The Efficacy of Written Corrective Feedback on Second Language Development: The Impact of Feedback Type, Revision Type, Learning Motivation and Strategies

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To my father

ABSTRACT

Written CF is a common practice in L2 teaching despite the theoretical controversies about its contribution to L2 development (Truscott, 1996; Bitchener & Ferris, 2012). Empirical research into this issue has been dominated by quasi-experiments in the cognitive framework. By inferring L2 development from the accurate development in the written output, these quasi-experiments have generated somewhat inconclusive results. Framed in the perspectives of both the cognitive theories and the Dynamic Systems Theory, this project examined the L2 learning potential of written CF (enhanced by revision) when accurate development was not achieved. It also examined the possible moderating effects of revision type and L2 motivation. The possible causes of the different extents to which the students benefited from written CF was explored in two follow-up case studies. To accommodate the difference in research aims (i.e. descriptive vs. exploratory), a mixed-method approach was adopted: a quasi-experiment was followed by a multi-case study.

Examining the efficacy of two written CF types (i.e. direct feedback and metalinguisitic explanation) on the development of the English passive voice in comparison with writing practice, the quasi-experiment was conducted among 87 vocational college students in China. It involved three writing tasks, one revision task (feedback groups only), and an L2 motivation questionnaire survey. The results showed that, compared with writing practice, written CF did not significantly contribute to the accurate development of the target feature. However, compared with writing practice, written CF significantly contributed to the partial development of this feature. Moreover, one L2 motivational variable, Ideal L2 self, significantly moderated the effect of one written CF type, direct feedback.

To explore the possible causes of the different extents to which the students benefited from written CF, the follow-up multi-case study focused on two students who had participated in the quasi-experiment and differed significantly in the accurate development of the target feature. Data were collected via three writing tasks, one revision task and two stimulated recall interviews with each participant. The analyses of stimulated recall and texts revealed a link between strategy use in the cognitive processing of written CF and the retention of written CF over time.

Hence, this project revealed that, in the EFL context in China, written CF may contribute to L2 development even when accurate development is not achieved. Moreover, the efficacy of written CF can be influenced by L2 motivation and strategy use in the cognitive processing of written CF. Therefore, it is suggested that written CF can be a useful tool in the EFL teaching in China, and learner differences, such as L2 motivation and learning strategies, need to be considered while providing written CF in this context. Replicative research is suggested in other L1 contexts to test the generalizability of the present findings.

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LIST OF ABBREVIATIONS

CET	College English Test
CF	corrective feedback
DCF	direct corrective feedback
EFL	English as a foreign language
ESL	English as a second language
FL	foreign language
IL	interlanguage
L1	first language
L2	second language
ME	metalinguistic explanation
SL	second language
Written CF	written corrective feedback

ATTESTATION OF AUTHORSHIP

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

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CHAPTER 1

INTRODUCTION

1.1 Context of this project

This project was initiated by my own experience with written corrective feedback (CF) as an English teacher in a college in China. Written corrective feedback (written CF) is one form of input provided to a second language (L2) learner. It refers to "a written response to a linguistic error that has been made in the writing of a text by an L2 learner (Bitchener & Storch, 2016, p. 1)". In the English as a foreign language (EFL) context in China, as expressed in *San tzu ching* (i.e. *Three-character scripture*, a Confucian classics written in Song Dynasty), a teacher is regarded as irresponsible if he/she is not strict with the students. As a result, unfocused written CF (i.e. all the errors in the text are corrected) is expected by both the institutional authorities and the students, and is the general practice in English teaching (Wang, 2010). When I was an EFL teacher in China, I followed this general practice, and provided written CF on every error I discerned in my students' writing. Generally speaking, compared with the time and effort I put into the provision of written CF, the results of written CF were disappointing — the same types of errors reoccurred no matter how many times I had corrected them. Nonetheless, in each class, there were always some students who benefited more from written CF and revealed greater improvement in writing accuracy than their peers. Students with little improvement in their writing accuracy were observed, too. As other English teachers in the same institution also struggled with the effect of written CF, how to provide written CF more effectively was a recurrent theme in the teaching and researching seminars in this institution. However, a satisfactory solution was not found.

The extent of the effectiveness of written CF can be seen from the findings of two recent studies on the English writing competence of Chinese students in tertiary education (Gao, 2015; the National Association of English Writing, 2014). Based on the students' self-reports, Gao's study revealed that limited vocabulary size and poor grammar were the major difficulties the students encountered in English writing. A similar finding was revealed in the study conducted by the National Association of English Writing in 2014. Analyses of the texts written by 300,814 students from 463 institutions of higher education in 30 provinces in China (including all types of tertiary institutions) revealed that grammatical errors were the most frequent in their English

writing. Hence, it seems that how to provide written CF more effectively is a common issue in the English teaching in universities and colleges in China.

The practice of written CF in L2 teaching is related to the writing-to-learn dimension of L2 writing (Manchón, 2012). L2 writing is a skill to be developed in the learning process. Meantime, because writing in L2 pushes the learner to use the L2 actively, the learner has the opportunity to engage in deep processing of linguistic forms in the writing process (Swain, 1985). Therefore, L2 writing also serves as a means of L2 learning, and errors in L2 writing manifest the problems in the learner's interlanguage (Van Beuningen, 2011). Interlanguage (IL) refers to the systematic knowledge of the L2 in the learner's mind, which is independent of his/her first language (L1) and the target language (Selinker, 1992). In other words, IL is the learner's developing L2 system. From the perspectives of cognitive theories and Dynamic Systems Theory (DST), written CF can help the learner to modify his/her erroneous knowledge of the L2 and consolidate the correct L2 knowledge, thus contributing to IL development (these ideas will be introduced in the next section, and will be detailed in Chapter 2). As a result, the errors in the learner's L2 writing can be overcome gradually.

Whether written CF can be effective has been a focus in empirical research for more than 20 years. It has been found to work effectively under certain circumstances. The exploration of the circumstances in which written CF can work effectively is progressing slowly. It has been found that one to three written CF treatments can contribute to the development of writing accuracy in authentic L2 use of certain morphological items (Bitchener, 2008: Bitchener, Young & Cameron, 2005; Stefanou & Révész, 2015). However, its contribution to the development of writing accuracy in authentic L2 use of syntax remains under-explored. It has also been found that the requirement for revision can significantly influence the effect of written CF. However, whether different types of revision significantly influence the effect of written CF remains unknown because learners have been found to adopt different types of revision: the marked error being corrected (successful revision), an incorrect change to the marked error (unsuccessful revision), text with the marked error deleted (deletion of text with the marked error) and no change to the marked error (no response to the marked error) (Ellis, 2009). Moreover, language learning aptitude and L2 motivation have been found to be the two most influential individual difference factors in L2 development (Dörnyei, 2005; Ellis, 2008). Individual difference factors, also known as learner internal factors, refer to the enduring personal characteristics that differ by degree

among people and may moderate L2 learning processes (Dörnyei, 2005). The significant influence of language learning aptitude on the effect of written CF has been revealed. However, whether L2 motivation also significantly influences the effect of written CF remains unknown. In addition, differences in learners' cognitive processing (i.e. mental activities) of written CF have been revealed recently: Shintani and Ellis (2013) and Stefanou (2014) found that some learners noticed written CF, but they could not understand it; moreover, Stefanou also found that some learners did not even noticed written CF. However, whether the differences in the learners' cognitive processing of written CF is related to the effect of written CF remains unknown. This project attempted to extend the knowledge about written CF in relation to these factors from the theoretical perspectives of both cognitive processing and Dynamic Systems Theory.

Therefore, in the following sections, the theoretical background of this project which consists of L2 learning and the role of written CF in L2 learning from both theoretical perspectives is introduced first. As theoretical claims need to be validated empirically, the next section introduces the empirical research background of this project, with foci on the L2 learning potential of written CF and moderating factors. Research gaps are identified along with the introduction of each issue. The gaps are addressed in this project. Consequently, the design of this project is introduced next. Aims of this project are presented first. Then, the methods used to achieve each aim are introduced sequentially, along with the significance of each method. Finally, an outline of the thesis is explained.

1.2 The theoretical background of this project

It was mentioned in the last section that, from both the cognitive and DST perspectives, written CF can be expected to facilitate L2 development. In this section, how L2 learning and written CF are viewed from both theoretical perspectives will be introduced.

Written CF explicitly points out when errors have been made in the learner's written output. Thus, the information conveyed in written CF is explicit. Explicit knowledge refers to conscious knowledge initially learned explicitly as facts about the L2 (Ellis, 2008). As errors produced by the learner manifest problems in his/her IL, written CF informs the learner about a mismatch between his/her IL and the target language. The learner needs to cognitively process the written CF input in order to learn from it. From

the cognitive perspective, L2 learning can be viewed from both the micro and macro perspectives. The former focuses on a single episode of cognitive processing, while the latter focuses on cognitive processing over a life-long span.

According to Gass (1997), the micro cognitive processing consists of five stages: noticing, understanding, intake, integration and output. This model of cognitive processing was originated in the oral context. Nonetheless, as cognitive processing of the oral language is similar to that of the written language, Gass' cognitive processing model can be equally applicable to the cognitive processing of written CF. First, the written CF input is noticed by the learner due to the mismatch between the learner's IL and the target language (i.e. the written CF input) (Schmidt, 2001). Then, the learner will analyse the noticed written CF input for understanding. Whether the noticed input is understood depends on how large the mismatch is. Only the understood input will get to the third stage, intake, where hypotheses about the new knowledge are formed and tested. The outcome of intake is the internalization of the written CF knowledge. When the internalized knowledge is passed to the long-term memory, integration occurs. Finally, output manifests what the learner has learnt about the L2. In the process of producing output, the learner's attention will be shifted from the meaning to the form. Thus, a new hypothesis about the feature learnt will be formed and tested in the output. This cognitive processing episode reveals that written CF, which provides explicit knowledge, can lead to the development of correct, explicit knowledge in the IL. As a result, the relevant erroneous L2 knowledge in the learner's IL is corrected.

From the macro perspective, as a kind of skill learning, L2 learning is the process of converting explicit knowledge into implicit knowledge (i.e. the unconscious, automatized and unreportable knowledge) via practice (Dekeyser, 1997, 1998). Hence, L2 learning progresses from controlled processing, which demands focused attention, to automatic processing without attention (Dekeyser, 1997, 1998).

Three macro processes of cognitive processing have been identified: knowledge internalization, knowledge modification and knowledge consolidation (Housen & Pierrard, 2005). Knowledge internalization corresponds to the first four stages in the micro cognitive processing, and leads to the establishment of the initial form-meaning connections. Knowledge modification refers to the process in which the form-meaning connections are elaborated as the result of the learner responses to feedback. Knowledge consolidation refers to the process in which the internalized knowledge and the

modified knowledge in mind are enhanced via repeated retrievals and deeper processing in use (Williams, 2012). Hence, written CF can play a role in the processes of knowledge modification and knowledge consolidation. In the former process, learners' responses to written CF function to modify their partially developed knowledge because the errors in the IL are corrected with the development of relevant correct, explicit knowledge after the written CF treatment. In the latter process, learners' responses to written CF function as practice, during which they have the opportunity to retrieve and process their developing knowledge. Hence, from both the micro and macro cognitive perspectives, written CF can facilitate L2 development.

However, L2 learning does not take place in a vacuum. As learners are social beings, they interact with their learning context continuously in the learning process. It is likely that this will impact the cognitive processing in L2 learning. Due to the impact of the moderating factors on the cognitive processing in L2 learning, the efficacy of written CF may be influenced by these moderating factors. Thus, in reality, the L2 learning potential of written CF may vary from learner to learner.

DST is a theory concerning changes in the learner's IL in the L2 learning process. From the DST perspective, IL is a system consisting of "different subsystems (syntactical, phonological, lexical, textual) that interact (de Bot, 2008, p. 171)." These subsystems are the components of IL. Each subsystem in turn consists of sub-subsystems. Moreover, IL interacts with the learning context. Due to the interactions between IL and the learning context as well as the interactions between components of IL, IL undergoes continuous changes. Hence, IL is dynamic. Sometimes the change that IL has undergone is abrupt, thus easily visible from the outside. Sometimes the change is subtle, and therefore difficult to perceive from the outside. Besides, because the components of IL react to one another, a small change in one component may affect another component or other components. Thus, the development of IL is nonlinear, and may be unpredictable (de Bot et al., 2013).

In line with the above view of IL, from the DST perspective, L2 learning consists of interactions between input and IL (de Bot, 2008). Thus, L2 learning is a dynamic process consisting of movements forward, movements backward and stagnations (Larsen-Freeman, 1997). Moreover, there are self-organized criticalities in the L2 learning process. Self-organized criticality refers to the critical state that the system has reached, where one more piece of input leads to the break/collapse of the pre-existing

system (i.e. an abrupt change of the system) (de Bot, 2008). As a result, the system is restructured with this additional input. Restructuring refers to the process of reorganization of L2 knowledge structures as the newly assimilated information is incorporated into IL in long-term memory (Ortega, 2009). Hence, L2 learning "is an iterative process" activated by continuous L2 input (de Bot et al., 2013, p. 210).

As a result, from the DST perspective, written CF, one form of L2 input, can play a role in L2 learning. When the IL has reached the self-organized criticality, one more treatment of written CF can lead to the restructuring of the IL and the development of the target feature. Moreover, as L2 learning is an iterative process consisting of interactions between input and IL, written CF input can be a trigger and a component of such interactions in L2 learning. In addition, from the DST perspective, no demonstration of improvements in writing accuracy after written CF treatment does not necessarily mean learning has not taken place. It could be that the learner has started to learn the target feature in the written CF, but has not fully developed the feature yet. More finely-grained examination is needed in such cases, because from the DST perspective, there are both abrupt and subtle changes in the IL in the process of L2 learning, and the subtle changes "may not be externally visible, but the underlying processes may have been changed" (de Bot et al., 2013, p. 212).

Theoretical claims need empirical validation. Hence, the next section will introduce the empirical findings about the L2 learning potential of written CF (i.e. the efficacy of written CF for L2 development), which is the empirical research background of this project.

1.3 The empirical research background of this project

With no written CF research to my knowledge being conducted from the DST perspective, the theoretical claims about the L2 learning potential of written CF from the DST perspective are open to empirical testing.

By comparison, a considerable body of quasi-experiments has been conducted in the cognitive framework. These studies have addressed the L2 learning potential of written CF from two perspectives: unfocused and focused written CF (these studies will be reviewed in detail in Chapter 3). In the unfocused studies, all the errors are treated; while in the focused studies, only the target errors are treated. The unfocused studies have generated mixed findings on the L2 learning potential of written CF (Kepner,

1991; Truscott & Hsu, 2008; Van Beuningen, De Jong & Kuiken, 2008, 2012). However, methodological problems have been identified in studies that revealed no significant effect from unfocused written CF on L2 development: no pre-test to reveal whether there was a significant initial difference between the treatment group and the comparison group (Kepner, 1991), and the comparison group being invalid to some extent (Semke, 1984; Sheppard, 1992; Truscott & Hsu, 2008). By comparison, the two studies which revealed significant effects from unfocused written CF adopted a more rigid design (Van Beuningen et al., 2008, 2012). Hence, more research into the effect of unfocused written CF with a rigid design is needed for clarification.

The focused studies have targeted one to three features at one time. The English article system (the first mention indefinite article and anaphoric mention definite article) has been a recurrent theme (Bitchener, 2008; Ellis, Sheen, Murakami & Takashim, 2008; Sheen, 2007; Sheen, Wright & Moldawa, 2009). Besides, the English definite article, the simple past tense, the prepositions, English indefinite article and the hypothetical conditional have also been targeted (Bitchener et al., 2005; Frear & Chiu, 2015; Shintani & Ellis, 2013; Shintani, Ellis & Suzuki, 2014; Shintani, Aubrey & Donnellan, 2016). Metalinguistic explanation is a type of written CF investigated in the focused studies. To provide metalinguistic explanation, errors can be numbered in the text, and a grammatical description can be provided for each numbered error at the bottom of the text (Ellis, 2009) or elsewhere. However, metalinguistic explanation was provided without error location in three of the focused studies (Shintani & Ellis, 2013; Shintani et al., 2014; Shintani et al., 2016). Except for these three studies, this body of focused written CF research has generated stronger evidence on the learning potential of written CF for the English article systems (Bitchener, 2008; Ellis et al., 2008; Sheen, 2007; Sheen et al., 2009), and some evidence for other features such as the English definite article and the simple past tense (Bitchener et al., 2005; Frear & Chiu, 2015). With most studies targeting morphological features, syntax is an under-explored area. Only two studies have addressed it prominently and both targeted the hypothetical conditional (Shintani et al., 2014; Shintani et al., 2016). Moreover, both studies adopted dictogloss tasks, a type of writing task that generated contrived L2 use (Shintani & Ellis, 2015). In addition, Shintani et al. (2014) investigated both direct feedback (i.e. the correct form is provided) and metalinguistic explanation, and found that written CF (including direct feedback and metalinguistic explanation), when accompanied by revision, significantly affected the development of hypothetical conditional. By comparison, Shintani et al.

(2016) investigated only metalinguistic explanation, and found that written CF under the same condition did not significantly affect the development of the hypothetical conditional. Direct feedback is underpinned by Interactionist theories, which emphasize noticing and input (Shintani & Ellis, 2013), while metalinguistic explanation is underpinned by Skill acquisition theories, which stress procedualization of explicit knowledge into implicit knowledge via practice (Shintani et al., 2014) (these will be detailed in Section 2.4). Therefore, the L2 learning potential of direct feedback and metalinguistic explanation may differ. As a result, the L2 learning potential of written CF with these two written CF types combined together, as in Shintani et al.'s (2014) study, may be different from that of written CF with metalinguistic explanation alone, as in Shintani et al.'s (2016) study. Hence, more written CF research into the learning potential of both direct feedback and metalinguistic explanation for syntactical features with authentic L2 use tasks is needed for clarification.

In addition, the mixed findings on the L2 learning potential of written CF in the literature suggest the existence of moderating factors. In the exploration of factors that may moderate the effects of written CF, it has been revealed repeatedly in quasi-experiments that revision significantly impacted the efficacy of written CF (Chandler, 2003; Shintani et al., 2014). Learners have been found to adopt different types of revision: successful revision, unsuccessful revision, deletion of text with the marked error and no response to the marked error (Ellis, 2009) (see Section 1.1). The comparative effects of different types of revision have been addressed in case studies with inconsistent results (Hyland, 2003; Van Beuningen, 2011). As only successful revision may indicate the internalization of the correct form, it may contribute most to L2 development among the four types of revision. Thus, the impact of different revision types deserves further systematic exploration.

Language learning aptitude and L2 motivation have been found to be the two most influential individual difference factors in L2 development (Dörnyei, 2005; Ellis, 2008). The significant impact of language learning aptitude on the efficacy of written CF has been revealed in quasi-experiments (Sheen, 2007; Shintani & Ellis, 2015), while the impact of L2 motivation has only been addressed in two case studies (Ferris et al., 2013; Hyland, 2003). Both case studies suggested a link between L2 motivation and the effects of written CF. However, in both studies, L2 motivation was viewed as a static concept. As learners are social beings, and interact with the learning context

continuously, their L2 motivation has a dynamic dimension, too. Hence, there is a need to explore the impact of dynamic L2 motivation on the efficacy of written CF.

Moreover, learners who did not appear to have benefited immediately from the written CF treatment have been observed in a recent study (Guo, 2015). Does this mean that written CF is not beneficial to such learners' L2 development? Why did the writing accuracy of some learners not show improvement while some of their peers did so well after they all received the same type of written CF from the same source? These issues have not been addressed prominently in empirical tests. Because understanding the benefit of written CF to the learners who clearly show improvements in writing accuracy and to the learners who do not show improvements in writing accuracy is part of understanding the role of written CF in L2 development, these issues deserve exploration. This project sought to address the gaps identified in this section (see section 3.9 for the research questions investigating these gaps). Therefore, the next section will introduce the design of this project.

1.4 The design of this project

This project sought to explore the L2 learning potential of written CF together with an investigation into the extent to which revision types and L2 motivation may moderate the process. It also sought to examine the causes of learners' benefit/non-benefit of a single written CF episode in terms of writing accuracy.

