Readers' awareness in the use of intertextual strategies when reading multiple texts

Christian Tarchi & Lidia Casado-Ledesma

University of Florence | Italy

Abstract: Metacognitive reading awareness, involving cognitive process control and reading strategies, is linked to better comprehension and performance, but its relationship with intertextual integration strategies and the quality of argumentative essays remains unexplored. This study aimed to investigate the role of metacognition in employing integration strategies when reading conflicting texts. 69 undergraduate students participated in an online reading-writing activity, where they wrote argumentative essays based on conflicting texts about red meat consumption. We examined the students' use of intertextual integration strategies (refutation, weighing, synthesizing) and assessed their metacognitive awareness through their reflections on these strategies. The quality of the argumentative essays served as a measure of multiple text comprehension. The results indicated a lack of metacognitive awareness regarding integration strategies, with students overestimating their ability to employ these strategies. However, they demonstrated better understanding of refutational strategies based on the examples provided in their essays. Interestingly, students who were aware of and utilized these strategies in their essays performed better in the multiple-text comprehension task.

Keywords: metacognitive reading awareness; intertextual integration strategies; multiple-text comprehension; undergraduate students

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Contact: Christian Tarchi, Dept. FORLILPSI, University of Florence, via San Salvi, 12, 50125 Florence | Italy, christian.tarchi@unifi.it - https://orcid.org/0000-0003-4013-4794

1.   Introduction

Writing tasks based on multiple texts are increasingly required at university. These learning activities demand making connections across the sources and putting into practice intertextual strategies in order to develop a coherent representation of the topic addressed in the texts (Bråten & Strømsø, 2011). To carry out this process successfully it is necessary to adopt a strategic approach when reading; especially when the task has to be translated into an external outcome or product such as an argumentative essay. Being that, writing tasks based on multiple texts require the activation of high order skills as metacognition.

Metacognitive reading awareness is the individual's ability to employ different thinking processes that lead to a good understanding of the text. As such, this awareness involves the control of cognitive processes and the application of several reading strategies (Dardjito, 2019; Reza et al., 2013). This awareness of individuals is related to higher achievement in reading comprehension tasks (Girli & Öztürk, 2017). In fact, according to Mokharti and Reichard (2002), metacognitive awareness of reading strategies is not only an indicator of how the subject behaves during reading, but also a factor related to performance and effective comprehension. Despite the role that metacognitive awareness plays in reading processes, to the best of our knowledge the association between metacognitive awareness and intertextual integration strategies is understudied. Studies have mainly focused on verifying whether providing metacognitive prompts supports the processing of multiple texts (e.g., Stadtler & Bromme, 2007; Barzilai et al., 2018), but neglected to investigate metacognitive awareness in unprompted tasks, specifically with the strategies that can be employed to integrate arguments and counterarguments when reading texts with conflicting information: rebutting, weighing and integration strategies (Nussbaum & Schraw, 2007). This study aims to shed some light on the role of metacognition in the use of strategies related to intertextual integration when reading texts with conflicting information.

1.1   Reading and Writing from Multiple texts

In today's society the ability to read and write based on multiple texts with conflicting information is absolutely crucial and poses significant challenges for students at different educational levels (Rouet, 2006). Reading and writing based on multiple texts requires the mental construction of an integrated representation of the information contained in different sources dealing with the same topic from different perspectives (Bråten et al., 2012).

In recent years there has been a proliferation of theoretical proposals aimed at uncovering the processes underlying the comprehension of multiple texts and source-based writing. In fact, several models have been proposed to conceptualize how this comprehension is achieved (e.g. the documents model of multiple texts:

Britt et al., (1999); the two steps verification model: Richter & Maier (2017); the discrepancy-induced source comprehension model (DIS-C): Braasch & Bråten (2017); the cognitive affective engagement model (CAEM): List & Alexander (2017) or the RESOLV model: Rouet et al. (2017). More recently, the Integrated Framework of Multiple Texts (IF-MT) proposed by List and Alexander (2019) has attempted to integrate multiple theoretical models in one comprehensive framework. The Integrated Framework of Multiple Texts (IF-MT) (List & Alexander, 2019) proposes a three-stage process for comprehending multiple texts: preparation, execution, and production. During the preparation stage, learners assess the task's goals, influenced by external factors like the topic and objectives, as well as individual factors such as prior knowledge, interests, and text-processing abilities. In the execution phase, learners employ behavioral, cognitive, and metacognitive strategies to interact with texts, including searching for information, understanding individual texts, and synthesizing information from multiple texts. In the production phase, cognitive and affective outcomes are expected, such as increased knowledge and mental representations, as well as changes in interests and attitudes. The IF-MT (List & Alexander, 2019) highlights the importance of metacognitive and regulatory processes in supporting the cognitive strategies involved in comprehending multiple texts. Therefore, metacognition and monitoring of reading processes, including planning, comprehension, and evaluation, are crucial in achieving comprehensive understanding.

