. Future research should replicate this finding with novel texts and tasks, and with multiple source documents that include diagrams and other supports generally found in authentic expository texts.

Further, all students learned from exposure to the multiple texts. The selected complementary expository texts, on the topic of sleep, had been used in previous research and we knew that students engaged and learned from the texts. While we intentionally gauged reading level, it may be that the benefit for the metacognitive intervention on knowledge learning would be stronger with more difficult or challenging texts. Future research should consider this finding and engage more difficult texts.

In this work, college students volunteered to complete the study for a small amount of extra credit. There was considerable attrition and students assigned to the intervention conditions dropped out at greater rate. It is likely that students perceived the difficult task of integration, and writing the essay, in addition to the knowledge and self-report items too arduous for the extra credit that they would receive for participation. This likely also resulted in sample characteristics of those who completed the study. It is possible those who completed represented students who were more interested in the topic, more diligent students, or more compliant students. All students received credit whether they completed the entire study, so

motivation to complete all phases of the study may not be representative of all students. Future research should test the intervention with authentic learning tasks, perhaps with within-subjects cross over design with multiple tasks so all learners can realize the benefit of the intervention. Given the established challenges of multiple text integration, the important findings from this study indicate promise for a metacognitive prompting intervention to support students' multiple text integration on an essay task. Future directions that further expand these findings to additional readers, texts, and tasks are warranted.

## Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

## References

Alexander, P. A. (2017). Reflection and Reflexivity in Practice versus in Theory: Challenges of Conceptualization, Complexity, and Competence. *Educational Psychologist, 52,* 307-314. https://doi.org/10.1080/00461520.2017.1350181

Anmarkrud, Ø., McCrudden, M. T., Bråten, I., & Strømsø, H. I. (2013). Task-Oriented Reading of Multiple Documents: Online Comprehension Processes and Offline Products. *Instructional Science, 41,* 873-894. https://doi.org/10.1007/s11251-013-9263-8

Atkinson, R. C., & Shiffrin, R. M. (1968). Human Memory: A Proposed System and Its Control Processes. In K. W. Spence, & J. T. Spence (Eds.), *Psychology of Learning and Motivation* (pp. 89-195). Elsevier. https://doi.org/10.1016/s0079-7421(08)60422-3

Azevedo, R., Cromley, J. G., Winters, F. I., Moos, D. C., & Greene, J. A. (2005). Adaptive Human Scaffolding Facilitates Adolescents' Self-Regulated Learning with Hypermedia. *Instructional Science, 33,* 381-412. https://doi.org/10.1007/s11251-005-1273-8

Bandura, A. (2006). Guide for Constructing Self-Efficacy Scales. In F. Pajares, & T. Urdan (Eds.), *Self-Efficacy Beliefs of Adolescents* (pp. 307-337). Information Age Publishing.

Barzilai, S., & Ka'adan, I. (2016). Learning to Integrate Divergent Information Sources: The Interplay of Epistemic Cognition and Epistemic Metacognition. *Metacognition and Learning, 12,* 193-232. https://doi.org/10.1007/s11409-016-9165-7

Barzilai, S., & Zohar, A. (2012). Epistemic Thinking in Action: Evaluating and Integrating Online Sources. *Cognition and Instruction, 30,* 39-85. https://doi.org/10.1080/07370008.2011.636495

Barzilai, S., Zohar, A. R., & Mor-Hagani, S. (2018). Promoting Integration of Multiple Texts: A Review of Instructional Approaches and Practices. *Educational Psychology Review, 30,* 973-999. https://doi.org/10.1007/s10648-018-9436-8

Boscolo, P., Arfé, B., & Quarisa, M. (2007). Improving the Quality of Students' Academic Writing: An Intervention Study. *Studies in Higher Education, 32,* 419-438. https://doi.org/10.1080/03075070701476092

Brante, E. W., & Strømsø, H. I. (2017). Sourcing in Text Comprehension: A Review of Interventions Targeting Sourcing Skills. *Educational Psychology Review, 30,* 773-799. https://doi.org/10.1007/s10648-017-9421-7

Britt, M. A., & Aglinskas, C. (2002). Improving Students' Ability to Identify and Use Source Information. *Cognition and Instruction, 20,* 485-522. https://doi.org/10.1207/s1532690xci2004_2

Britt, M. A., Perfetti, C. A., Sandak, R., & Rouet, J. F. (1999). Content Integration and

Source Separation in Learning from Multiple Texts. In S. R. Goldman, A. C. Graesser, & P. van den Broek (Eds.), *Narrative Comprehension, Causality, and Coherence: Essays in honor of Tom Trabasso* (pp. 209-233). Routledge.