This project was conducted among the second-year International Business majors, Business English majors and Hotel Management majors at a vocational college in west China. In order to provide a more comprehensive picture of the L2 learning potential of written CF, a mixed methods approach was adopted (i.e. a quasi-experiment, together with a questionnaire survey, was followed by a multi-case study). In the explorations of the L2 learning potential of written CF, many quasi-experiments targeted morphological errors (Bitchener, 2008; Ellis et al., 2008; Frear & Chiu, 2015; Sheen, 2007; Shintani & Ellis, 2013). The present quasi-experiment extends the target feature to a little explored syntactic feature: the English passive voice. Therefore, it is expected to further our insights into the L2 learning potential of written CF. Besides, the exploration of moderating factors is extended in the present quasi-experiment. By systematically addressing the impact of different revision types, the present quasi-experiment sought to provide a clearer picture of their moderation, thus broadening the insight into the L2 learning potential of written CF, and informing pedagogy with knowledge about

whether it is necessary for the learner to revise their texts until they are error-free. The questionnaire survey built into the present quasi-experiment explores systematically the impact of dynamic L2 motivation on the L2 learning potential of written CF. Thus, it develops knowledge about the moderation potential of L2 motivation, broadens insights into the L2 learning potential of written CF, and informs pedagogy.

Via writing tasks and a revision task as well as stimulated recall interviews, the follow-up multi-case study focuses on two participants from the present quasi-experiment. One improved most in the writing accuracy in the present quasi-experiment; the other not at all. The stimulated recall interviews focus on the learners' cognitive processing of written CF in the revision task and the subsequent new writing tasks to explore the extent to which they benefited from written CF and why their improvements differed so greatly. The exploration of written CF's contribution to cognitive processing can deepen our understanding of its L2 learning potential, thus informing pedagogy about whether it is worthwhile to provide written CF. Moreover, a close examination of a learner who benefited most from written CF and a learner who benefited least from written CF, in terms of accurate development, will generate rich information about individual differences in the learners' cognitive processing of written CF, thus contributing to theory development and pedagogy.

Finally, with the present quasi-experiment exploring the general L2 learning potential of written CF among a group of learners and with the present multi-case study focusing on one learner who improved most in writing accuracy and another who did not show any improvement in writing accuracy, it is believed that this project has the potential to provide a more comprehensive picture about the L2 learning potential of written CF, and inform pedagogy. The structure of the report of this project (i.e. the outline of the thesis) is introduced in the next section.

1.5 The outline of the thesis

This thesis includes seven chapters. Following this introduction, Chapter 2 explores the L2 learning potential of written CF from two theoretical perspectives. As mentioned in Section 1.2, both cognitive and DST theories explain the practice of written CF in L2 teaching. In Chapter 2, L2 learning and the role of written CF in L2 learning are detailed from both theoretical perspectives. Then, the theoretical claims against the practice of written CF are introduced.

Chapter 3 reviews the empirical studies relevant to the research aims of this project with foci on the L2 learning potential of written CF and the moderation of revision types and L2 motivation. In the process of the review, relevant theoretical claims raised in Chapter 2 are drawn on in the discussion of empirical findings. Research gaps in the previous empirical work are identified as they emerge. Research questions are presented at the end of Chapter 3.

Chapter 4 describes the methodology of this project. A mixed method approach (a quasi-experiment, together with a questionnaire survey, followed by a multi-case study) was adopted to collect multi-faceted data. Justification for this approach is provided. Then, the major research instruments of the quasi-experiment (i.e. the writing tasks, the revision task and the questionnaire) and of the multi-case study (i.e. the writing tasks and the stimulated recall interviews) are detailed, respectively. Each is followed by an introduction to their respective data collection and analytical procedures. Justification is provided in each instance.

Chapter 5 presents the key findings of the quasi-experiment. The quasi-experiment addresses the first four research questions. The findings of each research question are presented and discussed immediately with reference to the research question, and the findings of previous relevant studies and the relevant theoretical claims.

Chapter 6 presents the key findings of the multi-case study. The multi-case study addresses the last research question. Each finding is presented and discussed with reference to the research question, and the findings of previous relevant studies and the relevant theoretical claims.

Chapter 7 summarizes and synthesizes the key findings of the quasi-experiment and of the multi-case study. Then, the theoretical, empirical, methodological and pedagogical significance of this project are indicated. Limitations of this project are identified, and research implications are suggested, too.

CHAPTER 2

THE L2 LEARNING POTENTIAL OF WRITTEN CF FROM THE THEORETICAL PERSPECTIVES

2.1 Introduction

This project was motivated by my own English learning and teaching experience in the EFL context in China. However, this do not mean that this project was conducted without theoretical guidance. Hence, in this chapter, L2 learning theories underpinning this project will be reviewed.

The practice of written CF in L2 instruction has been primarily explained in terms of cognitive processing theories (Bitchener & Ferris, 2012; Bitchener & Storch, 2016). Hence, these theories will be introduced in Section 2.2 with a focus on the cognitive account of L2 learning and the role of written CF in cognitive processing. As a result, L2 learning will be explained from the micro and macro cognitive perspectives respectively in Section 2.2.1 and Section 2.2.2. Following the cognitive account of L2 learning, the role of written CF in micro and macro cognitive processing will be explored in Section 2.2.1 and Section 2.2.2 respectively. Then, the cognitive processing of written CF in a single processing episode will be outlined in Section 2.2.3 as the functions of written CF in both micro and macro cognitive processing are achieved via the cognitive processing of written CF in a single processing episode. After that, theoretical objections to written CF will be introduced in section 2.2.4 before insights into the role of written CF in cognitive processing is summarized in Section 2.2.5.

Built on the role of written CF in cognitive processing, the treatment potential of written CF on the English passive voice, the target feature, will be discussed in Section 2.3. Since the treatment potential of written CF is embodied in that of a specific written CF type, the possible differences in the treatment potential of written CF types will be explored in Section 2.4 with a focus on direct feedback and metalinguistic explanation, the two types of written CF adopted in this project.

As cognitive processing does not take place in a vacuum, it may be moderated by factors such as the types of revision adopted by the learner, the learner's L2 motivation and learning strategies. Therefore, the possible moderation of revision types, L2 motivation and learning strategies will be explored in Section 2.5, Section 2.6 and

Section 2.7 respectively before the cognitive account of written CF is summarized in Section 2.8.

Next, regarding the issue of whether written CF is beneficial to learners whose writing accuracy did not improve after the treatment of written CF, Dynamic Systems Theory (DST) offers a different perspective from which to examine the relationship between written CF and L2 learning. Hence, DST will be introduced in Section 2.9. Different from other L2 learning theories, including the cognitive theories introduced above, DST examines L2 development from the perspective of changes in the learning process. As a result, L2 learning from the DST perspective will be introduced first in Section 2.9.1, followed by an exploration of the role of written CF in L2 learning from the DST perspective in Section 2.9.2. After that, the DST account of written CF will be summarized in Section 2.9.3. Then, at the end of this chapter, a summary of the L2 learning potential of written CF from both cognitive and DST perspectives will be presented in Section 2.10. These two theoretical perspectives inform the research design of this project and the interpretation of the findings.

2.2 L2 learning and the L2 learning potential of written CF from the cognitive perspective

Written CF has been underpinned by mainstream cognitive theories (i.e. Skill acquisition theories and Interactionist theories). According to Skill acquisition theories, explicit knowledge (e.g., written CF) can be converted into implicit knowledge via practice (i.e. proceduralization of explicit knowledge) (Anderson, 1983; McLaughlin, 1987). Thus, written CF can affect the process of proceduralization by providing explicit knowledge, helping to focus the learner's attention on problems (i.e. gaps) in their IL (Bitchener, 2012), and ensuring the learner's false hypotheses are not proceduralized into implicit knowledge and integrated into IL (Polio, 2012).

According to Interactionist theories (Long, 1996), CF, including written CF, is a component of interaction, and a source of input because positive evidence (i.e. the correct L2 forms) does not provide sufficient information about the restrictions of rules (Bitchener & Ferris, 2012). Moreover, written CF "can indirectly facilitate the acquisition of implicit knowledge by priming the processes involved in its development (i.e. NOTICING AND NOTICING THE GAP) [emphasis in the original]" (Ellis, 2008, p.846).

As both kinds of theories grant written CF positive positions in the cognitive processing of L2 learning, thus considering it facilitative to L2 development, this section will focus on the cognitive processing of L2 learning and the functions of written CF in them. The cognitive processes of L2 learning can be viewed from both the micro and macro perspectives.

As the micro L2 learning processes are included in the macro L2 learning processes, the former, together with the functions of written CF in the former, will be introduced first. Then, the macro L2 learning processes, together with the functions of written CF in this process will be introduced. Also, as the functions of written CF in both micro and macro learning processes are achieved via the cognitive processing of written CF in a single processing episode, the processing of written CF in a single processing episode will be introduced next. Finally, the role of written CF in cognitive processing will be summarized.

2.2.1 Micro processing of L2 learning and the functions of written CF during the processing

In this section, cognitive processing from the micro perspective will be introduced before the functions of written CF in this process, as the process serves as the backdrop to the functions of written CF.

2.2.1.1 Micro processing of L2 learning

L2 learning from the micro perspective concerns how L2 knowledge is internalized, and Gass' (1997) information processing model (Figure 1) is influential in the explanation (Ellis, 2008). It consists of five sequential stages from input to output — apperception or noticing (Schmidt, 1990), comprehension or understanding (Schmidt, 1990), intake, integration and output. This model was developed in the oral context. Nonetheless, as cognitive processing of the oral language and the written language are similar, Gass' cognitive processing model can be equally applicable to the cognitive processing of written L2 input such as written CF.
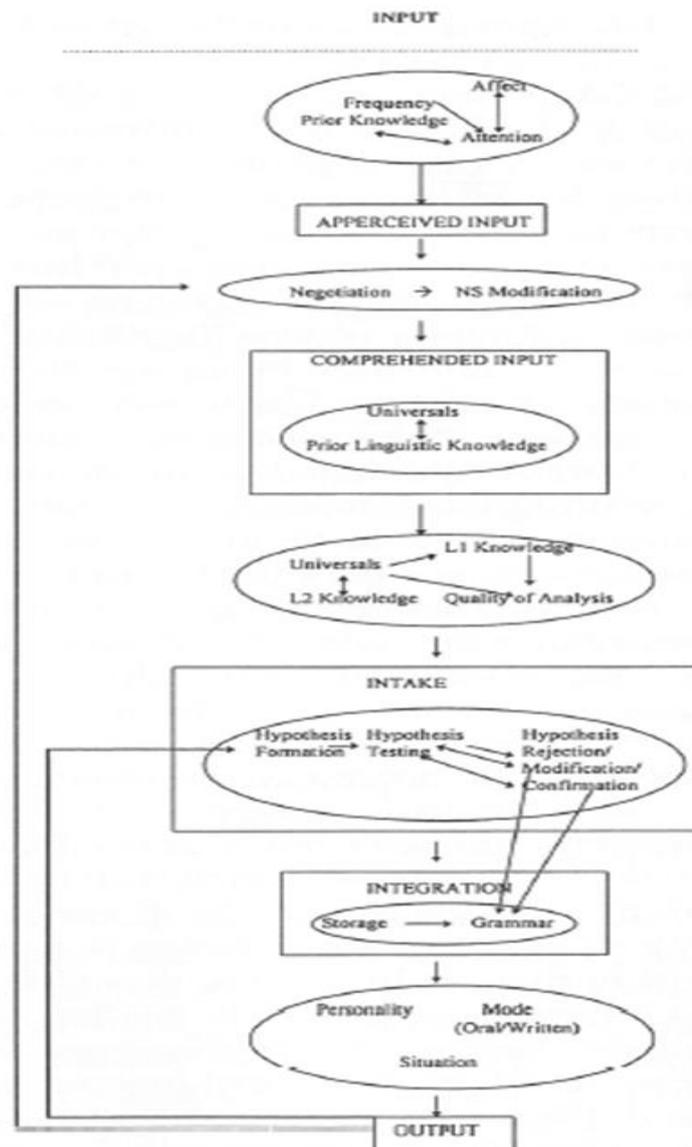
Figure 2.1 Gass' (1997) model of L2 learning
Source: Gass (1997, p.3)

For any knowledge to be learned, first of all, it has to be attended to by the learner. L2 learning involves attention at two levels sequentially: peripheral attention and focal attention (Robinson, 1995). There are three levels of peripheral attention: alertness, orientation and detection. Detection is the cognitive registration of sensory stimuli outside focal attention. It is necessary for L2 learning, but does not necessarily involve awareness (Tomlin & Villa, 1994).

The first stage of L2 leaning, *apperception or noticing* (noticing hereafter), takes place in working memory, where part of the detected information is noticed by the learner (i.e. received focal attention), due to its recognizable features relevant to some part of the learner's IL or gaps in the IL, while other parts of the detected information are

filtered out. Time pressure, motivation, prior knowledge, salience of form (i. e. the unusualness of a form among others in the input) and attention may influence what can be noticed.

Then, the working memory goes on to analyse the noticed input for *comprehension or understanding* (understanding hereafter). There are two levels of analysis, semantic analysis and structural analysis, with different outcomes. The former is more superficial than the latter, and leads to understanding of meaning, while the latter leads to understanding of language form (Gass, 1997). In other words, understanding is a gradual process, understanding of meaning can be achieved earlier than that of the form (Bitchener & Storch, 2016). Hence, only structural analysis will lead the information to the next stage: intake, where hypotheses about the new information are formed, tested and confirmed/rejected/modified in the working memory.

Integration occurs when the outcomes of intake (i.e. newly assimilated linguistic features), are passed from the working memory to the long-term memory. There are two forms of integration. One is the development of IL with newly incorporated information; the other is storage with newly assimilated information which has not been able to be incorporated into IL for the time being. The final stage, *output*, serves as the site for both manifestation of integration and hypothesis testing. It can also draw the learner's attention to language form, and trigger metalinguistic reflection. As individual differences, task demand (i.e. the amount of cognitive resources, such as attention and relevant knowledge, needed in engaging in a task) and the strength of the representation of a linguistic feature (i.e. the degree of consolidation of a linguistic feature in the IL) moderate the manifestation, not all that has been learned can be manifested in the output.

This L2 learning model, from the micro perspective, reflects that the learner is active, selective and constructive in the L2 learning processes. It also reveals that individual differences controlled by the learner, have an important role at the stages of noticing and output, but not at the stages in the middle, where linguistic and psycholinguistic factors devoid of social context dominate. As the latter factors are more inviolable to direct manipulation than those under the learner's control, instruction is expected to be more effective at the peripheral stages. This gives rise to written CF, which links output to noticing, the two peripheral stages of micro learning process.

2.2.1.2 The functions of written CF in the micro processing of L2 learning

As written CF is a kind of input that is provided on written output, it links the peripheral stages of L2 learning. Thus, it can function at these two stages (i.e. noticing and output), and trigger a new episode of L2 learning. Moreover, as written CF types differ in informativeness (the amount of information about the error) and in explicitness in the guidance of correction (Ortega, 2009), they may contribute differently to the second stage, understanding (will be discussed further in Section 2.2.3 with written CF types).

2.2.1.2.1 Written CF as a facilitator of noticing

For any knowledge to be learned, first of all, it has to be attended to by the learner. L2 learning involves attention at two levels sequentially: peripheral attention and focal attention (Robinson, 1995). The former requires no awareness, while the latter does.

According to Tomlin and Villa (1994), there are three levels of peripheral attention: alertness, orientation and detection. Alertness refers to "general readiness to deal with incoming stimuli or data" (Tomlin & Villa, 1994, p.190). Orientation channels attentional resources to a particular bit of input by activating it in some way while inhibiting other parts of the input (Gass, 1997). Detection is the cognitive registration of sensory stimuli outside focal or selective attention. It is necessary for L2 learning, but does not necessarily involve awareness. Though alertness and orientation are not necessary conditions of the occurrence of detection, they do enhance the chance of its occurrence.

Detected information enters sensory memory stores automatically. Then, via selective attention, part of it is selected for further process in working memory (Robinson, 2003)(i.e. that part of the detected knowledge is noticed by the learner). Thus, it comes to the second stage: noticing (Schmidt, 1990). Noticing "is the process of bridging some stimulus into focal attention" (Bitchener & Ferris, 2012, p. 17). Attention and awareness are crucial components in the concept of noticing.

Noticing the gap refers to the learner's awareness of a mismatch or gap between what he/she can produce and what he/she needs to produce, and between his/her IL as manifested in his/her output and the target language (TL) input (Schmidt, 2001). Since noticing the gap makes the learner feel a need to learn, it is the initial step toward L2 learning (Ellis, 2008; Gass, 1997).

Noticing the form in the TL input is a precedent for noticing the gap between the IL output and the TL input. It is also a prerequisite for structural analysis and understanding, which in turn, is a prerequisite for intake. Salience of form (i.e. the unusualness of a form among others in the input) moderates in the process from input to noticing: the more salient/unusual a form is, the more likely it is to be noticed by the learner (Gass, 1997).

As written CF is off-line, the learner can take his/her time in the information processing, and is thus more likely to notice written CF and the gap pointed out by written CF. Moreover, the explicit nature of written CF strengthens its ability to heighten the salience of the erroneous form. Therefore, both features of written CF strengthen its function as a noticing facilitator. Additionally, written CF is a facilitator of output since it is given to the latter.

2.2.1.2.2 Written CF as a facilitator of the functions of output

Contrasting to the previous view of output as mechanic practice of knowledge, the Output Hypothesis considers comprehensible output (i.e. free communicative output) to be a valuable source of learning (Swain, 1985, 1995). Written CF is provided on writing, which is comprehensible output in the written form.

According to the Output Hypothesis, the comprehensible output (output hereafter) serves first as a site for hypothesis testing. Secondly, it can promote noticing of the form, and push the learner to shift from meaning analysis to structural analysis, which is the prerequisite for the conversion of input into intake as revealed in Gass' (1997) model. Thirdly, output can trigger metalinguistic reflection, which is conducive to the development of IL.

However, Swain (1991) pointed out, without assistance of CF, output alone may not serve these functions. That CF is a catalyst of the functions of output was echoed in Han (2002), who argued that external feedback may significantly facilitate the fulfilment of the 'noticing' function of output.

Written CF informs the learner of the incorrect hypothesis about a feature, and thus enables him/her to notice the gap. As a result, the learner may form new hypothesis with information provided in the written CF. Metalinguistic reflection can be triggered by recognition of the gap. The explicit and off-line features of written CF contribute to its

greater potential to be noticed and processed, thus strengthening its assistance to the functions of output.

In the metalinguistic reflection triggered by written CF, the stored information is analysed again and again at different levels to be integrated into IL. Such analyses happen within the IL, too. Thereby, integration is not a one-time task. Hence, not only the new information but also the re-analyses of the features retrieved from long-term memory can lead to the restructuring and development of IL. This is explained from the macro perspective of L2 learning processes.

2.2.2 Macro processes of L2 learning and functions of written CF in them

In this section, cognitive processing from the macro perspective will be introduced before the functions of written CF in this processing, because the former serves as a backdrop to the functions of written CF.

2.2.2.1 Macro processes of L2 learning

Three sequential macro processes have been identified in the development of the IL (Housen & Pierrard, 2005), though they are likely to "overlap and influence one another in as yet undetermined ways" (Williams, 2012, p. 321). They are knowledge internalization, knowledge modification and knowledge consolidation.

From the macro perspective, the initial step of L2 learning is knowledge internalization, which corresponds to the first four stages in Gass' (1997) model. As a result, the initial form-meaning connections are established. Then, the form-meaning connections are elaborated and refined as the learner responds to feedback. This is knowledge modification. The representations of the internalized knowledge and the modified knowledge in mind are strengthened via repeated retrievals and deeper processing (i.e. the process of knowledge consolidation), which leads to an increasingly fluent and flexible use of the knowledge (Williams, 2012). In other words, continuous practice of retrieval and processing contributes to the continuous enhancement of strength of knowledge representations (i.e. restructuring). Therefore, L2 development is "nonlinear with backslides, stagnation and acquisition" (de Bot, 2008). And this will be explained further in Section 2.9.

These three macro processes reveal that written CF plays a role in both the processes of knowledge modification and knowledge consolidation. In the former process, learners'

responses to written CF functions to modify their partially developed knowledge; while in the latter, their responses to written CF functions as practice of retrieval and processing of their fully developed knowledge, which contributes to automation and consolidation of such knowledge. These functions of written CF are explained in Skill acquisition theories.

2.2.2.2 The functions of written CF in the macro processes of L2 learning

According the Skill acquisition theories, L2 learning is a kind of skill learning that progresses from the initial explicit knowledge stage involving controlled processing to the final implicit knowledge stage involving automatic processing. L2 skills are learned via practice of the skills (Dekeyser, 1997, 1998). In other words, L2 learning is the process of converting explicit knowledge into implicit knowledge via practice.