When a multiple-text comprehension task is complemented by a subsequent writing activity, it also becomes a source-based writing task. Hybrid tasks, such as source-based writing, involve the integration of both reading and writing processes since they require reading multiple texts and synthesizing information from them to create a comprehensive written product on a specific topic (Braine, 1995; Weston-Sementelli et al., 2018). The combination of reading and writing processes demands a coordinated approach that encompasses comprehension, learning, relating, planning, writing, revising, editing, and organizing the writing task (Campbell, 1990). Thus, source-based writing activities require the implementation of integration strategies.

According to Spivey and King (1989), integration entails three key processes: selection, organization, and connection. Initially, learners must select pertinent information from a text due to limitations in retention capacity, guided by criteria such as relevance or significance. Subsequently, they organize the chosen content into a coherent mental structure, which may involve establishing a new organizational framework when dealing with multiple texts. Lastly, learners connect information at both a global and local level, creating a unified discourse by forming conceptual and linguistic links among propositions, clauses, and sentences. Therefore, integration involves actively reshaping content from diverse texts into a unified whole (Boscolo et al., 2007; Segev-Miller, 2004). Segev-Miller (2007) proposes

that connecting and organizing processes can be more accurately understood as conceptual and rhetorical transformations, respectively. Conceptual transformations include comparing texts, formulating macropropositions to represent identified connections, and creating new categories. Rhetorical transformations craft new text structures to interconnect ideas, while linguistic transformations articulate relations between texts through linguistic connectors and lexical repetition. Thus, intertextual integration entails various processes, including automatic inferencing and strategic activities such as comparing texts. Successful integration requires managing multiple processes, involving metacognitive planning and evaluation to handle reading and product creation effectively (Barzilai et al., 2018; Rouet & Britt, 2011; Salmerón et al. 2018; Segev-Miller 2007).

Creating an argumentative essay after reading multiple texts with conflicting information (a clear example of source-based writing tasks) is a complex activity, requiring the identification of contradictory positions, assertions, and evidence. Developing an integrative argumentative essay involves connecting assertions, justifications, and evidence from diverse documents in a framework that contrasts and establishes connections between arguments and counterarguments (Britt & Rouet, 2012; Mateos et al., 2018). Nussbaum and colleagues (Nussbaum & Edwards, 2011; Nussbaum & Schraw, 2007) have identified three different strategies for integrating arguments and counterarguments in this kind of source-based writing activities. The first strategy is the rebuttal strategy, which involves refuting or criticizing the arguments supporting the opposing position if they are deemed flawed or inadequately supported. Another strategy is to support one of the perspectives after evaluating and considering the arguments from both sides (weighing strategy). The third strategy, known as the synthesis strategy, aims to propose a reconciliatory solution that combines the positive aspects of both opposing positions. It is important to note that while all three strategies involve integrating arguments and counterarguments from both perspectives, only the weighing strategy and the synthesis strategy are associated with two-sided reasoning, as described by Nussbaum (2008).

1.2   Metacognitive Awareness in Reading Comprehension

Research in the field of psychology and education has highlighted the active and strategic nature of reading (Paris & Jacobs, 1984; Pressley, 2002). This strategic dimension of reading in turn underlines the importance of self-regulation as a critical factor in excelling in reading comprehension tasks. In fact, theoretical frameworks on self-regulated learning cover most of the issues discussed in the promotion of reading comprehension. According to Zimmerman (1998), self-regulated learning involves individuals actively controlling their learning process through a cycle of setting goals, implementing strategies, assessing outcomes, and

reflecting on their performance. Rooted in Bandura's Social Cognitive Theory (1986), self-regulation underscores people's capacity to govern their thoughts and behaviors. Zimmerman (1998), further contends that self-regulated learners are motivated by goals, employ strategic actions to achieve them, and evaluate their progress. In the context of reading, Schunk and Zimmerman (2007) emphasize the importance of this process for effective comprehension, advocating its application before, during, and after reading.

Metacognitive awareness represents a key component of self-regulated reading. If readers are not aware about which strategies is more effective and how it should be effectively implemented, it becomes more difficult for them to self-regulate to achieve their reading goal. The influence of metacognitive awareness on cognitive and motivational processes while reading is well-established in research (Mokhtari & Reichard, 2002). In this regard it is worth mentioning that self-regulated readers are actively involved in cognitive and metacognitive activities before, during and after reading (Paris et al., 1991). Metacognitive reading regulatory skills encompass three key processes: planning, monitoring, and evaluation (Reza et al., 2013). Planning involves the selection of suitable strategies and allocation of resources to enhance performance. It encompasses activities such as making predictions before reading, sequencing strategies, and allocating time and attention effectively. Monitoring is the ongoing analysis of information during a project or task to ensure efficiency and effectiveness. It involves conscious awareness of comprehension and text performance, allowing students to assess the sufficiency and appropriateness of available resources and their adherence to planned actions. Evaluation entails appraising learning outcomes and regulatory processes, including the re-evaluation of goals and conclusions. It can be both formative and summative, examining what was achieved and how it was accomplished.

