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Text Interpretation in Foreign Language Reading-to-Write

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Abstract

The present study investigated how English as a foreign language (EFL) writers read and used source texts whilst reading-to-write. Two separate studies were conducted. In Study I, 16 participants were first completing a reading-to-write task on an eye-tracker, and then a stimulated recall session was performed to elicit their text interpretation processes. In Study II, another 172 participants responded to a reading-to-write process questionnaire after completing the same task. Findings from eye-tracking data, stimulated recalls, and questionnaires showed that the participants engaged in several types of text interpretation processes through task completion, and they were using different reading strategies at various stages of reading-to-write to understand and exploit the text provided in the source materials and in their own writings.

Keywords

Foreign Language Writing, Reading-to-Write Tasks, Text Interpretation, Careful Local/Global Reading, Expeditious Local/Global Reading

1. Introduction

A typical reading-to-write task often provides writers with several source materials. These sources should be comprehended, and relevant information should be extracted and reassembled into an original piece of writing. The background information presented in the sources can help to mitigate the negative effects imposed on writers who are unfamiliar with the writing topics assigned (Jennings, Fox, Graves, & Shohamy, 1999; Lee & Anderson, 2007). Impact studies of integrated writing tasks have also demonstrated that this kind of test can improve, to some extent, washback on teaching and learning of writing (Feak & Dobson, 1996; Weigle, 2004).

Text interpretation is a process in which writers create "internal representations from linguistic and graphic inputs" (Hayes, 1996: p. 13), and is mainly concerned with reading activities. In a traditional independent writing task, text that needs to be interpreted includes the text in the task instructions and the text writers have written, while in an integrated reading-to-write task, text in the source materials is also added into the whole text, which may result in differences in writers' cognitive processing while completing the task. In this study, EFL writers' text interpretation processes while responding to a reading-to-write task were investigated, in order to gain more insights into writers' use of this type of cognitive process.

2. Literature Review

Khalifa and Weir's (2009: p. 43) reading model provides a useful classification of reading activities that test-takers perform in real-life situation. Two types of reading are identified in their model: careful reading and expeditious reading, both of which can be accessed at local and global levels. Careful local reading is used to comprehend the meaning of sentence(s), during which lower-level processes such as "decoding at the word or phrase levels" and "establishing propositional meaning at the sentence level" are involved; careful global reading is used to comprehend main ideas or the majority information in the whole text, and higher-level processes such as "linking propositions in building a mental model" and "inferencing" are involved in this type of careful reading (Khalifa & Weir, 2009). Expeditious local reading is used to scan or search for specifics in the text, while expeditious global reading involves skimming for gist, or searching for main ideas and important details.

Studies of reading processes in language assessment are mainly concerned with independent reading tasks (for example, reading comprehension tasks). Most findings have revealed that independent reading tasks seem to be targeted at measuring careful local reading at the clause and sentence level rather than careful reading at the global level, and rarely at expeditious reading (Urquhart & Weir, 1998; Khalifa & Weir, 2009; Moore, Morton, & Price, 2010). There is little research on reading processes involved in integrated reading-to-write tasks. Among these few attempts to investigate writers' text interpretation processes, most studies were conducted through offline investigation methods. Shi (2004) compared the written products of two types of writing tasks (opinion and summary) produced by two groups of writers: native and non-native English writers. The findings revealed that L2 writers borrowed more from source texts than L1 writers, and that the summary task elicited more verbatim use of source texts than the opinion task. Similarly, Campbell's (1990) study found that L2 writers cited the source texts considerably more than L1 writers.

Studies that investigated writers' online cognitive processing are scarce (Wang & Zhang, 2021). Therefore, in order to improve our understanding of how writers read and use source text or any other types of text in reading-to-write, there

is a need to conduct experiments using some online investigation methods. This study used a combination of eye-tracking, stimulated recall and questionnaire methods to look into 16 EFL writers' text interpretation processes while completing a typical reading-to-write task. Data from both online and offline methods were collected and triangulated to address the following research question: How do EFL writers read and use source text as they complete a reading-to-write task?

