Exploring and Analysis of Student Engagement in English Writing Grammar Accuracy Based on Teacher Written Corrective Feedback

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Abstract

Whether students benefit from written corrective feedback (WCF) may depend on their level of engagement with the feedback. To date, student engagement with written corrective feedback has been investigated qualitatively. However, the association between student engagement with feedback and learning outcomes that result from that engagement has not been thoroughly examined. Moreover, little attention has been paid to secondary students' engagement with written corrective feedback because most studies have focused on university students. Therefore, this mixed-method experimental study was conducted to discern if there was an association between student engagement with feedback and English writing grammar accuracy and to explore how high school students engaged with the feedback behaviorally, affectively, and cognitively. Writing tests and a questionnaire were used with 26 secondary

students, and focus group interviews were conducted with five randomly-selected participants before, during, and after the intervention. The results indicated that there was no significant association between the variables and that students' engagement with WCF had both negative and positive effects on their English language writing accuracy. The nature of their engagement with this type of feedback was ultimately found to be complex and linked to the three dimensions of student engagement.

Introduction

Developing strong English writing skills is important for daily communication and workplace interactions. Due to continued advancements in technology, written communication is becoming increasingly important in education, business, and other fields across the globe. However, this skill requires strong linguistic competence and other abilities such as critical thinking, so it is often believed to be more difficult to master than other competencies (Dueraman, 2015). In Thailand, it has been reported that secondary students (Padermprach, 2017) and university students (Boonyarattanasoontorn, 2017) are not able to write accurately and effectively because of their limited linguistic knowledge. Therefore, teachers must find a way to develop their students' linguistic comprehension in order to foster their writing skills. One common strategy that is used to help students pay attention to linguistic errors in writing involves providing written corrective feedback (WCF).

WCF is generally used to deal with linguistic errors and improve accuracy in writing. Although providing WCF for every student is time-consuming, it is a crucial practice for writing instruction (Ferris & Hedgcock, 2014). Several recent studies have found that WCF improves

grammatical accuracy in writing, but many believe that we still do not understand the full potential of this type of feedback (Hyland & Hyland, 2019). Though WCF has its benefits, Bitchener (2017) has suggested that research still needs to be done on the factors that influence its effectiveness.

Hyland and Hyland (2019) have pointed out that student responses to WCF have not yet been widely researched. Previous studies (e.g., Han & Hyland, 2015; Zheng & Yu, 2018) have explored how university students engaged with WCF behaviorally, affectively, and cognitively and found that students who had high levels of engagement with the feedback were able to make more corrections than the students who were less engaged. However, these studies did not examine whether and to what extent student engagement with feedback equipped them with what they needed to write more accurately when they were faced with a new assignment. Moreover, to our knowledge, no studies have investigated secondary students' engagement with WCF. Because secondary students and university students work in different contexts, it cannot be assumed that they engage with feedback in the same way.

In order to fill this research gap, we examined whether and to what extent student engagement with teacher WCF contributed to English writing grammar accuracy. Moreover, unlike previous studies, we addressed another perspective of student engagement with WCF by exploring how secondary students behaviorally, affectively, and cognitively engaged with feedback, hoping to gain insights into the nature of student engagement that could allow English writing instructors to develop their written corrective feedback to increase student engagement.

Literature Review
Student engagement with written corrective feedback and learning outcomes

According to Ellis (2010), student engagement refers to a student's commitment to their writing after they have received corrective feedback. Their engagement is mediated by different types of

corrective feedback, individual difference factors, and contextual factors and can be interpreted through three perspectives: behavioral engagement, affective engagement, and cognitive engagement. Behavioral engagement is concerned with whether students use strategies to correct their errors and what strategies they use. Affective engagement refers to emotional reactions and attitudes towards WCF, and cognitive engagement is how and to what extent students pay attention to the feedback. Ellis (2010) originally oriented his componential framework around oral and written corrective feedback. Because these two types of feedback have notable differences, the framework should be modified to make it more compatible with WCF as Han and Hyland (2015) have suggested. For example, written corrective feedback is delayed, whereas oral corrective feedback is usually immediate (Ellis, 2010; Han & Hyland, 2015).

According to Han and Hyland (2015) and Zheng and Yu (2018), student engagement is considered a "meta-construct" of the three types of student engagement, each of which influences one another. According to Han and Hyland (2015), the relationship between these three dimensions is dynamic and they have suggested that student engagement should be investigated holistically rather than individually. Zheng and Yu (2018) have also found an interrelationship between the three types of student engagement.

Regarding learning outcomes, Ellis (2010) has interpreted the learning outcomes as acquisition, explaining that studies on written corrective feedback should focus on acquisition as "an increase in the accuracy with which partially acquired features are used" (2010, p. 344) because it is difficult to identify a linguistic item that all students do not know or have not acquired.

Research framework for student engagement with teacher written corrective feedback

In this study, behavioral engagement, affective engagement, and cognitive engagement were interpreted as interrelated sub-constructs of student engagement (i.e., the meta-construct), which aligns with the work of Han and Hyland (2015) and Zheng and Yu (2018). Then, for

the purposes of this study, we treated English writing grammar accuracy as a learning outcome as the result of student engagement, as shown in Figure 1.