Braasch, J. L. G., Bråten, I., Strømsø, H. I., Anmarkrud, Ø., & Ferguson, L. E. (2013). Promoting Secondary School Students' Evaluation of Source Features of Multiple Documents. *Contemporary Educational Psychology, 38,* 180-195. https://doi.org/10.1016/j.cedpsych.2013.03.003

Bråten, I., & Braasch, J. L. G. (2018). The Role of Conflict in Multiple Source Use. In J. L. Braasch, I. Bråten, & M. McCrudden (Eds.), *Handbook of Multiple Source Use* (pp. 184-201). Routledge. https://doi.org/10.4324/9781315627496-11

Bråten, I., & Strømsø, H. I. (2011). Measuring Strategic Processing When Students Read Multiple Texts. *Metacognition and Learning, 6,* 111-130. https://doi.org/10.1007/s11409-011-9075-7

Bråten, I., Anmarkrud, Ø., Brandmo, C., & Strømsø, H. I. (2014). Developing and Testing a Model of Direct and Indirect Relationships between Individual Differences, Processing, and Multiple-Text Comprehension. *Learning and Instruction, 30,* 9-24. https://doi.org/10.1016/j.learninstruc.2013.11.002

Bråten, I., Strømsø, H. I., & Britt, M. A. (2009). Trust Matters: Examining the Role of Source Evaluation in Students' Construction of Meaning within and across Multiple Texts. *Reading Research Quarterly, 44,* 6-28. https://doi.org/10.1598/rrq.44.1.1

Chi, M. T. H. (2021). Translating a Theory of Active Learning: An Attempt to Close the Research-Practice Gap in Education. *Topics in Cognitive Science, 13,* 441-463. https://doi.org/10.1111/tops.12539

Chi, M. T. (2023). Individualistic and Collective Causal Knowledge Structures for Understanding Sequential and Emergent Processes. In *Frontiers in Education* (Vol. 8, p. 1198362). Frontiers Media SA. https://doi.org/10.3389/feduc.2023.1198362

Cromley, J. G., Kunze, A. J., & Dane, A. P. (2021). Multi-Text Multi-Modal Reading Processes and Comprehension. *Learning and Instruction, 71,* Article ID: 101413. https://doi.org/10.1016/j.learninstruc.2020.101413

Danielson, R. W., Sinatra, G. M., Trevors, G., Muis, K. R., Pekrun, R., & Heddy, B. C. (2023). Can Multiple Texts Prompt Causal Thinking? The Role of Epistemic Emotions. *The Journal of Experimental Education, 91,* 621-635. https://doi.org/10.1080/00220973.2022.2107604

Darowski, E. S., Patson, N. D., & Helder, E. (2016). Implementing a Synthesis Tutorial to Improve Student Literature Reviews. *Behavioral & Social Sciences Librarian, 35,* 94-108. https://doi.org/10.1080/01639269.2016.1243437

De La Paz, S., Monte-Sano, C., Felton, M., Croninger, R., Jackson, C., & Piantedosi, K. W. (2017). A Historical Writing Apprenticeship for Adolescents: Integrating Disciplinary Learning with Cognitive Strategies. *Reading Research Quarterly, 52,* 31-52. https://doi.org/10.1002/rrq.147

Demir, B., Haverkamp, Y. E., Braasch, J. L. G., & Bråten, I. (2024). Investigating the Role of Prior Knowledge in Comprehending Intratextual and Intertextual Relationships When Reading Multiple Texts. *Learning and Individual Differences, 111,* Article ID: 102442. https://doi.org/10.1016/j.lindif.2024.102442

Denton, C. A., Muis, K. R., Munzar, B., & Etoubashi, N. (2020). Putting Self-Regulated Learning and Metacognition into Multiple Representations and Perspectives. In P. Van Meter, A. List, D. Lombardi, & P. Kendeou (Eds.), *Handbook of Learning from Multiple Representations and Perspectives* (pp. 314-328). Routledge. https://doi.org/10.4324/9780429443961-22

Firetto, C. M., & Van Meter, P. N. (2018). Inspiring Integration in College Students Reading Multiple Biology Texts. *Learning and Individual Differences, 65,* 123-134. https://doi.org/10.1016/j.lindif.2018.05.011

Follmer, D. J., & Tise, J. (2022). Effects of an Executive Function-Based Text Support on Strategy Use and Comprehension-Integration of Conflicting Informational Texts. *Reading and Writing, 35,* 1731-1758. https://doi.org/10.1007/s11145-022-10257-7

Greene, J. A., & Bråten, I. (2016). *Handbook of Epistemic Cognition* (pp. 1-18). Routledge.

