

Unproduced Text and Unexpressed Ideas: Compromise and Give-up in the L2 Writing Process

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Abstract

第二言語学習者が産出した間違いや特徴的な言語使用は、専門的内容の第二言語執筆に関する研究での主要な分析対象である。しかし、産出文の量的分析では、書き手が産出を「回避」(Larsen-Freeman & Long, 1991)した困難や着想——「非産出文」や「非産出着想」——を特定できないという問題が生じる。そこで、本研究では書き手の執筆過程に関する内観報告を分析することで、産出文と乖離する書き手の着想を含む思考過程を特定し、第二言語での「非産出文」や「非産出着想」を把握することにした。調査では、専門内容について英語で執筆する課題を与え、執筆過程を録画した。次に、その録画を見せながら質問を行う面接(刺激再生法)と半構造化面接を行った。刺激再生法を用いた面接での内観報告は書き起こし、帰納的に分類分析した。その結果、第二言語で産出困難であった着想を包含する「妥協」と「断念」の方略を抽出できた。本研究では、第二言語学習者の専門的内容の執筆について、「妥協」と「断念」の方略を特定し、低頻度ではあるが、書き手にとって重要な専門内容を含む「非産出文」や「非産出着想」を把握する重要性を指摘する。また、書き手視点での指導の可能性を示唆する。

Key Words: disciplinary-content L2 writing, stimulated recall, L2-writer-oriented pedagogy

1. Introduction

Second-language (L2) learners' misuse or idiosyncratic use of language has been a major research subject for studies on L2 disciplinary-content writing. Many studies have so far focused on L2 learners' idiosyncratic use of language by comparing with native speakers of English (e.g., Allen, 2010; Gilquin, Granger, & Paquot, 2007; Hyland & Milton, 1997) or with experts in a specific discipline (e.g., Luzón, 2009) using a quantitative method such as corpus analysis.

Overtness in text, however, does not always represent the entirety of learners' language and ideas. Larsen-Freeman and Long (1991) point out that learners tend to use forms and rules they are confident with and to avoid those they are not confident with by using circumlocution or some other strategies. This fact suggests not only that L2 learners tend to avoid certain expressions in

writing, but also that overt misuse of certain words or phrases does not present a complete picture of learners' difficulties in writing. In other words, studies based only on overt text are not able to deal with learners' covert difficulties—that is, unproduced text.

Furthermore, and most importantly, studies based on overt text often discuss frequency of quantifiable expressions in small chunks or idiosyncratic use of observable language only from the researchers' view—and not the writers'—of the success or failure of the writing (e.g., Allen, 2010; Gilquin, Granger, & Paquot, 2007; Hyland & Milton, 1997; Luzón, 2009). This tendency to focus significance on quantity is not flexible enough to take into account writers' expertise or ideas that are not presented in the text—that is, unexpressed ideas.

Based on this perspective, this study adopts the stimulated recall procedure to elicit writers' thought processes that present their covert difficulties, unproduced text and unexpressed ideas, during disciplinary-content L2 writing. In the study, two thought processes were identified that revealed discrepancies between text produced on paper and ideas that writers were unable to express in the L2. I refer to the two thought processes as *compromise* and *give-up* strategies. This paper argues that identifying these two strategies would allow language teachers to provide advice that is useful for developing writers' skills to express their own ideas and expertise. Such advice may assist writers in writing what they really want to write but cannot express in their L2.

2. Previous studies using stimulated recall

To elicit writers' thought processes during writing, this study adopts a method called stimulated recall. Stimulated recall is an introspective method used to elicit participants' thought processes in carrying out a task or activity (Gass & Mackey, 2000). Stimulated recall is conducted after a task performance while playing back the recording of the task. It is considered that if a participant is exposed to a large amount of stimulus associated with situations of an event, like video or audio recording, the participant is able to recall the event vividly and precisely during an interview (Bloom, 1954).

Several studies have explored writers' thought processes during a writing task using stimulated recall or similar methods. Rose (2009), for example, used stimulated recall to identify writers' block in L1 writing processes. The study showed high-blockers (writers with stronger writer's block) expressed more rigid rules than low-blockers, concluding that constraints imposed by the writers themselves, such as rigid rules, could be barriers in L1 writing. Jones (1985) sought to apply Krashen's Monitor hypothesis (Krashen, 1982) to investigate L2 writers' composing problems and presented cases of L2 writers' consciously monitoring their own writing. Jones's study concluded that overuse of the monitor did not contribute to grammatically improved writing. Boshier (1998) studied ESL writers' writing processes as well as their problem-solving processes

using stimulated recall. Boshier's study suggested that each ESL writer might have different strengths and weaknesses in reading and writing regardless of their proficiency test scores. Sasaki (2000) also used stimulated recall and compared differences in writing strategies between L2 novice and expert writers. Sasaki's study showed that novice writers spent shorter time on planning and paused to translate their ideas into English for each semantic chunk.

