Undergraduate ESL students' engagement in academic reading and writing in learning to write a synthesis paper

Ruilan Zhao
The Ohio State University
United States

Alan Hirvela
The Ohio State University
United States

Abstract

As an important and a challenging source-based writing task, synthesizing offers rich opportunities to explore the connections between reading and writing. In this article, we report findings from a qualitative study of two Chinese students' learning experiences with academic synthesis writing in a university ESL composition course. Specifically, we discuss how the two students' understanding of synthesis and sources influenced their synthesis writing practices and how they perceived the connections between their reading strategies and synthesis writing processes. Our results reveal that the students' understanding of synthesis and the functions of sources played a crucial role in learning to synthesize, as did their ability to use rhetorical reading strategies to complete this new literacy task. We argue that whether second language (L2) students understand the complex reading-writing relationships underlying synthesizing is crucial for their successful textual production. These findings carry valuable implications for understanding reading and writing connections and teaching L2 source-based writing.

Keywords: writing from sources, discourse synthesis, reading and writing connections, learning to write, task representation, Chinese undergraduate students

In the academic context, writing from sources is an important component of academic reading and writing. Students' abilities to create appropriate intertextual links is crucial to their academic success (Hirvela, in press). Nonetheless, the intertextuality practices of academic composing involve a complex set of literacy skills and knowledge. Thus, it is not surprising that source-based writing remains a difficult task for many college students at the same time that it is a central focus of academic writing courses, especially those operating within the English for Academic Purposes (EAP) mode that dominates second language (L2) writing instruction. Such L2 writing courses tend to place a particular emphasis on the idea of reading for writing, which is the central act underlying source-based writing and EAP literacy and the key domain in their efforts to address reading-writing connections.

A commonly assigned task in Anglophone universities is synthesizing (Grabe & Zhang, 2013a), in which students read academic texts and integrate the source texts into their own papers. This involves looking across the sources and combining them in ways that generate a broader understanding of the topic. Due to the complex reading and writing activities related to synthesis writing, this task poses a significant challenge to many students, and especially to second language writers, for whom the core notion of working with sources may be new or may be influenced by ideas and practices in their native language literacy background which differ from those applied to English. Then, too, these L2 writers are still learning the target language itself as well as the complex nuances of its literacy conventions. This makes the study of their engagement with synthesizing especially important. However, while the L2 writing literature has looked fairly extensively at another important source-based writing task, summarizing (Keck, 2006, 2014; Shi, 2004), synthesizing has received less attention despite its importance in the world of academic literacy. Hence, there is still much to be learned about L2 writers' efforts to synthesize and their ability to connect reading and writing within this complex literacy act. Thus, this study sought to extend our understanding of L2 writers' experiences with synthesizing. In this study, using think-aloud protocols and stimulated-recall interviews, we explored two undergraduate ESL students' understanding of synthesizing and sources, and examined how their understanding influenced their actual synthesis writing practices. We further explored the connections between their strategies in reading a model of a synthesis text and their synthesis writing processes to shed light on reading and writing relationships in L2 source-based writing.

Review of Literature

Reading and Writing Connections

In the first language (L1) reading and written composition fields, research on reading-writing connections has formed a rich theoretical foundation and empirical base dating back to the 1980s (Flower, Stein, Ackerman, Kantz, McCormick, & Peck, 1990; Kucer, 1985; Salvatori, 1996; Stotsky, 1983; Tierney & Pearson, 1983). Among a wide range of reading-to-write tasks, what is often called a discourse synthesis has drawn a fair amount of research attention (Ackerman, 1991; Greene, 1993; McGinley, 1992; Spivey, 1984, 1990, 1991, 1997; Spivey & King, 1989). Spivey's groundbreaking work is particularly important to understand the reading and writing processes in composing a discourse synthesis. Spivey (1990) examined how readers/writers deal with source texts to construct meanings and create their own texts, which she called "the transformations they perform" (p. 260) from both sides of the reading-writing continuum. She proposed a constructivist model of reading-writing connections and stated that three operations– organizing, selecting, and connecting–are central to textual transformation and meaning construction. Organizing refers to the transformation when readers/writers create mental representations designed to organize text content and construct meaning in their own texts. Selecting is the operation of choosing important and relevant information from the source. Connecting refers to the textual transformation in which readers/writers interweave multiple source texts and connect them to their prior knowledge. Spivey (1997) demonstrated that discourse synthesis is a fundamental literacy act which is "the very basis of reading, writing, and learning in almost any domain of knowledge" (p. 191) and thus an important topic to be explored

by academic literacy researchers.

Deeply influenced by their L1 counterparts, L2 writing researchers have also been interested in reading-writing connections (Belcher & Hirvela, 2001; Carson & Leki, 1993; Hirvela, 2004) since L2 writing instruction began to move toward a source-based writing orientation in the early 1990s. Reacting against earlier years of L2 writing instruction in which reading and writing were treated separately, these scholars emphasized the important role of reading in the L2 composition classroom and suggested using reading as a means of teaching writing. In their edited volume, Belcher and Hirvela (2001) highlighted several important themes in linking multiple forms of literacy. Among these key areas, research on textual borrowing and source use has developed into a viable line of inquiry in L2 writing scholarship (Grabe & Zhang, 2013a, 2013b; Hirvela & Du, 2013; Polio & Shi, 2012; Shaw & Pecorari, 2013; Shi, 2004, 2010, 2012). The reason that writing from sources, especially the act of reading for writing, has received so much attention is that source use is now recognized as being at the heart of academic literacy (Leki, 2007), so much so that it is now an important part of the assessment of L2 writing ability, as reflected in particular in the integrated reading-listening-writing tasks employed in the Test of English as a Foreign Language (TOEFL) that is administered throughout the world.