3. Methods

3.1. Participants

Study I involved 16 participants. They were all master's students from China and were studying in the UK at the time of data collection. They ranged in age from 21 to 28 years old. Eleven (69 percent) of them were females and five (31 percent) were males. Their performance on the International English Language Testing System (IELTS) test overall and on the Reading and Writing components is summarised in Table 1. The proficiency levels of these participants fell between B2 and C1 according to the Common European Framework of Reference for Languages (CEFR).

172 participants took part in Study II. They were all native Chinese undergraduate students enrolled in Business English programs at two universities in China. Among them, 120 were in their second year studying at University A; 52 were in their third year studying at University B. They were mostly (91.4 percent) female students, and their ages ranged from 20 to 21 years old. Based on their TEM-4 (Test for English Majors, Band Four; a national test for English major students in China) scores, it was estimated that their proficiency in English is between CEFR B2 and C1. These participants were regarded as being representative of the population targeted by the TBEM-8 reading-to-write task.

3.2. Tasks and Instruments

3.2.1. Tobii TX300 Eye-Tracker

The participants' eye movements were recorded using a screen-based binocular tracking eye-tracker: Tobii TX300 (Tobii AB, Sweden). The infrared illuminators and image sensors are located underneath an ordinary looking monitor (screen unit). They are both invisible to the human eye causing no disturbance to the subject in an experiment so that a participant would perform the task as if sitting

Table 1. Participants' IELTS test scores.

IELTS/IELTS components	Mean	Median	Mode	Standard Deviation	Minimum	Maximum
Overall	7.16	7.00	7.50	0.35	6.50	7.50
Reading	8.00	8.00	8.50	0.58	7.00	9.00
Writing	6.25	6.00	6.00	0.55	5.50	7.00

in front of a normal computer screen. The Tobii TX300 has a high tolerance for head movement. It allows the subject to move freely in front of the eye-tracker if their heads are positioned within an area of 37 cm (width) × 17 cm (height) at a distance of 65 cm from the screen (maximum head movement speed: 50 cm/s). If the participant moves out of this area while being eye-tracked and then back into it, tracking is recovered almost instantly (time to tracking recovery after lost tracking: 10 - 165 ms). The freedom of head movement and unobtrusiveness allow participants to act more naturally and minimize their fatigue, particularly in a lengthy experiment such as the one reported in this study, which involved a reading-to-write task lasting about 40 minutes. In this way, the features of the specific eye-tracker used contribute to the validity of the claim that performance is authentic.

3.2.2. TBEM-8 Reading-to-Write Task

One sample task of the Test for Business English Majors-Band 8 (TBEM-8, developed and administered in China) reading-to-write tasks was used and investigated in this study. The topic of the task concerned Steve Jobs' resignation from Apple. The task contained a set of instructions, and five source materials in the prompt. The instructions stated clearly 1) for whom this essay was to be written, so that the writer may be able to decide in what style the writing should be, for example, whether a colloquial style as might be used in an e-mail or an academic style similar to that used in an assignment for university course; 2) what content was expected in the writing (describe the event, analyze the situation and comment on the impact of Jobs' resignation on Apple); 3) how long the writing should be (250 - 280 words) and how much time (40 minutes) was given to complete the task; and 4) some indication of how the writing was to be scored (how well you develop your ideas and how coherent your essay is). On the eye-tracker screen, the task was displayed as follows: the first three source materials were displayed on the left side of the screen, and the other two source material and the answer sheet (where the participants typed their writings) were presented on the right side of the screen.

3.2.3. Questionnaire

A reading-to-write process questionnaire was also utilised to elicit participants' cognitive processes. This questionnaire was developed by Chan (2013), and adapted according to the features of TBEM-8 reading-to-write task. In this questionnaire, items related to the text interpretation processes are: Item 2.1, "I read through the whole of each source material carefully"; Item 2.2, "I searched quickly for the ideas which might help me to write the essay"; Item 2.3, "I read some relevant part(s) of the materials carefully"; Item 4.5, "I selectively re-read the source materials".