Although their research questions and the background of participants are all different, what these studies had in common is that they used stimulated recall and analyzed the data from writers' perspectives to identify their barriers in writing. These studies show that stimulated recall can allow a researcher to investigate writers' covert thought processes which are inconsistent with their overt actions (Bloom, 1954), as well as complex thought processes such as assumptions, strategies and conflicts that may usually be unvoiced (Rose, 2009). This method therefore can contribute to investigating the discrepancies between words visibly produced on paper and invisible thought processes, and can be used for exploring writers' difficulties in writing.

3. Method of this study

As part of a larger study of what kind of difficulties L2 writers face individually, I gave a disciplinary-content writing task in English to L2 writers; video-recorded their writing sessions; and conducted interviews including stimulated recall with each participant, as explained in the following sections.

3.1 Participants

For this study, I recruited 11 graduate students majoring in science courses (see Table 1). They were all native speakers of Japanese and enrolled at the same Japanese research-based university. The participants' comprehensive English proficiency level was low to intermediate. Remuneration in the form of a 500-yen voucher was paid to each participant.

3.2 Data collection

I set two video cameras fixed on tripods on the desks in advance: one camera was set on the desk in front of the participant seat to capture writer's upper body; the other camera on the desk to capture writer's handwriting. Before the writing task began, I explained the purpose of the study and privacy protection policy, and confirmed participants' intention to participate in the study. The writing task required participants to write about their specialty or projects at their laboratories in English. During the task, the use of erasers was prohibited; participants were required to cross out wrong words so that their writing processes became visible. Once the participants finished writing, I conducted an interview while playing back the video images as a stimulus. As a general rule, a

pause of more than 2 seconds or salient actions including crossing out wrong words was a guide to ask the participant why he or she did so and what he or she was thinking during the action. As soon as the stimulated recall finished, I conducted a semi-structured interview. I asked the participants about whether or not they had anything they were dissatisfied with in their writing. This process was conducted with all the participants, and the interviews were all conducted in participants' L1, Japanese.

Table 1. *List of participants*

No.	Name*	Gender	Age	Major	Grade/Program
1	Osamu	M	22	Physics	1st-year / MA
2	Reiji	M	22	Physics	1st-year / MA
3	Nana	F	23	Chemistry	1st-year / MA
4	Shigeru	M	24	Geology	2nd-year / MA
5	Minami	F	25	Biology	2nd-year / PhD
6	Shin-ichi	M	22	Physics	1st-year / MA
7	Momoko	F	23	Biology	2nd-year / MA
8	Leo	M	25	Biology	1st-year / PhD
9	Celina	F	24	Biology	2nd-year / MA
10	Tatsuya	M	23	Physics Biology	1st-year / MA
11	May	F	23	Biology	2nd-year / MA

* The names are all pseudonyms.

4. Coding procedure

To analyze participants' thought processes during writing, the stimulated recalls were transcribed and analyzed with an inductive coding approach based on words or phrases used by the participants (Saldaña, 2013). This section presents the major coding examples.

4.1 Examples of introspection and others

Participants' utterances were first categorized into *introspection* or *others*. The process of distinguishing *introspection* from *others* is important to exclusively analyze participants' introspection on their writing processes. Before coding all the data, 107 segments (15% of the total) were coded by two linguists to confirm reliability in differentiating *introspection* and *others*, and 105 out of 107 segments were agreed between the two linguists. Coding for the two segments

was decided based on the discussion.

Introspection

Participants' utterances were categorized into *introspection* when they reported their thought processes during writing. For the excerpts and transcription conventions, see Appendix.

Excerpt

‘~~Our theme~~: Among atomic physics experiment, we specialize in experiments using exotic atoms.’ (Osamu, lines 7-9)

Stimulated recall (SR)

Osamu: After this part, the story is about my research project. I first wrote out the word “theme” for “*kenkyū naiyō* [research project]”, but I thought it might sound like a theme for an essay. So I crossed out the word, and was searching for the word for “*naiyō*” [the contents], I mean, I was thinking how to say it in English.¹

Others

Participants' utterances were categorized into *others* when they seemed not to report their thought processes during writing sessions.