Practicing source-based writing involves a series of fundamental literacy acts, such as comprehending the source texts, summarizing and paraphrasing the texts, evaluating and responding to the sources, and synthesizing multiple sources of information. In the comprehending and composing processes, readers/writers interact with sources in complex and recursive manners. To understand the synergistic relationship between reading and writing, Hirvela (2004) argued that:

> Synthesizing, as a teaching and learning tool, provides rich opportunities for L2 students to develop their reading and writing abilities. By the same token, synthesizing is especially useful in drawing students' attention to connections between reading and writing. (p. 93)

Although the importance of L2 reading-writing relationships has been widely recognized, it is still a relatively underexplored and under-theorized area (Grabe & Zhang, 2013b). At the same time, and as Grabe and Zhang also observed, when such relationships are studied as well as taught, it is source-based writing that serves as the center of attention. This includes synthesis writing, a sophisticated constellation of reading and writing skills that deserves more research attention. In that light, our study aims to contribute to the literature on reading and writing connections through a close investigation of L2 writers' development while completing a hybrid literacy task.

Related Research on Rhetorical Reading and Synthesis Writing

To contextualize this study, we discuss research focusing on L2 synthesis writing. However, it is worth noting that these works are heavily influenced and shaped by the constructivist model of discourse synthesis laid out by Spivey and her colleagues in the L1 domain. In addition, Haas and Flower's (1988) study of rhetorical reading from the L1 reading literature also provided an important theoretical perspective to our study, as did the seminal book *Reading to Write* (Flower

et al., 1990), which described an extensive study of students engaged in reading for writing activities.

Haas and Flower (1988) extended the constructivist view of reading by comparing three types of reading strategies–content strategies, function/feature strategies, and rhetorical strategies–that experienced readers and student readers employed in making sense of the text. The more experienced readers used rhetorical strategies to actively construct their reading of the text–considering the author's purpose, context, and audience in tandem with content and function strategies. In contrast, the student readers who were less experienced tended to rely mainly on content strategies, which Haas and Flower called "knowledge getting" (p. 177), similar to the knowledge-telling strategies used by immature writers in Bereiter and Scardamalia (1987), whose work distinguishes between "knowledge telling" and "knowledge transforming." Thus, Haas and Flower's (1988) work not only provided useful analytical tools to reexamine reading strategies, but also suggested a line of inquiry to study reading and writing relationships, one that involves both students' display of knowledge (knowledge telling as a result of knowledge getting, or retrieval) and their ability to do something with that knowledge, that is, knowledge transforming. This was useful because synthesis writing taps into both types of reading and writing, with knowledge transforming playing the dominant role.

In addition to focusing on the students' use of rhetorical reading strategies previously explored in the Haas and Flower (1988) study just described, Flower et al. (1990) were especially interested in undergraduate students' task representation of their source-based assignments and its impact on their reading for writing performance. This study was important for our purposes because it foregrounded the idea of examining the ways in which students conceptualize an academic literacy task such as synthesizing.

In the L2 context, the amount of research on L2 synthesis writing is relatively small given the importance of synthesizing skills. Most studies have been conducted under the umbrella of source-based writing. Shi's (2004) study indicated that both cultural background and task type had effects on L2 students' textual borrowing strategies, for example, the amount of words borrowed and appropriateness of source texts. Plakans (2008, 2009) revealed that synthesis tasks elicited a more constructive process than writing-only tasks and in the constructive process, L2 students employed discourse synthesis operations–organizing, selecting, and connecting–to varying degrees. Plakans considered the discourse synthesis framework a useful construct for researching integrated reading-writing tasks. Furthermore, she suggested that L2 students' English proficiency, previous writing experience, and L1 cultural and rhetorical tradition should also be considered.

In another strand of research, Plakans and Gebril (2012, 2013) examined source use in L2 source-based writing. They found that selection of sources played a crucial role in L2 students' writing performance. High scoring writers were more likely to locate important information and integrate it into their writing. On the contrary, direct copying from the sources and over relying on the reading passages negatively affected writing scores. Also, in a recent experimental study, Zhang (2013) demonstrated that explicit instruction about integrating reading and writing had a positive effect on L2 students' synthesis writing.

Collectively, the handful of studies just cited showed that synthesis writing is a challenging literacy task for L2 writers. Both reading strategies and source use through writing seem to play crucial roles in learning to write a synthesis, and developing an effective combination of the two skill areas places heavy demands on L2 writers. Furthermore, failure in one of these domains results in an overall inability to synthesize well, thus demonstrating the importance of effective relationships between reading and writing. However, despite the value of this work, what remains missing is a holistic view of the connectivity between reading strategies and synthesis writing, particularly from students' learning perspectives. To address that gap, this study examined two undergraduate ESL students' learning experiences with synthesizing and addressed the following research questions:

1. How does the two participants' understanding of synthesis and sources influence their synthesis writing practices?
2. How do they perceive the connections between reading strategies and synthesis writing processes?

Methodology

Research Context and Site

This study was derived from a larger research project which investigated how English as a Second Language (ESL) undergraduate students learned synthesis writing in a university composition course (Zhao, 2015). The study was conducted in one academic year from 2013 to 2014 at a comprehensive mid-western university in the United States. This university enrolls more than six thousand international undergraduates every academic year, accounting for approximately ten percent of the total undergraduate student population (Office of International Affairs, 2014).

The ESL composition program at the university offers a two-course sequence that aims to introduce international undergraduate students to English academic writing and prepare them to compose academic research papers for mainstream courses across the curriculum. The course under study is the second in the sequence, focusing on incorporating sources into academic research papers. The major assignments of the course are a short synthesis paper and a long synthesis paper in which L2 students need to integrate multiple source texts into their papers.

The teacher of the course, Ms. Perry[1], was a native English speaker in her mid-30s. She held a master's degree in TESOL and had five years of L2 teaching experience at the tertiary level, though synthesis writing was relatively new to her. She described her teaching approach to writing as process-oriented and considered providing feedback crucial to students' writing development. She also strongly believed that reading and writing were closely connected. During the semester when we conducted the study, the first researcher, who was Ms. Perry's colleague in the ESL composition program, observed her class twice a week throughout the course. Ms. Perry had taught the same course a few times before, and her teaching was highly rated by the program director, her colleagues, and her students. Thus, we felt it would be especially meaningful to study the teaching and learning of synthesis writing as well as reading-writing

relationships in her class.