3.3. Procedures for Data Collection

In Study I, the 16 participants first completed the TBEM-8 reading-to-write task

while their eye movements were recorded by the eye-tracker. These eye traces then formed the stimuli for a stimulated recall session in which the participants reported their text interpretation processes while reading-to-write. The stimulated recall session was conducted in Mandarin Chinese, and audio and video records were taken for later analysis.

In Study II, the 120 participants from University A took the TBEM-8 reading-to-write task as a midterm test for a college English writing course. They were given the task via computer in a multimedia classroom. Immediately after completing the task, the participants were asked to respond to the questionnaire reporting the extent to which source materials had been visited during task completion. Participants at University B were assessed using the reading-to-write task as the writing component of an end-of-term English test. The test was administered through a traditional paper and pencil format. It lasted about 120 minutes, after which the questionnaire was given to the participants to elicit their text interpretation processes when completing the task.

3.4. Data Analysis

In Study I, the participants' protocols were first transcribed based on the video recordings of the stimulated recall session. The transcriptions were then segmented into a series of units for the following coding work. It should be noted that the text interpretation processes were categorised into several subprocesses so that different types of these processes can be investigated individually (see Table 2 for the working definitions and examples of these subprocesses). The number of occurrences for each subprocess was calculated. Also, these processes were further explained in detail using quotes from participants' stimulated recalls.

In Study II, 172 questionnaires were collected. Two questionnaires were discarded because they were incomplete (more than ten items remained unanswered). The remaining 170 valid questionnaires were analysed using SPSS. A frequency analysis was conducted to see the percentage of participants choosing each number (1 to 5) for each item. The agreement rate for each item was calculated by adding the percentages of participants who agreed and strongly agreed to that item.

Table 2. Working definitions and examples of text interpretation processes.

Cognitive processes/ subprocesses (Codes)		Working definitions of cognitive processes/subprocesses	Examples
Text interpretation (TI)	TI-1	Participants read the instructions.	"I was reading the instructions."
	TI-2	Participants read the source texts.	"I went back to read the second source material."
	TI-3	Participants read the text-written-so-far.	…

4. Results and Discussion

4.1. Study I

Text interpretation is a process that creates "internal representations from linguistic and graphic inputs" (Hayes, 1996: p. 13). In the context of an independent writing task, the text to be interpreted normally includes the text in task instructions (TI-1) and the text writers have written (TI-3), while in a typical reading-to-write task, the text in source materials (TI-2) is also added into the whole text and thus resulting in differences in writers' cognitive processing during task completion.

The whole process of completing the TBEM-8 reading-to-write task was, for ease of analysis, divided into three phases: before writing, during writing and after writing (after completion of the first draft). The participants' protocols were then parsed to differentiate the use of text interpretation process between these phases. Table 3 shows the number of occurrences of the participants reading the task instructions (TI-1) at different phase of writing. Before writing, they started by reading through the entire instructions carefully to create an initial understanding of the task, for example, Participant 8 reported that "*I read through the instructions very slowly and paid close attention to what I should write and how many aspects I should cover...*". Most of the participants reread the instructions several times before moving on to the source materials; this may be due to the complexity of instructions in reading-to-write tasks that test-takers may spend more time creating a task representation than they do in an independent writing task. This can also be supported by participants' eye-traces that they read back and forth between the instructions and source materials in the first five minutes of task completion. Participant 13 explained this kind of looking behaviour in her recalls:

> I was reading the second source material, and then I went back to read the instructions again, I wanted to make sure what this material was for, and what was the connection between it and the instructions, then I could decide in which part (of the essay) I could use the information in this material.

Some participants also claimed that reading the source materials imposed an extra cognitive load on their minds that they forgot what the instructions were

Table 3. *Text interpretation-1* at different phase of writing by participant.