Figure 1

Research Framework for Student Engagement with Teacher Written Corrective Feedback
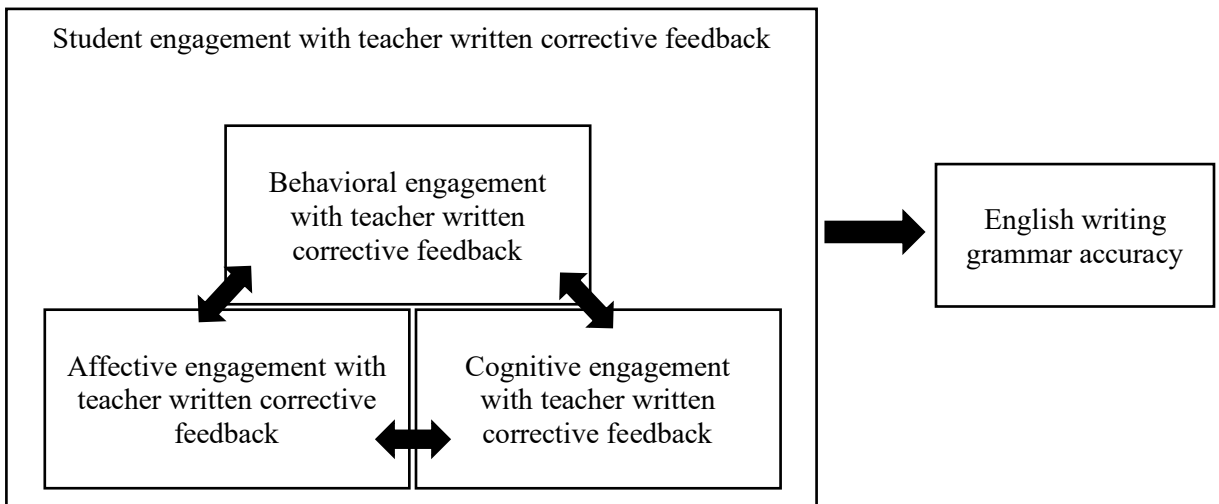
Behavioral engagement refers to the observable revision strategies that students use to help them understand written corrective feedback and resolve their errors (Han & Hyland, 2015). In order to analyze revision strategies, Ferris (2006) has proposed student revision analysis categories such as "error corrected," "incorrect change," "no change," "substitution," and "deleted text" (p. 88). According to her, students make correct revisions according to their teacher's feedback most of the time, with incorrect changes, no changes, and other revision strategies being found to a lesser extent. Ferris et al. (2013) have examined how students revised their writing and discovered many observable strategies, such as rereading many times and asking others to read a text.

Affective engagement refers to a student's emotional reactions and attitudes towards WCF after they receive it (Han & Hyland, 2015).

According to Mahfoodh (2017), these emotional responses can be positive and negative. Different types of teacher written feedback elicit a range of emotional responses, including satisfaction, acceptance, surprise, disappointment, and happiness. For example, students may feel acceptance of feedback, rejection of feedback, surprise, and dissatisfaction, while negative evaluation can cause disappointment and frustration. Nevertheless, negative emotional responses could influence students' strategies for revision and their understanding of feedback. Ultimately, attitudes towards feedback can be positive, neutral, and negative (Han & Hyland, 2015).

Cognitive engagement is the extent to which students process WCF (Ellis, 2010) and utilize cognitive strategies (Han & Hyland, 2015). The degree to which students process feedback may depend on the quality of noticing (Qi & Lapkin, 2001). It could be perception, noticing, and understanding based on Schmidt's (1990) Noticing Hypothesis. The use of cognitive strategies can indicate that students are making a cognitive effort to process WCF, and their adoption of metacognitive strategies can reflect regulation, which is important to processing feedback (Han & Hyland, 2015).

How students cognitively process feedback can also be explained through Bitchener's (2019) cognitive-processing stages for a single WCF episode. Bitchener has explained that students need to be motivated and focus on accuracy before they pay attention to feedback. Only then can they notice the gap between the WCF and their errors with understanding. When the students comprehend what the feedback is telling them about their errors, they analyze and compare the WCF with their existing long-term linguistic knowledge to produce accurate outputs. If the student correctly produces a new output, the consolidation process occurs, but if they are not accurate, the process needs to be repeated.

In addition to explaining the cognitive-processing stages involved in understanding a single piece of WCF, Bitchener (2019) has also proposed stages for accessing new knowledge from processing WCF in order to explain how students use recently acquired knowledge to write new texts. He has explained that students need to be motivated

about accuracy and focus on meaning while writing because they must be aware of the relationship between form and meaning in a text. Then, when students recognize that they need to convey a particular meaning by using new knowledge, they will be ready to retrieve it and eventually produce the output. Finally, their output will be assessed, and feedback will be provided if the output is inaccurate.

Related studies on student engagement with teacher written corrective feedback

Han and Hyland (2015) investigated how four university students behaviorally, affectively, and cognitively engaged with teacher WCF. Their multiple-case study revealed that these students engaged with the feedback in different ways. The first participant was highly engaged with the feedback and developed a deeper understanding of it by attending a teacher-student writing conference. She also employed many cognitive and metacognitive strategies, such as repeating what she understood from the writing conference and regulating her negative feelings. The second participant was overwhelmed after receiving the feedback and could not regulate her negative emotions. She also left some errors unchanged because of her lack of understanding, misunderstanding, and overconfidence. Consequently, she could only correct a few errors. The third student was found to have limited comprehension despite several successful corrections. It was reported that she often used an online dictionary but did not understand the structure that she needed to use for corrections. The fourth participant did not intend to engage with the feedback and asked his friend to correct the errors in his work.