Participants

The participants were two undergraduate students from China, Steve and Chen [1]. This study and the larger project it came from focused on Chinese students because they represent a rapidly growing international student population. Steve and Chen were chosen due to their similar disciplinary and cultural backgrounds as well as their different experiences with synthesis writing. Their stories of learning-to-write from sources are representative of the larger group of participants' learning experiences and provide valuable accounts of L2 students' understanding of reading and writing relationships.

The following table (Table 1) shows that the two participants shared similar learning backgrounds except for year of study and writing ability as informally rated by the teacher. Steve was a freshman, and Ms. Perry considered him a relatively 'strong' writer based on his diagnostic essay on the first day of class. In contrast, Chen was a transfer student who had studied in a Chinese university for two years. Ms. Perry considered his writing ability 'weak' based on his diagnostic essay (We used the teacher's rating of the two students as our label for them). It is worth noting that both students had taken the first-sequenced writing course in the previous semester, which introduced the basic aspects of academic writing, including summary, paraphrase, evaluative, and persuasive writing. Based on the university's mandatory placement examination, which focused strictly on writing ability, Steve enrolled in the regular section of the first writing course. However, Chen was placed into an intensive section, in which he needed to participate in an extra 2-hour tutoring session every week due to his low placement exam score. This course arrangement indicated concern about Chen's overall English language proficiency.

Table 1. *Participants' background information*

Name	Age	Gender	Major	Length of residence	Year of study	Teacher-rated writing ability
Steve	20	Male	Mathematics	5 months	Freshman	Strong
Chen	21	Male	Mathematics	5 months	Transfer student	Weak

Background of Chinese undergraduate students' literacy education. In addition to knowing about the two participants, it is crucial to understand the background of Chinese students' literacy learning in their native language and English. At the beginning of the course, the students were interviewed about their prior learning experiences in their first language (Chinese) and second language (English). Each background interview was approximately one hour long and was conducted in Mandarin, which was also the native language of the first author. The background interviews also elicited their initial understanding of synthesis in relation to other writing tasks they had done in the past. Both students reported that they had not practiced synthesis writing in English nor in Chinese before. Hence, they each had to construct a task representation for synthesizing based solely on what they learned during the course that was the site for this study, since they had no already established synthesizing schema to draw from.

Looking more closely at background knowledge and experience, based on the background interviews we conducted with Chinese students in the larger research project (Zhao, 2015), international undergraduate students from China, including both freshmen and transfer students,

usually practice narrative and descriptive writing in Chinese in elementary school. They learn expository and argumentative or persuasive writing in middle and high schools. Typically, they are given a general topic to write about using examples from well-known people and their personal experiences. However, they are not required to work with sources, a crucial fact related to their transition to source-based writing in English. The Chinese rhetorical tradition values the use of famous persons' sayings and classic literacy works, but these are not used as sources in the ways employed in English academic writing. In fact, there is not an equivalent concept of synthesis writing in the Chinese rhetorical tradition (You, 2010). Hence, students coming from that background encounter a dramatically different textual world when reading and writing academically in English.

As for English writing, most Chinese students study English as a foreign language in elementary and secondary schools. However, they have very little experience with English writing because the English instruction at school focuses on vocabulary, grammar, and reading comprehension. Chinese high school students are only required to write very short essays in English (about 150-200 words). These essays are usually descriptive and narrative writing tasks, such as writing a letter or describing a picture, thus involving no reading and no connections between reading and writing. The main goal for such tasks is to evaluate whether the students use vocabulary and grammar accurately to write complex sentences and compose coherent paragraphs.

In addition to their English lessons at school, Chinese students who prepare to study abroad in American universities take additional English classes in 'cram schools' to prepare for the TOFEL and SAT tests. The writing instruction at cram schools is structural and formulaic. The students often memorize writing templates in order to produce five-paragraph essays for the tests they take. Thus, Chinese students have very limited prior knowledge about English writing before they begin their studies in the American university and no real experience with source-based writing, including synthesizing.

Data Collection

Before the data collection, the two researchers discussed the research design, making decisions about the data collection procedures, methods, and research instruments (e.g., stimulated-recall protocol and semi-structured interview questions) for this study and the larger study. The data reported here were drawn mainly from three sources. First, drafts of the students' short and long synthesis papers were collected.

The second data source was think-aloud retrospective protocols (Greene, 1995) in which the students read a model synthesis paper and articulated the reading strategies they employed. While cognizant of concerns about the use of think-alouds, this approach was selected because the think-aloud method is commonly used in reading research to examine the reading process (Flower et al., 1990; Haas & Flower, 1988; Pressley & Afflerbach, 1995), and it best allowed us to closely examine the students' thought processes as they read a model synthesis paper. The think-aloud section was arranged after the teacher discussed two model papers in class. We used one of the model papers with which both participants were familiar. To ensure that the think-aloud protocols fully and accurately represented their thought processes, the participants verbalized their thoughts as they composed their reading of it to a digital recorder in a quiet

study room in the presence of the first researcher.

The third data source was stimulated-recall interviews about the students' writing processes related to their synthesis papers. Two stimulated-recall interviews were conducted immediately after the participants had completed their papers in the middle and toward the end of the course. The stimulated-recall interviews included two parts: the first part was the retrospective comments made by each participant about his strategies or moves made in the writing process; the second part was the participants' responses to several cued questions regarding their choices and decisions about organization, selection, and integration of sources (Greene & Higgins, 1994). During the think-aloud retrospective protocols and the stimulated-recall interviews, the participants spoke in their native language, Mandarin. Both data sources were audio recorded and transcribed into English by the first author.