Writing phase	Participant																Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Before writing	6	6	9	3	2	6	3	6	3	5	4	3	5	4	3	6	74
During writing	9	2	1	3	1	2	3	6	2	3	1	8	3	6	0	2	52
After writing	1	0	0	2	0	0	0	0	1	0	0	0	1	0	0	0	5
Total	16	8	10	8	3	8	6	12	6	8	5	11	9	10	3	8	131

about and thus reread the instructions either during or after reading the source materials.

During writing, the participants most often used an expeditious form of reading: scanning, to locate specific information in the task instructions, as evidenced in their eye-tracking recordings and the protocols, for example, Participant 12 went back to read the instructions while composing, "*I was talking about resignation, so I had a look back to the instructions and found that it wanted me to discuss the impacts of Jobs' resignation, this was to make sure that I was on the right track*". The purpose of reading the instructions at this phase is, to a large extent, monitoring the progress of writing, more specifically, to check if the text written so far is not deviating from the topic specified in the task instructions, and to determine whether writing plans need to be modified for the text to be produced. After completing the first draft, few participants reported that they revisited the task instructions when they re-checked if the essays fulfilled the requirements of the task. This may be partly because most of the participants tended to monitor their writing frequently as they wrote, but less often after finishing the draft.

Reading the source materials (TI-2) was the most reported process of text interpretation (375 instances) in the participants' stimulated recalls. Table 4 shows that they reported the most instances of TI-2 (271 instances, 72.3 percent) while they were writing; 98 instances (26.1 percent) were devoted to comprehending the source materials before writing and only two participants mentioned that they did read the materials after finishing the first draft. Before writing, the form of reading adopted by these participants was, as evidenced in eye-tracking recordings, mostly careful reading. They read through the source materials in a slow and careful manner, particularly when they were reading the English source material (Source 2). Organising process (using strategies to understand the structure of readings) was also engaged in reading activities during this phase, for example, Participant 1 summarised the main points in different source materials when she was reading, "*…I found that there were some similarities as well as some differences in these source texts, so I thought I might need to think critically on this issue, I re-evaluated the requirements of the task*".

During writing, the participants used scanning most often to locate the specific information in the source materials they considered useful in their writing,

Table 4. *Text interpretation-2* at different phase of writing by participant.

Writing phase	Participant																Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Before writing	4	7	10	7	8	7	5	7	8	5	8	6	3	5	5	3	98
During writing	30	19	23	17	11	12	23	19	22	14	6	16	14	14	19	12	271
After writing	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0	0	6
Total	34	26	33	24	19	19	28	26	30	22	14	22	17	22	24	15	375

which is similar to the process of reading the task instructions during writing; for instance, Participant 1 told the researcher why she frequently went back and forth between Source 2 and the answer sheet when writing the first paragraph of her essay, "*…there were some key words I could add into my introduction, they helped to describe what kind of person Steve Jobs was, and what the impacts of his resignation were…they helped me to elaborate my points*". Similarly, Participant 4 looked back to the same source material at some point during writing, but he stated that he was checking whether the word "resignation" was spelt correctly in his writing.

As expected, rare instances of reading the source materials were found after writing. This may be because of the time limit under testing situations that test-takers may focus on examining the textual quality of their written products such as accuracy of spelling, word use and sentence structure rather than the appropriateness of the content which probably needs spending time to refer back to the source materials.

Reading the text that had been written (TI-3) is the last subprocess of text interpretation found in the participants' stimulated recalls. Unlike the other two processes discussed above, this process may be expected not to differ much between independent and integrated writing tasks, as it is by nature more associated with test-takers' writing abilities rather than the integration of reading and writing skills. As shown in Table 5, most of the TI-3 processes (133 instances) were reported during writing; the participants said they were trying to plan for the text to be produced by reading the text that had just been written, for example, Participant 5 stated that "*I didn't know what to write in the concluding paragraph, so I went back to have a look at what I had written*", also they reported that they were checking the qualities of the text produced.

4.2. Study II

Four items were meant to measure the participants' text interpretation process, which, in this questionnaire, referred specifically to participants' activities relating to reading the source materials. Table 6 presents these four items and the agreement rate for each item.