Zheng and Yu (2018) explored how 12 low-proficiency Chinese undergraduate students engaged with teacher WCF in three dimensions. For behavioral engagement, the participants reported that they read through their text and made the corrections based on their native language. Some of them consulted other people and used external resources, such as the Internet. With respect to their affective engagement, most of the participants appreciated the teacher's efforts to provide them with feedback, but they wanted to have the opportunity

to participate in an individual writing conference. Nearly all of the participants responded to the feedback positively, but a few expressed frustration when they realized that they still made the same errors in the next draft. The participants' cognitive engagement was limited because they only corrected errors when their teacher provided them with the correct form or direct corrective feedback. They had trouble understanding the WCF, especially the indirect corrective feedback, because they were uncertain about what the teacher was trying to tell them and left the errors unmodified.

Research Objectives

1. To examine how student engagement with teacher written corrective feedback is related to English writing grammar accuracy
2. To investigate how secondary school students engage with teacher written corrective feedback behaviorally, affectively, and cognitively

Methodology

Research design

A mixed-method experimental design was employed in the study.

Context and participants

The study took place at an all-girls school in Bangkok. Due to the COVID-19 pandemic, the research was conducted in an online class. English Reading-Writing course was an additional English course that secondary students were required to take. The class met for 40 minutes on Wednesdays over the course of 14 weeks except for two classes which lasted 50 minutes for the writing tests. Purposive sampling was used to select the participants. Twenty-six tenth graders were selected for this study because they were enrolled in English Reading-Writing and did not study in an English program. We chose these students to minimize opportunities that could enhance their writing skills from other English courses. Since this study employed a

mixed-method experimental design, five participants (20%) were randomly selected for qualitative data collection. Based on a class orientation and their pervious performance in the class observed by the researcher before the study, most participants had similar educational background, past experiences in learning English, and English writing proficiency.

Feedback provision and delivery

According to Lee (2017), coded feedback with an underline as indirect WCF was provided by the researcher as the writing instructor in this study. Eleven error codes were adopted from Ferris' (2006) error categories and codes: word choice (WC), verb tense (VT), verb form (VF), word form (WF), articles (Art), singular-plural (SP), pronouns (Pro), run-on sentence (RS), fragment (F), sentence structure (SS), and subject-verb agreement (SV). Because there were some error categories that focused on errors that took place at the phrase level or the sentence level, such as fragments and sentence structures, entire erroneous phrases and sentences with these kinds of errors were underlined, and the error codes were written at the beginning of the phrases or sentences to indicate errors at the phrase and sentence levels. Moreover, if two or more errors were close together or overlapped in the same sentence, multiple error codes with underlines were provided in different colors. An example of the feedback provision is shown in Figure 2. The feedback was written on an electronic version of the participants' drafts, and the file was returned to them in Google Classroom.

Figure 2

Example of the Feedback Provision

Research instruments and validation

A writing pre-test and a writing post-test were used to evaluate the participants' English writing grammar accuracy before and after their engagement with teacher WCF. Each test provided one prompt for the participants to write a descriptive paragraph about 120 words in 50 minutes. The topics for the pre-test and post-test were describing a person they knew and describing a person they admired, respectively. The selection of the topic for the descriptive writing and the number of words were chosen from the coursebook they used in the school. However, since this study used written tests which were less objective, two raters were necessary to ensure consistent scoring.

A questionnaire on student engagement with teacher WCF was used to examine the degree of the participants' engagement after editing grammatical errors. The questionnaire was composed of 30 items divided into three parts according to the three dimensions of student engagement with teacher WCF: behavioral engagement, affective engagement, and cognitive engagement. Each part consisted of ten items representing each dimension. While using a questionnaire can gather responses from the participants very quickly, some of their responses might not be true because of their desire for privacy (Creswell, 2012). To deal with this problem, the participants in this study were assured that their responses would remain anonymous.

Interview protocols were used to investigate the participants' engagement with teacher WCF in three perspectives: behavioral engagement, affective engagement, and cognitive engagement before, during, and after engaging with the feedback. Because the study

included three interview sessions, there were three interview protocols. The first interview protocol was developed to elicit the participants' past experiences with English writing. The second one was used to explore how the participants engaged with the teacher WCF behaviorally, affectively, and cognitively. The third one aimed at investigating the participants' reflection of how their engagement with the feedback contributed to their improvement in English writing grammar accuracy. According to Creswell (2012), one disadvantage of using an interview is that responses from an interviewee may be made to please an interviewer. To solve this issue, the participants were guaranteed that their responses would not affect their final grade of the course.

With regard to validation of the instruments, the writing pre-test and post-test were evaluated based on content validity, and the questionnaire and interview protocols were validated by considering their construct validity through the index of item-objective congruence (IOC) by three experts in the field of English language teaching. These instruments were considered appropriate, and they were revised according to their suggestions. The writing tests were measured for their reliability based on inter-rater reliability by correlating the scores by the raters, who were the researcher and one English teacher. The inter-rater reliability was 0.987 for the writing pre-test and 0.989 for the writing post-test.

Data collection

According to Creswell and Creswell (2017), a mixed-method experimental study is a research design that allows qualitative data collection to be conducted before, during, and/or after the intervention or some combination to enhance the quantitative findings. The present study collected the qualitative data three times which constituted the combination of all three aspects, hence three main phases of data collection, as illustrated in Figure 3.