Hagen, Å. M., Braasch, J. L. G., & Bråten, I. (2014). Relationships between Spontaneous Note-Taking, Self-Reported Strategies and Comprehension When Reading Multiple Texts in Different Task Conditions. *Journal of Research in Reading, 37,* S141-S157. https://doi.org/10.1111/j.1467-9817.2012.01536.x

Harrison, G. M., & Vallin, L. M. (2018). Evaluating the Metacognitive Awareness Inventory Using Empirical Factor-Structure Evidence. *Metacognition and Learning, 13,* 15-38. https://doi.org/10.1007/s11409-017-9176-z

Haverkamp, Y. E., Bråten, I., Latini, N., & Strømsø, H. I. (2024). Effects of Media Multitasking on the Processing and Comprehension of Multiple Documents: Does Main Idea Summarization Make a Difference? *Contemporary Educational Psychology, 77,* Article ID: 102271. https://doi.org/10.1016/j.cedpsych.2024.102271

James, K., & Goldman, S. R. (2020). Constructing Explanatory Models from Text-Based Information: Why Instructional Tools Help. *Contemporary Educational Psychology, 63,* Article ID: 101918. https://doi.org/10.1016/j.cedpsych.2020.101918

Kintsch, W. (1998). *Comprehension: A Paradigm for Cognition.* Cambridge University Press.

Lee, H. Y., & List, A. (2021). Examining Students' Self-Efficacy and Perceptions of Task Difficulty in Learning from Multiple Texts. *Learning and Individual Differences, 90,* Article ID: 102052. https://doi.org/10.1016/j.lindif.2021.102052

List, A. (2025). Integrating Prior Knowledge and Multiple Texts: Expanding the Documents Model Framework. *Reading and Writing, 39,* 239-264. https://doi.org/10.1007/s11145-025-10641-z

List, A., & Alexander, P. A. (2019). Toward an Integrated Framework of Multiple Text Use. *Educational Psychologist, 54,* 20-39. https://doi.org/10.1080/00461520.2018.1505514

List, A., Du, H., Wang, Y., & Lee, H. Y. (2019a). Toward a Typology of Integration: Examining the Documents Model Framework. *Contemporary Educational Psychology, 58,* 228-242. https://doi.org/10.1016/j.cedpsych.2019.03.003

List, A., Stephens, L. A., & Alexander, P. A. (2019b). Examining Interest throughout Multiple Text Use. *Reading and Writing, 32,* 307-333. https://doi.org/10.1007/s11145-018-9863-4

Mahlow, N., Hahnel, C., Kroehne, U., Artelt, C., Goldhammer, F., & Schoor, C. (2020). More than (Single) Text Comprehension?—On University Students' Understanding of Multiple Documents. *Frontiers in Psychology, 11,* Article 562450. https://doi.org/10.3389/fpsyg.2020.562450

Mayer, R. E. (2012). Information Processing. In K. R. Harris, S. Graham, T. Urdan, C. B. McCormick, G. M. Sinatra, & J. Sweller (Eds.), *APA Educational Psychology Handbook, Vol 1: Theories, Constructs, and Critical Issues* (pp. 85-99). American Psychological Association. https://doi.org/10.1037/13273-004

McCrudden, M. T., Magliano, J. P., & Schraw, G. (2010). Exploring How Relevance Instructions Affect Personal Reading Intentions, Reading Goals and Text Processing: A Mixed Methods Study. *Contemporary Educational Psychology, 35,* 229-241.

https://doi.org/10.1016/j.cedpsych.2009.12.001

McNamara, D. S., Watanabe, M., Huynh, L., McCarthy, K. S., Allen, L. K., & Magliano, J. P. (2024). Summarizing versus Rereading Multiple Documents. *Contemporary Educational Psychology, 76,* Article ID: 102238. https://doi.org/10.1016/j.cedpsych.2023.102238

National Assessment for Educational Progress (2019). *Reading Framework for the 2019 National Assessment of Educational Progress.* https://www.nagb.gov/content/dam/nagb/en/documents/publications/frameworks/reading/2019-reading-framework.pdf

Panadero, E. (2017). A Review of Self-Regulated Learning: Six Models and Four Directions for Research. *Frontiers in Psychology, 8,* Article 422. https://doi.org/10.3389/fpsyg.2017.00422

Pennsylvania Department of Education (2013). *Academic Standards for English Language Arts.* https://www.pa.gov/content/dam/copapwp-pagov/en/education/documents/instruction/curriculum/ela/pa%20core%20standards%20ela%206-12.pdf

Perfetti, C. A., Rouet, J. F., & Britt, M. A. (1999). Toward a Theory of Documents Representation. In H. van Oostendorp, & S. R. Goldman (Eds.), *The Construction of Mental Representations during Reading* (pp. 88-108). Psychology Press.