Metacognition serves as a differentiating factor between more and less skilled readers. Skilled readers demonstrate higher comprehension abilities by utilizing their general knowledge to understand literary texts and drawing valid inferences. They also employ comprehension monitoring strategies to address any difficulties encountered during reading. In contrast, less skilled readers have limited metacognitive knowledge regarding reading. They tend to approach reading as a decoding process rather than actively constructing meaning from the text (Mokhtari & Reichard, 2002). Most of the evidence on the role of strategic processing in multiple-text comprehension comes from think-aloud studies, which found that students who contrast, interrelate, and corroborate more during reading have also better multiple-text performances (e.g., Anmarkrud et al., 2014; Goldman et al., 2012; Strømsø, Bråten, & Samuelstuen, 2003; Wolfe & Goldman, 2005). These results have been confirmed in studies using self-report inventories (Bråten et al., 2014; Bråten & Strømsø, 2011).

Importantly, achieving successful text comprehension necessitates the reader's application of metacognitive knowledge and deliberate strategies in a conscious manner. Being that, for effective text comprehension, readers must actively utilize both their metacognitive knowledge and intentional strategies (Sheorey & Mokhtari, 2001). This awareness can be consciously or subconsciously triggered when tackling a reading task. The reader's grasp of reading involves familiarity with diverse strategies, which impacts their cognitive approach to reading. Skilled readers distinguish themselves from unskilled ones by their conscious understanding and practical use of strategic reading processes. For this reason, metacognitive awareness plays a pivotal role in reading comprehension, as it involves the reader's conscious recognition of the disparity between their reading approach and the demands of the text. This recognition empowers them to bridge the comprehension gap by employing appropriate strategies that align with the specific situation (conditional knowledge), while also demonstrating their proficiency in executing these strategies effectively (procedural knowledge). Concurrently, metacognitive regulation becomes apparent as the reader actively monitors and evaluates their own reading and learning process. This active engagement includes the strategic planning of approaches to tackle encountered reading difficulties, enabling readers to make necessary adjustments and assess the outcomes of their efforts. An essential aspect is readers' awareness of their own comprehension abilities and the challenges presented by the text, as it allows them to tap into available resources and overcome reading obstacles successfully (Dabarera et al., 2014). Students' ability to reflect on their learning and organise their learning acts plays an important role in their learning conceptions, especially when focused on reading and writing (Yin et al., 2023).

1.3 The present study

Metacognitive reading awareness seems to be strongly implicated in the ability of comprehension processes, differentiating expert readers from non-experts. Several studies have analyzed the impact of this metacognitive ability on comprehension processes involved when reading and writing from multiple texts, but students' intertextual integration strategy knowledge is still unexplored. We conducted the present study in which we aimed:

1) To assess undergraduate students' awareness of the use of intertextual integration strategies when reading texts with conflicting information and producing argumentative essays on the topic. Several studies suggest that readers struggle in implementing a sophisticated strategic approach to multiple-text comprehension tasks. Students rely more often on low-integration strategies and fail in synthesizing the multiple perspectives represented in different texts (Tarchi & Villalón, 2021; Mateos et al., 2018). Therefore, we hypothesized that students who employed low-level intertextual integration strategies (i.e., refutation) were also

more aware of their performance and metacognitive processes. With weighting and synthesis strategies being the most complicated, we expected little deliberate use of these strategies.

2) To explore the association of readers' awareness of intertextual strategies on the writing performance based on multiple texts, inferred through the quality of the argumentative essays. Given the importance of metacognitive awareness in reading comprehension, we expected higher awareness of intertextual integration strategies to be associated with better writing performance.

2. Method

2.1 Participants

Sixty-nine undergraduate students participated in the study (Age= 21.53 ± 1.67; 66 females and 3 males). They were enrolled in a Psychology course, offered within the School of Education curriculum, in a large university in Italy. All participants were Italian and spoke Italian as their primary language. The socioeconomic status of the students, assessed through the occupation of the parents, was homogeneous (i.e., middle class). Student participation was voluntary, and they signed an informed consent prior to the study. The study followed all the indications of the Declaration of Helsinki (World Medical Association, 2013) and was approved by the Ethics Committee of the University of Florence (Italy).