Figure 3

Data Collection Procedure
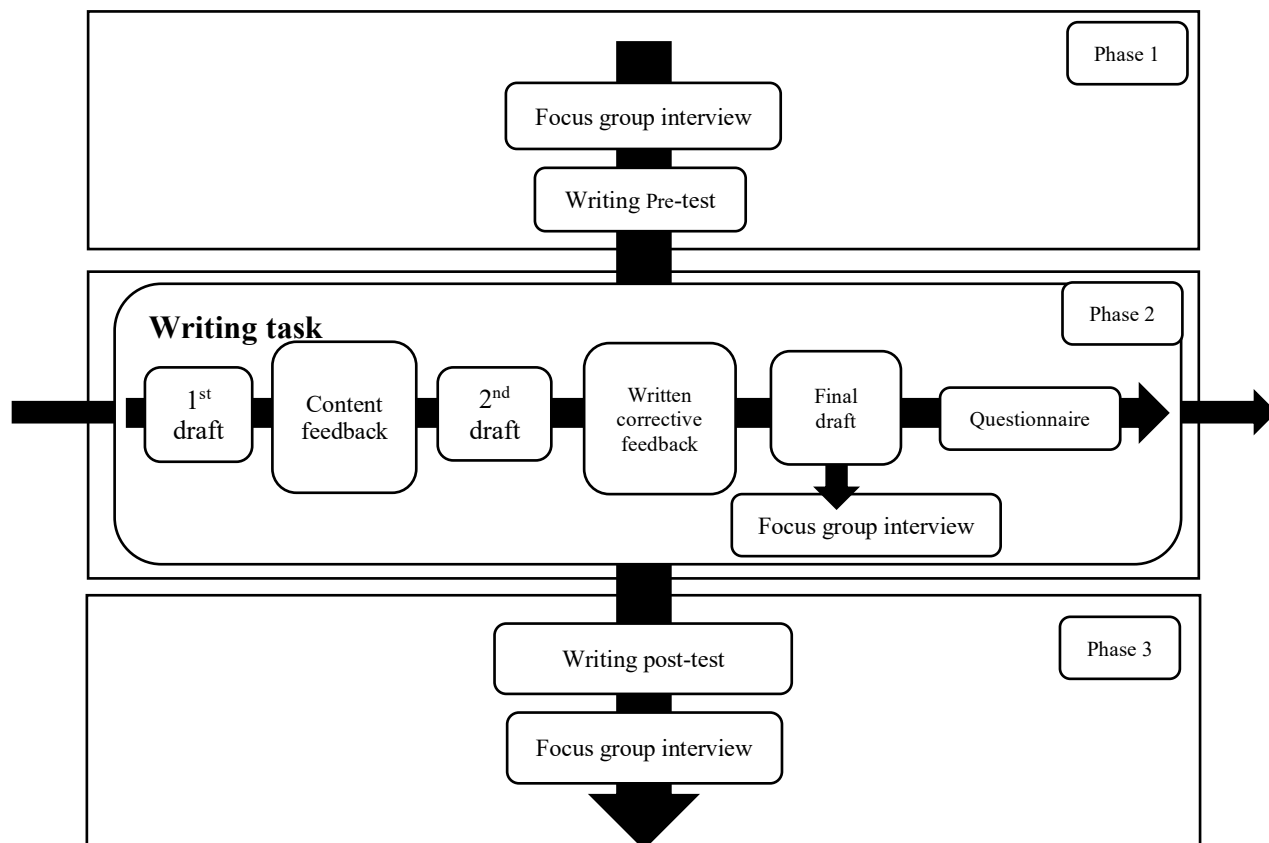
In the first phase, a focus group interview with five randomly selected participants was conducted to gather their background data and assess their past experiences with learning how to write in English. After this interview, the writing pre-test was administered to measure their English writing grammar accuracy before engaging with the teacher WCF as a part of writing instruction. The participants were required to write a 120-word descriptive paragraph about a person they knew in 50 minutes. Then, the pre-test was examined and rated by the researcher and another English teacher based on the analytic scoring rubric which focused on the eleven error categories adapted from Ferris's (2006) error categories and codes: word choice, verb tense, verb

form, word form, article, singular-plural, pronoun, run-on, fragment, sentence structure, and subject-verb agreement.

In the second phase, the participants were asked to write a 120-word descriptive paragraph about their classmate. After they completed the first draft, content feedback was provided two days later. After that, the participants reviewed and revised their draft within five days. When they submitted their second draft, the coded feedback was introduced and briefly explained to them. Coded feedback guidelines were also provided for reference. Then, the second draft was examined, and the researcher serving as the writing instructor provided WCF on eleven error categories for the next two days. The content feedback was provided before the WCF in order to keep the participants from deleting the WCF as they were trying to revise. When they finished their error corrections and submitted the final draft in five days, the five randomly selected participants had another focus group interview to assess how they behaviorally, affectively, and cognitively engaged with the teacher WCF. The five participants' second drafts and final drafts were used as prompts for the subsequent interview. After the focus group interview ended, the 30-item questionnaire was administered to all the participants, asking them to report how well they had engaged with their teacher's WCF. The data from the focus group interview and the questionnaire were collected concurrently.

In the third phase, which took place one week later, the participants took the writing post-test to measure their English writing grammar accuracy after engaging with the feedback, which involved writing a 120-word descriptive paragraph about a person they admired in 50 minutes. The post-test was examined and rated in a similar way to the writing pre-test. A focus group interview took place after the post-test to better understand how the participants' engagement with the feedback contributed to their English writing grammar accuracy through three perspectives.