- a) Question to a researcher Reiji: Is this sentence correct?
- b) Evaluation May: I was able to write smoothly as no technical terms were necessary.
- c) Reading aloud text Celina: They form complex
- d) Explanation of an action Nana: I was rewriting because the pen wrote too lightly.
- e) Unclassifiable utterance Shigeru: Well, what am I thinking?

4.2 Examples of seeking a solution

The utterances assigned to *introspection* were further categorized into smaller groups, *seeking a solution*, *finding a solution* and *identifying a problem*. The process of *seeking a solution* consists of the codes *consideration* and *conflict*.

Consideration

Consideration is a process of thinking about a subject or how to solve a problem.

Excerpt

‘Now, biofuel is made from corn, potato and satoukibi, but they can eat and it ~~make~~ ~~f~~ would be going to make food war.’ (May, lines 7-9)

SR

May: I do not know how to say “*satōkibi* [sugar cane]” in English.

Conflict

Conflict is a thought process of wondering which choice of several is the best.

Excerpt

‘Cancer diagnosis has been done by detecting a biomarker by antigen. A biomarker is protein cancer people ~~<particularly>~~ particularly have in blood.’ (Celina, lines 7-9)

SR

Celina: Biomarker, protein, well, because I wanted to write “cancer people have” after the word “protein”, I was wondering whether to add “that” or not.

4.3 Examples of finding a solution

Finding a solution is a process of applying a solution, whether it is permanent or temporary. When applying a solution, participant’s action results in either *writing* or *not writing*. If a participant applies *give-up*, his or her action ends up *not writing*. On the other hand, if a participant applies one of the four thought processes: *affirmation*, *retrieval from memory*, *compliance with the rules* and *compromise*, his or her action ends up *writing*. In order to differentiate *compromise* and *give-up*, which are major focuses of this study, the process of differentiating *writing* and *not writing* is an indicator. For the reliability of distinguishing *compromise* and *give-up*, I had another linguist categorize 64 segments (9% of the total). The interpretation of all 64 segments was confirmed using the help of the video data to check participants’ actions. Based on this procedure, I categorized the rest of the data. Here are the five thought processes included in *finding a solution*:

Affirmation

Affirmation is deciding to employ an intuitively conceived solution.

Excerpt

‘Antihydrogen: The exotic Aatom consists of antiproton and positronium, which are antimatter of proton and electron, respectively.’ (Osamu, lines 13-14)

SR

Osamu: Yes, it was the only way of saying it that I knew, so it was like “let’s use that!”

Retrieval from memory

Retrieval from memory is recalling what a writer has learnt in the past, such as grammar or vocabulary, and writing it up based on the past experience.

Excerpt

‘When we administrate this vaccine on mice, mice ~~will~~ would produce antibody against amyloid β .’ (Momoko, lines 6-7)

SR

Momoko: Well, I was recalling what I had written for a writing project in my laboratory.

Compliance with the rules

Compliance with the rules is a thought process of deciding to employ expressions based on writer’s own rules, such as deciding to write a word that is not used before in the same document.

Excerpt

‘One of my professors ~~studies about this~~ researches on Fukushima matter.’
(Nana, lines 10-11)

SR

Nana: Here, I thought that I had already used the word “study” so it would be better to change the word. I also felt uncomfortable with too many “about”, and I thought the word “research” would go well with “on”. I changed it in this way.

Compromise

Compromise is applying an alternative to an initially conceived solution. The participants mentioned in their interviews that what they had written was an alternative, resulting in simplifying their original ideas despite their intentions.

Excerpt

‘The ~~top~~ <average> score will ~~be~~ increase gradually according to this iteration.’
(Tatsuya, line 17)

SR

Tatsuya: I wanted to write something like “if you repeat this, it will evolve in a good direction”. But I could not come up with any good expressions. I think I compromised a lot here.

Give-up

Give-up is abandoning the expression of ideas in English in order to push forward with writing—in other words, it is a strategy to not write so as to proceed with the task. The difference between *compromise* and *give-up* is the resulting action: writing or not writing.

Excerpt

‘So, <by testing the activity of the enzyme,> I can categorize many cells.’ (Celina, line 18)

SR

Celina: Here, again, I was wondering how to say “*shurui* [type]” in English. I paused, but I was not able to come up with the word.