2.2 Procedure

The procedure was implemented online through Qualtrics. First, students were given the texts discussing the conflicting stances regarding red meat consumption. After the reading, they were asked to write an argumentative essay expressing their opinion about the topic. Specifically, the instructions of the reading-writing activity were *"you will read two texts that discuss two different positions on a controversial topic. Your task is to write an argumentative essay in which you present the issue addressed in the texts, expressing your opinion on it and referring to the content of the texts"*. Students had no time limit when reading or writing. Students were then presented with questions about the intertextual integration strategies they had employed in their essay (refutation, weighing and synthesizing strategies). To ensure that all students knew what these strategies were, a brief definition was provided before the question. If students responded that they had used any of these strategies in their essays, they were also asked to give an example.

2.3   Measures and Materials

Texts

We used two texts related to the topic of red meat consumption (one of the texts pointed out the relationship between the consumption of this type of meat and the risk of cancer, while the other text refuted the danger of consumption). Texts were balanced by length and difficult level, as assessed through the Gulpease Index (Lucisano & Piemontese, 1988). The Gulpease Index is a readability index for texts calibrated for the Italian language. The Gulpease index considers two linguistic variables: word length and sentence length compared to the number of letters. The formula for its calculation is as follows:

$$89 + \frac{[(300 * (number\ of\ sentences) - 10 * (number\ of\ letters)]}{number\ of\ words}$$

The "pro red meat" text was 776 words long and had an intermediate level of difficulty (Gulpease index = 46). The "against red meat" text was 711 words long and also had an intermediate level of difficulty (Gulpease index = 50). Each text included 6 arguments in support of the position defended. The translated version of the texts is included in Appendix A.

Awareness about intertextual strategies

Students' degree of awareness was assessed through their responses regarding the use of the strategies of refuting, weighing, and synthesizing. As mentioned in the procedure section, after composing the argumentative essay, students were asked about the use of intertextual integration strategies; that is, students had to answer the following questions: Have you used a refutation strategy in your writing? Have you used a weighing strategy in your writing? Have you used a synthesis strategy in your writing? Students who claimed to have used these strategies in their essays were given a score of 1, while those who denied their use were given a score of 0. Thus, three dichotomous variables were generated (one for each intertextual integration strategy).

Effective use of intertextual strategies

Student essays were coded for the presence (1) or absence (0) of refuting, weighing, and synthesizing strategies in their argumentative essays. Two independent raters, who had received a specific training, coded the 30% of the essays, achieving a good score of agreement (k = .95).

Argumentative quality (Intertextual integration)

Intertextual integration was assessed through the quality of the argumentative essays. The argumentative essays were coded using a 1-7 scale, adapted from Bråten et al. (2014). The coding procedure involved four steps: 1) identification of the participants' perspective on the controversy, 2) identification of the number of supportive reasons, 3) identification of information related to the opposing position and 4) assessment of the overall essay structure. It's worth noting that during the coding process, step 3 enabled us to identify the intertextual integration strategies utilized by students in elaborating their argumentative essays. If students solely mentioned the opposing viewpoint to discredit it, they were employing a refutation strategy. Conversely, if students incorporated the alternative perspective to assess, analyze, or integrate it in order to develop a nuanced solution to the issue, they were employing a weighing or synthesizing strategy. As a result of this evaluation scheme, the essays were scored according to the criteria shown in Table 1. According to this system for assessing the argumentative quality, essays that included refutation strategies were rated with a score of 5, whereas essays incorporating intertextual integration strategies (either weighing or synthesis) were given a score of 6.

Table 1. Coding system to assess argumentative quality

Score	Description
1	Underdeveloped essays (position unclear)
2	Position on the controversy (pro or against), supported by fewer than four reasons
3	Position on the controversy (pro or against), supported by four or more reasons
4	Position on the controversy, supported by four or more reasons, and with the other perspective mentioned but not discussed
5	Position on the controversy, supported by elaborated reasons, and including the alternative perspective, but without trying to reconcile the two sides of the problem
6	Position on the controversy, supported by elaborated reasons, with a consistent discussion of the opposing perspective.
7	Well-structured and focused essays, containing the five argument components.

Two independent raters, who had received a specific training, coded 30% of the argumentative essays, achieving a good score of agreement (k = .89).

2.4   Data Analysis

The first research aim, i.e., assessing undergraduate students' awareness of the use of intertextual integration strategies when reading texts with conflicting information and producing argumentative essays on the topic, was investigated

through the procedure of contingency tables to observe the relationship between the declared use of strategies (metacognitive reading awareness) and their actual application. In addition, we conducted a content analysis of the examples provided by students who had stated they used intertextual integration strategies in their essays. These two analyses yielded evidence concerning the extent of genuine metacognitive awareness among students regarding the utilization of intertextual integration strategies, considering both declarative and procedural aspects. The examination of examples is pivotal due to the potential randomness in the alignment between reported strategy deployment and its actual occurrence in argumentative essays. Nevertheless, individuals demonstrating genuine metacognitive awareness are anticipated to not only acknowledge the use of the identified strategy in their writing but also offer a pertinent example illustrating its application.