In addition, we gathered information about Ms. Perry's teaching of synthesis writing through three semi-structured interviews and classroom observation field notes. The three interviews, conducted at the beginning, middle, and end of the course, focused on the teacher's beliefs regarding writing instruction in general and synthesis writing in particular, and her reflection on her pedagogical practices after teaching the short and long synthesis papers, respectively. The teacher interviews, each ranging from 50-60 minutes, were conducted in English and transcribed verbatim by the first author. The classroom field notes were gathered twice a week (80 minutes per section) for 15 weeks throughout the semester. These data revealed Ms. Perry's approaches to and ideas about synthesis writing instruction and helped us understand the participants' synthesis learning experiences through the lens of the teacher's ideas and expectations.

Data Analysis

After gathering the data, the two researchers discussed the data analysis framework in connection with the study's research questions and aims. We started with the decision to focus on students of different writing ability as judged informally by the teacher, as we felt it was important to have some basis for comparison, and we used her descriptors for them (Steve as the strong writer and Chen as the weak writer), since she knew them best as writers. To provide "thick description" (Merriam, 2009, p. 43) of the L2 students' reading and writing activities in composing a synthesis, our study employed the qualitative cross-case analysis approach (Yin, 2014). We first analyzed the quality of the students' synthesis papers according to the theoretical model of discourse synthesis we adopted (Spivey, 1997). Their papers were coded in the following categories: organization, selection of sources, integration of sources, and strategies of source use.

For the think-aloud retrospective protocols, we were particularly interested in how the two students used three types of reading strategies to construct understanding of the model papers: Haas and Flower's (1988) *content strategies*, *function/feature strategies*, and *rhetorical strategies*. The think-aloud data were coded using the same three analytical tools by the first author and then verified in consultation with the second author. We compared the two participants' strategies to understand, in particular, whether (and how) L2 students employed *rhetorical reading,* defined as "an active attempt at constructing a rhetorical context for the text as a way of making sense of it" (pp. 167–168).

For the stimulated-recall interviews, we examined the *rhetorical moves* (Graff, Birkenstein, & Durst, 2009; Harris, 2006) that the students made in the writing process as they composed their synthesis papers. In addition, the interviews with the teacher and classroom observation field notes provided a rich instructional framework from which to contextualize the participants' reading and writing activities in learning to write a synthesis paper. The multiple data sources were triangulated to capture the major themes and recurring patterns that cut across data sources, with equal weight applied to each data source during the triangulation process.

Findings

The Participants' Strategies in Reading a Model Paper

Before looking at the two students' synthesis writing, it is helpful to first consider the input concerning synthesizing that they were exposed to as readers, as this was their starting point in understanding as well as performing the act of synthesizing. This input revolved in part around the teacher's use of model synthesis papers as well as the students' reading and analysis of them. To provide a context for the students' reading of the model papers, we first considered Ms. Perry's representation of the model papers in class. After discussing the overall organizational structure of a synthesis paper through an example of one during a class session, Ms. Perry asked the students to read two model papers and analyze the various rhetorical strategies the student writers identified, and discussed the purpose, context and function of the model papers. The following field note captured the gist of the class discussion:

> The teacher projects the model paper onto the screen and asks the students to read it and identify the different parts of the introduction paragraph, such as hook, background information, and thesis statement. The teacher explains to the students that they can also include their research questions before stating the thesis. She analyzes the thesis to demonstrate the three key components–topic, focus and thesis points. After analyzing the introduction, the teacher moves onto the first body paragraph. She gives the following instructions: "What I want you to find are topic sentence, concluding sentence, and I want you to figure out what information belongs to the student writer and what information belongs to his/her sources." The teacher gives the students five minutes to read this paragraph. Five minutes later, the teacher asks the students to analyze and identify the different components. (Classroom observation field note, 2/14/2014)

This classroom observation field note revealed that Ms. Perry highlighted the discourse structures and functions of the model paper she selected. For instance, she emphasized the discourse structures–hook, background, thesis statement, topic sentence, and concluding sentence. She further explained the functions of these discourse structures to help the students understand the rhetorical nature of synthesis writing. Her discussion and analysis of the model paper was helpful in at least two ways. First, Ms. Perry illustrated the organization of a synthesis paper using concrete examples, which helped students in making sense of the abstract discussion about organizational structure. Second, she further demonstrated possible ways of synthesizing sources and some rhetorical strategies the students could utilize in their synthesis papers. Thus,

she sought to build for the students a workable task representation for synthesis paper writing.

After the classroom discussion, the students read the model paper aloud individually with no time limit. Each think-aloud protocol consisted of two types of verbalization: actual reading of the model paper aloud and the comments made by the participant while thinking aloud. We observed where the participants parsed the text and compared their comments about the text. Interestingly, Steve and Chen parsed the model paper in a very similar manner. However, their comments revealed variations in their strategies in constructing their representations of the text. Both Steve and Chen employed the *content strategies* and *function/feature strategies* during the think-aloud protocols. These strategies indicated a shared understanding of content and function reading, though the participants' grasp of rhetorical strategies remained different. According to Haas and Flower (1988), content strategies deal with "content and topic information," and function/feature strategies refer to "conventional, generic functions of texts, or conventional features of discourse" (p. 175). Both students summarized what the text was about or paraphrased the author's opinions. As Table 2 shows, 20% of Steve's think-aloud protocol was devoted to content strategies, while it was 33% for Chen.