L2 learning initiated by written CF begins with controlled processing. As written CF explicitly points out the erroneous structures in the learner's IL, which are manifested in output, knowledge conveyed in written CF is initially encoded as explicit knowledge in the long-term memory without ready-made activation links for use, and functions to modify the partially developed knowledge. Hence, it is difficult for the learner to apply the knowledge learned from written CF in conditions needed. The learner has to focus attention on it in order to use it correctly, and errors may occur occasionally, especially when the performance is accompanied by stressors like time pressure.

Extensive and consistent written CF pushes the learner to practice the controlled processes again and again, which leads to the development and enhancement of corresponding activation links in long-term memory. That is, as written CF enables the learner to see "what has gone wrong in the operating conditions under which they went wrong" (Johnson, 1988, p. 93), procedures to use the knowledge — "condition-action rules" (Dörnyei, 2009, p. 151), are developed in the long-term memory, and are activated with each treatment of written CF.

Numerous such activations make the knowledge initially encoded as explicit knowledge more and more analysed, elaborated and specific, thereby changing the representation of the knowledge in the long-term memory. In other words, explicit knowledge is reorganized into more and more efficient procedures for use (i.e. implicit knowledge). As a result, IL is restructured, the learner uses L2 learning strategies more flexibly, and the performance becomes increasingly automatic and invariable, while decreasing in attentional demand.

Hence, both micro and macro learning processes reveal that written CF plays a role in the L2 learning process, thus facilitating L2 development. As the effect of written CF on both micro and macro learning processes is achieved via cognitive processing of written CF in a single processing episode, the next section will turn to the processing of written CF in a single processing episode.

2.2.3 Processing of written CF in a single processing episode

In the L2 writing context, there are two occasions where written CF is processed in a single processing episode. One is in the treatment (i.e. the initial written CF episode) to develop relevant explicit knowledge, which is evidenced by the modified output (i.e. revision) or new accurate use of L2. Thus, this initial written CF episode connects the micro learning process with the macro learning process. The other occasion is in the subsequent new writing, where the explicit knowledge learnt in written CF is retrieved and used in online language use. This latter processing episode functions to consolidate the explicit knowledge learnt from written CF, thus playing a role in and contributes to the macro learning process.

2.2.3.1 Processing of written CF in the initial episode (i.e. in the treatment session)

Drawing on Gass' (1997) model of processing input in general (see Section 2.2.1.1) and Tomlin and Villa's (1994) model of peripheral attention (see Section 2.2.1.2.1), Bitchener (2016, December) proposed a cognitive processing model illustrating how written CF as input is processed in the initial episode(i.e. in the treatment. Six stages of cognitive processing are identified in this model:

• conscious attention to written CF
• noticing of the difference between the learner's own output and written CF as input
• understanding of written CF
• analyses and comparisons between written CF input and the learner's present knowledge
• hypothesis formation and testing of the knowledge in written CF
• production of the modified output (i.e. revision)

As mentioned in Section 2.2.1, there are two levels of attention one after another in L2 learning, peripheral and focal attention (Robinson, 1998). Tomlin and Villa (1994) identified three levels of peripheral attention: alertness, orientation and detection. Alertness is the state of general readiness and motivation to respond to outside stimuli, including written CF. Based on this state, the learner is oriented to "some type of class of sensory information at the exclusion of others" (p.191). This is orientation. For the learner to attend to written CF, his/her attention needs to be channelled to form/accuracy

(Bitchener, 2016, December). With his/her attention oriented to form/accuracy, the learner is ready to detect the incoming stimulus (i.e. written CF). Detection is the cognitive registration of a stimulus outside the focal attention (Tomlin & Villa, 1994). It involves "the actual commitment of attentional resources to select, or engage, a particular and specific bit of information" (p.192).

With the preparation of detection, the learner is ready to notice some aspect of the stimulus. If written CF is the input, the difference between the learner's own output and the target-like input in the written CF will receive focal attention (i.e. be noticed by the learner). Noticing does not necessarily involve understanding. That is, the learner's noticing of the error pointed out by the written CF does not automatically mean he/she understands the grammatical rule underpinning the written CF and the correct form, which is the next stage of processing.

After having noticed the difference between his/her output and the written CF input, the learner will try to figure out what the written CF says about the error (i.e. the grammatical rule underpinning the written CF and/or the correct form). This is understanding written CF. The type of written CF and the learner's present knowledge may play a role in this process. The more explicit written CF type and partial knowledge of the target form in the learner's present knowledge may facilitate the understanding.

Upon understanding written CF, the learner is able to analyse and compare the relationship between written CF input and his/her present knowledge again and again at different levels. The learner's internal factors, such as working memory and language learning aptitude, and external factors, such as types of written CF, may influence such analyses and re-analyses.

While comparing his/her present knowledge with written CF input, the learner can form hypotheses about the use of the written CF knowledge, and test the hypotheses in the modification of the output (i.e. revision). Individual differences (the learner's internal factors) may moderate this process. Successful revision, which is often underpinned by a correct hypothesis, is often considered to signal the beginning of knowledge development (Bitchener, 2016, December). However, unsuccessful revision, which is underpinned by an incorrect hypothesis, should not be considered as a token of failure in starting the learning process. It may suggest that further opportunity for hypothesis formation is needed, and success in learning may be evidenced in new writing where the

target form is used, or in revision after a different type of written CF is provided (Bitchener, 2016).

If the learner fails to modify the erroneous output correctly, further feedback will be provided, and the above processing will be repeated. In the case of successful modification of the output, the learner is able to consolidate the new knowledge learnt from written CF in the subsequent new writing. Hence, the next section will focus on the processing of written CF in the subsequent processing episode in new writing tasks.

2.2.3.2 Processing of written CF in subsequent episodes (i.e. in new writing tasks)

Although the processing stages that learners go through while utilizing written CF knowledge in a new writing task and moderating factors in this process have rarely been explored, Bitchener (2016, December) proposed a cognitive processing model which identifies the key processes which learners may go through while they are consolidating written CF knowledge in the subsequent writing task. Six processing stages are identified in this model:

• orientation to form and meaning
• identification of the need to use written CF knowledge
• recognition of the relationship between the knowledge learnt from written CF and the
  meaning to be expressed
• retrieval of written CF
• hypothesis formation and testing
• output

In this model of the cognitive processing of written CF in new writing tasks, hypothesis formation and testing refers to the learner's forming and testing a hypothesis about the written CF knowledge in the context of language use while he/she is producing the new text. For the other stages in the processing of written CF, see the data analysis section of the multi-case study in Chapter 3.

In writing, the learner is expected to focus first on meaning, then on form (Bitchener, 2016, December). If he/she attends to form, it is likely that he/she would identify the need to use written CF in writing because written CF also focuses on form. Then, as language is the tool to convey ideas, while the learner is expressing his/her ideas, he/she is expected to establish the relationship between the meaning to be expressed and the form to be used for the expression. If there are obligatory occasions of the target feature in written CF in the writing, the learner would establish the relationship between what to write and the target form in written CF, thus activating the retrieval of the newly

learnt written CF knowledge. Next, the learner needs to form a hypothesis about the retrieved knowledge in the present context of language use, and test the hypothesis in writing. As a result, the output involving the use of the target form in written CF is produced.

This processing may occur more than once in the writing of a single new text because there may be several obligatory occasions of the target feature in written CF, and the learner may identify the need to use written CF knowledge on multiple occasions. Thus, this processing may be reactivated on multiple occasions in the subsequent writing.

Moreover, writing consists of three phases, planning, execution and monitoring. As the task of each phase varies, the learner's focus will vary from phase to phase accordingly. For example, in planning, the focus is on content; in execution, the focus will be shifted to both content and the language form; while in monitoring, the focus will be shifted to form (Kormos, 2012). Hence, even if only one obligatory occasion is generated in a piece of new writing to use the target form from the written CF, the learner may experience more than one written CF episode while writing. The more written CF episodes occur in writing (i.e. the more practice of retrieving the explicit written CF knowledge in the online language use), the more likely this explicit knowledge will be consolidated and procedualized for automatic use (i.e. be converted into implicit knowledge). Hence, processing written CF knowledge in the subsequent writing task contributes to ongoing L2 development. However, theoretical objections to written CF have been raised, too. They will be discussed in the next section.

2.2.4 Theoretical objections to written CF

Theoretical disputes about the L2 learning potential of written CF are related to the issue of interface between implicit knowledge and explicit knowledge in L2 learning literature. Drawing on Krashen's (1985) Monitor model, the non-interface position holds that explicit knowledge can never be converted into implicit knowledge. This is because explicit knowledge and implicit knowledge are completely different and separate systems resulting from two different ways of knowledge internalization. Drawing on the Skill acquisition theories, the strong interface position holds that explicit and implicit knowledge are two extremes on the continuum of knowledge. Thereby, explicit knowledge can be converted into implicit knowledge via extensive output practice (DeKeyser, 2003). Drawing on the Interactionist theories, the weak interface position holds that explicit knowledge contributes to noticing of the form and

gap. Thus, it can foster the development of implicit knowledge by priming the processes involved in acquisition (incidental learning without consciousness). This is because explicit and implicit knowledge are separated systems with interaction (Ellis, 2008).

Theoretical objections particularly in relation to written CF were raised by Truscott (1996, 2004), who does not "deny the value of grammatical accuracy", but doubts whether written CF "can contribute to its [L2] development" (1996, p.329). First, drawing on Natural Order Hypothesis (Krashen, 1985) and Teachability Hypothesis (Pienemann, 1989), Truscott claims, as "L2 grammatical learning follows natural orders", written CF encounters "(P)roblems (I)nvolving (O)rder of (A)cquisition" (1996, p.344). Thus, written CF is ineffective as it interferes with "natural sequences of acquisition" due to the inadequate guidance from the current insights into the developmental sequences (1996, p.345). However, this is a manipulation problem rather than a theoretical problem (Bitchener &Ferris, 2012).

The second issue raised by Truscott is pseudo-learning. From the non-interface position, Truscott (1996) raises "the knowledge acquired through grammar correction is, or can be, pseudo-knowledge" because the IL cannot be affected by error correction (p.345). Therefore, (grammar) "correction is at best ineffective" (2004, p. 342).

He further claims that written CF may even do harm to L2 acquisition. One reason is that the practice of written CF diverts the teaching and learning resources from other more effective activities such as writing practice (1996, 2004). The other reason is, due to the learners' inherent dislike of correction, written CF will lead to anxiety. Thus, the students "shorten and simplify their writing in order to avoid corrections" (1996, p.355). This claim is underpinned by the single-resource, limited capacity model of attention (Skehan, 1998). According to this attentional model, accuracy and complexity compete against each other for the attentional resources. As a result, focusing on accuracy leads to the learner's avoidance of using features that are not well-controlled (Skehan & Foster, 2001). However, according to the multi-resource model of attention, accuracy and complexity are not in trade-off, but closely connected with each other (Robinson, 2003). In addition, as written CF is offline and private, the probability that written CF raises L2 anxiety is not as high as oral CF.

It is important to note that, Truscott (1996, 2004) used "acquisition" (1996, p.344-345) or "acquired" (1996, p. 345) in the above quotes with ambiguity. On the one hand, in the discussion about whether written CF interferes with the natural order of acquisition,

"acquisition" refers to the incidental learning without consciousness. On the other hand, Truscott (1996; 2004) seemed to refer to the process of acquisition (i.e. L2 development) rather than incidental learning in the above quoted sentence "the knowledge acquired through grammar correction" (1996, p.345).

Moreover, in the L2 writing context, the context where written CF functions, it is not appropriate to refer to L2 acquisition as incidental learning without consciousness. Compared with oral communication, time pressure in an L2 writing task is not high. It is likely that the learner has the time to retrieve and process explicit knowledge while composing the text (Williams, 2012). Moreover, an L2 writing task consists of three phases: planning, execution and monitoring. (Kormos, 2012). The focus of the last phase, monitoring, is on language form: the learner consciously uses his/her explicit knowledge to evaluate whether the idea is expressed clearly and appropriately, and modify the text accordingly. Hence, it is difficult to determine whether the implicit knowledge resulted from incidental learning without consciousness or explicit knowledge resulted from conscious learning is used in the L2 written production. As a result, "acquisition" in the L2 writing context tends to refer to the process of acquisition. In other words, it is used as an alternative to L2 development. Nonetheless, theoretical disputes can only be settled empirically. The two theoretical issues raised by Truscott (1996) (i.e. pseudo-learning and harm to L2 learning), will be re-addressed with the review of relevant empirical studies in Chapter 3. Moreover, this project will join the exploration into the efficacy of written CF on L2 development.

2.2.5 Summary of the role of written CF in cognitive processing

From the micro perspective, the cognitive processing of L2 learning consists of noticing, understanding, intake, integration and output. As input given to the learner's output, written CF can function as a facilitator of noticing and output. From the macro perspective, the cognitive processing of L2 learning consists of knowledge internalization, knowledge modification and knowledge consolidation. Therefore, the learner's responses to written CF can result in his/her modification of the partially developed knowledge; the learner's retrieval and processing of written CF in the subsequent writing tasks can contribute to knowledge consolidation.

The effects of written CF on both micro and macro learning processes are achieved via cognitive processing of written CF in a single processing episode. There are two occasions where written CF is processed in a single processing episode: in the treatment

session (i.e. the initial processing episode), and in a subsequent writing task. Cognitive processing of written CF in the initial episode leads to the development of the relevant explicit knowledge. Hence, the initial cognitive processing episode connects the micro learning processes with the macro learning processes. While written CF is processed in a subsequent writing task, the written CF knowledge is retrieved and processed for online language use. Thus, it contributes to knowledge consolidation. However, theoretical objections against written CF have been raised, too.

Holding that explicit knowledge cannot be converted into implicit knowledge, Truscott (1996) claims that written CF cannot lead to L2 development useful for the actual L2 use. Moreover, holding that language complexity and accuracy are in trade-off in L2 writing, he claims (1996) that written CF harms L2 development, because the students "shorten and simplify their writing to avoid corrections" (p. 355). In addition, he considers (1996, 2004) that written CF also harms L2 development by taking the L2 learning resources away from more effective activities such as writing practice. Theoretical disputes can only be settled empirically. This project will join the body of research in the exploration of the L2 learning potential of written CF.

From the theoretical perspective, the contribution of written CF to L2 development is embodied in its treatment potential on specific linguistic features. Hence, the next section will turn to the treatment potential of written CF on the target feature: the English passive voice.

2.3 The treatment potential of written CF on the target feature: the English passive voice

Morphology, syntax and lexis knowledge are learnt in different ways (Ferris, 1999; Schwartz, 1993; Truscott, 1996) as they are different linguistic domains (parts; Kreidler, 1998). Thus, written CF, even the same type of written CF, may not be equally effective for all types of errors (Van Beuningen, 2008). Based on his meta-analysis of a body of quasi-experiments on the L2 learning potential of written CF, Truscott (2007) claimed that written CF may treat discrete items successfully, but not complex syntactic errors.

However, any complex system comprises less complex sub-systems. If written CF successfully treats the sub-systems (i.e. the components), of the target feature, it can do so with the whole system (i.e. the target feature), although it may take more time since the combination of the sub-systems into one is not simple accumulation. The treatment

potential of written CF on the English passive voice, a syntactic feature (Hinkel, 2002), for Chinese learners of English can be taken as an example.

There are two voices in English: the active voice and the passive voice. Active voice describes an event or process from the agent's perspective, while the passive voice from the patient's perspective. In English passive voice, the patient is the subject, while the agent is either unmentioned or mentioned by a by-phrase at the end of the sentence (Greenbaum, 1991). English passive voice is marked by three markers: auxiliary be, past participle and by. The first two markers are obligatory, while the last one is not — it is omitted when the agent of the action is unmentioned in the sentence.

Auxiliary verbs in English are a set of verbs which subordinate to the main lexical verb (i.e. are followed by the full verb, to form a question, a negative sentence, a compound tense or the passive voice. In English, the main auxiliaries are "do, be and have". "Auxiliary be" refers to the verb "be" when it is followed by a full verb to form the progressive tense or the passive voice (Crystal, 2008). To form the progressive tense, "-ing" form of the full verb is used, while to form the passive voice, the past participle of the full verb is used. Past participle is a verb form that typically expresses a completed action. It is used to form the perfect tenses in the active voice and all the tenses in the passive voice (Chalker & Weiner, 2003).

Passive voice may be used more frequently in academic writing than in other genres (Hinkel, 2002). On the one hand, it is included in almost all the English as a second language (ESL) grammar instruction; on the other hand, it is a difficult language point for learners of many L1s: many learners, including advanced learners, often have difficulty in the formation of passive structure or in appropriate use it in speaking or writing (Hinkel, 2002). Chinese learners of English may experience a particular difficulty with English passive voice, for there is no syntactically derived passive voice in Chinese (Hinkel, 2002), which may be attributed to the topic-prominent feature of Chinese language.

In Chinese, there are both passive meaning and form. "Bei" construction is the counterpart of English passive voice in Chinese (Li & Thompson, 1981). However, "bei" construction has a negative semantic prosody (Li & Thompson, 1981). Thus, it is used to express passive, negative meaning. For example, "Her purse bei steal." (Her purse was stolen). For the other cases, passive meaning is expressed without "bei" construction. Take the following sentence as an example:

(1) Rice cook already.

On the surface, sentence (1) seems to be an active sentence as the verb is in the same form as in active voice (Hung, 2005). However, rice cannot cook itself. The meaning of this sentence can be interpreted in English like this: "As to the rice, someone has cooked it already." Sentence (1) is correct in Chinese, but not in English. This is because, unlike English, Chinese is a topic-prominent language. Thus, subject is not obligatory in Chinese. Therefore, "rice" functions as the topic, not the subject of sentence (1) (Hung, 2005). In this case, the subject (i.e. the person who cooked the rice), is not important, thus is omitted, and only the key words are left. By comparison, to stress the person who cooked the rice, e.g., "mother", the following sentence will be produced:

(2) Mother cook already rice.

At the first glance, sentence (1) and sentence (2) seem to be in the same structure. However, they are not. Though the first word in both sentences is stressed, they function differently in the sentences: "rice" as the topic in sentence (1), while "mother" as the subject in sentence (2). There is no subject in sentence (1).

As a result, the use of passive voice in Chinese is one tenth of that in English (Xiao, McEnery, & Qian, 2006). It should be pointed out that it is easier to sense the passive meaning in sentences with "bei" construction than in sentences without this Chinese passive structure.

Moreover, the non-inflected nature of Chinese language may also contributed to the learning difficulty. Because of this nature, there is no grammatical morphology for marking in Chinese, and consequently the forms of Chinese verbs do not change (Chen, Shu, Liu, Zhao & Li, 2007). By comparison, in English passive voice, there are three markers in passive voice: auxiliary be, past participle and by. According to the Marked Differential Hypothesis, the unmarked features of L1 tend to interfere with learning of their marked counterparts in the L2, making it more difficult for the learners to learn the marked features in the L2 (Eckman, 1977).

As the English passive voice differs from its Chinese counterpart in both syntactic processing and markers, learning the English passive voice for Chinese learners of English means a change in syntactic processing and the establishment of markers. Passive voice is seldom used in Chinese due to the negative semantic prosody borne by

the "bei" construction, the Chinese passive voice. And the passive meaning is blurred in sentences without the "bei" construction such as sentence (1). Hence, the change in syntactic processing from Chinese to English is meaning-related. By comparison, the establishment of markers is form-related.

As discussed in Section 2.2, understanding is gradual. A comprehensive understanding of a feature consists of both semantic and structural analysis. Hence, during the course of learning English passive voice, it is normal for the native speakers of Chinese to develop the syntactic processing required in the English language earlier than the markers, because the former is related to meaning. Nonetheless, empirical evidence is needed to establish such a claim, and this project will test such a claim.

To sum up, due to the differences in both syntactic processing and markers in the passive voice in English and Chinese, it is difficult for the Chinese speakers to learn English passive voice. As the greater likelihood to elicit errors is a prerequisite for extensive written CF which, in turn, is necessary for the efficacy of written CF because acquisition, the ultimate goal of L2 learning, requires extensive evidence and practice (Gass, 1997), English passive voice was targeted in this project. Moreover, syntactic features are underexplored in the written CF research. Up to now, only one study targeted a syntactic feature, the hypothetical conditional (Shintani et al., 2014). Thus, focusing on English passive voice in this project would further the knowledge about the effect of written CF on errors of different linguistic domains.