Overall, as shown in Table 6, more than 80 percent of participants chose either "agree" or "strongly agree" in response to the four items. Items 2.1 and 2.3

Table 5. *Text interpretation-3* at different phase of writing by participant.

Writing phase	Participant																Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Before writing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
During writing	21	3	8	8	12	7	3	17	8	13	1	11	7	1	9	4	133
After writing	1	4	0	2	0	2	1	3	2	6	0	0	4	1	1	2	29
Total	22	7	8	10	12	9	4	20	10	19	1	11	11	2	10	6	162

Table 6. Agreement with items measuring the process of *text interpretation.*

Items	agree or strongly agree (n = 170)
2.1 I read through the whole of each source material carefully	82.2%
2.2 I searched quickly for the ideas which might help me to write the essay.	89.3%
2.3 I read some relevant part(s) of the materials carefully.	93.5%
4.5 I selectively re-read the source materials.	87.1%

investigated participants' careful reading approaches. For Item 2.3, a very large proportion of participants (93.5 percent) claimed that they read some relevant part(s) of the materials carefully, while Item 2.1 had a lower agreement rate (82.2 percent) among participants, and about 10 percent of participants did not agree that they read through the whole of each source material, which was distinct from the other items in this group.

Items 2.2 and 4.5 elicited participants' responses to activities relating to expeditious reading. For Item 2.2, 89.3 percent of participants agreed that they searched quickly for the ideas which might be helpful in writing the essay, with 10.7 percent of participants choosing "no view" on this item. Items 2.1 and 2.2 seem to be opposites in some way, although it may be due to the fact that participants are thinking more along the lines of a sequence of behaviour (e.g., they read carefully first, and then expeditiously later). But the questionnaire does not necessarily help to differentiate between the different types of behaviour that were able to be identified in the eye-tracking study. A similar high percentage of participants (87.1 percent) claimed that they selectively re-read the source materials while writing the first draft (Item 4.5), but there were also about three percent of participants who thought they did not engage in this type of reading during writing.

5. Conclusion

A total of 668 instances of text-interpretation processes were reported by the 16 participants in the eye-tracking and stimulated recall study; meanwhile, in the questionnaire study, a large proportion (more than 80 percent) of participants claimed that they adopted both careful and expeditious reading approaches when reading the source materials. Previous studies (e.g., Chan, 2013) showed similar results for writers' reading activities in integrated writing tasks. This study goes on to further explore how these activities differ at various stages of writing, benefiting from the eye-tracking technique which allows an online investigation of participants' eye-movements during task completion.

Before writing, the participants typically started responding to the TBEM-8 reading-to-write task by quickly browsing all the components of this task, and then went back to read the task instructions and source materials one after another in a slow and careful manner. They were also found comprehending and

analysing the structure of the source materials to interpret the connections between different sources. *During writing*, the participants most often used an expeditious form of reading: scanning, to locate specific information in either the instructions or source materials that they considered useful in their writing. Another interesting finding was that the participants tended to read Chinese source materials much faster than the English texts. This may indicate that the language of the text appeared to influence the degree and nature of writers' interaction with the source texts, which has not been studied in previous research. *After writing*, the participants reported relatively less instances of text-interpretation process, most of which were devoted to reading the text that has been produced for monitoring and revising purposes.

This study primarily contributed to increased insights into how EFL writers read and engage with source materials while reading-to-write, thus helping EFL teachers to better plan their lessons. For example, they should realise that EFL learners may be involved in different types of reading activities as they read and write, and they could design some specific tasks which may be helpful to raise students' awareness of the varieties and usefulness of various reading processes when reading-to-write. Furthermore, the findings resulting from the analysis of eye-tracking, stimulated recall, and questionnaire data were triangulated and provided a solid basis on which conclusions could be drawn about test-takers' text interpretation processes while completing the TBEM-8 reading-to-write task. It is believed that this methodology could be of value as part of test validation studies. For example, it could be used to collect a priori cognitive validity evidence based not on "what the test constructors believe an item to be testing" (Alderson, 2000: p. 97), but on what processes test-takers employ for successful task completion (Brunfaut & McCray, 2015).

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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