Data analysis

Because we used a mixed-method experimental design, it was necessary to analyze both quantitative and qualitative data in order to

answer the first research objective. As for the quantitative data analysis, in order to identify the association between student engagement with WCF and English writing grammar accuracy, the scores from the writing post-test and the questionnaire were used to find the correlation.

The writing post-test was examined to measure the participants' English writing grammar accuracy in eleven error categories after they engaged with the feedback by the researcher and an English teacher. In order to minimize the differences in text length, the first 100 words of the post-test were scored based on the analytic rubric score.

The 30-item questionnaire that focused on student engagement with WCF was scored based on the participants' responses. The questionnaire consisted of two fixed answers ("Yes" and "No"), so the score depended on how many statements the participants felt accurately described their engagement. The more statements they agreed with, the higher the scores that corresponded with their level of engagement with the feedback.

Then, the two sets of scores from the writing post-test and the questionnaire were correlated. Because the number of participants in this study was fewer than 30, the scores were analyzed to determine whether parametric or non-parametric analysis was suitable (Pagano, 2013). The Shapiro-Wilk test was used to examine if the data were normally distributed, and it was found that both variables were in fact normally distributed ($p > .05$). Therefore, the Pearson product-moment correlation coefficient was used as a statistical test to determine if there was any association.

As regards analysis of the qualitative data, the after-post-test focus group responses were examined using content analysis, which involved transcribing and coding the data and grouping them into themes (Creswell, 2012). The responses were coded and grouped based on the contribution of student engagement with teacher WCF to English writing grammar accuracy.

Regarding the second research objective, the responses from the before-pre-test and before-post-test focus group interviews were also examined using content analysis. The codes and themes were based on

the three types of student engagement with teacher written corrective feedback.

Results

The results of the study are presented in accordance with the research objectives.

Research objective #1: To examine how student engagement with teacher written corrective feedback is related to English writing grammar accuracy

Table 1 illustrates the association between student engagement with teacher WCF and English writing grammar accuracy. The section on the left side of Table 1 shows the relationship between the two variables; the section on the right side focuses on the results of the after-post-test focus groups and illustrates the positive and negative contributions that student engagement with WCF made to English grammar accuracy through the three dimensions.

Based on the correlation coefficient on the left side of Table 1, there was no association between student engagement with teacher WCF and English writing grammar accuracy r(24) = -0.09, p = .67.

To examine further, the average scores of the writing pre-test and post-test were analyzed through a paired-samples t-test. It was found that the average score of the post-test was significantly higher than that of the pre-test at the 95% confidence level (p = 0.003). Therefore, the effectiveness of the feedback might not have played a role in the association. Interestingly, an improvement in English writing grammar accuracy between the writing pre-test and post-test was found despite the fact that no significant relationship existed between the two variables, which was a finding that was further investigated through the focus group interview.

Table 1

The Joint Display of the Integration between the Quantitative and Qualitative Data

Quantitative findings based on the correlation between English writing grammar accuracy and student engagement with teacher written corrective feedback			Qualitative findings based on the participants' views about how the results of their engagement with teacher written corrective feedback affected their English writing grammar accuracy
		Student engagement with teacher written corrective feedback	1. Behavioral engagement Positive contribution: - Checking for accuracy during the test Negative contribution: - Not having an opportunity to practice more 2. Affective engagement
English writing grammar accuracy (Post-test)	Pearson Correlation	-.089	Positive contribution: - Feeling more cautious
	Sig. (2-tailed)	.667	Negative contribution: - Unvarying attitudes towards the feedback
	N	26	3. Cognitive engagement Positive contribution: - Paying more attention to the errors - Remembering a pattern of a structure to write for the test Negative contribution: - Forgetting

As shown on the right side of Table 1, the contribution that student engagement with teacher WCF made to English writing grammar accuracy was found to be positive and negative in all three dimensions. With respect to the contribution that behavioral engagement with the feedback made towards the development of English writing grammar accuracy, the participants reported that they checked their accuracy during the test, especially the most common errors that they made during the writing task. For instance, one student made the following comment:

> "After correcting the errors, the feedback made me realize that I often begin a sentence with 'because' and 'but,' so I always checked it while doing the test." (Participant 4)

However, the participants indicated that there should be more opportunities to perform another writing task and engage with the new feedback in order to use what they learned from the comments while working on another piece of writing. For example, one participant explained:

> "I think I can write more accurately if I do another writing task and receive the feedback again so that I can learn if the errors I made from the previous [writing] task remain and if there are any more new errors." (Participant 2)

With respect to the contribution that affective engagement with teacher WCF made towards the development of English writing grammar accuracy, the participants reported that they felt they should not make mistakes on the test. One participant explained, "the teacher's feedback made me feel more cautious about the errors when I was doing the test." These responses showed the positive impact of their affective engagement with the feedback. However, all the participants believed that their attitudes towards the WCF did not affect their English writing grammar accuracy because they thought "it was the norm to correct errors according to the feedback and learn from it." Therefore, the fact that their attitudes remained unchanged indicated that their affective engagement with the teacher WCF negatively contributed towards their English writing grammar accuracy.

Regarding the impact of cognitive engagement with teacher WCF on English writing grammar accuracy, the participants reported that they paid more attention to the errors that they made most frequently during the writing task. One participant explained:

> "It [the feedback] helped me remember the errors I made very often, so I had to pay more attention to them [when doing the writing test]" (Participant 2)

Moreover, another participant mentioned another cognitive strategy that helped her complete the writing test:

> "Because of self-editing and searching for the information on the Internet, I could remember a pattern of a structure that I had used to revise my writing in the writing task and used it to write in the test. And it was good." (Participant 3)

These two cognitive strategies indicated that cognitive engagement with teacher WCF made a positive contribution towards the participants' English writing grammar accuracy. Nevertheless, one participant mentioned forgetting as the negative contribution to the English writing grammar accuracy: "I don't know why I'm always forgetting whenever I have a test."