Besides the treatment potential of written CF on specific linguistic features discussed in this section, the theoretical contribution of written CF to L2 development is also embodied in the treatment potential of different written CF types. Hence, the next section will turn to this issue.

2.4 The treatment potential of different written CF types

The major written CF types are: direct feedback, indirect CF and metalinguistic CF. Direct feedback directly provides the correct form, indirect written CF indicates rather than actually corrects an error, while metalinguistic CF provides some form of explicit comment about the nature of the errors. There are two forms of metalinguistic CF: error codes (abbreviated labels for different kinds of errors) and metalinguistic explanation (Ellis, 2009). In the teaching practice, sometimes direct feedback is accompanied by metalinguistic explanation; while in the written CF research, the combination of direct

feedback and metalinguistic explanation has been a recurrent theme (Bitchener, 2008; Bitchener & Knoch, 2009a; Bitchener & Knoch, 2009b; Bitchener, Young & Cameron, 2005; Sheen, 2007).

As only direct feedback provides correct forms, it is the most explicit form of correction. By comparison, metalinguistic explanation provides rules about errors with illustrations. Thus, it provides most information about the error, and is the most informative type of written CF. Theoretically speaking, feedback with differences in explicitness may have different effects on noticing, because written CF can function as a noticing facilitator. Likewise, feedback with differences in informativeness may have different effects on understanding (i.e. the second stage of cognitive processing), because the information used in cognitive processing of the input can influence the learner's understanding of the input. Hence, the results of feedback types may differ.

Direct feedback and metalinguistic explanation are underpinned by Interactionist theories and Skill acquisition theories. In the case of direct feedback, correct forms (positive evidence) are provided directly, and learners are induced to comprehend their grammatical meanings rather than to produce the target feature. Hence, direct feedback is input-providing and is underpinned by Interactionist theories, which emphasize noticing and input (i.e. positive evidence) (Shintani et al., 2014). Direct feedback outperforms other written CF types in the sense that it enables the learner to internalize the correct form immediately (Chandler, 2003). This is particularly important for learners with low proficiency. They can compare their incorrect forms with the correct forms in direct feedback though they may not (attempt to) develop the rule underlying the corrections (Shintani & Ellis, 2013).

By comparison, metalinguistic explanation is output-prompting (Shintani et al., 2014). Instead of the target features, metalinguistic descriptions of errors are provided. The learner has to use the information in metalinguistic explanation to work out the target features. In this outputting process, he/she practises the mapping between the explicit knowledge and the context to use the knowledge. Hence, it is underpinned by Skill acquisition theories, which regard output as an aid in the procedualization of explicit knowledge, and stress the proceduralization of explicit knowledge into implicit knowledge (Shintani et al., 2014).

As a result, from the theoretical perspective, if the influences of degree of explicitness and informativeness on the efficacy of written CF is confirmed, L2 learning theories

need to incorporate these differences "as conditions of L2 learning"; from the pedagogical perspective, teachers certainly would like to focus on the most effective written CF type (Bitchener, 2012, p. 354). Hence, it would be better to investigate the efficacy of direct feedback and metalinguistic explanation respectively before combining them together, and this project will make such an attempt.

The output-prompting nature of metalinguistic explanation is related to one strategy used by the learner in responding to written CF: revision. Learners have been found to use different types of revision while responding to written CF. Hence, the next section will focus on the moderation of revision type.

2.5 The possible moderation of revision type

Theoretically, the process of revision after written CF treatment is related to the importance of practice from the perspective of Skill acquisition theories. As discussed in Section 2.2, input is necessary for L2 acquisition, the ultimate goal of L2 learning, but input alone is not sufficient for acquisition in many cases. Besides serving as a site for hypothesis testing, output (i.e. practice) can also serve to push the learner to notice the form and to initiate metalinguistic reflections (Swain, 1995). As a result, revision following written CF, including copying direct feedback, leads to pushed output, which involves noticing of the error and its correction. This noticing may promote memorization of the target feature (Shintani et al., 2014). Moreover, correcting errors while revising the whole text is a contextualized practice contributing to proceduralization of explicit knowledge gained from written CF (Shintani & Ellis, 2013). Therefore, at the theoretical level, revision can enhance the efficacy of written CF. Empirical evidences will be presented and discussed in section 3.5 in Chapter 3.

Learners have been found to adopt different types of revision: the marked error being corrected (successful revision), an incorrect change to the marked error (unsuccessful revision), text with the marked error deleted (deletion of text with the marked error) and no change to the marked error (no response to the marked error) (Ellis, 2009).

As successful revision, which is one type of modified output, may manifest the internalization of the correct understanding of written CF (see Section 2.2.1), it may contribute more effectively to L2 development than the other types of revision. However, empirical evidence is needed to establish such a claim, and this project will test this claim.

Besides revision, a strategy adopted by the learners in responding to written CF, other learner factors may also moderate the efficacy of written CF. The next section will turn to the one of the most influential learner factors: L2 motivation.

2.6 The possible moderation of L2 motivation

It has been confirmed in empirical research that language aptitude and motivation are the two most influential learner factors in L2 learning (Ellis, 2008). Compared with cognitive factors (e.g., language aptitude), which are "fairly stable and resilient to social and instructional influences", L2 motivation is more accessible to direct manipulation (Kormos, 2012, p.398).

In everyday language, motivation is "a matter of quantity" (Ortega, 2009, p.168). From this viewpoint, three antecedents of motivation (variables that form the structure of motivation, and thus contribute to the changes in motivational quantity) are of central importance. They are integrativeness, orientation and attitude. Integrativeness is "a genuine interest in learning the second language in order to come closer to the other language community" (Gardner, 2001, p.5). Orientation refers to the reasons for L2 learning. Attitude includes the one towards the L2 community and speakers, and the one towards instructional settings (Gardner, 2001).

Later, recognizing the shortcomings of dwelling on the quantity of motivation and integrativeness, the quality of motivation became the focus. Three levels of quality of motivation have been identified: intrinsic motivation, extrinsic motivation and amotivation (Noels, Pelletier, Clement, & Vallerand, 2000).

Intrinsic motivation "refers to the motivation that derives from a learner's internal curiosity about the target language or the interest generated by participating in a language-learning activity" (Ellis, 2008, p.969). Students with intrinsic motivation "engage in the learning process because they find it interesting and enjoyable" (Kormos, 2012, p. 394). By comparison, a learner is boosted by extrinsic motivation when he/she attributes his/her L2 learning behaviour to means-end, instrumental causation imposed by external sources (Noels et al., 2000). Learners with extrinsic motivation "carry out the learning activity in order to gain a reward or to avoid punishment" (Kormos, 2012, p.394). In extreme cases, learners perceive no external or internal value/relevance to their learning behaviour. They are amotivated (Noels et al., 2000).

This model of L2 motivational quality is strong as it focuses on "broad human motives underlying motivational states" (Ortega, 2009, p.178). However, as motivation relies greatly on "who learns what in what milieu" (Clement & Kruidenier, 1983, p. 288), it lacks a theoretical accommodation of L2-specific contexts, which is the strength of the previous model of L2 motivational quantity.

Recently, differing from the previous two motivational models, which view L2 motivation as static, "a more process-oriented view of motivation has emerged" (Ellis, 2008, p. 677). As a result, the L2 Motivational Self System has been developed (Dörnyei, 2005).

The L2 Motivational Self System is a macro model of language-specific motivation, and it accommodates the previous L2 motivational models and is built on the general social psychological theory of regulatory focus. According to the theory of regulatory focus, people's decisions on actions are motivated with reference to their ideal selves and ought selves. The ideal self is the kind of person the individual would like to become, while the ought self (In the field of psychology, ought self rather than ought-to self is used) is the kind of person the individual thinks he/she should become (Dörnyei, 2009).

The L2 Motivational Self System consists of three components: Ideal L2 self, Ought-to L2 self and L2 learning experience. Ideal L2 self "is the L2 specific facet of one's ideal self: if the person we would like to become speaks an L2, the ideal L2 self is a powerful motivator to learn the L2 because of the desire to reduce the discrepancy between our actual and ideal selves." (Dörnyei, 2009, p.217).

Ought-to L2 self "concerns the attributes that one believes one ought to possess to meet expectations and to avoid negative outcome" (Dörnyei, 2009, p.218). L2 learning experience "concerns situated, 'executive' motives related to the immediate learning environment and experience" (Dörnyei, 2009, p.218). This dimension indicates motivation is context-specific, and teachers and specific learning tasks contribute to motivational changes.

This dynamic L2 motivational model has been tested in a range of foreign language (FL) contexts (Csizer & Kormos, 2009; Kormos et al., 2011; Lamb, 2012; Ryan, 2009; Taguchi et al., 2009), and has been generally confirmed. Nonetheless, the vagueness in the Ought-to self/Ideal self delineation has been revealed (Papi, 2010). To clarify this issue, Lanvers (2016) proposed a return to Higgins' Self Discrepancy Theory.

The Self Discrepancy Theory originated in clinical psychology (Higgins, 1987). Compared with the L2 Motivational Self System, it includes one more self domain, the Actual self, which refers to one's representation of the attributes that one or someone else believes one actually possesses. According to the Self-discrepancy theory, the discrepancies between the Actual self and the Ideal self/Ought self from two standpoints (own/other) will generate tensions. And such tensions, in turn, will generate a motivational dynamic for a change in action.

Drawing on Higgins' Self Discrepancy Theory in qualitative data analysis, Lanvers (2016) found, among over 50 adolescents learning a foreign language in UK, that these high school students were dominantly motivated to learning the foreign language by the discrepancy between Ought self from others' standpoint (teacher, parents and university or job applications) and the Actual self from their own standpoint. A similar finding was revealed in written CF research, too. To explore the Learner moderating the efficacy of written CF, Li and Li (2012) conducted a multi-case study among four college students in China after a preliminary quasi-experiment. This study revealed that all the students were motivated to study English due to the requirement from the college authority to pass a nationwide English proficiency test — College English Test (CET). However, the two students who perceived a large gap between the English proficiency level of CET 2 and their actual English proficiency level worked harder and responded more actively to written CF in revision than the other two students, who perceived a minimal gap between the English proficiency level of CET 2 and their actual English proficiency level. Moreover, measured by the changes in their scores on CET 2, the English proficiency of the former two students improved noticeably faster than the latter two students. Hence, adapting the L2 Motivational Self System with self discrepancy may contributed to a richer understanding of L2 motivation, and thus offer a more valuable foundation to cultivate L2 motivation. Therefore, by adapting the L2 Motivational Self System with self discrepancy, this project may capture the function of dynamic L2 motivation on the efficacy of written CF, thus contributing to a better understanding of both L2 learning variables.

Another learner factor, L2 learning strategies, refers to the measures taken by the learner to solve specific problems encountered in an L2 learning task (Oxford, 1990). Hence, strategies adopted by the learner in responding to written CF may influence the efficacy of written CF. As a result, the extent to which learners can benefit from written

CF may differ from learner to learner, because it is unlikely that different learners adopt the same strategies in their responses to written CF.

2.7 The possible moderation of L2 learning strategies

Although there is no unanimous definition of L2 learning strategies, based on the characteristics that cover most accounts of L2 learning strategies, L2 learning strategies can be considered as actions (either mental or behavioural) taken by the individual learner to solve specific problems while engaging in an L2 learning task. That is, L2 learning strategies are problem-oriented, and vary according to task type and individual preferences. Also, "some strategies are directly observable, while others are not" (Ellis, 2008, p. 705). For example, revision type, which was discussed in Section 2.5, is a behavioural strategy taken by the learner in the process of learning from written CF. Thus, it can be observed externally. By comparison, the mental activities that the learner is engaging in while revising the text cannot be observed from outside.

There are two major taxonomies of L2 learning strategies: Oxford's (1990) model and O'Malley and Chamot's (1990) model. Oxford's model is a bi-partite structure, comprising indirect and direct strategies, with the latter type deals with the incoming information of the target language directly. Under each umbrella, three sub-classes are identified: direct strategies comprising memory, cognitive and compensation strategies, and indirect strategies comprising metacognitive, social and affective strategies. However, two issues have been identified in this model (Dörnyei, 2005). One is that memory strategies are distinguished from cognitive strategies, although the former is under to umbrella of the latter. Another is that compensation strategies are related to language use rather than language learning. This is because, as far as the function and psycholinguistic representation are concerned, the process of language use differs greatly from that of L2 learning. Thus, this model would be improved if compensation strategies are excluded (Dörnyei, 2005). It is important to note, if both issues are addressed, Oxford's model will be adapted into a four part structure: cognitive, metacognitive, social and affective strategies. This is similar to the model of O'Malley and Chamot's (1990).

O'Malley and Chamot's (1990) model consist of three categories: metacognitive, cognitive and socio-affective strategies. According to them, metacognitive strategies are higher order executive skills that regulate cognition via planning, monitoring and evaluating the L2 learning actions. Compared with the strategies in the other two

categories, metacognitive strategies may be a bit abstract. Take reflection as an example. Reflection refers to the mental process involving assessment of an activity in order to identify the gaps among the intention, behaviours and outcomes of the activity (Yancey, 1998). Hence, it is goal-orientated and under the control of the learner. As a result, it has the potential to provide the learner with "insights necessary to learn from experience and alter habitual behaviours" (Jones & Shelton, 2006, p.53). Consequently, changes in L2 learning behaviours (i.e. learning strategies) resulting from reflection will lead to changes in learning outcomes. Self-initiation is another metacognitive strategy. It refers to the learning behaviours initiated by the learner's inherent interests (Gu, 2005). Hence, self-initiation indicates that the learner is ready and able to identify and utilize the learning opportunities him/herself. Like self-initiation, reliance on the expert is also a metacognitive strategy that regulates cognition via planning the learning activity. As the learner prefers to rely on the expert in learning, he/she is not ready to identify, thus utilizing the learning opportunities him/herself. As a result, compared with a self-initiated learner, a learner who relies on the expert can identify, thus utilizing fewer learning opportunities.

Cognitive strategies function directly in information processing of L2 input to facilitate L2 learning; and socio-affective strategies involve "interaction with another person or ideational control over affect" (O'Malley & Chamot, 1990, p.44-45). Hsiao and Oxford's (2002) factorial analysis suggested that it would be better to separate the socio-affective category into two separate categories. Hence, if the issue in O'Malley & Chamot's model or issues in Oxford's (1990) model are addressed, each of the adapted taxonomies will consist of four categories: metacognitive, cognitive, social and affective strategies.

As learning strategies are adopted by the learner to solve specific problems encountered in a learning task, they can facilitate L2 learning. Thus, theoretically, while the learner is responding to written CF, the learning strategies he/she adopts can impact on the efficacy of written CF. In other words, the efficacy of written CF is influenced by whether and how the learner notices the gap and involves him/herself in the problem-solving activities as well as the follow-up revisions (Kormos, 2012). However, except for revision, the moderation of learning strategy is an underexplored area in written CF research. Thus, this project will explore the impact of learning strategies on the efficacy of written CF.

2.8 Summary of the role of written CF in cognitive processing together with moderating factors

To sum up, from the micro cognitive perspective, written CF, the input addressing errors in the output, can function as a facilitator of noticing and output. From the macro cognitive perspective, written CF can contribute to the modification of the partially developed knowledge and the consolidation of the developed knowledge. However, holding that explicit knowledge cannot be converted into implicit knowledge, Truscott (1996) raises that written CF cannot lead to L2 development useful for actual L2 use. He also considers that written CF harms L2 development by causing anxiety and taking L2 learning resources away from more effective activities such as writing practice. Hence, the L2 learning potential of written CF is the key aim of this project.

Directive feedback is the most explicit written CF type, while metalinguistic explanation the most informative type. From the theoretical perspective, differences in the explicitness and informativeness may lead to different effects of written CF on noticing and understanding, the first two stages of cognitive processing. Consequently, the efficacy of directive feedback and metalinguistic explanation may differ. This issue will be explored in this project.

Among the four revision types adopted by learners in responding to written CF (successful revision, unsuccessful revision, deletion of text with the marked error and no response to the marked error), only successful revision may manifest the internalization of correct understanding of written CF. Thus, it may contribute more to L2 development than the other revision types. This assumption will be tested in this project.

As an influential learner factor, L2 motivation may also moderate the efficacy of written CF. Because the learner constantly interact with the learning context, L2 motivation has a dynamic dimension. This project will explore the moderation of dynamic L2 motivation on the efficacy of written CF. Another learner factor, L2 learning strategies, is taken by the learner to solve problems encountered in a learning task. Therefore, strategies the learner adopts in his/her cognitive processing of written CF may impact the efficacy of written CF. This is an issue explored in this project.

Therefore, from the cognitive perspective, written CF can facilitate L2 development. However, with the possibly different treatment potential of different written CF types, together with the possible moderation of learner factors such as L2 motivation and

learning strategies, it is possible that a learner's writing accuracy does not improve after the written CF treatment. Does this mean no contribution from written CF to this learner's L2 development, thus contradicting the L2 learning potential of written CF revealed above from the cognitive perspective? In the examination of such a phenomenon, Dynamic Systems Theory is helpful with the offer of a perspective different from the cognitive theories. Hence, the next section will turn to L2 learning and the L2 learning potential of written CF from the perspective of Dynamic Systems Theory.

2.9 L2 learning and the L2 learning potential of written CF from the perspective of Dynamic Systems Theory

No L2 learning theory comprehensively deals with all the aspects of L2 learning (Littlewood, 2004): each highlights certain aspects of it (de Bot et al., 2013). Recently, Dynamic Systems Theory, a theory emphasizing "the journey" (i.e. the process) of L2 learning (Spivey, 2007, p.23), has been taken on in research as a complementary approach. It offers a different perspective from which to examine the efficacy of written CF on L2 learning. Therefore, in this section, first, L2 learning will be explained from the perspective of Dynamic Systems Theory. Then, the role of written CF in L2 learning from this perspective will be explored. Finally, insights into the L2 learning potential of written CF from this perspective will be summarized.

2.9.1 L2 learning from the perspective of Dynamic Systems Theory

Dynamic Systems Theory (DST) "is a theory of change that takes time as a core issue" (de Bot et al., 2013, p. 201). Dynamic "refers to the changes that a system undergoes due to internal factors and to energy from outside itself" (de Bot et al., 2013, p. 200). Systems "are groups of entities or parts that function together" (de Bot et al, 2013, p. 200). Any system consists of embedded sub-systems (and sub-subsystems in some circumstances) interrelating with one another. Systems undergo continuous changes: sometimes the change is abrupt, and thus it is externally visible; sometimes the change is subtle, and thus it can hardly be perceived from the outside. As the systems interact with their environment and the components of systems react to one another, systems are complex and adaptive. As a result, a small change in one component may affect another component or other components of the same system. Thus, the change of systems is nonlinear, and may be unpredictable (de Bot et al., 2013).

From the perspective of DST, L2 "has all the characteristics of dynamic complex systems": it is "complex with different subsystems (syntactical, phonological, lexical, textual) that interact"; it is "sensitive to initial conditions, open, self-organizing, feedback-sensitive and adaptive"; and it "develops non-linearly and sometimes is unpredictable and chaotic" (de Bot, 2008, p. 171).

As a result, L2 learning is also a dynamic process (de Bot, 2008). It is "the interaction between input and the self-organizing system" (de Bot, 2008, p. 171). Thus, with backslides, stagnations and sudden, large movements forward, L2 learning is not a simple accumulation of input (Larsen-Freeman, 1997). This means the expectation of a linear relationship between input and outcome is not realistic. Moreover, there are self-organized criticalities in the L2 learning process. Self-organized criticality refers to the critical state that the system has reached, where one more piece of input leads to the break/collapse of the pre-existing system — an abrupt change of the system (de Bot, 2008). As a result, the system is restructured with this additional input, and the development is large enough to be visible easily from the outside. Hence, L2 learning "is an iterative process … the more frequently one hears something, the more easily it is activated, the more frequently it is used and the faster it is learned" (de Bot et al., 2013, p. 210). Hence, DST offers a different perspective to view written CF.

2.9.2 The role of written CF in L2 learning from the perspective of Dynamic Systems Theory

As noted above, from the perspective of DST, L2 is sensitive to feedback. Thus, written CF, a type of feedback, can play a role in L2 learning. When IL has reached the self-organized criticality, one more treatment of written CF can lead to the restructuring of the IL. Thus, the target form in written CF is developed.

It was also stated previously that, from the perspective of DST, L2 learning is an iterative process consisting of interactions between input and the self-organizing system (i.e. IL). Thus, written CF as input is a trigger and a component of such interactions in L2 learning.