The second research aim, i.e., analyzing the impact of readers' awareness of intertextual strategies on writing performance based on multiple texts (inferred through the quality of the argumentative essays), was investigated through a series of t-tests for independent samples. The aim of this second analysis was to compare the performance of those students who were aware of integration strategies and used them effectively, and those students who did not consciously use integration strategies. All the analyses were performed using the statistical software IBM SPSS® v19.

3. Results

3.1 Assessing Awareness of the Use of Intertextual Integration Strategies

As shown in Table 2, the association between having metacognitive awareness of integration strategies and their effective use in argumentative essays depends on the integration strategy considered. 17.4% of the participants had an awareness of the use of refuting strategies coinciding with their actual application ($x^2 = 4.11$; p=.04). This percentage drops to 5.8% in the case of the weighting strategy ($x^2 = .11$; p=.74). In the case of the synthesis strategy, the match rises to 65.2 % ($x^2 = .18$; p=.67). The procedure of the study contemplated that, if the students claimed to have used any of the strategies in their essays (refutation, weighting, or synthesis), they were asked to provide an example of them. Thus, and with the intention of going deeper into these results and analyzing the real degree of declarative and procedural knowledge of the students about the integration strategies, we performed a content analysis of the examples they stated for each strategy. This post-hoc analysis allowed us to qualify the previous results, since the analysis of the examples revealed that, overall, only 39% of the examples showed a true refutation strategy. 10% for the weighting strategy and 4.1% for the synthesis strategy.

Table 2. Relation between intertextual strategy awareness and effective strategy use: n (%)

	Refutation			Weighting			Synthesizing		
	Effective use	Non effective use	Total	Effective use	Non effective use	Total	Effective use	Non effective use	Total
Awareness	12	15	27	4	46	50	45	14	59
	(17.4%)	(21.7%)	(39.1%)	(5.8%)	(66.7%)	(72.5%)	(65.2%)	(20.3%)	(85.5%)
Non awareness	9	33	42	2	17	19	7	3	10
	(13%)	(47.8%)	(60.9%)	(2.9%)	(24.6%)	(27.5%)	(10.1%)	(4.3%)	(14.5%)
Total	21	48	69	6	63	69	52	17	69
	(30.4%)	(69.6%)	(100%)	(8.7%)	(91.3%)	(100%)	(75.4%)	(24.6%)	(100%)

Table 3 shows some of the examples provided by the students, distinguishing between the inclusion or not of the strategy.

Table 3. Examples of integration strategies provided by students

	Content Analysis	
	Example containing the strategy	Example not containing the strategy
Refutation	"An example may be stating that although red meat contains dangerous and cancer risk-carrying substances, this danger, however, is related to the amount of meat actually consumed, which should not exceed certain amounts"	"In the second paragraph, I talked about the benefits, referring to the research. In the third, however, I laid out the risks, again referring to the research. I tried to be neutral, and then expressed my opinion"
Weighing	"I reflected on the good and bad of eating red meat. I decided that I would like to eat it anyway"	"For example, in writing my opinion, I weighed very carefully the words to use, to make it clear what I meant"
Synthesis	"In conclusion, the best solution to this issue would be the proper consumption of red meat, both for the environment and for us who live in it: to have a more sustainable impact, it is better to focus on the consumption of white meat such as chicken, rather than red meat, to avoid going against colorectal cancer, the most common from too much red meat intake."	"To arrive at a single thesis and antithesis, I combined the common and fundamental points of the texts"

3.2 Analyzing the Impact of Readers' Awareness of Intertextual Strategies on Multiple-Text Reading and Writing

In order to compare the writing performance based on multiple texts of students who were aware of integration strategies and used them effectively, and students who did not consciously use integration strategies, we conducted three independent-sample Student's T-tests (one for each intertextual integration strategy). The total sample (n = 69) reported a reasonably good argumentative essay quality (M = 5.65 ± 2.16). Table 4 presents argumentative quality scores for each sub-group (correct reporting use of a strategy versus incorrect reporting of a strategy use for each of the three intertextual integration strategies).

Table 4. Descriptive data for argumentative quality scores, in relation to the sub-groups

	Correct		Not correct	
	N	M ± SD	N	M ± SD
Refutation	12	6.50 ± 0.91	57	5.47 ± 2.31
Weighting	4	7.00 ± .00	65	5.57 ± 2.20
Synthesizing	45	6.78 ± .47	24	3.54 ± 2.50

The analysis revealed a significant difference in the argumentative quality, that is the measure employed to infer multiple-text reading and writing, of the essays in favor of students in whom a correspondence was observed between the strategy report and its effective use (refutation: t = − 2.55, p = .01, d = 0.59; weighing: t = − 5.24, p = .00, d = 0.91; synthesis: t = − 6.27, p = .00, d = 1.80). Effect sizes (Cohen's d) were calculated with the formula

$$Cohen's d = \frac{mA - mB}{SDpooled}$$

with *mA* and *mB* representing the mean score for group A and group B, and

$$SDpooled = \frac{\sqrt{[\sum(x - mA)^2 + \sum(x - mB)^2}}{nA + nB - 2}$$

All effect sizes were medium-to-large, according to Cohen's standards (1988).