Give-up and the preceding code, *compromise*, are both examples of avoidance strategies, but they differ somewhat from the avoidance strategies of previous studies (e.g., Schachter, 1974), which are identified based on produced text from the researcher’s point of view.

4.4 Examples of identifying a problem

Identifying a problem is finding a problem in materials a writer has written before. This process includes *sense of discrepancy* and *generation of ideas based on description*. This process emerges after a writer has applied a strategy and solved a problem.

Sense of discrepancy

Sense of discrepancy is detecting a problem in what a writer has written before.

Excerpt

‘I study material Physics, which is th a field to’ (Shin-ichi, line 1)

SR

Shin-ichi: I first thought it should be “the”, but I had second thoughts that it should be “a”.

Generation of ideas based on description

Generation of ideas based on description is coming up with an idea to complement what a writer has written.

Excerpt

'I study ~~environmental analysis~~. chemistry. ~~My~~ I was interested in environmental analysis, especially about the accident occurred on 11th <in> March, 2011. <As you know, the 311 earthquake and tsunami caused tragic accident to the Fukushima Power Plant.> . . .

. . . I'd like to study about how radioactive isotopes moves in environment. ~~As~~ As the accident occurred, a lot of radioactive isotopes are released.' (Nana, lines 6-8 & lines 22-23)

SR

Nana: Then, I was about to write "accident occur(r)ed", but I just noticed that the day of the Fukushima accident was not on the 11th. It was like "oops!" I decided to modify it, but I could not recall the exact date. So I reconsidered that it might be alright with "in March", and I rewrote it. Then I thought I needed to clarify how the accident occurred. I thought I had to write a cause of the accident. This is how my "journey" began.

5. Results

5.1 General results

Based on the coding procedure presented in the previous section, 79% (541 segments) of the total (684 segments) were categorized into introspection, while 20.9% (143 segments) were categorized into others. Those assigned in introspection were further categorized into smaller groups: seeking a solution, finding a solution, identifying a problem, time pressure and style and intention. Table 2 showed the proportion of these codes categorized in introspection as well as the total number of segments in the stimulated recall (*n*). As shown in Table 2, seeking a solution, which consists of the two codes (consideration and conflict), accounted for 38.1% (206 segments). Finding a solution, which consists of the five codes (affirmation, retrieval from memory, compliance with the rules, compromise and give-up), accounted for 33.5% (181 segments). Compromise in finding a solution accounted for the relatively small percentage of 6.3% (34 segments), but was found in all the participants except Momoko and Leo. Give-up also accounted for small percentage of 2.8% (15 segments), but was found in the utterances of six participants: Reiji, Nana, Shigeru, Minami, Celina, Tatsuya. Identifying a problem, which consists of the two codes (sense of discrepancy and generation of ideas based on description), accounted for 10.7% (58 segments) of introspection.

Table 2. Results of coding utterances categorized to introspection

Category	Code	Resulting action	<i>n</i>	Proportion in "introspection"		
Problem-solving process	Seeking a solution	Consideration	173	32.0%	38.1%	
		Conflict	33	6.1%		
	Finding a solution	Affirmation	Writing	114	21.1%	33.5%
		Retrieval from memory		11	2.0%	
		Compliance with the rules		7	1.3%	
		Compromise		34	6.3%	
		Give-up		Not writing	15	
	Identifying a problem	Sense of discrepancy	Pausing/ Reading	47	8.7%	10.7%
		Generation of ideas based on description		11	2.0%	
	Time pressure*		N/A	14	2.6%	2.6%
Style & intention*	Writing style	N/A	30	5.5%	15.1%	
	Explaining the intention	N/A	52	9.6%		
Total			541	100.0%	100.0%	

* Not discussed here.