Finally, from the perspective of DST, process, what was described above as the journey of L2 learning, is the main concern. Thus, failure in improving writing accuracy after written CF treatment does not necessarily mean learning has not taken place. It could be that the learner has started to learn the target feature in the written CF, and is on the way to the destination of L2 learning (i.e. the accurate use of the target feature). More finely-

grained examination is needed in such cases, because according to DST, there are both abrupt and subtle changes in the IL in the process of L2 learning, and the subtle changes "may not be externally visible, but the underlying processes may have been changed" (de Bot et al., 2013, p. 212). In addition, from the perspective of DST, due to the existence of self-organized criticalities and L2 learning being an iterative process, such cases of failure in accurate development may suggest that more written CF is needed to iterate the L2 learning process until the IL has reached the critical state, where one more treatment of written CF leads to the restructuring of IL and the target feature is fully developed in the IL.

2.9.3 Summary of the L2 learning potential of written CF from the DST perspective

To sum up, from the perspective of DST, a theory concerning changes in the learner's IL in the L2 learning process, L2 is an open and self-organizing system with interrelating subsystems reacting to one another. Thus, L2 is complex and sensitive to initial conditions and to feedback. To align with the characteristics of L2, L2 learning is also a dynamic complex system. L2 learning is an iterative process inclusive of interactions between input and the self-organizing system. Thus, IL is not simply an accumulation of input, and it develops nonlinearly. Also, there are self-organized criticalities in L2 learning: when IL has reached the critical state, one additional piece of input would lead to the restructuring of IL.

From the perspective of DST, L2 is sensitive to feedback. Thus, written CF as a kind of feedback, can facilitate L2 learning. Moreover, as L2 learning consists of iterative interactions between input and IL (i.e. the learner's self-organized system), written CF, as input, can trigger such interactions, and then interact with IL. As a result, it can contribute to L2 development. Furthermore, from the perspective of DST, there are both abrupt and subtle changes in the IL during the L2 learning process, and it may be difficult to perceive the subtle changes from outside (de Bot et al, 2013). As a result, the cases of failure in the improvement in accuracy after written CF treatment may not simply mean the inefficacy of written CF in L2 development, but rather call for more nuanced examinations in the learning process. And this project is such an attempt. Finally, with the view that L2 learning is an iterative process and self-organized criticalities exist in the process, such cases of failure suggest more written CF is needed to facilitate the recurrent learning process until the critical state is reached in the IL, and the learner is ready to develop fully the target feature in written CF.

2.10 Summary of the L2 learning potential of written CF from the theoretical perspectives

In summary, written CF, the input addressing errors in the output, can function as a facilitator of noticing and output in the micro learning processes. In the macro learning processes, it can contribute to knowledge modification and knowledge consolidation. However, holding that explicit knowledge cannot be converted into implicit knowledge, Truscott (1996) raises that written CF cannot lead to L2 development useful for actual L2 use. He also considers that written CF harms L2 development by causing anxiety and taking L2 learning resources away from more effective activities such as writing practice. Hence, the L2 learning potential of written CF is the key aim of this project.

Directive feedback is the most explicit written CF type, while metalinguistic explanation the most informative type. Theoretically speaking, differences in the explicitness and informativeness may lead to different effects of written CF on noticing and understanding. Thus, the treatment potential of these two written CF types on the same feature may differ. Nonetheless, this assumption needs to be tested, too.

Among the four revision types adopted by learners in responding to written CF (successful revision, unsuccessful revision, deletion of text with the marked error and no response to the marked error), only successful revision may manifest the internalization of correct understanding of written CF. Thus, it may contribute more to L2 development than the other revision types. This assumption will be tested in this project.

As an influential learner factor, L2 motivation may also moderate the efficacy of written CF. because the learner constantly interact with the learning context, L2 motivation has a dynamic dimension. This project will explore the moderation of dynamic L2 motivation on the efficacy of written CF. Another learner factor, L2 learning strategies, is taken by the learner to solve problems encountered in a learning task. Therefore, strategies the learner adopts in his/her cognitive processing of written CF may impact the efficacy of written CF. This is an issue explored in this project.

Therefore, from the cognitive perspective, written CF can facilitate L2 development. However, with the possibly different treatment potential of different written CF types, together with the potential moderation of learner factors such as L2 motivation and strategies, it is possible that a learner's writing accuracy does not improve after the written CF treatment. Does this contradict the L2 learning potential of written CF

revealed above from the cognitive perspective? In the examination of such a phenomenon, Dynamic Systems Theory is helpful with the offer of a different perspective.

DST is an L2 learning theory concerning changes in the IL in the L2 learning process. According to DST, L2 is sensitive to feedback. Thus, written CF, a kind of feedback, can facilitate L2 development. Moreover, from the DST perspective, L2 learning consists of iterative interactions between input and IL. As input, written CF can trigger such interactions, and then interact with IL. Thus, it can contribute to L2 development. Furthermore, DST holds that there are both abrupt and subtle changes in L2 during the L2 learning process, and the subtle changes may be difficult to perceive from the outside. Hence, from the DST perspective, the cases of no improvement in writing accuracy after written CF treatment may not necessarily mean that written CF does not benefit such learner's L2 development. Instead, they can be viewed as a call for more nuanced examinations of these learner's learning process. This project will make such an attempt.

The above theoretical review revealed that both the cognitive and DST theories strongly underpin the L2 learning potential of written CF despite the theoretical objections to it. A considerable body of research has been examining the efficacy of written CF for L2 development. These studies will be reviewed in the next chapter.

CHAPTER 3

A REVIEW OF STUDIES ON THE EFFICACY OF WRITTEN CF FOR L2 DEVELOPMENT

3.1 Introduction

This project is built on the results of the previous research into the efficacy of written CF. Thus, relevant previous written CF studies will be reviewed in this chapter. The studies to be reviewed here are published in the mainstream double blind peer-reviewed journals. Regarding the impact of moderating factors on the efficacy of written CF, as this is a new area in written CF research, relevant unpublished PhD theses will also be included.

There are two parallel lines of research into the efficacy of written CF. One focuses on L2 learning, addressing whether written CF contributes to the development of linguistic knowledge and use. The other focuses on L2 writing, investigating whether written CF facilitates the improvement of the general quality of L2 learners' texts (Ferris, 2010). Since this project investigates the efficacy of written CF for L2 development, only studies in this strand will be reviewed.

As to the measurement of the efficacy of written CF on L2 development, since only the independently and consistently accurate use of a linguistic feature can be considered as the signal of L2 development, a new piece of writing after the written CF treatment is necessary for addressing the efficacy of written CF for L2 development (Bitchener & Ferris, 2012). In addition, as improvement is possible without any CF (Truscott, 1996), it is also necessary for studies addressing this issue to include a control group (without any CF) for comparison (Bitchener & Storch, 2016; Bruton, 2009, Truscott, 2004; 2007). The scores of the control group provide a baseline for comparison (Bruton, 2009). Thus, the design of the experiment should rule out other factors such as writing practice, input in class and outside exposure (Truscott, 2004), and the control/comparison group should be one whose members write but do not receive any feedback on language form, while feedback on content and requests for clarity of meaning is acceptable (Truscott, 2007). Therefore, only studies including a new piece of writing and a control group will be reviewed.

However, a review of all such studies is beyond the scope of this thesis. Recurrent themes in this body of empirical studies include the efficacy of written CF for L2 development, the efficacy of written CF for different error types, the efficacy of different types of written CF as well as the moderation of revision types and learner factors (Bitchener, 2012). As these issues are relevant to this project, only studies addressing these issues will be reviewed in sections 3.2 - 3.6 respectively.

In addition, in the practice of written CF, learners without improvement in the independent and accurate use of the target feature(s) have been observed (Guo, 2015). Does this mean that written CF is not beneficial for such learners' L2 development? This issue has not been addressed in written CF research. Nonetheless, some studies addressing L2 development from the Dynamic Systems Theory (DST) perspective (see Section 2.3 for introduction of DST) may shed some light on this issue. Hence, in Section 3.7, such studies will be reviewed. The existence of learners without improvement in their writing accuracy also raise another question: Why can learners differ so much in the way they benefit from written CF? To address this question, an exploration of learners' cognitive processing is needed. Hence, studies on the learners' cognitive processing will be reviewed in Section 3.8. Finally, after the review of empirical studies, the research niches will be summarised in Section 3.9, and from these niches, the research questions of this project will be presented.

3.2 Studies on the contribution of written CF to L2 development

It has been raised in Chapter 2 that written CF can contribute to both micro and macro L2 learning processes; thus, it can facilitate L2 development. In this section, this theoretical assumption will be checked against empirical studies. The efficacy of written CF for L2 development has been addressed from two perspectives: unfocused and focused written CF. In the unfocused studies, all the errors are treated; while in the focused studies, only the target errors are treated. Before the review of the studies on the contribution of written CF to L2 development, two issues in this body of research that have been critiqued recently will be clarified first: low ecological validity and differences in the measurement of accuracy (Liu & Brown, 2015).

First, regarding the ecological validity of the quasi-experiments to be reviewed, written CF has been adopted in L2 teaching for a long time on the assumption that it facilitates L2 development. Written CF research started without consideration of its role in L2 development (Bitchener & Ferris, 2012; Hendrickson, 1978). By comparison, the quasi-

experiments to be reviewed in this section explored whether and to what extent written CF contributes to L2 development (i.e. the attribution between the two variables). Thus, findings of this body of research can inform pedagogy whether written CF is to be adopted in L2 teaching. In the L2 teaching context, there are various factors that have the potential to moderate the efficacy of written CF. In order to establish attribution, it is necessary to control the possible moderating factors in the quasi-experiments, which is not realistic in the naturalistic teaching settings. Therefore, ecological validity is not in the scope of consideration in exploring the contribution of written CF to L2 development because it weakens the reliability of the findings of the quasi-experiments.

Second, the differences in the measure of accuracy in the quasi-experiments are considered to have contributed to the mixed picture about the contribution of written CF to L2 development in literature. Thus, more unified measure of accuracy is suggested (Liu & Brown, 2015). However, the unfocused written CF studies aim to explore the contribution of written CF to the improvement in global accuracy, while the focused ones aim to explore its contribution to the improvement in the accuracy of only the target features. As a result, in the unfocused studies, global accuracy was measured, while in the focused ones, the use of the target feature(s) on specific occasions was tracked. Under the umbrella of global accuracy measure, several sub-types were adopted due to the differences in the texts to be analysed in the studies. For example, accuracy per 100 words can be used with long texts, but not with short texts less than 100 words. On the other hand, a measure suitable for analysing short texts may result in excessive but unnecessary work for a researcher facing many long texts. As a result, the unfocused studies to be reviewed varied in the suitable accuracy measures for their data. Likewise, under the umbrella of tracking the use of the target feature(s), several sub-types were adopted in the focused studies targeting different features among different types of L2 learners. In some studies, there was a need to consider the issue of overuse of the target feature(s), while in others, there was not such a need. Moreover, the accuracy measure of a complex feature differed from those of simple and discrete features in order to capture the development in the use of the complex feature. Hence, the diversity in the measures of accuracy in the quasi-experiments to be reviewed resulted from the differences in the target linguistic scope of written CF (unfocused or focused written CF), in the texts to be analysed (for unfocused studies) and in the target features (for focused studies).

To conclude, ecological validity is beyond the consideration of the body of quasi-experiments to be reviewed because the moderating factors co-existing with it make it very difficult to address the key question in these studies: whether and to what extent written CF contributes to L2 development? In addition, regarding the accuracy measures in these studies, with the differences in the target linguistic scope of written CF (unfocused or focused written CF), in the data collected, and in the target features, diversity to some extent is expected and found in these studies. Hence, the quasi-experiments to be reviewed are considered as robust, and this project is built on them. Therefore, these studies will be reviewed hereafter.

Early studies addressed the contribution of written CF to L2 development with unfocused written CF, followed by the studies on the contribution of focused written CF and those comparing the contribution of unfocused and focused written CF. Therefore, these three types of studies will be reviewed in this section in the same order.

3.2.1 Unfocused studies

There were three quasi-experiments addressing the efficacy of unfocused written CF before Truscott (1996) raised the theoretical objections on the efficacy of written CF (see Section 2.2.3). Semke (1984) focused on the efficacy of direct feedback, error code and direct feedback plus content feedback, Kepner (1991) on the efficacy of direct feedback plus metalinguistic explanation, and Sheppard (1992) on the efficacy of error code. Each variable was compared with the effect of content feedback.

Investigating among 141 learners of German in a US college for ten weeks, Semke (1984) explored the efficacy of written CF (direct feedback, error code with revision and direct feedback plus content feedback) in comparison with content feedback. The students were randomly assigned to four groups: the content feedback group, the direct feedback group, the direct feedback plus content feedback group and the error code with revision group. All students finished ten writing tasks in this period except members of the error code with revision group, who finished five due to involvement with revision. To control the significant initial difference in accuracy between groups, covariance was adopted for data analyses. With no significant difference between groups found in the post-test, Semke concluded that written CF was not better than content feedback for L2 development.

Investigating among 60 learners of Spanish in a US college for 12 weeks, Kepner (1991) explored the efficacy of direct feedback accompanied by metalinguistic

explanation in comparison with content feedback. All students wrote eight journal entries in this period. They were randomly assigned to either the content feedback group or the direct feedback plus metalinguistic explanation group. Echoing Semke's (1984) finding, no significant difference in accuracy between groups was found in the post-test.

Investigating among 26 ESL learners in a US college for ten weeks, Sheppard (1992) explored the efficacy of error code in comparison with content feedback. The students finished nine writing tasks in this period. They were randomly assigned to either the content feedback group or the error code group. Similar to Semke's (1984) and Kepner's (1991) findings, no significant difference in accuracy between groups was found over time. Moreover, the error code group showed a significant tendency to avoid complex sentences over time, while the content feedback group did not. Such findings would seem to support Truscott's claim that written CF does not facilitate L2 development, but rather may negatively influence L2 development (see Section 2.2). However, with methodological problems identified in each study, the extent to which these findings can support the inefficacy and harm of written CF is open to question.

First, the comparison group in Semke's (1984) study (the content feedback group) was not a valid one: incomprehensible language in the texts of this group was bracketed. This could lead to focusing on form, which is a function of written CF. Second, in Kepner's (1991) study, there was only a post-test. Without a pre-test, whether there was an initial difference between groups is unknown (Bitchener & Ferris, 2012). Finally, in Sheppard's (1992) study, like in Semke's (1984) study, the comparison group (the content feedback group) was not a valid one, either: members of this group received written requests for clarification of meaning. As a request for clarification of meaning is an implicit strategy adopted in oral CF (Ellis, 2008; Gass, 1997), the control group did receive written CF. As a result, the findings of these studies need to be considered with caution.

After Truscott (1996) raised the theoretical objections on the efficacy of written CF, four recent studies into the efficacy of unfocused written CF for L2 development managed to overcome these methodological problems with a more carefully considered research design. Truscott and Hsu (2008) and Frear and Chiu (2015) explored the effect of underlining, while Van Beuningen et al. (2008, 2012) explored the effects of direct feedback and error code.

Investigating among 47 EFL learners in a Taiwan university for three weeks, Truscott and Hsu (2008) focused on the effect of underlining in comparison with self-revision. The students were randomly assigned to either the underlining group or the self-revision group. All student wrote two narratives and revised the first narrative. No significant initial difference in accuracy between groups was found. Neither was there a significant difference between groups in the post-test although the underlining group significantly outperformed the self-revision group in the revision task. Such finding would seem to support Truscott's (1996) claim that written CF could only lead to superficial, and perhaps transient learning at best, which would not last long (see Section 2.2).

Unfocused underlining was investigated again in Frear and Chiu's (2015) study among 42 university-level EFL learners in Taiwan for four weeks with reconstruction tasks after text reading. This study focused on the effects of one-shot treatment of focused and unfocused underlining as well as their comparative effects on both the use of the regular past tense (the target feature of focused underlining) and the general accuracy, including that of punctuations. The participants were randomly assigned into three groups: the focused underlining group, the unfocused underlining group and the control group. The delayed post-test took place two weeks after the treatment. The two feedback groups read the written CF for five minutes before they took the immediate post-test, while the control group only took the immediate post-test as writing practice. Regarding the use of the regular past tense, ANOVA was adopted for data analyses because no initial significant difference was detected. By comparison, regarding the general accuracy, ANCOVA was adopted for data analyses to control the initial significant difference. Only findings about the efficacy of unfocused underlining will be reported here. Contrasting to Truscott and Hsu's (2008) findings, in this study, the unfocused underlining group significantly outperformed the control group in both the use of the regular past tense and in general accuracy in both post-tests. This finding also challenged Truscott's (1996; 2004) claim that teaching and learning resources allocated to written CF should be allocated to other more productive activities such as writing practice (see Section 2.2).

Difference in findings of the two studies on unfocused underlining may be related to the difference in their methodology. The comparison group in Truscott and Hsu's (2008) study did self-revision, which may draw the learner's attention to language form, which, in turn, is a function of written CF. By comparison, the control group in Frear and Chiu's (2015) study took the immediate post-test as writing practice. Thus, their

attention was not drawn to language form. Hence, the function of the comparison treatment in Truscott and Hsu's study overlapped with the function of written CF. As a result, unfocused underlining was found less effective in their study.

Investigating among 62 Dutch L2 learners in two secondary pre-vocational schools for three weeks, Van Beuningen et al. (2008) focused on the effects of direct feedback and error code in comparison with self-revision and writing practice. The students were randomly assigned to four groups, each receiving one type of treatment. All students wrote two narratives in the pre-test and the post-test respectively. All involved in revision of the pre-test texts except members of the writing practice group, who wrote two more narratives instead. No significant initial difference in accuracy between groups was found. Contrasting to Truscott and Hsu's (2008) finding, the direct feedback group significantly outperformed both the self-revision and writing practice groups in the post-test one week after the treatment. Thus, like in Frear and Chiu's (2015) study, the short-term effect of unfocused written CF was evidenced.

Keeping the groups and research focus constant, the study (Van Beuningen et al., 2012) was extended to six weeks to explore the long-term effect of written CF among 268 Dutch L2 learners from both the general secondary schools and the secondary pre-vocational schools. This study also aimed to explore the change in language complexity over time as well as the moderation of educational level. All students wrote one narrative in each of the three tests (i.e. the pre-test and two post-tests). The writing practice group that did not involve with revision, wrote one more narrative instead. Findings of the last issue will be reported in Section 3.6.1. No significant initial difference in accuracy between groups was found, but both written CF groups (direct feedback and error code) significantly outperformed both the self-revision and writing practice groups in the first post-test one week after the treatment. Moreover, in the second post-test one month after the treatment, both written CF groups significantly outperformed the writing practice group, but only the error code group significantly outperformed the self-revision group. Thus, both short-term and long-term effects of written CF were evidenced in this study, and Truscott's (1996) claim that written CF can potentially harm L2 development by taking teaching and learning resources away from other more productive learning tasks such as writing practice was challenged (see Section 2.2.3). In addition, this study (Van Beuningen et al., 2012) also showed written CF did not lead to less complex writing in terms of structure and lexis while contributing to the improvement in writing accuracy. Hence, Truscott's (1996) claim

that written CF will lead to shorter and simplified writing was challenged, too (see Section 2.2).

It is noted that findings of Frear and Chiu's (2015) study and Van Beuningen et al.'s studies (2008, 2012) were in line, and both contrasted to Truscott and Hsu's (2008) finding. Such a difference in findings may be related to the difference in their comparison/control group. In Truscott and Hsu's study, the only comparison group did self-revision. Like written CF, self-revision may lead to attention to language form. Hence, further research with a more careful design is needed for the clarification of the efficacy of unfocused written CF.

3.2.2 Focused studies

The English article system (the first mention indefinite article and anaphoric mention definite article) has been a recurrent theme in focused research. It has been targeted in a range of studies: Sheen (2007), Ellis et al. (2008), Sheen et al. (2009), Bitchener (2008), Bitchener and Knoch (2008; 2009a; 2009b; 2010). Apart from the English article system, some other features have also been researched. Bitchener et al. (2005) targeted the English definite article, the simple past tense and the prepositions, Stefanou and Révész (2015) targeted the English articles with generic and specific plural references, Frear and Chiu (2015) targeted the English simple past tense, Shintani and Ellis (2013) targeted the English indefinite article, Shintani et al. (2014) targeted the English indefinite article and the hypothetical conditional, and Shintani et al. (2016) targeted the English past counterfactual conditional.