Table 2. *Strategies employed in reading the model paper*

	Steve	Chen
Content strategies	20% (3) [2]	33% (5)
Function/structure strategies	53% (8)	67% (10)
Rhetorical strategies	27% (4)	0%

Because the main goal of reading the model paper was to inform their writing, it is not surprising that content strategies only accounted for a small percentage of their reading protocols. However, it is interesting to see examples of the content strategies used by both participants:

> In this part, the author talks about Chinese students' dressing style. (Steve)
> Here, the author compares the differences between Americans and Chinese. (Steve)
> In this part, the author talks about how Americans dress up. (Chen)
> This section is all about American students, what kind of clothes they wear. (Chen)

In the think-aloud sections, Steve and Chen also employed *structure/function strategies* while reading the model paper. Predictably, these strategies accounted for more of the protocols than did the content strategies: for Steve, 53% and 67% for Chen. Given that synthesis writing was a new literacy task for them, the organizational structure was bound to attract their attention, as it would provide an initial conceptual framework for them, one that could be enhanced as they acquired more knowledge of synthesizing. Thus, they, particularly Chen, devoted a large proportion of the think-aloud statements to structure/function strategies. For example,

> Here the author begins the introduction with a personal example. (Steve)
> This is a restatement of the author's first thesis point. (Steve)
> This part is the background. (Chen)
> At the end, this is the conclusion of this paragraph. (Chen)

So far, we have observed that both students constructed their representations of content, of

structure, and of discourse features while reading the model paper. As Haas and Flower (1988) argued, in order to engage in critical reading, students need to "move beyond content and convention and construct representations of texts as purposeful actions, arising from contexts, and with intended effects" (p. 170). In other words, critical reading involves not only careful reading of the content and identification of the structure and discourse features, but more importantly, a constructive representation of the complex texts, which requires the use of sophisticated rhetorical reading strategies. However, their argument is calibrated toward the work of native language (L1) writers. For L2 writers new to synthesis writing in the target language, there might have been a greater need to develop structurally-based knowledge in order to establish an initial schema for synthesizing before engaging in critical thinking about source texts. This reasoning may account for the fact that just over half (53%) of Steve's engagement with the model paper, and 2/3 (67%) of Chen's, focused on structural elements.

Between Steve and Chen, there was a major difference in their use of rhetorical strategies. As shown in Table 2, 27% of Steve's think-aloud statements were rhetorical strategies. In contrast, Chen did not use rhetorical reading strategies at all. This difference in their reading may help account for Steve's better performance as a synthesis writer. Examples of Steve's rhetorical strategies included:

> In this part, the author uses the previous example to show her opinion, like her changes of dressing style.
> This part is the author's opinions about the source. So the author uses her observation about Chinese students' clothes to support the source.
> Here the author uses Chinese students' examples to reinforce her previous opinion.
> I guess that the author is trying to explain the reasons of different dressing styles.

From the above examples, we observed that Steve tried to construct a more sophisticated representation of the model paper. He speculated on the author's writing purpose, intended effects, and the overall context. To some extent, he interacted with the text to construct his own representation and meaning. This use of rhetorical reading strategies may explain Steve's better performance as a synthesis writer, as they helped him form, through reading, a synthesizing schema that could be transferred to his synthesis writing, thus establishing a productive connection between reading and writing. By contrast, Chen's lack of any use of rhetorical reading strategies presumably prevented him from using reading to form a synthesizing schema that could support his synthesis writing, and likewise made it difficult for him generate meaningful reading-writing connections.

In brief, the analyses of the think-aloud retrospective protocols indicated that the more successful reader, Steve, employed all three types of reading strategies. In particular, his use of rhetorical reading strategies further distinguished him from the less successful reader, Chen. Rhetorical reading was not only crucial in understanding and interpreting the model paper, but also was likely closely connected to the composing processes of synthesis writing.

The Quality of the Participants' Synthesis Papers

To better understand the writing produced by the students, the writing prompts for the synthesis

tasks are provided in the Appendix. Before we delve into the complex processes involved in synthesis writing, we compare the two students' overall performance on the synthesis tasks. The two participants' synthesis papers were analyzed following the discourse synthesis model discussed earlier and focusing on three core operations: organizing, selecting, and connecting (Solé, Miras, Castells, Espino, & Minguela, 2013; Spivey, 1990). Of particular importance to the quality of their papers was source use, since learning how to work with sources was a central goal of the course. In terms of source selection, the students were required to choose source texts from academic databases. The number of sources and the appropriateness of sources were examined. With regard to source integration, two important measurements in Solé et al. (2013), intertextual integration (i.e., links between two or more source texts) and intratextual integration (i.e., links within one single source text), were used. In addition, the students were required to integrate their own examples and observations into the synthesis papers; thus, writer input and source integration were also examined. Finally, their strategies for source use, including summary, paraphrase, and direct quotation, were analyzed.

Table 3 shows that Steve and Chen performed very differently in the synthesis tasks. In the short synthesis assignment, the more successful writer, Steve, included more sources that were appropriate for his paper. He established both intertextual and intratextual links as well as writer-source integrations. He also employed a variety of strategies of source use. In contrast, the less successful writer, Chen, only connected the sources to his personal experiences and observations. He merely met the minimum requirement of source use, rather than employing various strategies. This may be due to the fact that establishing links within and between sources was more difficult than using personal examples to support his claim. It is also likely that, as Chen indicated in the interview, he felt more comfortable and familiar with using personal examples from his previous writing practices.

The comparison of the writing of the long synthesis paper further distinguished the stronger writer from the weaker writer. Steve formed more intertextual, intratextual, and writer-source integrations by bringing together sources and his own ideas. He achieved a balance of using summary, paraphrase, and direct quotation. On the contrary, Chen did not successfully connect the sources, as illustrated by the limited number of source integrations in his work. Regarding his strategies of source use, Chen tended to heavily rely on copying the source texts rather than summarizing and paraphrasing them. Also worth noting is that the selection of sources became more challenging for Chen; he tended to choose inappropriate sources for his papers. This suggests that Chen did not fully understand the important role of sources in composing a synthesis and lacked a clear conceptual understanding of synthesizing from both a reading and a writing perspective. In other words, he had an underdeveloped task representation for synthesizing, while Steve's appeared to be more fully formed. In light of what we saw earlier regarding his analysis of a model synthesis paper and the lack of meaningful input he gained through reading, this less successful task representation for writing on Chen's part is perhaps not surprising.