Figure 1 illustrates the relationships between the codes and categories. The three categories (seeking a solution, finding a solution and identifying a problem) relate to participants' problem-solving processes, and the codes in finding a solution (affirmation, retrieval from memory, compliance with the rules, compromise and give-up) are strategies to end a thinking process. This division is based partly on participants' utterances and partly on Manchón (2012) who wrote that the cognitive nature of writing is in part a problem-solving activity in which a writer cannot move between initial and end states, and engages in search for a solution; the writers' thinking process to get from the initial state to the end state is done through a process called problem-solving strategies. When facing a problem during writing, such as how to write in English, a writer's thought process starts from (1) seeking a solution, and the writer experiences consideration or conflict thought process. Then, the writer goes on to either (2-a) or (2-b) process in (2) finding a solution, and applies one of the strategies to end the thinking process. If the writer decides to apply (2-a) give-up strategy, this decision results in not-writing. If the writer applies one of the four strategies in (2-b), the decision results in writing. If the writer recognizes the problem is solved, the writer can end the thought process at (2) finding a solution, but if the writer finds a new problem in what he/she has written, the writer may go on to (3) identifying a problem, start another cycle of a thought process at (1) seeking a solution, and continue the circulatory process as long as time permits.

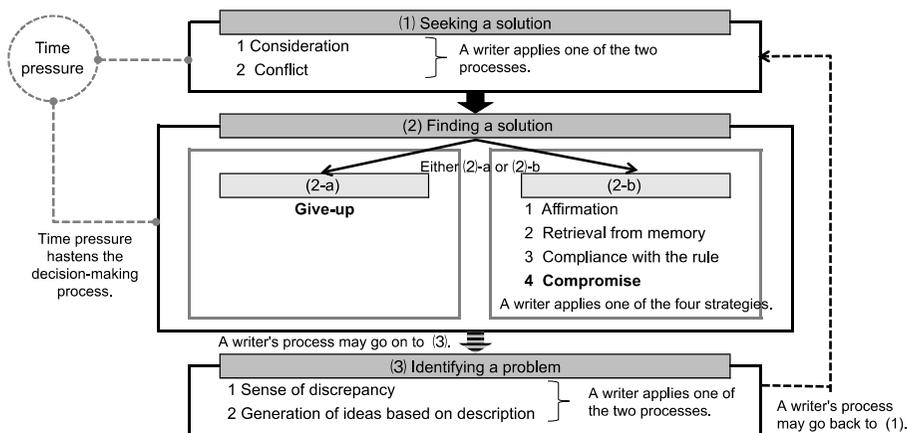


Figure 1. Writers' problem-solving process during disciplinary-content L2 writing. This figure illustrates the relationships between the major codes and categories.

5.2 Results of compromise and give-up strategies

The results of coding utterances assigned to introspection revealed a general pattern of participants' thought processes they experience during disciplinary-content L2 writing. Further careful comparison of categorized participants' utterances and produced text revealed that their utterances assigned to compromise and give-up strategies included unproduced text and unexpressed ideas, which were related to participants' expertise and unique ideas constructed in Japanese. Furthermore, the participants' experiences with compromise and give-up strategies were likely to be recalled in the semi-structured interview. In the semi-structured interviews, seven of the eleven participants reported experiences with the two strategies. This section focuses on Shigeru and Reiji, who were different types of writers in terms of their experiences in writing, speed and fluency and who both experienced compromise and give-up strategies.

5.2.1 Shigeru's compromise strategy

Shigeru was a 24-year-old, second-year master's degree student majoring in geology. Shigeru had intensively practiced writing to pass the entrance exam of a high-level university during his high school days. In the writing task, Shigeru wrote about his research project, which investigated geological layers to determine when early life began on earth. He also wrote about where he conducted exploration, and how he analyzed geological deposit. He started his writing without planning or making a draft, but his writing was smooth and fast with few pauses. He produced 233 words in 34 minutes, which was above the average number of the words produced by the participants (175 words). He only made several modifications in the last part of his writing:

'<I think that in these> ~~In In these <these>~~ hydrothermal environments, the early life gave rise.' (Shigeru's excerpt 1, line 18.)

In the stimulated recall, when he watched himself writing the passage, Shigeru reported:

"In these environments", I will come back here and write over these words after I go through to the end. I really wanted to write how the environment was when the first life began, but I simply wrote "in these environments" because I did not know how to express it. (Shigeru's compromise strategy)

His initial idea was that he wanted to write how the environment was when the life began on the earth, but as his utterance "I simply wrote 'in these environments'" shows, he used the short word "these" instead of his detailed idea. This suggests the word he was able to use forced Shigeru to simplify his initial idea. Therefore, it can be considered that he applied a *compromise* strategy to proceed with his task. Here is another excerpt from Shigeru:

'/ From now, I wish ~~elud~~ elucidating the ~~bioavailability~~ Ni, P, Zn ~~conter~~ contents in those day's seawater, because these elements are requisite for the early life's evolution.' (Shigeru's excerpt 2, lines 19-20)