Research objective #2: To investigate how secondary school students engage with teacher written corrective feedback behaviorally, affectively, and cognitively

This section is divided into four parts. The first focuses on the participants' background information and past experiences with learning English writing, and the other three center on the three types of student engagement with teacher WCF: behavioral engagement, affective engagement, and cognitive engagement.

Background information and past experience

Three participants reported that when they were enrolled in the seventh through ninth grades, they learned how to write in English by completing writing assignments, such as 120-word descriptive essays and picture description writing tasks. One of the participants used to receive direct corrective feedback from her teacher. The other two reported that they had not learned writing before but had had a writing test of around 100 words in the mid-term and final examinations. Even though most of the participants did not receive feedback in the past, they perceived it as an important element of developing their English writing accuracy.

Behavioral engagement

The participants' behavioral engagement was reflected in their revision strategies and observable strategies for editing. Table 2 shows the number of errors that appeared in the texts of the five participants as well as their use of revision strategies.

Table 2

Summary of Errors in the Texts of the Five Participants and Their Use of Revision Strategies

Participants	Second drafts Total number of errors	Final drafts Total number of errors	Revision Strategies
Participant 1	22	3	Correct revision: 19 Incorrect revision: 2 No change: 1
Participant 2	18	1	Correct revision: 16 Substitution (Correct): 1 No change: 1
Participant 3	12	0	Correct revision: 11 Substitution (Correct): 1
Participant 4	14	4*	Correct revision: 13 Incorrect revision: 1
Participant 5	11	0	Correct revision: 11
*Note: including new errors after correct revision			

According to Table 2, all the participants could successfully correct most of their errors based on teacher WCF. Some of the participants (Participants 1, 2, and 4) made a few inaccurate corrections by means of incorrect revision and no change. However, Participant 4 made new errors after the revision based on the feedback. The new errors that she made after making revisions based on the feedback belonged to different error categories than her initial errors. For example, there was an error of sentence structure (parallel structure) in the original sentence. During revision, the participant corrected the parallel structure error by adding the same verb, but she made two subject-verb agreement errors:

> Original: She speaks eloquently, speaks quickly and clearly.
> Revision: She speaks eloquently, speak clearly, and speak quickly.

Based on the before-post-test focus group responses, the participants reported that they could correct their errors accurately because they understood the feedback after the teacher-student writing conference. One participant explained:

> "I understood it [the error] when the teacher [researcher] gave a hint that the two sentences were combined with a comma." (Participant 4)

The participants also reported that they searched for information on websites to help them edit their writing and understand the feedback. However, some participants pointed out they did not search the Internet for every error category. One participant explained that some errors were easy to understand and correct:

> "Some errors were not difficult to correct because the way to correct them was obvious. For example, when I got an SP [Singular-Plural], I just added an s to the noun to make it a plural noun." (Participant 5)

Regarding incorrect revisions, the participants admitted that they did not know how to correct some of the errors, especially when they did not understand the feedback. For instance, one participant made the following comment:

> "When I got an SS [Sentence Structure], I knew what it referred to, but I didn't know what it was exactly and how to correct it, so I corrected the error using my instinct." (Participant 4)

With respect to substitution, one participant reported that she was concerned about the readability of the sentence, so she decided to correct it in a way that was different from the suggestion offered in the feedback. The five participants also explained that they did not want to

delete their errors because they had to meet the word count requirement. Finally, there were two participants who did not make any changes to their errors. One of them reported that she was careless and did not check her text thoroughly; the other did not have a firm grasp of the linguistic knowledge that was necessary to correct the errors, which led to a misunderstanding about the mistakes. Consequently, she left her errors unmodified.

Regarding observable strategies for editing, all of the participants reported that they searched for grammatical guidance related to their errors online. Then, they compared example sentences available on websites with their own sentences while editing. If there were some errors that were still too difficult to fix, they consulted their peers. Then, they corrected the errors before attending the student-teacher writing conference and spoke with the researcher about checking their corrections. However, some participants said that they did not ask for help from their peers but instead waited to consult with the teacher.

With respect to the influence of behavioral engagement on cognition, the participants reported methods that were similar to the observable strategies: searching for information about certain errors online, comparing the example sentences with their own sentences, and consulting with the teacher and their peers. One participant explained that the main reason they used these strategies was to understand the feedback. Regarding the influence of behavioral engagement on feelings, the four participants reported that they were happy and proud of themselves after making the corrections. However, one participant argued that she did not feel anything because she merely viewed the act of error correction as a task.

Affective engagement

Affective engagement with WCF was investigated by examining the participants' emotional responses and attitudes towards the feedback. Three participants said that they were shocked and surprised when they received their feedback:

> "I was surprised when I saw a long line under many sentences, and some sentences had two or three layers of lines and error codes in the same sentence. I had already checked for accuracy before submitting the [second] draft, so I didn't think that I would get the feedback like this, hhh."
> (Participant 3)

In contrast, one participant argued that she did not feel surprised because she had not checked the grammatical accuracy, so she expected to receive a lot of feedback. The other participant said that she also felt disappointed when she realized that her writing contained errors.