Investigating among 91 intermediate ESL learners in the US for two months with reconstruction tasks after text reading, Sheen (2007) focused on the efficacy of the direct feedback and the direct feedback plus written metalinguistic explanation on the use of the English article system. The students were randomly assigned into two treatment groups (each receiving one type of written CF) and the control group (receiving no written CF treatment). The two treatment groups received written CF treatment twice in this period. Without the initial significant difference between groups, both treatment groups significantly outperformed the control group in the immediate post-test, while only the direct feedback plus metalinguistic explanation group significantly outperformed the control group in the delayed post-test one month after the treatment. Hence, the L2 learning potential of focused written CF was revealed.

The English article system was targeted again with reconstruction tasks after text reading in Ellis et al.'s (2008) study among 35 intermediate EFL learners in Japan for ten weeks. This study focused on the effects of focused and less focused direct feedback as well as their comparative effects on the English articles. The focused feedback targeted only the English articles, while the less focused feedback targeted a variety of features, including the English articles. The students were randomly assigned into the focused direct feedback group, the less focused direct feedback group and the control group, which was treated with general comments and questions about the content. Without the initial significant difference between groups, after two treatments, neither feedback group significantly outperformed the control group the immediate post-test, but both did so in the delayed post-test one month after the last treatment. Hence, the L2 learning potential of focused and less focused written CF was revealed.

Readdressing the effects of focused and less focused written CF with reconstruction tasks after text reading, Sheen et al. (2009) studied among 80 intermediate ESL learners in the US for nine weeks. The focused feedback targeted only the English articles, while the less focused feedback targeted five features: the articles, the regular and irregular past tense, the prepositions and copula "be". This study focused on the effects of two treatments of focused and less focused direct feedback and writing practice as well as their comparative effects on both the target features of both focused feedback types. The participants were randomly assigned into four groups: the focused direct feedback group, the less focused direct feedback group, the writing practice group and the control group. No significant initial difference between groups was detected regarding the target features. Only findings about the efficacy of the two focused written CF will be reported here. Regarding the accuracy of articles, only the focused group significantly outperformed the control group in both post-tests. Regarding the combined accuracy of the five target features, the focused group significantly outperformed the control group in only the immediate post-test. The finding about the focused group, but not the less focused group, was in line with Ellis et al.'s (2008) finding. The difference in their findings about the less focused group may be related to the difference in their manipulation of this feedback approach. In Sheen et al.'s study, the less focused feedback was provided in "a relatively unsystematic way" (p.559) (i.e. with inconsistency), which may have weakened the effect of this feedback approach.

Investigating the efficacy of focused written CF on the English article system, Bitchener (2008) adopted picture description tasks in his quasi-experiment among 75 lower-

intermediate ESL learners in NZ for ten weeks. This study focused on the effects of the direct feedback, the direct feedback plus oral and written metalinguistic explanation and the direct feedback plus written metalinguistic explanation. The participants were randomly assigned into these three treatment groups and the control group, which did not receive written CF but only their original texts to read themselves. Without the initial significant difference between groups, after two treatments, all the treatment groups significantly outperformed the control group in both the immediate post-test and the delayed post-test, which took place one month after the second treatment. Hence, the L2 learning potential of focused written CF was revealed in picture description tasks, a kind of task "approximate authentic communication activities" (Bitchener & Knoch, 2009a, p. 203), in the ESL context. Keeping the research foci, groups, writing tasks and the data collection procedure constant, this study (Bitchener & Knoch, 2008) was extended to 144 lower-intermediate English learners in NZ consisting of migrants and the newly arrived international students. This was to explore the moderation of learning context (ESL vs EFL) as well, the results of which will be reported in Section 3.6.1. Again, the same findings as in Bitchener's (2008) study were revealed.

With the same type of writing tasks and the same target features as those in Bitchener's (2008) study and Bitchener and Knoch's (2008) study, Bitchener and Knoch (2009a) studied among 52 lower-intermediate ESL learners in NZ for ten months. The participants were randomly assigned into four groups replicating the previous two studies. After the treatment, all the treatment groups significantly outperformed the control group in all the four post-tests, including the last one ten months after the treatment. As a result, the L2 learning potential of the direct feedback was further confirmed. In addition, their (2009b) re-analyses of the same data revealed, when all the treatment groups were combined into one treatment group, this combined treatment group still significantly outperformed the control group in all the post-tests.

Keeping the target features and types of writing tasks constant, Bitchener and Knoch (2010) examined the efficacy of error location and metalinguistic explanation among 63 advanced ESL learners in the US for ten weeks. The participants were randomly assigned into four groups: the written metalinguistic explanation with error location group, the oral and written metalinguistic explanation with errors location group, the error location group and the control group, which received their original texts to read, but no written CF. Without the initial significant difference between groups, after one treatment, all the treatment groups significantly outperformed the control group in the

immediate post-test, while only the two metalinguistic explanation groups significantly outperformed the control group in the delayed post-test nine weeks after the treatment. Hence, the L2 learning potential of focused written CF on the English article system was further confirmed.

Other linguistic features have also been targeted in the focused research. Investigating among 53 post-intermediate ESL learners in NZ for 12 weeks, Bitchener et al. (2005) focused on the effects of the direct feedback and the direct feedback plus oral and written metalinguistic explanation on the use of the English definite article, the simple past tense and the prepositions with letter writing tasks. The participants were randomly assigned into three groups: the direct feedback group, the direct feedback plus oral and written metalinguistic explanation group and the control group, which received content feedback. All students received three treatments, and the delayed post-test took place one month after the last treatment. No group significantly improved in the use of prepositions over the 12 weeks. However, the direct feedback plus oral and written metalinguistic explanation group improved significantly in the use of articles and the simple past tense over time. Thus, written CF was found to be able to treat more than one feature simultaneously.

Investigating among 89 intermediate EFL learners in Greece for four weeks, Stefanou and Révész (2015) focused on the effects of the direct feedback and the direct feedback plus written metalinguistic explanation on the use of the English articles with specific and generic plural references. Two types of writing tasks, picture description and text summary, were adopted in the writing tests. The students were randomly assigned to two treatment groups, each receiving one type of treatment, and the control group, which was treated with spelling correction. All students were treated twice, and the delayed post-test took place two weeks after the second treatment. Regarding the improvements in the use of the article for the specific reference in both types of writing tasks, without the initial significant difference between groups, the combined treatment group significantly outperformed the control group in both the improvement from the pre-test to the immediate post-test and the improvement from the pre-test to the delayed post-test. By comparison, regarding the improvements in the use of the article for the generic reference, the combined treatment group only significantly outperformed the control group in the improvement from the pre-test to the delayed post-test in picture description tasks. However, regarding the latter significant difference, with the initial significant difference being detected and no measure taken to control it in the

subsequent data analyses, as the authors acknowledged, it needs to be considered with caution. Nonetheless, the significant effects of the direct feedback and the direct feedback plus written metalinguistic explanation revealed in this study were in line with the findings of the previous studies (Bitchener, 2008; Bitchener and Knoch, 2008; 2009a; 2009b; Bitchener et al., 2005; Ellis et al., 2008; Sheen , 2007).

After Bitchener et al.'s (2005) study, the English simple past tense (only the regular past tense) was targeted again in Frear and Chiu's (2015) study with underlining. As the methodology of this study has been detailed in Section 3.2.1, only the findings about the focused underlining will be reported here. The focused underlining group significantly outperformed the control group regarding the use of regular past tense in both post-tests. As underlining is less explicit and less informative than the previously investigated written CF types in focused research (direct feedback, metalinguistic explanation and error code), this study revealed that focused written CF, even in a less explicit and informative style, can be effective in treating certain features.

Apart from the above studies that confirmed the L2 learning potential of the written CF, there are few studies that failed to find any significant effect of written CF. They are Shintani and Ellis' (2013) study targeting the English indefinite article, Shintani et al.'s (2014) study targeting both the English indefinite article and the hypothetical conditional, and Shintani et al.'s (2016) study targeted the English past counterfactual conditional.

Investigating among 49 lower-intermediate ESL learners in the US for three weeks, Shintani and Ellis (2013) focused on the effects of the direct feedback and metalinguistic explanation on the use of the English indefinite article with picture description tasks. The participants were randomly assigned into three groups: the direct feedback group, the metalinguistic explanation group and the control group. Both feedback groups read the written CF for five minutes before reconstructing the texts without access to the written CF or their original texts, following up the same process as the control group. Without the initial significant difference between groups, after the treatment, only the metalinguistic explanation group significantly outperformed the control group in the immediate post-test. However, the three groups did not differ significantly in the delayed post-test two weeks after the written CF. Such findings seemed to contradict to the significant effect of metalinguistic explanation revealed in Bitchener and Knoch's (2010), which also adopted picture description writing tasks.

However, it should be noted that the manipulation of metalinguistic explanation in the two studies were different. It was provided with error location in Bitchener and Knoch's study, but not in this study. In this study (Shintani & Ellis, 2013), no error indication was provided to the metalinguistic explanation group. It was raised in Section 2.4 that the degree of explicitness of written CF may impact the understanding of written CF. Hence, difference in the explicitness of metalinguistic explanation in the two studies may have contributed to the difference in their findings. Moreover, written CF is a written response to the linguistic errors in the learners' texts (Bitchener & Storch, 2016). Strictly speaking, the metalinguistic explanation provided in Shintani and Ellis' study was not written CF.

Investigating among 140 pre-intermediate EFL learners in Japan for five weeks, Shintani et al. (2014) focused on the effects of the direct feedback and metalinguistic explanation (without error location, not even error indication) on the use of the English indefinite article and hypothetical conditional as well as the moderation of revision on their effects with dictogloss tasks. Findings about the moderation of revision will be reported in Section 3.5.1. The participants were randomly assigned into five groups: the direct feedback group, the direct feedback group with revision, the metalinguistic explanation group, the metalinguistic explanation group with revision and the control group, which received their pre-test texts to process in whatever way they wanted. The delayed post-test took place two weeks after the treatment. Regarding the use of the English indefinite article, without the initial significant difference between groups, no significant differences were found between the direct feedback group, the metalinguistic explanation group and the control group in both post-tests. Regarding the use of the hypothetical conditional, without the initial significant difference between groups, both feedback groups significantly outperformed the control group in the immediate post-test, but not in the delayed post-test. Such findings seemed to contradict to the significant effect of written CF on two features simultaneously found in Bitchener et al.'s (2005) study. However, besides the difference in their manipulation of metalinguistic explanation (see the last paragraph), the methodology of the two studies differed in the number of linguistic domains of the target features. In Bitchener et al.'s (2005) study, all three targeted features are in the same domain: morphology; while the two features in this study are in two domains: morphology and syntax. Thus, members of the feedback groups in this study may have experienced a higher cognitive load while

processing and using written CF than those in Bitchener et al.'s study. As a result, written CF was found to have a better effect in their study than in this study.

The target feature was narrowed down to the English past counterfactual conditional in Shintani and colleagues' new study. Investigating among 61 pre-intermediate and intermediate EFL learners in Japan (TOEIC: 460-725) for four weeks, Shintani et al. (2016) focused on the effects of pre-task and post-task metalinguistic explanation (without error location) and a comparison of these with dictogloss tasks. The students were randomly assigned into three groups: the pre-task metalinguistic explanation group, the post-task metalinguistic explanation group and the control group which only did the writing practice. Besides the three writing tests, all students finished a writing practice task for the treatment. As only the post-task metalinguistic explanation is a type of written CF, only findings about its efficacy will be reported here. Without the initial significant difference between groups, the post-task metalinguistic explanation group significantly outperformed the control group in the immediate post-test, but not in the delayed post-test two weeks after the treatment.

Such findings seemed to contradict to the significant effects of metalinguistic explanation revealed in Bitchener and Knoch's (2010) study, but were in line with those about metalinguistic explanation in the previous two Shintani and colleagues' studies, in which metalinguistic explanation was also provided without error location. However, difference in the manipulation of metalinguistic explanation may have led to the long-term effect of metalinguistic explanation in Shintani and colleagues' studies differing from that in Bitchener and Knoch's (2010) study. Moreover, the difference in the linguistic domain of the target features in this study and Bitchener and Knoch's study may have played a role, too. Hypothetical conditional, including the past counterfactual conditional investigated in this study, is the only syntactic feature that has been targeted in focused research. And it has only been targeted in two of Shintani and colleagues' studies reviewed above. As syntactic features are more complex than the other features (morphological ones) that have been targeted in the focused research, a one-shot treatment may be sufficient for some lexical errors (as revealed a range of studies reviewed in this section), but not for the syntactic ones (see Section 2.2.1 for theoretical explanation). Nonetheless, further research, which eliminates the moderation of manipulation of metalinguistic explanation, in syntactic errors is needed for clarification. This project makes such an attempt.

To sum up, apart from the issues about the syntactic features and the manipulation of metalinguistic explanation that demand further research for clarification, this body of focused written CF research generated stronger evidence of its efficacy on the English articles and some evidence of its efficacy on other features. Though many of them encountered the problem of a relatively small sample size in each group (n<30), which makes it difficult to generalize the statistical significance revealed in each of the studies, they did provide insights into the efficacy of written CF when being considered together, and support the L2 learning potential of written CF such as a contributor to knowledge modification and consolidation (see Section 2.2).

3.2.3 Studies comparing the efficacy of focused and unfocused written CF

Empirical studies have found both focused and unfocused written CF can facilitate L2 development. To date, only one study compared the efficacy of focused and unfocused written CF: Frear and Chiu (2015) did so with underlining, with the focused underlining targeting the regular English past tense.

As the methodology of Frear and Chiu's (2015) study has been detailed in Section 3.2.1, only the results of the comparison between focused and unfocused underlining will be reported here. Regarding the use of the regular English past tense, no significant difference was found in both post-tests. Moreover, both groups improved significantly over time, but their improvements did not differ significantly. Regarding the general accuracy, again, no significant difference was found in both post-tests. However, only the focused underlining group improved significantly over time. It seems from this study, on the one hand, when the target feature is concerned, the effects of focused and unfocused written CF do not differ significantly. On the other hand, when the general accuracy is concerned, focused written CF is superior to the unfocused written CF. However, more research into this issue (the comparative effects of focused and unfocused written CF) is needed for clarification.

In summary, to explore the L2 learning potential of written CF, studies have been conducted on unfocused and focused written CF as well as on a comparison between the two written CF approaches. Only one study explored the comparative effect of the focused and unfocused written CF, and revealed that the focused approach was superior. However, more studies on this issue are needed for clarification. The research design of the studies on unfocused written CF has been improved recently, and generated more

evidence on its efficacy. However, more research into this issue is needed as the comparison group may be invalid in the only recent unfocused study that revealed the inefficacy of written CF. By comparison, the studies on focused written CF constitute a considerably larger body of research, and have generated stronger evidence of its efficacy on the English articles and some evidence of its efficacy on other features. Nonetheless, with morphology as the recurrent theme in the focused research, syntax is an underexplored linguistic domain which deserves further exploration. And this project makes such an attempt.

3.3 Studies comparing the efficacy of written CF for different types of errors

It has been raised in Chapter 2 that written CF may not be equally effective in treating all types of errors because different error types represent gaps in different linguistic domains (Ferris, 1999; Truscott, 1996). Therefore, its treatment potential on syntax, a complex system, has been doubted (Truscott, 2007). In this section, these theoretical assumptions will be checked against empirical studies. To date, only three studies, all quasi-experiments, have compared the effect of written CF on different linguistic features. Bitchener et al. (2005) targeted errors in the English definite article, the simple past tense and the prepositions, Shintani et al. (2014) the English indefinite article and hypothetical conditional, and Guo (2015) the English regular and irregular past tense and the preposition indicating space.

Bitchener et al. (2005) focused on the effects of the direct feedback and the direct feedback plus oral and written metalinguistic explanation on three types of lexical errors among ESL learners in NZ. As the methodology of this study has been detailed in Section 3.2.2, only the results of the treatment potential of written CF on the three error types will be reported here. During the quasi-experiment, none of the three groups (the direct feedback group, the direct feedback plus oral and written metalinguistic explanation group and the control group) significantly improved in the use of prepositions. However, the direct feedback plus oral and written metalinguistic explanation group improved significantly in the use of articles and the simple past tense during this period. Such findings lent some support to the assumption stated in Section 2.2 that written CF may be more effective in treating errors in some features than in others.

By comparison, Shintani et al. (2014) focused on the effects of the direct feedback and metalinguistic explanation on two features among EFL learners in Japan. As the methodology of this study has been detailed in Section 3.2.2, only the results of the treatment potential of written CF on the two error types will be reported here. Regarding the use of the English indefinite article, no significant differences were found between the two feedback groups and the control group in both post-tests. Regarding the use of the hypothetical conditional, both feedback groups significantly outperformed the control group in the immediate post-test, but not in the delayed post-test. As discussed in Section 3.2.2, such differences in the findings of this study and those of Bitchener et al.'s (2005) study may be related to their difference in the number of target linguistic domains.

Investigating among 147 pre-intermediate EFL learners in China for 19 weeks with picture description tasks, Guo (2015) focused on the effects of four written CF types (i.e. underlying, error code, direct feedback, and direct feedback plus metalinguistic explanation) on the English regular and irregular past tense and the preposition indicating space as well as the moderation of L2 proficiency on their effects. The students were randomly assigned into four written CF groups, each receiving one type of written CF, and the control group, which received content feedback. After the one-shot treatment, all students took the immediate pot-test and two delayed post-tests (one month and four months after the treatment, respectively). ANCOVAs were adopted for data analyses to control the significant initial difference between groups. Results about the moderation of L2 proficiency will be reported in Section 3.6.2.1. Only one significant difference between groups was found after the treatment: the direct feedback group significantly outperformed the control group in the immediate pot-test regarding the regular past tense. Such findings differed from those in Bitchenre et al.'s (2005) study, which also only targeted lexical errors, but in the ESL context. By comparison, the findings of this study were in line with Shintani et al.'s (2014) study, which was also conducted in the EFL context albeit targeting two linguistic domains (i.e. morphology and syntax). Hence, the findings of this study seemed to suggest that learning context may impact the efficacy of written CF, and written CF may work better in the ESL context. This is because learners in the ESL context have richer L2 input to draw on while processing written CF than their peers in the EFL context. Research into the moderation of learning context will be reviewed in Section 3.6.1.

3.4 Studies comparing the efficacy of different written CF types

It has been raised in Chapter 2 that different written CF types are underpinned by different L2 learning theories (i.e. Interactionist theories and Skill acquisition theories) and thereby they differ in their degree of explicitness and informativeness. And the degree of explicitness and informativeness of written CF can play a role in understanding, the second stage of cognitive processing of the input. Therefore, the treatment potential of different written CF types may differ. In this section, these theoretical assumptions will be checked against empirical studies. The efficacy of different written CF types has been compared in both focused and unfocused research. As early studies on this issue examined unfocused written CF, in this section, the unfocused studies on this issue will be reviewed before the focused ones.

3.4.1 Unfocused studies comparing the efficacy of different written CF types

Direct feedback, error code and error location have been compared in the unfocused research. Lalande (1982), Semke (1984) and Van Beuningen et al. (2008, 2012) compared the efficacy of direct feedback and error code, while Rob, Ross and Shortreed (1986) and Vyatkina (2010) compared the efficacy of direct feedback, error location and error code,

Investigating among 60 intermediate German learners in the US for a course period, Lalande (1982) compared the effects of three treatments of direct feedback and error code. The students were assigned to either the direct feedback group or the error code group. They wrote five plot summaries, with the first and the last one as the pre-test and post-test, respectively. In the post-test, the error code group significantly outperformed the direct feedback group in the use of cases, which seemed to suggest the superiority of error code.

Also investigating among German learners in the US, Semke (1984) compared the effects of three treatments of direct feedback, direct feedback plus content feedback and error code. As the methodology of this study has been detailed in Section 3.2.1, only results about the comparative effects of the written CF types will be reported here. Differing from Lalande's (1982) findings, the written CF groups in this study did not significantly differ in the post-test. The difference in the findings of the two studies may be related to that in their methodology. With the results of the pre-test unreported in

Lalande's study, whether the significant difference found in the post-test had existed in the pre-test is unknown.