While he was watching himself writing the passage in the stimulated recall, he commented:

Well, I know words. I was able to come up with words. I wanted to use the term "bioavailability" to express that my interest was to know how elements essential for living things were used. In particular, I wanted to give the exact name of the elements, but I was unable to make a sentence. So, probably, I wrote over this sentence. I did not use the term "bioavailability". I simply wrote how many elements necessary for living things were dissolved in the sea at that time. I changed my idea. (Shigeru's compromise strategy)

The technical term "bioavailability" used in the excerpt 2 was crossed out because, as he reported in the stimulated recall, he could not make a sentence using the term. Moreover, he was unable to express even what he reported in lines 4 to 5 in the stimulated recall of how many elements are necessary for living things, which he might not notice. Instead, he wrote the chemical symbols such as Ni, P, and Zn, and this alternative expression forced him to simplify his initial idea, as his comment "I changed my idea" suggests. In his interview, he himself described

that this simplification process of his initial idea as compromising, providing a basis for the researcher to differentiate this strategy from the one of abandoning the writer's idea and to name this strategy compromise. When he was asked in the semi-structured interview if he had anything he was dissatisfied with in his writing, Shigeru said:

For example, particularly the last part, which I wrote about things or projects that I am most interested in. I wanted to say that I would like to know what the Earth's environment was like at the time when the first life started 4 billion years ago. I wanted to write: "I would like to know how nickel, phosphorus and zinc were used by living things". I wanted write it more explicitly, but I could not come up with better expressions, and so I simply wrote how much nickel, phosphorus and zinc there were at that time.

As his comment shows, Shigeru reported similar ideas mentioned in his stimulated recall. What is more, as he said in the first line of the semi-structured interview, the passages shown in excerpts 1 and 2 should have been the important part for him because they explained what he was most interested in.

5.2.2 Reiji's compromise and give-up strategies

Reiji was a 22-year-old, first-year master's degree student majoring in physics. In the writing task, he wrote about his research project on exotic atoms. Although his TOEIC score was 620, he had limited experience in writing. In the writing task, he wrote about his research project on exotic atoms and he produced 75 words in 37 minutes. This was the second least number of the words produced among the participants. He started by writing out some key words he might use later. In the process of writing, he made long pauses many times and spent a long time on writing a single sentence. For example, he paused for 1 minute and 45 seconds to write out the first word in the following sentence after he wrote the previous one:

'Hydrogen contains two particles, proton and electron.' (Reiji's excerpt 1, lines 5-6)

Since he paused for a considerably long time in the video played for the stimulated recall, I asked him what he was thinking. Reiji reported:

Reiji: I don't know how long I paused here. But I was thinking that I had to explain about "hydrogen atom", and I was thinking about how to express it in English.

Kimie (the researcher): Did you have any idea in Japanese?

Reiji: Well, the final sentence was different from the initial idea.

Kimie: I see.

Reiji: Initially, I came up with an image of an atom model that has a proton in the center and an electron rotating around the proton. And, I was wondering how to express it in English.

Kimie: Uh-huh.

Reiji: But I gave up describing an accurate model. I gave it up. Instead, I wrote out “hydrogen contains two particles, an electron and a proton”.

(Reiji’s compromise strategy)

According to his comments, he seemed to have the original idea in Japanese, but his ideas were not all expressed in Reiji’s excerpt 1. For example, the idea of an atom model mentioned in stimulated recall was not included in Reiji’s excerpt 1. Instead, the idea was simplified to two particles: a “proton and electron”. That is, his initial idea was compromised when he attempted to express it in English. Similarly, he had another unexpressed idea in the following excerpt:

‘This “Anti” means different charge.

For example, ~~Hydrogen~~ <electron> has ~~+1~~ -1 charge.

Anti ~~Hydrogen~~ <electron> has +1 charge.’ (Reiji’s excerpt 2, lines 9-11)

Since he crossed out the word “Hydrogen” in the video played for the stimulated recall, I asked him why:

Reiji: Yes. I did not include the explanation, but I wish I could have described that hydrogen itself did not have charge.

Kimie: Uh-huh.

Reiji: Well, here, it is described that an electron has minus 1 charge. However, hydrogen actually has a proton and an electron. The proton also has both plus and minus charge, which differ in charge from each other. Hydrogen has a proton with plus 1 charge and an electron with minus 1 charge, and they cancel each other out. Hydrogen therefore has no charge. I wish I could have said something like this but actually I did not. Here, I wrote “hydrogen” but it was just a mistake.