Table 3. *Analyses of source use in the students' synthesis papers*

		Short synthesis		Long synthesis	
		Steve	Chen	Steve	Chen
Selection of sources	Number of sources	3	2	5	4
	Appropriateness	Appropriate	Problematic	Appropriate	Problematic
Integration of sources	Number of intertextual integration	1	0	2	0
	Number of intratextual integration	3	0	4	1
	Number of writer-source integration	2	3	8	2
Strategies of source use	Summary	3	1	3	0
	Paraphrase	1	0	1	0
	Quote	3	3	6	6

Participants' Composing Processes for the Synthesis Paper

In rhetorical reading, readers construct meanings of texts by considering the context, textual cues, the author's purpose, and audience expectations. The model papers provided some tangible opportunities for the participants to appropriate, first as readers and then as writers, the key moves in synthesis writing. As depicted in Table 4, the *rhetorical moves* (Graff, Birkenstein, & Durst, 2009) or *writerly moves* (Harris, 2006) of academic writing include a wide and rich array of activities.

Table 4. *Summary of rhetorical moves or writerly moves and examples*

Rhetorical move or writerly move (Graff et al. 2009; Harris, 2006)	Examples
Making your own stance	Making a claim
	Restating the claim
Encountering the sources	Framing the quote/paraphrase/summary and Citing the sources
Forwarding the ideas of the sources	Responding to the quote/paraphrase/summary Extending the quote/paraphrase/summary
Countering the source by giving a different perspective	Arguing against the sources
Connecting different sources and ideas	Illustrating using personal examples Illustrating using other sources

Looking now at the students' writing and considering the possibilities for writing displayed in Table 4, Tables 5 and 6 provide representative excerpts of synthesis papers written by Steve and Chen as well as their retrospective comments about the composing processes, respectively.

Table 5. *Illustration of Steve's stimulated-recall interview about his synthesis paper*

Excerpt of Steve's synthesis paper [5]	Comments on his paper
[1]Online education can encourage more participation. [2]Our classes sometimes are quiet and many students don't want to say their opinion during class. Also, some of the classes are big, and professor may miss some students' opinions. [3]In the article "Foster Strengths and Circumvent Weaknesses: Advantages and Disadvantages of Online Versus Face-to-face Subgroup Discourse," Mingzhu Qiu and Douglas McDougall (2013) show that "In a face-to-face subgroup sometimes students are a little shy. There is no way to hide in an online course. You have to do your own work" (p. 6). [4]In face-to-face class, when students are required to discuss, some students' opinion may be ignored. However, in online class, when students are required to participate in discussion, they have to discuss and professors will not ignore their opinion. [5]In my online art education course, we were required to discuss in Carmen, and our TAs and the professor replied all our responses. [6]Qiu and McDougall (2013) agree that online education is able to give students enough time to discuss and give international students a better way to discuss. [7]Actually, it's difficult for some international students to discuss with American students due to languages difficulty and personalities. [8]In my education class, my classmates are shy, and the class is always quiet. If the class is online, international students can take participation in discussion without the problem. [9]Also, when students discuss in face-to-face class, professors cannot give students so much time to do it. The problem can be solved when the discussion is online. [10]In conclusion, online education gives students a better opportunity to take part in discussion.	[1] This is my topic sentence. [2] Here I add my own observation. [3] Here I quote the source because it is written in a very simple way and I don't know how to paraphrase it in a better way. [4] This part is an extended discussion about the source. [5] This sentence is my personal example, which supports the ideas from the source. [6] Here I summarize the two authors' opinions that online education provides enough time for international students. It is difficult to find an exact quote so I just summarize their opinions. [7] This is a further explanation of that source. [8] This is my example which is connected to the source. [9] This part is a further explanation of my point: online education gives students enough time. [10] This sentence is the restatement of the topic sentence.

From Steve's comments in Table 5, we observed a series of rhetorical moves discussed in the work of Graff et al. (2009) and Harris (2006). These suggest a certain degree of sophistication in Steve's understanding and performance of synthesizing, especially as someone new to such a literacy task. They also suggest that he made successful connections between reading and writing as he moved input from reading to his writing. In this paragraph, Steve made a claim in the first unit and defined the function of the first sentence as "topic sentence." He then illustrated his claim using his personal example (unit 2). In the third unit, he framed the quote and cited the source. He also explained the reason for his choice of source use–quoting instead of paraphrasing the actual source. After citing the source, he extended the quote by providing a detailed explanation (unit 4). In the fifth unit, he illustrated the source idea with a personal example by establishing writer-source integration. The sixth unit connected the previous discussion about the source to a summary of the authors' opinion. Steve continued explaining the authors' opinion (unit 7) and connected his own example to that opinion (unit 8). In the ninth unit, Steve provided a contrasting example to support the point that "online education gives students enough time." Finally, he concluded this paragraph with a restatement of his claim (unit 10).

Table 6 demonstrates that Chen's comments about his strategies or moves in writing the

synthesis paper were less elaborated than Steve's comments, a finding perhaps not surprising given what we have already seen regarding Chen's engagement with synthesizing. Chen only described four moves in this paragraph: making a claim (unit 1), illustrating using a personal example (unit 2), framing the quote and citing the source (unit 3), and restating his claim (unit 4). This, as noted earlier, suggests an underdeveloped task representation for synthesizing to work from. It should also be noted that Steve and Chen shared some strategies/moves that are functional and structural, such as making a claim, framing the quote and citing the source, and restating the claim.

Table 6. *Illustration of Chen's stimulated-recall interview about his synthesis paper*

Excerpt of Chen's synthesis paper [3]	Comments on his paper
[1]From my own experience, we can see the development of communication technology improve the relationship between children and parents a lot. [2]When I was a little boy, I had to live with my aunt a few days. It was my first time to leave my parents. I missed them so much. But in those years China, it was very expensive to make a phone call. So, I could only call my parents once a week and write letters to them at other time. We could not talk with each other no matter when we want. I felt alone and even doubted if they still love me. One day, I won a game with my companies, even though it is a stupid children game. I was so excited and wrote a letter to tell my parents. Unfortunately, I received their letters a week later. They said they were proud of me and I was best, but I would have no that happy feeling any more. [3]In the article "Communication technology in the home environment of four-year-old children" (2013) written by Lepicnik-Vodopivec J and Samec P, we can see "the timelines of information is very important to built a good family relationship, especially, for young children. If these young kids cannot get the reply from their parents in time, it will cause so many negative affect." (p. 2) [4]If some messages cannot be replied on time, it will make no sense. The timeliness of information is very important. So, in the past, if children could not contact to their parents, it caused a bad family relationship.	[1] This is the topic sentence. [2] This is an example of my experience in the past. [3] Here I cite a source to emphasize that the timeliness of information is important for relationships between children and parents. I think I used this source pretty well because this source supports my example. [4] This is a summary of the point that I just made.