With respect to the influence of affective engagement on behavior, the four participants reported that they wanted to have a break before making corrections because they were not ready to revise the errors immediately. One participant, however, said that she corrected her mistakes as soon as she saw the feedback. She explained that she was in the mood for working on homework when she received the feedback. As for the influence of affective engagement on cognition, some participants reported that they initially scanned the teacher WCF even though they did not make corrections right away so that they could get an overall impression of their mistakes. Some participants reported that even though they were surprised and shocked, they felt that the errors would not be difficult to correct because they received the same error codes many times. However, one participant explained that she thought the corrections were going to be complicated because she received multiple error codes and underlines in many sentences.

Cognitive engagement

The participants' cognitive engagement could be determined by the extent to which they noticed and understood the teacher WCF and what cognitive and metacognitive strategies they used to engage with the feedback.

The participants' responses revealed that they understood the teacher WCF on three different levels: total understanding, partial understanding, and no understanding. They reported that when they

totally understood the feedback, they knew what it told them and could correct the errors accurately. If they partially understood the feedback, they sought more clarification to help them better grasp the feedback. When they did not understand the feedback, they explained that they did not know what exactly the feedback was trying to convey. They recognized the error categories because of the coded feedback but did not know how to correct the errors. One participant described her understanding of the feedback that she received in the following way:

> "When I saw the VT [Verb Tense], I understood that the tense was wrong. […] For the Art [Article], I knew that there was an error about the article when I checked the feedback guideline, but I didn't know what was wrong with it. For the F [Fragments], I only knew that the sentence had a problem, but I didn't know what it was." (Participant 1)

Several participants also expressed confusion about errors that could be interpreted in different ways. For instance, one participant made the following comment:

> "I knew this F [Fragments] for "Play my best friend" [missing verb] because I felt that the sentence isn't complete, but I didn't understand this F for "keep promises and keep words" [missing subject]. (Participant 4)

Regarding the influence of cognitive engagement on behavior, all of the participants reported that they corrected the errors that they had a better understanding of first and saved the more difficult errors for later. When they were dealing with errors that they partially understood or could not understand, they searched the Internet and consulted with their peers and the teacher in order to better comprehend the feedback before they made any corrections. As for the influence of cognitive engagement on feelings, all of the participants reported that they felt slightly stressed but managed to regulate their negative feelings by taking a break before continuing with their corrections.

Discussion

This study investigated the relationship between student engagement with teacher WCF and English writing grammar accuracy and explored secondary students' perspectives of their engagement with teacher WCF in three dimensions.

The association between student engagement with teacher written corrective feedback and English writing grammar accuracy

This study found no relationship between student engagement with teacher WCF and English writing grammar accuracy despite an improvement in English writing grammar accuracy between the pre-test and post-test. The association between these variables could potentially be influenced by the negative contribution of student engagement with teacher WCF in the three dimensions, as reported in Table 1.

1. Negative contribution of three types of student engagement with teacher WCF to English writing grammar accuracy

As for the negative contribution of behavioral engagement to English writing grammar accuracy, not having more opportunities to perform additional writing tasks could negatively impact students' English writing grammar accuracy. The participants believed that they could monitor their understanding of the feedback by writing a new text and receiving feedback again to see if the same errors reoccurred.

Regarding the negative contribution of affective engagement, the participants' attitudes towards the feedback remained the same and did not significantly affect their English writing grammar accuracy. According to their before-pre-test focus group responses, the participants had positive attitudes towards teacher WCF before participating in the study, so their outlook remained the same. If they had expressed new thoughts about the feedback that were more positive or negative than their initial beliefs, it might have affected their accuracy in some ways.

As for the negative contribution of cognitive engagement, forgetting was identified as an adverse outcome. According to Bitchener (2019), forgetting can be interpreted as when students cannot identify

the need to use new knowledge while writing a text. Consequently, they do not access and retrieve the knowledge that they have recently acquired, which leads to inaccuracy.

Despite the negative contribution of student engagement with teacher WCF to English writing grammar accuracy, the positive contribution found in this study may indicate that the participants might have developed strategies to help them write more accurately. The positive contribution of student engagement with teacher WCF to English writing grammar accuracy is discussed in the next section.

2. Positive contribution of the three types of student engagement with teacher WCF to English writing grammar accuracy

With respect to behavioral engagement's promotion of English writing grammar accuracy, checking for accuracy during the writing test could be a positive outcome that could suggest the participants acquired an understanding of English writing grammar accuracy after engaging with the feedback.

Regarding the contribution of affective engagement to English writing grammar accuracy, it is possible that the students felt more cautious while writing a text because the teacher WCF drew attention to their errors. According to Bitchener's (2019) stages for accessing new knowledge from processing WCF, this kind of engagement could indicate that students have developed a stronger motivation to be accurate, which is a necessary step to attaining new linguistic knowledge and writing a text.

When it came to analyzing the impact of cognitive engagement on English writing grammar accuracy, we found that the participants adopted cognitive strategies, such as paying more attention to the errors that they made most often and remembering a structure to help them write a text. The cognitive strategies mentioned in Table 1 might have helped them write accurately because there was a statistically significant improvement in English writing grammar accuracy.

As regards the positive and negative effects of student engagement with teacher WCF on English writing grammar accuracy, it seemed that student engagement might not immediately lead to an

improvement in accuracy but may indicate learning from engaging with the feedback. Other factors, such as individual difference factors and contextual factors, might affect student engagement with WCF feedback, as Ellis (2010) has proposed. Nevertheless, teacher written corrective feedback is still necessary to help students improve their accuracy by learning from the feedback.