Pintrich, P. R. (2000). The Role of Goal Orientation in Self-Regulated Learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of Self-Regulation* (pp. 451-502). Elsevier. https://doi.org/10.1016/b978-012109890-2/50043-3

Puustinen, M., & Pulkkinen, L. (2001). Models of Self-Regulated Learning: A Review. *Scandinavian Journal of Educational Research, 45,* 269-286. https://doi.org/10.1080/00313830120074206

Rouet, J. F. (2006). *The Skills of Document Use: From Text Comprehension to Web-Based Learning.* Routledge.

Rouet, J. F., Britt, M. A., & Durik, A. M. (2017). RESOLV: Readers' Representation of Reading Contexts and Tasks. *Educational Psychologist, 52,* 200-215. https://doi.org/10.1080/00461520.2017.1329015

Rouet, J. F., Saux, G., Ros, C., Stadtler, M., Vibert, N., & Britt, M. A. (2021). Inside Document Models: Role of Source Attributes in Readers' Integration of Multiple Text Contents. *Discourse Processes, 58,* 60-79. https://doi.org/10.1080/0163853x.2020.1750246

Rouet, J.-F., & Britt, M. A. (2011). Relevance Processes in Multiple Document Comprehension. In M. T. McCrudden, J. P. Magliano, & G. Schraw (Eds.), *Text Relevance and Learning from Text* (pp. 19-52). Information Age. https://doi.org/10.1108/978-1-61735-531-820251003

Schraw, G., & Dennison, R. S. (1994). Assessing Metacognitive Awareness. *Contemporary Educational Psychology, 19,* 460-475. https://doi.org/10.1006/ceps.1994.1033

Simon, H. A. (1979). Information Processing Models of Cognition. *Annual Review of Psychology, 30,* 363-396. https://doi.org/10.1146/annurev.ps.30.020179.002051

Sperling, R. A., Howard, B. C., Staley, R., & DuBois, N. (2004). Metacognition and Self-Regulated Learning Constructs. *Educational Research and Evaluation, 10,* 117-139. https://doi.org/10.1076/edre.10.2.117.27905

Stadtler, M., & Bromme, R. (2007). Dealing with Multiple Documents on the WWW: The Role of Metacognition in the Formation of Documents Models. *International Journal of Computer-Supported Collaborative Learning, 2,* 191-210. https://doi.org/10.1007/s11412-007-9015-3

Stadtler, M., & Bromme, R. (2008). Effects of the Metacognitive Computer-Tool Met.a.ware on the Web Search of Laypersons. *Computers in Human Behavior, 24,* 716-737. https://doi.org/10.1016/j.chb.2007.01.023

Strømsø, H. I., Bråten, I., & Samuelstuen, M. S. (2008). Dimensions of Topic-Specific Epistemological Beliefs as Predictors of Multiple Text Understanding. *Learning and Instruction, 18,* 513-527. https://doi.org/10.1016/j.learninstruc.2007.11.001

Tarchi, C., Ruffini, C., & Pecini, C. (2024). Executive Functions and Multiple-Text Comprehension. *Learning and Individual Differences, 116,* Article ID: 102566. https://doi.org/10.1016/j.lindif.2024.102566

Wiley, J., Goldman, S. R., Graesser, A. C., Sanchez, C. A., Ash, I. K., & Hemmerich, J. A. (2009). Source Evaluation, Comprehension, and Learning in Internet Science Inquiry Tasks. *American Educational Research Journal, 46,* 1060-1106. https://doi.org/10.3102/0002831209333183

Winne, P. H. (2001). Self-Regulated Learning Viewed from Models of Information Processing. In B. J. Zimmerman, & D. H. Schunk (Eds.), *Self-Regulated Learning and Academic Achievement: Theoretical Perspectives* (pp. 153-189). Routledge.

Winne, P. H., & Hadwin, A. F. (1998). Studying as Self-Regulated Engagement in Learning. In D. Hacker, J. Dunlosky, & A. Graesser (Eds.), *Metacognition in Educational Theory and Practice* (pp. 277-304). Erlbaum.

Zimmerman, B. J. (2001). Theories of Self-Regulated Learning and Academic Achievement: An Overview and Analysis. In B. J. Zimmerman, & D. H. Schunk (Eds.), *Self-Regulated Learning and Academic Achievement: Theoretical Perspectives* (pp. 1-37). Routledge.