Still comparing the effects of direct feedback and error code, Van Beuningen et al. (2008) investigated among 62 Dutch L2 learners for three weeks. As the methodology of this study has been detailed in Section 3.2.1, only results about the comparative effect of the written CF types will be reported here. Without the initial significant difference between groups, no significant difference was found in the post-test, which was in line with Semke's (1954) findings. Then, this study (Van Beuningen et al., 2012) was extended to 268 Dutch L2 learners and prolonged to six weeks. As the methodology of this study has been detailed in Section 3.2.1, only results about the comparative effects of the written CF types will be reported here. Again, the same pattern in their (2008) study was found, and was extended to the delayed post-test one month after the treatment.

Investigating among 134 EFL learners in a Japanese college for an academic year, Rob, et al. (1986) compared the efficacy of four treatments of direct feedback, error code, error location and error number margined. The students were blindly assigned into four treatment groups, each receiving one type of written CF. All students wrote five narratives, with the first and the last one as the pre-test and post-test, respectively. ANOVA was adopted for data analyses to control the initial significant difference between groups. No significant difference was found in the post-test, which was in line with Semke's (1954) and Van Beuningen et al.'s (2008, 2012) findings of the comparative effects between the direct feedback and error code.

Readdressing the comparative effects of the direct feedback, error code and error location, Vyatkina (2010) investigated among 66 German beginners in the US for one semester. The students were randomly assigned to the direct feedback group, the error code group and the underlining group (a way of error location). All students wrote five compositions, and revised their texts after each of the four treatments. Only composition 1, 3 and 5 were used for data analyses. No significant difference was found in these three writing tasks, which was in line with Rob et al.'s (1986) findings about the comparative effects of these three types of written CF. Hence, the above studies with a carefully considered design revealed that unfocused direct feedback, error code and error location/underlining did not differ significantly in both the foreign language (FL) and the second language (SL) contexts.

3.4.2 Focused studies comparing the efficacy of different written CF types

Direct feedback, metalinguistic explanation and error location have been compared in the focused research. Bitchener and Knoch (2010) compared the effects of different combinations of error location, Bitchener et al. (2005), Sheen (2007), Bitchener (2008) and Bitchener and Knoch (2008; 2009a) compared different direct feedback combination, while Shintani and Ellis (2013) and Shintani et al. (2014) compared direct feedback and metalinguistic explanation.

Investigating among ESL learners in the US, Bitchener and Knoch (2010) compared the effects of written metalinguistic explanation with error location, oral and written metalinguistic explanation with error location, and error location. As the methodology of this study has been detailed in Section 3.2.2, only results about the comparative effects of the written CF types will be reported here. Without the initial significant difference between groups, no significant difference was found in the post-test, suggesting metalinguistic explanation did not significantly impact the effect of error location.

Investigating among ESL learners in NZ, Bitchener et al. (2005) compared the effects of direct feedback and direct feedback plus oral and written metalinguistic explanation. As the methodology of this study has been detailed in Section 3.2.2, only results about the comparative effects of the written CF types will be reported here. No significant difference between the two written CF groups was found in the period of the study, suggesting metalinguistic explanation did not significantly impacts the effects of direct feedback.

Also investigating among ESL learners in the US, Sheen (2007) compared the effects of direct feedback and direct feedback plus metalinguistic explanation. As the methodology of this study has been detailed in Section 3.2.2, only results about the comparative effects of the written CF types will be reported here. Echoing Bitchener et al.'s (2005) findings, without the initial significant difference between groups, no significant difference was found in the post-test in this study.

Investigating among ESL learners in NZ, Bitchener (2008) compared the effects of direct feedback, direct feedback plus written metalinguistic explanation and direct feedback plus oral and written metalinguistic explanation. As the methodology of this study has been detailed in Section 3.2.2, only results about the comparative effects of

the written CF types will be reported here. Without the initial significant difference between groups, no significant difference was found in the post-test, which was in line with Sheen's (2007) findings.

Then, this study (Bitchener & Knoch, 2008) was extended to 144 English learners in NZ, consisting of migrants and newly arrived international students. As the methodology of this study has been detailed in Section 3.2.2, only results about the comparative effects of the written CF types will be reported here. Without the initial significant difference between groups, no significant difference was found in the post-test, conforming to Sheen's (2007) and Bitchener's (2008) findings. Later, this study (Bitchener & Knoch, 2009a) was prolonged to ten months with four post-tests. As the methodology of this study has been detailed in Section 3.2.2, only results about the comparative effects of the written CF types will be reported here. Without the initial significant difference between groups, no significant difference was found in any of the four post-tests, either. Hence, Sheen's (2007), Bitchener's (2008) and Bitchener and Knoch's (2008) findings that metalinguistic explanation did not significantly impact the effect of direct feedback was further supported.

As these four studies report that metalinguistic explanation did not significantly impact on the effects of direct feedback, it seems that direct feedback may be more effective than metalinguistic explanation. However, as direct feedback and metalinguistic explanation are underpinned by different L2 learning theories (see Section 2.2.4), it would be better to investigate the efficacy of each before combining them.

Investigating ESL learners in the US, Shintani and Ellis (2013) separated direct feedback and metalinguistic explanation when comparing their effects. As the methodology of this study has been detailed in Section 3.2.2, only results about the comparative effects of the written CF types will be reported here. Without the initial significant difference between groups, no significant difference was found in the post-test, suggesting the effects of direct feedback and metalinguistic explanation did not differ significantly.

Investigating EFL learners in Japan, Shintani et al. (2014) readdressed the comparative effects of direct feedback and metalinguistic explanation. As the methodology of this study has been detailed in Section 3.2.2, only results about the comparative effects of the written CF types will be reported here. Again, the same findings as in Shintani and Ellis' (2013) study was revealed. However, it should be pointed out, in both studies,

direct feedback was accompanied by error location, while metalinguistic explanation was not, not even error indication. Hence, the unbalanced treatment of the two written CF types in the two studies could have played a role in their findings. As a result, further research into this issue with a balanced treatment of direct feedback and metalinguistic explanation groups is needed. This project makes such an attempt.

To sum up, the unfocused research revealed that the effects of error code, error location and direct feedback did not differ significantly. By comparison, the focused research concentrated on the effects of direct feedback and metalinguistic explanation. With an issue identified in the manipulation of the two written CF types, further research is needed. This project addresses this issue with balanced manipulation of the two written CF types.

3.5 Studies on the moderating effect of revision and specific revision types

Written CF cannot be effective unless the learners respond to it (Ellis, 2009; Wigglesworth & Storch, 2012). Revision, including different types of revision, is a type of response to written CF (Ellis, 2009). It has been proposed in Chapter 2 that, as a kind of output, revision brings about an opportunity for the learner to restructure their IL, which in turn, will lead to the improvement in linguistic accuracy in both written and oral output (Polio, Fleck & Leder, 1998). Moreover, learners have been found to adopt four types of revision in responding to written CF: successful revision, unsuccessful revision, deletion of the text with the marked error and no response (Ellis, 2009). Among the four types of revision, successful revision may contribute most to L2 development, because only it may manifest the internalization of the correct form. In this section, these theoretical claims will be checked against empirical findings. As the knowledge of the function of revision is a prerequisite of the investigation of the function of specific revision types, in this section, studies addressing the impact of revision on the efficacy of written CF will be reviewed before those addressing the impact of specific revision types.

3.5.1 Studies on the impact of revision on the efficacy of written CF

Few studies have addressed the moderation of revision on the effect of written CF. Chandler (2003) investigated its moderation on the effect of underlining, while both Geng (2016) and Shintani et al. (2014) investigated its moderation on the effects of metalinguistic explanation and direct feedback.

Investigating among 31 college students in the US for a semester, Chandler (2003) focused on the moderation of revision on the effect of unfocused underlying. All the students wrote five autobiographies and received the same type of written CF five times. They were randomly assigned into two groups: one revised their texts immediately after the written CF treatment, the other did not revise their texts until they handed in their first draft of the last piece of writing. Comparing the original drafts of the two groups in this period, Chandler found no significant initial difference in accuracy between groups. However, the improvement in accuracy in the revision group was significantly higher than that of the non-revision group over time.

Investigating among 75 university students in China for five weeks, Geng (2016) focused on the effects of unfocused metalinguistic explanation (with error location) and direct feedback as well as the moderation of revision on their effects. The participants were randomly assigned to five groups: metalinguistic explanation with revision group, metalinguistic explanation without revision group, direct feedback with revision group, direct feedback without revision group and the control group. They all wrote five essays in this period, and except members in the control group, all received three treatments. Comparing the original drafts of the five groups in this period, Geng found no significant initial difference in accuracy between groups. However, only the metalinguistic explanation with revision group made significant improvement in grammatical accuracy during this period. Thus, Geng's findings echoed Chandler's (2003) finding in that revision can enhance the effect of unfocused written CF.

Targeting the use of the English hypothetical conditional and the indefinite articles among 171 university students in Japan for four weeks, Shintani et al. (2014) focused on the effects of focused metalinguistic explanation (without error location) and direct feedback as well as the moderation of revision on their effects. As the methodology of this study has been detailed in Section 3.2.2, only the results about the moderation of revision will be reported here. No significant initial difference between groups was found in the use of both target features. Moreover, no significant difference between groups was found in the improvement in the use of the indefinite article over time. However, regarding the improvement in the use of the hypothetical conditional, the direct feedback with revision group significantly outperformed the control group in the delayed post-test (new writing) two weeks after the treatment. In addition, when the two treatment groups with revision were combined into one revision group, the combined revision group significantly outperformed the control group in the delayed post-test,

while the combined non-revision group did not. Hence, the enhancing effect of revision was found with the focused written CF, too.

It is noted that although both Geng's (2016) and Shintani et al.'s (2014) studies focused on and confirmed the moderation of revision on the effects of written CF, Geng found metalinguistic explanation with revision, not direct feedback with revision, worked effectively, while Shintani et al found the opposite. The degree of explicitness of metalinguistic explanation in the two studies may have played a role here. Metalinguistic explanation was provided with error location in Geng's study, but not in Shintani et al.'s study. Thus, the metalinguistic explanation in Geng's study was more explicit than in Shintani et al.'s study. As the degree of explicitness of written CF may affect understanding, the second stage of cognitive processing of the input (see Section 2.4), the more explicit metalinguistic explanation (i.e. in Geng's study) worked effectively, while the less explicit metalinguistic explanation did not. Moreover, such a difference in their findings may be related to a difference in their methodology, too. In Geng's study, errors were located for both the metalinguistic explanation with revision group and the direct feedback with revision group; while in Shintani et al.'s study, errors were located for the direct feedback with revision group, but not the metalinguistic explanation with revision group. Hence, in the latter study, the two treatment groups were treated in an unbalanced way with the metalinguistic explanation with revision group receiving less help. This may have contributed to the better effect of direct feedback with revision in Shintani et al.'s study. Despite this difference in findings, both studies, together with Chandler's (2003) study, confirmed the enhancing effect of revision on the effect of written CF.

3.5.2 Studies on the impact of specific revision types on the efficacy of written CF

There are few studies addressing the impact of specific revision types on the effect of written CF. Van Beuningen (2011) focused on the impact of successful revision and unsuccessful revision, both Hyland (2003) and Hartshorn et al. (2010) addressed that of successful revision, while Ferris et al. (2013) addressed that of no response.

Examining four student' texts in a quasi-experiment, Van Beuningen (2011) focused on the impacts of both successful revision and unsuccessful revision on the effects of unfocused direct feedback and error code. By comparing the pre-test text and the revised text, evidence of successful revision of each student was traced first. Then,

erroneous features in the pre-test and the immediate and delayed post-tests were traced for retention of accuracy. The analyses revealed that successful revision did not guarantee long-term accuracy. Moreover, where the students (who either received direct feedback or error code) failed to revise the error successfully, the same error type occurred in their post-tests. That is, unsuccessful revision did not lead to accuracy improvement in the subsequent writing.

A different type of impact of successful revision was found in Hyland's (2003) study. Examining two students' texts in a three-month English course in NZ together with interview data, Hyland (2003) focused on the impacts of successful revision and L2 motivation on the effects of mixed written CF types (error location, error code, direct feedback, reformulation, and grammatical comments). First, by comparing the original text and the revised text, evidence of successful revision of each piece of writing was traced. Then, error types focused on by written CF were identified. Next, development in these linguistic problems was traced chronologically in the students' subsequent pieces of writing. The interviews were transcribed first. Then, the themes about L2 motivation were identified. The results of the impact of L2 motivation will be reported in Section 3.6.2.3, while only the results of that of successful revision will be reported here. The analyses revealed that both students achieved a high accuracy rate in revision, and errors in their respective major issue showed a general tendency of decline in the subsequent writing in the course.

It is noted that both Van Beuningen's (2011) and Hyland's (2003) studies were multi-case studies that involved text analyses in the same way. And both studies addressed the impact of successful revision. However, their findings were inconsistent: Van Beuningen found successful revision did not necessarily lead to accuracy improvement in subsequent writing, while Hyland found it did. Such a difference in their findings may be related to the differences in the methodology of the two studies. In Van Beuningen's study, there was only one treatment, and the participants had no access to the written CF after the treatment session. By comparison, Hyland's study was conducted in the naturalistic setting. The participants received multiple treatments, and were permitted to keep their texts (including the written CF). Thus, they could review the written CF when they wanted to. Hence, the differences in the number of treatments and in the access to written CF after a treatment session may have contributed to the difference in the findings of these two studies.

Investigating among 47 ESL learners in the English Learning Center of a university in the US, Hartshorn et al. (2010) systematically explored the moderation of successful revision on the effect of unfocused error code. The students had the pre-test and the post-test in week 1 and week 15, respectively. They were assigned into the treatment group and the control group in a way that could balance the learning background of the two groups. From week 2 to week 14, the treatment group was treated with "Dynamic written CF": they received error code, kept an error tally, and kept revising the same essay until it became error-free. Meanwhile, the control group was treated in the traditional way of instruction, which involved written CF and multiple revision. There was no initial significant difference between the groups in accuracy, but the treatment group significantly outperformed the control group in the post-test. Thus, the significant enhancement of successful revision on the effect of unfocused error code was revealed, which was in line with Hyland's (2003) finding about the enhancing impact of successful revision on mixed written CF types, while differed from Van Beuningen's (2010) finding which rejected such an assumption. However, in Hartshorn et al.'s study, types of revision of the control group were not considered. This may have influenced their findings. Moreover, the treatment group kept an error tally, and they wrote more essays and received more written CF than the control group. Thereby, the treatment of the two groups is unbalanced, and this may have influenced the findings. As a result, the theoretical assumption raised in Chapter 2 that, among the specific revision types, successful revision may contribute most to L2 development, is still to be tested empirically.

While the impact of successful revision has been explored in several studies, that of no response has only been explored in Ferris et al.'s (2013) study among ten students in a writing course (16 weeks) in the US. Error codes were applied to nine types of errors in this course. Like Hyland's (2003) study discussed previously in this section, this study also explored the impact of L2 motivation. Data were collected via four timed writing tasks and the subsequent respective timed revision of each as well as retrospective interviews with each student after the first three revision tasks. Data analysis procedure was the same as in Hyland's (2003) study. The results of the impact of L2 motivation will be reported in Section 3.6.2.3, while only the results of the impact of no response will be reported here. This study revealed that the major error for one participant, who often ignored the written CF in revision, was not addressed throughout the four writing tasks.

To sum up, on the one hand, the three studies addressing the moderation of revision on written CF revealed that revision can enhance the effect of written CF, lending empirical support to the theoretical claim raised in Chapter 2 that revision, together with written CF, can contribute to L2 development, which is manifested in accuracy improvement in subsequent output. On the other hand, studies on the impact of specific revision types have revealed an uncertain picture. Unsuccessful revision and no response were addressed in only one study in each case, and found to be not beneficial to the development of writing accuracy. However, more research into each revision type is needed for confirmation. By comparison, two of the three studies addressing the impact of successful revision generated different results: one found that successful revision was unable to guarantee subsequent accuracy improvement, while the other found it could. Findings of the only study that systematically addressed this issue may have been weakened by the unbalanced treatment of the treatment group and the control group as well as the failure to consider the revision types adopted by the members of the control group. Therefore, the theoretical assumption raised in Chapter 2 that, among the specific revision types, successful revision may contribute most to L2 development, is still open to question. This project attempts to test it.

3.6 Studies on the moderation of learner factors

Although learner factors is a relatively new field in written CF research (Bitchener, 2012), the moderation of both learner external and internal factors has been explored in the recent studies. Hence, studies addressing these two issues will be reviewed one after another in this section.

3.6.1 Studies on the moderation of learner external factors

In the exploration of the efficacy of written CF, the moderation of two learner external factors have been addressed: learning context and educational level. Bitchener and Knoch (2008) explored the moderation of the former, while Van Beuningen et al. (2012) explored the moderation of the latter.

Investigating among 144 English learners in NZ with the migrant students in the ESL group while the newly arrived international students in the EFL group, Bitchener and Knoch (2008) explored the moderating effect of learning context on the efficacy of focused written CF. As the methodology of this study has been detailed in Section 3.2.2, only results about the moderation of learning context will be reported here. No significant difference between the ESL group and EFL group was found in the period of

this study, suggesting learning context did not significantly moderate the effect of focused written CF.

Targeting 268 Dutch L2 learners in both the general secondary schools and the secondary pre-vocational schools, Van Beuningen et al. (2012) explored the moderating effect of educational level on the efficacy of unfocused written CF with students in the former schools representing higher educational level. As the methodology of this study has been detailed in Section 3.2.1, only results about the moderation of educational level will be reported here. No significant difference between the two types of students was found in the study, suggesting educational level did not significantly moderate the effect of unfocused written CF.

Due to the paucity of studies on the moderation of learner external factors, more written CF research is needed to generate knowledge in this field. By comparison, more research has been done into the moderation of learner internal factors.

3.6.2 Studies on the moderation of learner internal factors

Among the learner internal factors, L2 anxiety, L2 belief, L2 proficiency and language learning aptitude have been examined systematically in written CF research. As language learning aptitude and L2 motivation are the two most influential learner factors in L2 development (Ellis, 2008), and L2 motivation has only been considered in two case studies, studies that systematically explored the moderation of L2 anxiety, L2 belief, L2 proficiency will be reviewed before those systematically explored the moderation of language learning aptitude. Case studies addressing the impact of L2 motivation will be reviewed next. Finally, L2 motivation impacts L2 learning via its impact on learning behaviour (i.e. learning strategies), which directly influences learning outcome (Ellis, 2008; Kim & Kim, 2014). Therefore, relevant studies on the moderation of learning strategies will be reviewed last, before the insights into the moderation of learner internal factors gained from this body of research are summarized.

3.6.2.1 Studies on the moderation of L2 anxiety, L2 belief and L2 proficiency

In the exploration of the efficacy of written CF, the moderation of L2 anxiety was explored in Sheen's (2011) study, the moderation of L2 belief in Rummel and Bitchener's (2015) study, and the moderation of L2 proficiency in Guo's (2015) study.

Adopting a quasi-experiment and a questionnaire survey and investigating the same ESL learners' as in her (2007) study, Sheen (2011) explored with a questionnaire survey the moderating effects of L2 anxiety on two types of direct feedback: direct feedback and direct feedback plus metalinguistic explanation. No significant moderating effect was found on either feedback type. Thus, the theoretical assumption raised in Section 2.2.4, that the chance for written CF to raise L2 anxiety is not high because written CF is off-line and private, found some empirical support. On the other hand, Truscott's (1996) claim that written CF harms L2 learning because it will lead to L2 anxiety, which in turn will result in short and simplified language in L2 writing (see Section 2.2.1), was undermined empirically.

Adopting the same research design, but among EFL learners in Lao, Rummel and Bitchener (2015) focused on the moderating effects of L2 belief on error code, direct feedback and metalinguistic explanation. They found the students' beliefs about the efficacy of written CF types significantly moderated the efficacy of written CF types under investigation.

Like Rummel and Bitchener (2015), Guo (2015) also conducted a quasi-experiment among EFL learners, but in China. She explored the moderation of L2 proficiency on four written CF types (i.e. underlying, error code, direct feedback and direct feedback plus metalinguistic explanation) with an English proficiency test. As the methodology of this study has been detailed in Section 3.3, only results about the moderation of L2 proficiency will be reported here. Like Sheen (2011), Guo did not find significant moderating effects of the learner variable on the written CF types under investigation.

Hence, these three studies revealed that L2 anxiety and L2 proficiency did not significantly moderate the effects of written CF, but L2 belief did. However, with only one study addressing each of the three learner factors, more research is needed into these factors for a clear picture of their moderating effects. By comparison, the moderation of language learning aptitude has been explored more often, and these studies are reviewed in the next section.