Three dimensions of student engagement with teacher written corrective feedback

Behavioral engagement

The participants' behavioral engagement with the feedback did not always result in effective corrections as there were some participants who made incorrect revisions. The five participants reported that they could correct their errors effectively when they were able to analyze and understand the feedback. While discussing incorrect revision, the participants explained that they did not understand what the feedback was trying to convey about the errors, so they did not know how to correct them. It can thus be assumed that understanding is necessary for effective revision, which aligns with Bitchener's (2019) claim that understanding WCF can influence the utilization of revision strategies. This finding is consistent with Zheng and Yu (2018) who have reported that their participants did not edit their errors when they did not understand the feedback. Substitution was also used for corrections, but only when other concerns related factors other than accuracy were raised. It is worth noting that substitution may reflect deeper student engagement than correct revision because the former appeared to lead to changes at the sentence level, while the latter remained at the word level. As for deletion, the five participants reported that they did not delete the errors because of the word count requirement. It could be said that the word count requirements encouraged the participants to correct their errors rather than delete them. No change could be accounted for by misunderstanding according to the participants' responses.

Based on the participants' responses, searching for information on websites and consulting the teacher were the main observable

strategies used by all of the participants. This finding was also reported by Zheng and Yu (2018) who found that many participants searched the Internet to consult about the errors. However, it does not necessarily mean that they went online for every error because some of the errors were found to be easy to understand and correct.

Behavioral engagement was found to have an impact on cognitive and affective engagement. When the participants searched for information online, they compared example sentences with their own and consulted with the teacher and their peers, which indicated cognitive and metacognitive strategies to help them make revisions. If the information on the websites did not help them correct their mistakes, they discussed them with their teacher and peers. Regarding impacts on affective engagement, the participants expressed relief and happiness after they made a correction. It can be assumed that they might have had trouble correcting the errors based on the feedback. The reason why one participant felt indifferent after making a correction might be explained by other factors.

Affective engagement

Most of the participants felt surprised and shocked as soon as they received the teacher WCF. This result was partially consistent with Mahfoodh's (2017) finding that feeling surprised was the emotional responses to the coded feedback. However, his study did not identify shock as an emotional reaction to coded feedback. This difference may have stemmed from the fact that our study targeted a large number of error categories, which might have made the participants think that they made a lot of errors. Moreover, providing multiple error codes when many errors occurred in the same sentence and using a long underline to indicate sentence-level errors could have caused these negative feelings. Despite feeling surprised and shocked, however, the participants regulated their negative emotions by taking a break before correcting their errors and resting during the revision process, which indicated that they used metacognitive strategies to monitor their feelings and prepare themselves to make corrections. This finding was also consistent with Han and Hyland's (2015) findings, as one of the

four participants who had a high level of engagement with WCF changed negative feelings to motivation.

Cognitive engagement

The three levels of understanding of teacher WCF reflected in this study could resonate in some ways with the three levels of awareness mentioned by Schmidt (1990). Total understanding could be consistent with the understanding level because it included being able to identify the specific errors and know how to correct them accurately, which resulted in learning from the feedback. However, it should be investigated with caution since understanding one error code does not necessarily mean understanding every grammatical point related to the error code. Partial understanding could be similar to the noticing level because this type of comprehension likely leads to learning from understanding the feedback. However, no understanding might be different from the perception level because the five participants focused on all the error codes but failed to analyze and understand the teacher WCF or misunderstood the feedback, resulting in incorrect revision. It could be said that the coded feedback may be explicit enough to make them notice the errors.

Cognitive engagement was found to influence other types of engagement. With respect to the influence of cognitive engagement on behavior, since the participants reported that they corrected the errors that they understood most before correcting the ones they understood the least, it could be assumed that levels of understanding made them prioritize the errors based on their understanding, which indicated the metacognitive strategy to plan how to correct their errors. Moreover, when they could partially understand or could not understand the feedback, the participants sought more clarification by searching online and consulting the teacher and their peers, which functioned as cognitive strategies that helped them better comprehend the teacher WCF. This cognitive engagement is consistent with data found in Han and Hyland (2015) who have reported that one of their participants requested a teacher-student writing conference to seek more clarification from the teacher. Although these two strategies were

similar to the approaches that they used with respect to behavioral engagement, the purposes of these methods were different. In the case of cognitive engagement, students adopted these strategies to understand the feedback, but in the case of behavioral engagement, they used them to help edit their errors. Regarding the impact of cognitive engagement on feelings, the participants expressed that they were slightly stressed while trying to understand the teacher WCF. It was possible that understanding the feedback involved a lot of processes for them.

However, it is important to note that our findings on student engagement with teacher WCF might not entirely confirm the results of previous studies because we explored student engagement with the feedback in paragraph writing, while other studies (e.g., Han & Hyland, 2015) have investigated student engagement with the feedback in essay writing.

Conclusion

Our mixed-method experimental study discerned the association between student engagement with teacher WCF and English writing grammar accuracy and explored secondary students' engagement with this type of feedback in the three dimensions. The results do not indicate that a correlation exists between student engagement with teacher WCF and English writing grammar accuracy. Student engagement with the feedback made both positive and negative contributions to English writing grammar accuracy. The nature of secondary students' engagement with WCF was found to be complicated, and the three dimensions were related and influenced one another. Future research may need to expand the scope of the study by considering to what extent individual differences factors and/or contextual factors are related to student engagement and how these associations influence English accuracy in a new piece of writing.

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