4. Discussion

The present study investigated the degree of metacognitive awareness of different integration strategies in undergraduate students when approaching a multiple-text reading and writing task. We also analyzed the impact of being aware of the use of

these strategies and actually putting them into practice when writing argumentative essays after reading source-texts that present conflicting information.

With respect to our first objective, it should be noted that the results pointed to a generalized deficit in the level of metacognitive awareness associated with the use of integration strategies. In general terms, the students overestimated their frequency of use of the refutation, weighing, and synthesis strategies in their essays. However, they showed a greater declarative knowledge of refutational strategies, which was manifested in the presence of these strategies in the examples provided. In relation to performance on the multiple text writing task, we found better performance in those students who were aware of the use of strategies and who actually used them when writing their essays. These findings and their theoretical and educational implications are discussed below.

4.1   Metacognitive Reading Awareness of Intertextual Integration Strategies

The results derived from the frequency analysis revealed a difficulty of the students in relation to the conscious use of intertextual integration strategies. However, different patterns have been obtained depending on the integration strategy analyzed, which shows that, although these three strategies require connection processes between the arguments and counterarguments, they are not equivalent either in terms of cognitive demand or in terms of the perspectivism they require. It is worth highlighting the fact that for the weighing strategy, 66.7% of students had the perception of having used it. However, we only found actual use of this strategy in 5.8% of the cases. Regarding the synthesis strategy, we found a fairly high percentage of students who employed, apparently consciously, the strategy in their essays (66.7%). Nevertheless, when we analyzed the examples provided by the participants, we observed that only 4.1% of them actually represented a synthesis strategy. These data suggest that for weighing and integrating strategies, students overestimated their abilities. On the contrary, students had a much more accurate view regarding knowledge of rebuttal strategies and their conscious employment in argumentative essays. Thus, 39% of the examples provided actually corresponded to this strategy. These data are consistent with the theoretical claim that refutation is easier since it is still anchored in a one-sided reasoning process (Nussbaum, 2008).

Argument-counterargument integration, as defined by Nussbaum and Schraw (2007), refers to the skill of effectively synthesizing and reconciling various arguments and counterarguments to form a comprehensive and conclusive viewpoint, which is an extremely demanding process as it implies mitigate the effect of confirmation-bias (Felton et al., 2009; Villarroel et al., 2016). The concept of argument-counterargument integration draws inspiration from neo-Piagetian theories of reasoning development (Case, 1985; Halford & McCredden, 1998). According to this perspective, the development of reasoning involves the process

of coordinating and integrating diverse elements held in working memory to construct a more cohesive conceptual framework. In the context of argumentation, these diverse elements refer to individual arguments and counterarguments, which can be combined in various ways. However, not all of these combination options are equally associated with integration processes. Refutation is an integration strategy, but it is not considered very effective when texts are equivalent in authoritativeness and relevance, because of its tendency to promote one-sided reasoning rather than balanced reasoning, even though it requires the recognition of counterarguments. Additionally, effective argumentation entails metacognitive reflection, which involves taking a step back to evaluate and assess the overall strengths and merits of different arguments and counterarguments (Kuhn, 2005). Thus, the levels of metacognitive awareness required by the processes of weighing and integrating can be much higher due to the greater exercise of integration and perspectivism needed. In short, these tentative hypotheses about the greater complexity of some integration strategies versus others could explain our results.

4.2   Impact of Reading Awareness on Writing Based on Multiple Texts

The results of comparing the averages in the argumentative quality of the essays of those students who were aware of integration strategies and used them effectively, and those students who did not consciously use integration strategies, evidenced a higher performance of the first ones. This result holds regardless of the integration strategies considered (refutation, weighing and synthesis). These data support the fact that metacognitive reading awareness contributes positively to reading comprehension processes (Mokhtari & Reichard, 2002), which, in our study, has been inferred through the quality of a written text produced after reading two texts with conflicting information on the same topic.