However, Chen lacked the key rhetorical moves made by Steve, such as forwarding the ideas of the sources, countering the source by giving a different perspective, connecting different sources and ideas. These rhetorical moves are closely connected to the rhetorical reading strategies that were absent in Chen's reading of the model paper, thus reinforcing the value of reading in reading-to-write tasks like synthesizing. Therefore, we observed a clear distinction between the two students' reading and writing activities related to synthesizing: the connections between rhetorical reading strategies and rhetorical moves made by Steve, on the one hand, and the lack of rhetorical reading and key writerly moves in Chen's comprehending and composing processes on the other. This suggests that Steve had made connections between reading and writing that Chen was not yet developmentally ready to make.

Discussion

Given the two participants' similar disciplinary and cultural backgrounds, there are several explanations that may account for their different performances in synthesis writing. In what follows, we discuss two main explanatory factors that emerged from this study: the students'

understanding, or task representation, of synthesis and the functions of sources, and the connections they drew between reading the model paper and composing their own synthesis papers.

Understanding of Synthesis and the Functions of Sources

One important factor that apparently influenced the two students' engagement in the reading and writing activities of synthesizing was their understanding of synthesis and the role of sources throughout the course. At the beginning of the course, both Steve and Chen admitted that they had never heard of synthesis writing before and thus had no existing schema or task representations to draw from. However, after working on the short synthesis paper, the more successful writer, Steve, developed a clearer task representation of synthesis: "I think synthesis writing is having an opinion about a certain topic and using various sources to support that opinion." Steve further highlighted the important role of sources:

> In the past, I would not use many paraphrases and summaries in my paper. I would use very few evidences or sources. Now especially in the body paragraph, I need to use a lot of sources. (Interview with Steve)

This suggests that Steve, through synthesizing, was making connections between reading and writing as well as laying the foundation necessary for the more sophisticated work required in the long synthesis paper. In contrast, the less successful student, Chen, did not move beyond his comfort zone of opinion-based writing, which constituted a very limited task representation for synthesizing, and thus was not engaging reading-writing connections. Chen said, "In order to persuade someone or to state your opinion, you write a paper. Such a paper is called synthesis paper." Their different understanding of synthesis writing partly explains why Chen did not successfully integrate multiple source information into his papers. In particular, he saw no need for sources or the reading of them, as his task representation did not call for them.

Another explanation is that, as noted earlier, synthesis writing represented a new literacy task that is not practiced in the Chinese rhetorical tradition. Interestingly, though, both Steve and Chen perceived some similarities between *yi lun wen* (i.e., Chinese argumentative writing) and English synthesis writing. Nonetheless, how they actually applied their previously acquired rhetorical knowledge varied considerably. For example, after reading the model paper, Chen concluded that the structure of a synthesis paper is similar to a Chinese argumentative paper and transferred that schema to his English writing. Here he quickly grasped the basic organization of a synthesis, but influenced by the role of sources in Chinese writing, ignored the function of sources. Chen reported that:

> It [synthesis writing] is very much like *yi lun wen*. So the claim is my opinion; there are three sub-points to support my claim… If the teacher had told us that synthesis paper is an argumentative paper, I can find my Chinese argumentative essays and translate them into English. (Interview with Chen)

Instead of developing a fuller understanding of source-based writing, Chen took a different approach: he composed the long synthesis paper in a Chinese manner and translated his ideas

into English. Importantly, he noted that Chinese argumentative writing often uses well-known people's anecdotes as examples, whereas English synthesis writing requires citing the actual authors and research. However, here his understanding of source use was limited to citation format. For him, using sources simply meant properly citing the sources. Thus, he viewed sources as an auxiliary rather than a fundamental component in composing a synthesis.

In contrast, Steve not only recognized the similar overall organization between synthesis writing and *yi lun wen*, but also clearly indicated that the major difference was source use. Steve stated that:

> Chinese argumentative writing does not require quote, summary, and paragraph. It mainly relies on examples. In contrast, synthesis writing has to have quote and summary, and use examples to back up the quote or summary. (Interview with Steve)

Therefore, the two participants' different understanding of synthesis and the functions of sources partly explains their contrasting performances in the synthesis writing tasks, as demonstrated from the textual analyses of their synthesis papers.

Connections between Reading the Model Paper and Composing the Synthesis Paper

Another key factor that seemingly contributed to the two students' different learning experiences in synthesis writing was how they drew the connections between reading the model paper and writing their own synthesis papers. As the analyses of the think-aloud and stimulated-recall protocols revealed, their abilities to apply rhetorical reading strategies to make key rhetorical moves in their synthesis papers further explain the two students' distinctive performances in the synthesis tasks.

The more successful reader and writer, Steve, not only paid attention to the content and structure/feature of the model paper, but also employed rhetorical reading strategies while analyzing it. More importantly, the rhetorical reading strategies, concerning the writing context, purpose, and audience expectation, were closely connected to the rhetorical moves in his synthesis writing. Thus he was able to make a productive connection between reading and writing.

On the contrary, the less successful student, Chen, simply focused on the reading of the content and identification of the organizational structure and discourse features, without constructing a more sophisticated representation of the model paper, let alone synthesizing itself. Subsequently, he only applied a few writerly moves that were structural and functional (e.g., making a claim, framing the quotes and citing the source, and restating the claim), but failed to make the key rhetorical moves (e.g., extending the ideas of the sources, countering the sources, and connecting different sources and ideas) in his synthesis paper.