(Reiji’s give-up strategy)

As his comment “I did not include the explanation” in the stimulated recall shows, the

explanation of hydrogen's charge cannot be identified in any other part of his writing material, suggesting he abandoned the idea. In his excerpt 2, he only explained what "Anti" means using an example of an electron. When he was asked in the semi-structured interview if he had anything he was dissatisfied with in his writing, Reiji commented:

Well, I have several expressions I am dissatisfied with. As for the word "contain", I used the expression in the sense of including, but if I could say it in Japanese, I would have expressed it like there was a proton in the center and an electron orbiting around the proton. I wish I could have said it in English. Another one is here. This sentence. The expression of "anti" means having opposite charge. I was not able to explain it in English.

Reiji's comments in the semi-structured interview show that he also vividly recalled his two unexpressed ideas: one he compromised and the other he gave up.

6. Discussion

This study has evinced that writers experience various writing processes in disciplinary-content writing under controlled conditions. The analysis of the results has revealed that writers experience a cyclical problem-solving process with various strategies including two different avoidance strategies, compromise and give-up. Further examination of the stimulated recall data has shown that the utterances assigned in compromise and give-up strategies in finding a solution revealed discrepancies between what writers wanted to express and what they actually wrote. In other words, compromise and give-up strategies were found to encompass writers' unproduced text and unexpressed ideas.

These results have shown that writers avoid not just certain words or expressions (i.e. local avoidance), but also simplify or abandon their conceived ideas (i.e. global avoidance), which include specialized knowledge or unique ideas constructed in their L1. L2 writers may not always intentionally avoid certain phrases or words due to uncertainty about which would be correct, as discussed in conventional studies on learners' avoidance strategies (Larsen-Freeman & Long, 1991), but due to a more fundamental lack of knowledge of how to express their ideas in the target language. This L2 writer's tendency was presented in detail in Shigeru's and Reiji's cases. The participants' utterances have revealed that they had expert knowledge that they wanted to share but were able to formulate only in their L1. While an introspective method usually cannot reveal what is really happening in the participants' heads at a particular time, this study was able to reveal this L2 writer's tendency because the recalls and interviews were conducted in the L1 so that the participants were able to give detailed explanations.

As shown in Shigeru's case (a fast and productive writer) and Reiji's case (a slower and less productive writer), compromise and give-up strategies were identified in utterances of different types of writers. This finding implies that the two strategies can be experienced by writers regardless of their experience, style and fluency. Manchón (2012) also found that the L2 writers' dependence on the L1 can be observed even with high-level L2 writers as well as with low-level L2 writers, implying that proficiency is not the only factor for the use of L1 in L2 writing.

Although compromise and give-up accounted for only a small percentage in introspection, 6.3% and 2.8% respectively, seven of the eleven participants recalled their experiences with compromise and give-up strategies when they were asked whether or not they had anything they were dissatisfied with in their writing. This result suggests the possibility that the experiences with compromise and give-up strategies may be vividly retained in writers' memory and can be identified by asking a question after writing tasks. This finding also implies that the two strategies may appear less frequently but include more important information for writers. Identifying the two strategies through two-way communication, including dialogue in classroom activities or consultation, may thus allow language teachers to assist their learners so that they can express their expertise and unique ideas they really want to share but they cannot express in the L2.

This study has highlighted the importance of understanding disciplinary-content L2 writing not only from overtness in text but also from L2 writers' covert difficulties—unproduced text and unexpressed ideas. In other words, this study claims attention for the need to understand writer's view of the success or failure in the writing. However, due to the small number of participants and the single piece of writing for each participant, it is unclear to what extent the findings are generalizable. Compromise and give-up strategies in L1 disciplinary-content writing also need to be examined to compare unproduced text and unexpressed ideas in between L1 and L2. Nevertheless, the significant part of this study is that it shed light on the potential of an L2-writer-oriented pedagogy for disciplinary-content L2 writing.

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Appendix: The excerpt and transcription conventions

word	Words crossed out by a writer
<word>	Words later added by a writer
/	New paragraph (a symbol made up by Shigeru)
<i>italic word</i>	Untranslated words in transcripts to convey participants' intention
[word]	Translation of italic words

Note

¹ Stimulated recall data (SR) were transcribed and translated from Japanese to English by the author.

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