According to the IF-MT (List & Alexander, 2019), the processes involved in the comprehension of multiple texts are supported by the reader's self-regulated behavior, the monitoring of reading activity and the metacognitive awareness. In accordance with this model, during the execution phase, readers employ a range of behavioral, cognitive, and metacognitive strategies to engage with texts. These strategies encompass activities such as searching for relevant information, comprehending individual texts, and integrating information from the sources; especially when they address a topic from different perspectives. This being the case, students who have made conscious use of integration strategies in their essays have probably been able to approach the reading/writing task in a much more strategic way.   It is possible that these students may have employed various metacognitive reading regulatory skills that have enabled them to detect when the task demand was not matching the processes they were putting in place to address it. Therefore, a student who possesses both declarative knowledge of the synthesis strategy and procedural knowledge of its application, particularly in writing

exercises, is capable of recognizing when their thinking becomes biased by the influence of one-sided reasoning. This awareness stems from understanding the implications associated with employing a synthesis strategy and being able to identify instances where their thought process may be impacted by unilateral reasoning. This assumption would be in line with the fact that a more metacognitively aware reader would be able to plan, monitor and evaluate its behavior throughout the activity to overcome difficulties and make intelligent use of its resources (Dabarera et al., 2014; Reza et al., 2013). Furthermore, the observation that more metacognitive readers exhibit differential performance across all three integration strategies suggests that regulatory reading strategies possess a domain-general nature, effectively benefiting all aspects of the reading process. This implies that these strategies are applicable and advantageous in various reading processes, highlighting their versatility and effectiveness.

4.3   Limitations

The present study, while valuable, has several limitations that need to be acknowledged. Firstly, our results point to a considerably high ability of students to generate argumentative essays with a high level of integration. This result is not aligned with evidence from previous studies in the literature, which could be due to the subject matter of the texts chosen for the study. The consumption of red meat (and the text provided) may have been a topic easy to resolve in terms of intertextual integration. In upcoming research, it would be advisable to consider selecting an issue for the source-texts that is potentially more controversial with opposing perspectives difficult to reconcile. This would encourage students to delve deeper into diverse viewpoints, in order to propose integrative solutions.

Secondly, we have specifically targeted awareness of intertextual integration strategies, whereas it would be interesting to complement this information-gathering process with standardized questionnaires to assess the general level of reading metacognitive awareness among students and its association with the effective use of strategies as assessed, for instance, through a think-aloud protocol. Indeed, we lack evidence regarding certain processes associated with planning, monitoring, and evaluating the act of reading/writing, which would provide clearer evidence of this strategic approach to the activity. In future studies, it would be interesting to gather more information about these defining processes of self-regulated activity through behavioral measures.

4.4   Conclusions

Despite the limitations, the present study contributes to the understanding of how metacognitive processes influence writing tasks based on multiple texts. Our findings suggest that an instructional process may be necessary to enhance metacognitive awareness of integration strategies, particularly for those strategies

that pose greater challenges in terms of perspective-taking and overcoming biases of one-sided thinking, i.e., weighting and synthesis strategies. Furthermore, knowing that there is indeed a positive impact of metacognition on performance in these types of tasks, educational agents could encourage self-regulation skills in students and provide additional educational support to those students who exhibit greater difficulties in this competence at initial levels.

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Appendix A

Text 1: The Role and Benefits of Red Meat in the Diet
Red meat has always played a fundamental role in our diet: present for at least 2.6 million years, it has been a key factor in our evolution, facilitating the development of our brain and shaping us into who we are today. Red meat is an irreplaceable component of a healthy and varied diet, as it provides a large amount of essential nutrients that are more bioavailable than other food sources, such as high-quality proteins, beneficial fatty acids, and a variety of micronutrients essential for optimal health. Indeed, in addition to being a highly concentrated and unparalleled source of high-quality proteins (averaging 20-24 g of protein per 100 g), containing all essential amino acids, red meat significantly contributes to overall fat intake, providing around 18% of omega-6 polyunsaturated fatty acids and 17% of omega-3, as well as the most beneficial and essential for health EPA and DHA long-chain fatty acids, of which fish and meat are almost exclusive sources. When it comes to micronutrients, red meat is truly unmatched in terms of nutrient density and bioavailability. Heme iron, zinc, selenium, magnesium, copper, B vitamins, and vitamin D: no other food contains them all together at the same time, in such high amounts, and with such absorption and utilization capacity by the body. For all its positive effects on nutrition and health, while still staying below the recommended 500 grams per week to reap its benefits, red meat should never be absent from a truly complete and balanced diet, especially for groups with increased nutritional needs, such as children, adolescents, women of childbearing age, and the elderly, for whom red meat can decisively contribute to meeting nutritional needs comprehensively at each stage of life. Three years ago, the World Health Organization announced that it had included red and processed meat in the list of carcinogenic foods. In recent weeks, the complete study has finally been published. Almost 500 pages in which the true scope of the "bomb" that exploded three years ago can be understood. A fundamental document for the scientific community, which can now discuss it with knowledge. Because compared to the few lines published in 2015, there are several new elements in the monograph that has now been released. For example, we now know that the IARC has pronounced itself based on about 14 epidemiological studies, out of approximately 800 examined. Therefore, the vast majority of them turned out to be unreliable. Of the 14 analyzed, only seven showed a correlation between excessive red meat consumption and colorectal cancer, while the remaining seven studies did not identify any effect. "In most cases, the problem with these studies is that there is an overlap of factors. That is, it is not possible to understand if the subjects studied became ill due to the meat or other factors," explains Sebastiana Failla, a researcher at Crea - Zootecnia Acquacoltura, according to whom "the complete study should not be read as a condemnation of red meat, but as a stimulus to carry out new, more rigorous