The two students' different approaches in handling the reading and writing activities related to synthesizing reinforced the important role of reading in reading-to-write tasks like synthesis writing. This also suggests that the use of model texts, a matter of contention in both L1 and L2 writing scholarship (Macbeth, 2010), is helpful in preparing students to synthesize. The

comparison of their reading processes for the model paper and writing processes for synthesis papers further revealed that whether students understand the complex reading-writing relationships underlying synthesizing plays a crucial role in learning to write from sources. Spivey (1990) argued that composing from sources involves "hybrid acts of literacy" (p. 259) in which reading and writing influence each other interdependently. Compared to the weak writer, Chen, the strong writer, Steve, not only employed rhetorical reading strategies when interacting with the model paper, but also transferred rhetorical reading strategies to make the key rhetorical moves in composing a synthesis, likely as a result of his more developed task representation for synthesizing.

Implications and Conclusion

The L2 undergraduate students' engagement in reading and writing in learning to write a synthesis in this study suggests some valuable pedagogical implications for L2 writing instruction, particularly regarding L2 source-based writing. The two students' divergent understandings of synthesis and functions of sources contributed to their different performances in synthesizing. This suggests that L2 writing teachers need to present a comprehensive task representation of synthesis to L2 students and explicitly address the roles of source use in classroom instruction. The teachers' task representation of synthesis needs to encompass the complex reading and writing relationships in synthesizing as well as the important operations involved, such as organizing, selecting, and connecting, of synthesis. Furthermore, for L2 writers who are not familiar with source-based writing or may have a different cultural connotation of "source," it is critical for them to understand the roles of source use in English academic writing, specifically synthesis writing. The Chinese students in this study had been accustomed to opinion-based writing from their first language literacy education, so it is necessary to explain the differences between writing from sources and writing based on one's opinion. Teachers need to account for this. From there, L2 writing teachers can gradually introduce the fundamental skills of source-based writing, citation practices, and eventually integration of sources.

Another implication drawn from this study was the importance of connecting reading and writing in L2 writing classrooms. In the English for Academic Purposes mode that dominates second language writing instruction, L2 writing courses often place a particular emphasis on *reading for writing*. Thus, synthesizing, as an important reading-to-write task, represents the central literacy act of connecting reading and writing. The findings of this study echo Salvatori's (1996) argument of "using reading as a means of teaching writing" (p. 441) and suggest that an integrated reading-writing approach is critical in building L2 students' synthesizing abilities. Ms. Perry, the teacher in this study, used the model paper in class to demonstrate some rhetorical moves that the students could make in synthesis writing. However, the two students' readings of the model paper, particularly the lack of rhetorical reading strategies of the weak writer Chen, indicated that L2 writing teachers should make the invisible interconnectedness of reading and writing more visible to L2 students, so that they can develop their reading and writing skills simultaneously.

In closing, what this study reveals with respect to reading-writing connections is that synthesizing is a useful tool in helping L2 writers engage source texts and the interplay between

reading and writing that is crucial in English academic literacy. This is especially true for students whose L1 rhetorical background is not rooted in source text use and the acts of both reading and writing that constitute synthesizing, thus suggesting that synthesis writing can play a more significant role in L2 writing instruction and research. However, as this study indicates, a key component in the process of preparing students to synthesize, and thus make connections between reading and writing, is ensuring that students develop the kind of task representation for synthesizing that generates a productive framework, or schema, from which to work.

Acknowledgments

Notes

1. In order to protect participant identities, all names used in this study are pseudonyms.
2. In Table 2, numbers in the parentheses indicate the number of strategy use in the think-aloud.
3. In Table 5 and Table 6, superscript numbers mark individual units of analysis. The students' original texts were used. Grammatical errors and stylistic features were not edited.

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Appendix

Guideline of the Short Synthesis Paper

Write an approximately 3-4 page paper based on one of the chapters from *Culture* or *Sourcework* that we

have read *and* on an outside source that you have found on the university library database.

You may use your personal experiences as a starting point and use evidence from the article to support your discussion *or* you may start with information from the articles and support them with your own thoughts.

Present this information in your paper by organizing it like a formal academic paper. In the paper, be sure to include *at least*:
- one short summary
- one direct quote
- one paraphrase

from *both* the *Culture* or *Sourcework* article *and* the article from the OSU library database (6 citations in total). You will be expected to synthesize both sources cohesively into your essay. Be sure to have a reference list and in-text citations in APA style.

There are three ways of using sources to support a point in your paper. These are **summarizing, quoting, and paraphrasing**. Following are some tips from the book, *Real Essays* (Anker, 2009):

- *Summarize* when the main point(s) of a passage, paragraph, or article are enough to support your point.
- *Quote* when the original words are special or unique; or when the quote will have a greater effect in the original words; or when you want to prove that the person you are quoting actually made the statement.
- *Paraphrase* when passages are 1-3 sentences long; or the complete passage is relevant to your point, or the information is more important than the way in which the idea is expressed.

STEPS:
1. Begin with a research question and a working thesis statement. It is common for research questions to change, but they usually center on the same idea. You may change yours as necessary.
2. Review your sources and select supporting evidence.
3. Write an outline.
4. Write a full first draft of your paper with a reference list (use EasyBib to help you).

The first draft will only be graded as a completion grade (i.e., don't worry too much about grammar and vocabulary). After you receive my written feedback, we will have an individual tutorial where we will discuss any writing issues and where you can ask questions. After that, you will revise the paper; then submit it for a grade.

About the Authors

Ruilan Zhao recently completed her doctoral study in the Department of Teaching and Learning at the Ohio State University in 2015. She received her master of TESOL from Southern Illinois University. Her research interests include second language writing, reading and writing connections, and multilingual students' literacy development in diverse social context. E-mail: zhao.358@osu.edu

Alan Hirvela is a professor in the Foreign and Second Language Education Program at the Ohio

State University. He recently served as co-editor of *TESOL Quarterly*. Among other projects, he is currently writing a new edition of his 2004 book, *Connecting Reading & Writing in Second Language Writing Instruction*. E-mail: hirvela.1@osu.edu