epidemiological studies". The IARC monograph concludes that there is limited evidence that red meat consumption causes cancer in humans, so "excessive" consumption of this food is only considered a probable cause of increased risk of colorectal cancer. The IARC monograph, according to the Crea scientist, should also be read as an invitation to always monitor the entire meat supply chain, "from breeding to limit environmental contaminants, through preservation to cooking." This is the responsibility of both large-scale distribution and the final consumer". Needless to say, there are also dangerous molecules in red meat," Failla continues to explain, "and we have known about them for years, so we have been working for some time to breed and treat animals in a way that these molecules are no longer present in the final product." In fact, the IARC had already explained that, more than red meat itself, the problem is its incorrect cooking. In particular, cooking it with open flames or in a pan at high temperatures can produce dangerous substances such as polycyclic aromatic hydrocarbons or nitrogen oxides. However, there is another aspect to consider that could reassure Italians in particular. Some of the epidemiological studies considered by the IARC, in addition to the aforementioned limitations, take into account a daily consumption of red meat in doses much higher than what we consume, on average, in our lifetime. Additionally, it must be said that current dietary culture makes much greater use of fruits and vegetables," adds the Crea researcher.

Text 2: Cured Meats and Sausages Officially Classified as Carcinogenic
The International Agency for Research on Cancer (IARC) has included red and processed meat on the list of substances that can cause cancer. In a study published in the journal Lancet Oncology, the International Agency for Research on Cancer (IARC), an agency of the World Health Organization based in Lyon, has decreed that processed meats (such as sausages, salami, and hot dogs) are carcinogenic to humans, in a verdict that directly affects the plates of millions of consumers and is therefore destined to cause concern and debate. We try to get to the bottom of the news with this question and answer guide. After reviewing 800 epidemiological studies conducted on all continents, and focusing on the relationship between red meat and the onset of cancer, the IARC has classified processed meat as a definitive carcinogen (the so-called group 1, which also includes asbestos, ethyl alcohol, smoking, ultraviolet radiation, and the human papillomavirus), and red meat as a probable human carcinogen (group 2A). Processed meat is defined as meat that has undergone a process that extends its preservation or alters its flavor, such as smoking, salting, curing, or the addition of preservatives. It is these processes, as well as certain types of cooking such as barbecue, that increase the cancer risk. Therefore, red meat (such as beef, veal, lamb, or pork) that has not been processed and cooked in a certain way and at certain temperatures is less dangerous. According to the study, 50 grams of processed meat per day would increase the risk

of developing colorectal cancer (the type of cancer for which the highest correlation was found) by 18%. A significant percentage, but one that must be read in relation to the risk associated with this type of food: "For an individual, the chances of developing colorectal cancer from eating red meat are still small, but this risk increases with red meat consumption," clarifies Kurt Straif of the WHO. For the consumption of unprocessed red meat, it is more difficult to establish an amount because the scientific evidence that it can cause cancer is weaker. According to the most recent estimates from the Global Burden of Disease Project, an independent academic research organization, about 34,000 cancer deaths per year are related to diets high in processed meat. We are talking about associations, not cause-and-effect relationships. Tobacco is responsible for one million cancer deaths each year, alcohol consumption for 600,000, and pollution for more than 200,000. As for the reason why red meat is carcinogenic, there are still several hypotheses. Some argue that the pigment that gives the red color to hemoglobin (the protein found in the blood of vertebrates) in our intestinal tract is broken down by compounds a group -NO (N-nitroso) that damage the cells lining the walls of the intestine; other cells intervene to replace them, thus increasing the likelihood of errors in DNA replication. Others point to nitrites and nitrates, additives that maintain the red color of meat and that, in an acidic environment, generate carcinogenic compounds. Others believe that the iron in meat or certain strains of intestinal bacteria determine the cancer risk. High-temperature cooking methods, which involve direct contact of the meat with flames or hot surfaces, produce compounds (such as polycyclic aromatic hydrocarbons) that are believed to contribute to the carcinogenic risk, but their role is not yet fully understood scientifically. There is not enough data to say if there are safer cooking methods, nor to say if consuming raw meat can avoid the mentioned risks: in this case, however, it would be the risk of infection that would seriously threaten our health. In any case, substances in group 1 are not prohibited by law. As reported on the AIRC website, "it is important to know not only which list a particular substance is on, but also the doses and duration of exposure from which the risk becomes real and not just theoretical." In addition, the studies on which the lists compiled by the IARC "are carried out with very high doses or with very long exposure durations, which are difficult to reproduce in real life".