3.6.2.2 Studies on the moderation of language learning aptitude

As one of the two most influential learner factors in L2 learning, language learning aptitude, language analytic ability (a component of language learning aptitude) to be exact, has been a recurrent theme in written CF research. Sheen (2007), Stefanou and Révész (2015) and Shintani and Ellis (2015) explored its moderation with language

learning aptitude tests. As the designs of the former two studies have been detailed in Section 3.2.2, only findings about the moderating effects of language learning aptitude in these two studies will be reported in this section.

Sheen's (2007) study revealed that language analytic ability significantly moderated both the short-term and long-term efficacy of both written CF types under investigation (i.e. direct feedback and direct feedback plus metalinguistic explanation). Both the short-term and long-term moderating effects of language analytic ability on direct feedback was revealed again in Stefanou and Révész's (2015) study. By comparison, Shintani and Ellis (2015) found a slightly different pattern of moderation. Adopting the same research design and targeting the same features as in Shintani et al.'s (2014) study, Shintani and Ellis (2015) focused on the moderating effects of language analytic ability on direct feedback without revision, direct feedback with revision, metalinguistic explanation without revision and metalinguistic explanation with revision. This study revealed that language analytic ability only significantly moderated the short-term effects of the four written CF types under investigation.

Despite the discrepancy between their findings, all these three studies have generated evidence of the significant moderating effects of language learning aptitude on written CF. Hence, the studies on the moderation of learner internal factors have revealed that some of the factors have a significant moderating effect. Moreover, the evidence of the moderation of language learning aptitude is stronger. Hence, the next section will turn to the other highly influential learner factor: L2 motivation.

3.6.2.3 Studies on the moderation of L2 motivation

It has been raised in Chapter 2 that because L2 motivation refers to the effort in L2 learning resulting from the desire to learn, it can impact the efficacy of written CF via its impact on the learners' utilization of the L2 learning opportunities brought about by the written CF (Kormos, 2012). To be specific, it can significantly impact on whether and how the learner notices the gap and involves him/herself in the problem-solving activities as well as the follow-up revisions (Kormos, 2012). In this section, these theoretical assumptions will be checked against empirical studies. The impact of L2 motivation on the efficacy of written CF was explored in multi-case studies in naturalistic settings. Hyland (2003) focused on the impact of learning goal, while Ferris et al. (2013) focused on that of confidence. As the designs of both studies have been

detailed in Section 3.5.2, only the results relevant to the impact of L2 motivation will be reported in this section.

Hyland (2003) found that both participants who were concerned about writing accuracy, closely followed written CF in revision with a high accuracy rate, and errors in their respective major issues decreased in new writing over the course period. Hence, this study suggested a positive link between learning goal (a component of L2 motivation), revision type and the efficacy of written CF (manifested in the improvement in long-term writing accuracy). Addressing another L2 motivation component, Ferris et al.'s (2013) study suggested a negative link between L2 motivation, revision type and efficacy of written CF. They found a student, who was reluctant to respond to the written CF in revision, was conceited (confidence is a component of L2 motivation), and his major issue did not improve throughout the four writing tasks in the course. Hence, both studies lent some support to the theoretical claim in Chapter 2 that L2 motivation can influence the efficacy of written CF via its impact on whether and how the learner notices the gap and involves him/herself in the problem-solving activities as well as the follow-up revisions (Kormos, 2012).

However, the impact of L2 motivation on the efficacy of written CF via its impact on revision types adopted by the learner has not been addressed systematically. Thus, it is uncertain whether the links between the three variables revealed in the two case studies was found by chance. Moreover, in both studies, L2 motivation was viewed as a static concept, with learning goal and confidence being components of integrativeness, an antecedent of L2 motivation in terms of quantity (Kormos, 2012). Because learners are social beings, they interact with their learning context. Due to such interactions, L2 motivation has a dynamic dimension. However, with L2 motivation theories in terms of both quantity and quality viewing L2 motivation as a static concept (Dörnyei, 2009), the impact of the dynamic dimension of L2 motivation has been absent from written CF research. Nonetheless, as introduced in Section 2.2.6, L2 Motivational Self System has been developed in the trend of "process-oriented" view of L2 motivation (Ellis, 2008, p. 677), which accommodates the previous L2 motivational models (both motivational quantity and quality) and manifests the interaction between the learner and the learning context simultaneously (Dörnyei, 2009). Recently, the impact of L2 Motivational Self System on L2 learning outcome via its impact on learning behaviours has been explored systematically in Kim and Kim's (2014) study focusing on the structural relationship of L2 learning style, Ideal L2 self, motivated learning behaviour and English proficiency.

Investigating among 2687 South Korean high school students (both junior and senior), Kim and Kim (2014) tried to establish the structural relationship of L2 learning style, Ideal L2 self, motivated learning behaviour and L2 proficiency. Data of the former three variables were collected via a questionnaire survey. The L2 proficiency was measured by the mid-term examination scores of English. Only the results relevant to the structural relationship of Ideal L2 self, motivated learning behaviour and English proficiency will be reported here because they represented L2 motivation, learning behaviour and learning outcome respectively in this study. The structural equation modelling (the data analysis method in this study) revealed that Ideal L2 self was the most substantial predictor of L2 proficiency, and it influenced L2 proficiency both directly and indirectly via its impact on motivated learning behaviour. Besides, motivated learning behaviour also significantly predicted L2 proficiency, and directly influenced L2 proficiency. Hence, this study lent some support to the link between L2 motivation, types of revision (i.e. learning behaviour) and improvement in long-term writing accuracy (i.e. efficacy of written CF) revealed in Hyland's (2003) and Ferris et al's (2013) case studies.

Hence, the literature has suggested a link between L2 motivation as a static concept, the types of revision adopted by the learners in responding to written CF, and the efficacy of written CF (manifested in the development of writing accuracy over time). It has also revealed the significant impact of dynamic L2 motivation on learning outcome via its impact on learning behaviour. Consequently, there is a need to explore systematically the impact of dynamic L2 motivation on types of revision adopted by the learners in responding to written CF and on the efficacy of written CF. This project makes such an attempt.

As Kim and Kim's (2014) study reviewed in this section has shown that learning behaviours (i.e. learning strategies) can significantly influence learning outcome, and written CF may not be effective unless the learners respond to it (Ellis, 2009), the next section will turn to the moderating effects of learning strategies learners adopt in their responding to written CF.

3.6.2.4 Studies on the moderation of learning strategies adopted in responding to written CF

It has been raised in Chapter 2 that as learning strategies are adopted by the learner to solve specific problems encountered in a learning task, the efficacy of written CF can be influenced by the learning strategies he/she adopts in response to written CF (i.e. by

whether and how the learner notices the gap and involves him/herself in the problem-solving activities as well as the follow-up revisions) (Kormos, 2012). In this section, these theoretical assumptions will be checked against empirical studies.

Besides revision, learners have been found to adopt learning strategies such as seeking peer help in their responding to the written CF (Hyland, 2003). Regarding the impact of learning strategies on the efficacy of written CF, revision and types of revision have been the foci in research (Chandler, 2003; Ferris et al., 2013; Hyland, 2003; Shintani et al., 2014). As relevant studies on the influence of revision and types of revision have been reviewed in Section 3.5, they will not be repeated here. By comparison, to my knowledge,   the impact of other strategies on the efficacy of written CF is not available in literature. Nonetheless, research into the influence of learning strategies on learning outcome may shed some light. Wong and Nunan (2011) focused on the influence of learning strategies on L2 proficiency, while Gu and Johnson (1996) on the influence of vocabulary learning strategies on both vocabulary size and L2 proficiency.

Conducting a questionnaire survey among 110 HK university students, Wong and Nunan (2011) explored the relationship between learning style, learning strategies and L2 proficiency. Data of learning style and learning strategies were collected via the questionnaire survey. The L2 proficiency was measured by the grade of an English examination required for graduation from HK high school. They found that the students with higher English proficiency favoured strategies featuring by learning in use, while their lower proficient peers favoured strategies reflecting dependence on an expert such as the teacher. The chi-square test revealed that the two proficiency groups significantly differed in three types of strategies: learning in use, reliance on teacher and self-study.

Adopting the same research design, but targeting over 800 university students in mainland China, Gu and Johnson (1996) explored the relationship between vocabulary learning strategies and two learning outcomes: vocabulary size and L2 proficiency. Data of learning strategies were collected via the questionnaire survey. The vocabulary size was measured by a vocabulary size test, and the L2 proficiency was measured by an English proficiency test in China (CET 2). The regression analysis revealed that self-initiation (i.e. actions in learning initiated by the learner's inherent interests) was a significant predictor of both learning outcomes, while activation (i.e. active use of the new word) only significantly predicted vocabulary size. In contrast, visual repetition

(read silently without further cognitive processing) was a significant but negative predictor of both learning outcomes.

It seems from these strategy studies among Chinese learners of English that strategies such as self-initiation and active use of the L2 knowledge are effective for L2 development, while visual repetition and reliance on an expert such as the teacher are not effective. Hence, apart from revision, it is worthwhile to explore the impact of other strategies that the learners adopt in their responses to written CF. This project makes such an attempt.

3.6.2.5 Insights into the moderation of learner internal factors from the empirical studies

Regarding the moderating effects of learner internal factors on the efficacy of written CF, more research with an improved design is needed to explore the moderation of factors such as L2 anxiety, L2 belief and L2 proficiency due to the paucity of studies on these issues. Regarding the moderation of language learning aptitude, one of the two most influential learner factors in L2 development, studies on this issue have targeted different linguistic features. They all revealed that language learning aptitude significantly moderated the efficacy of written CF.

The moderation of L2 motivation, another highly influential learner factor in L2 development, has not been addressed systematically. The literature suggests a link between L2 motivation, types of revision (a kind of learning strategies adopted in responding to the written CF) and the efficacy of written CF. Moreover, the impact of the dynamic dimension of L2 motivation has not been considered in written CF research. For a clearer picture about the moderation of L2 motivation, systematic research into the moderation of dynamic L2 motivation is needed. This project makes such an attempt.

L2 learning strategies is a factor which can directly impact learning outcome (Ellis, 2008; Kim & Kim, 2014). Research into the moderation of learning strategies dwells on revision and revision types. Besides revision, learners also use other strategies in their responding to written CF (Hyland, 2003). However, except for revision, the moderation of learning strategies have not been addressed in written CF research. Considering the significant correlation between strategy use and learning outcomes in literature, the impact of learning strategies (other than revision) on the efficacy of written CF deserves exploration. Again, this project attempts to explore this issue.

3.6.3 Summary of the insights into the moderation of learner external and internal factors from empirical studies

To sum up, regarding the efficacy of written CF, the moderation of learner external factors, such as learning context and educational level, and learner internal factors, such as L2 anxiety, L2 belief and L2 proficiency, have been explored systematically. Except for L2 belief, no significant moderating effect of these factors has been found. By comparison, the significant moderation of language learning aptitude, one of the two most influential learner factors in L2 development, has been revealed repeatedly in empirical studies.

Different from language learning aptitude, the moderation of L2 motivation, another highly influential factor, has not been explored systematically. The literature suggests a link between L2 motivation, types of revision and the efficacy of written CF. However, the impact of the dynamic dimension of L2 motivation has been absent from written CF research. For a clearer picture about the moderation of L2 motivation, systematic research into the moderation of dynamic L2 motivation is needed. In addition, revision has been the focus of the research into the moderation of learning strategies. Given that learners also use other strategies while responding to written CF (Hyland, 2003), and literature reveals a significant correlation between strategy use and learning outcome, the impact of learning strategies other than revision deserves exploration. Hence, this project attempts to explore the influence of both dynamic L2 motivation and learning strategies on the efficacy of written CF.

Due to the moderation of learner factors discussed in Section 3.6.2, it is possible, among the students in the same class who receive the same type of written CF that targets the same linguistic feature, that the writing accuracy of some students may improve while that of the others may not. This is what has been observed in a recent study (Guo, 2015). As improvement in writing accuracy is the result of development of written CF knowledge in the learner's L2 system, does no improvement in writing accuracy mean no contribution from written CF to L2 development? What are the exact causes of the differences in learners' benefit from the same written CF? Hence, the next two sections will turn to empirical studies relevant to these issues.

3.7 Empirical studies on L2 development from the DST perspective

In a recent study on written CF, learners whose writing accuracy did not improve were identified and were treated further with one-on-one conferencing to explore how explicit the written CF needed to be for each learner to improve (Guo, 2015). This phenomenon raises the issue: Does no improvement in writing accuracy mean that written CF is not beneficial to L2 development? To my knowledge, no empirical research on this issue is available so far. Nonetheless, several empirical studies addressing the L2 development from the DST perspective may shed some light. Verspoor, Lowie and van Dijk (2008) focused on the development of language complexity, while Spoelman and Verspoor (2010) and Caspi (2010) on that of both language complexity and accuracy.

Conducting a three-year case study with an advanced Dutch learner of English, Verspoor, et al. (2008) traced the development of language complexity. During this period, 18 essays were collected in an academic L2 writing course at different times. The changes in two aspects of language complexity (i.e. lexical diversity and sentence complexity) in these essays were traced. Lexical diversity was measured by type token ratio, while sentence complexity by average sentence length in words. They found that the development of sentence complexity was accompanied by the stagnation of lexical diversity, and vice versa. Hence, this study suggested a trade-off between the two aspects of language complexity. Thus, the claim in Section 2.9.1 that, changes in one component may affect other component(s) of the same system, found some empirical support.

With the same research design, Spoelman and Verspoor (2010) focused on the development of both language complexity and accuracy. The case was a Dutch learner of Finnish at the beginning level. Over a period of three years, 54 compositions were collected from this learner on the same occasion (i.e. homework assignment). Changes in the accuracy of cases and in the complexity of lexis, noun phrase and syntax were traced. Complexity was measured by the learner's attempts to use new construction. They found that the accuracy rate of the 54 texts varied between 0.8 and 1.0 except for that of the eighth text, which dropped to 0.65. The degree of variability was high among the early texts, but decreased after the 11th text. It decreased further and tended to be stable after the 28th text with the accuracy rate of the last 26 texts ranging between 0.85 and 1.0. In other words, accuracy developed in this period, meanwhile it showed the

tendency of stabilization. By comparison, the development of complexity was more complex. On the one hand, the development in lexical complexity was accompanied by that in both noun phrase and syntax. On the other hand, the complexity of noun phrase and that of syntax were found to alternate with each other in their development. It is noted that the findings about the development of lexical complexity and syntactic complexity in this study differed from those in Verspoor et al.'s (2008) study, where a trade-off between the two variables was revealed. Such differences may be related to the differences in their methodology. This study focused on a beginner of Finish, while Verspoor et al.'s study focused on an advanced learner of English. Moreover, complexity in this study was measured by attempts to use a new construction shown in the texts, while in Verspoor et al.'s study, it was measured by average sentence length in words. Nonetheless, no matter what the relationship between the development of these two variables is (i.e. trade-off or mutual support), both kinds of relationship are evidence for the claim in Section 2.9.1 about the interrelationship between components of the same system.

Also focusing on the development of both language complexity and accuracy, Caspi (2010) studied four advanced learners of English with different L1s (i.e. Portuguese, Chinese, Vietnamese and Indonesian) for nine months. One essay was collected from each participant each week during the course of nine months. The development of four variables (i.e. lexical complexity, lexical accuracy, syntactical complexity and syntactical accuracy) were tracked. Syntactical complexity was measured by the "ratio of correct word error per clause" (p. 128), while lexical complexity was measured by both "complex word ratio" and "general word variation" (p.126). It was found that the learners' lexical complexity developed prior to their lexical accuracy, and the development of the latter was followed by the development of syntax in the same pattern. In other words, among the four learners, lexical development took place before syntactical development; and within either linguistic domain (i.e. lexis or syntax), complexity developed before accuracy. As language complexity involves using the linguistic feature to express the corresponding meaning, and language accuracy involves using the correct form of the linguistic feature to express the corresponding meaning, such findings lent some support to the claim in Section 2.2 that the meaning of the feature may develop earlier than its form. Moreover, among four advance English learners, this study revealed that lexical and syntactical complexity developed at different stages. This conformed to Verspoor et al.'s (2008) findings from one advanced

English learner, but differed from Spoelman and Verspoor's (2010) findings from a Finish beginner. Similarities and differences in the target languages and the participants' proficiency levels of these three studies may have contributed to the similarities and differences in their findings.

It is noted that generalization is a common issue for case studies since generalization is beyond the scope of this kind of research design. However, when these case studies are considered together, similarities in their findings may suggest something similarly occurring in L2 learning. Hence, these longitudinal studies on L2 development from DST perspective suggest that different linguistic features may develop at different times, and different aspects of one feature may develop at different rate. Thus, one aspect of the feature may be learnt faster than the other aspect(s). These studies also suggest that different aspects of the L2 interact over time: changes in one aspect may affect the development of the other(s). In other words, L2 learning is dynamic and complex; and when the transitions between static phases in L2 development are examined, the IL is found to be in a state of change. Hence, no improvement in the learners' writing accuracy after written CF treatment (as observed in Guo's (2015) study) does not necessarily mean written CF is ineffective. However, empirical research is needed to explore this issue.

As introduced in Section 2.9.1, there are both large and subtle changes in the development of the IL. Large changes in the IL can be observed externally, while subtle changes may not. Hence, to explore whether written CF contributes to L2 development in case that no improvement in writing accuracy is observed, it is necessary to explore whether written CF contributes to the subtle changes in the IL. As discussed in Section 2.2, written CF influences L2 development via its influence on cognitive processing in L2 learning, exploring the contribution of written CF to the subtle changes in the IL involves the exploration of the learner's cognitive processing of written CF. Therefore, the next section will turn to studies exploring the cognitive processing of written CF.

3.8 Empirical studies exploring the cognitive processing of written CF

It has been noted, on the one hand, empirical research into the L2 learning potential of written CF has been dominated by quasi-experiments in the cognitive framework; on the other hand, with empirical studies focusing on the changes of the product over time, the contribution of written CF to the cognitive processing has rarely been considered.

Ellis (2010) called for investigation of written CF in situ (i.e. examination of written CF in cognitive processing episodes). Attempts were made in several case studies to explore how the learners cognitively processed written CF in the treatment session. Suzuki (2012) focused on the cognitive processing of direct feedback, Shintani and Ellis (2013) focused on that of direct feedback and metalinguistic explanation, while Stefanou (2014) focused on that of direct feedback and direct feedback plus metalinguistic explanation.

Investigating among 24 EFL learners in Japan, Suzuki (2012) explored these learners' cognitive processing of direct feedback via their written reflection. Direct feedback was provided to any grammatical or lexical error in their original texts. The students were required to write down in their L1 their explanations of the corrections. They were allowed to write down "don't know" if they were not sure about the reason for correction. After that, they revised their original texts without access to written CF. Their written reflections revealed that, although the students noticed the corrections (this supported the role of written CF as a noticing facilitator discussed in Section 2.2.1.2), there were occasions where they could not figure out why they were corrected. As discussed in Section 2.2.3.1, this is because noticing of written CF does not guarantee an understanding of it. The comparison of the students' original and revised texts revealed that when the students figured out the rules underlying the corrections, they were more likely to incorporate the corrections in the revision than when they failed to understand the correction (i.e. "don't know" was written). As discussed in Section 2.2.1.1, this is because only the features, structure of which has been understood, can become intake, and be manifested in the output (revision is modified output). It is also noted that there were occasions, where the corrections were not incorporated in the revision although an understanding of relevant rules was shown in the students' written reflections. As introduced in Section 2.2.1.1, due to the moderating factors, not all that has been learnt can be manifested in the output.

Also focusing on the cognitive processing of written CF, Shintani and Ellis (2013) adopted eyeball tracking and stimulated recall interviews in their study. Six ESL learners in the US finished a picture description task first. Then, they were assigned to two groups: the direct feedback group and the metalinguistic explanation group. Their eye-gaze movements were tracked while they were reading the feedback for five minutes. After that, they have the same picture description task redone without access to the written CF nor their original texts. Finally, stimulated recall interviews were

conducted to explore further their responses to written CF. The eyeball tracking revealed that, like the students in Suzuki's (2012) study, all the students in this study noticed all the written CF points. Thus, the role of written CF as a noticing facilitator discussed in Section 2.2.1.2 was further supported. The stimulated recall interviews revealed that students receiving direct feedback could not figure out the relevant rules themselves if they did not have this pre-knowledge. This may explain why students Suzuki's study sometimes could not figure out the reason of the corrections. The stimulated recall also revealed that one student in the direct feedback group tried to memorize the corrections. By comparison, Shintani and Ellis found students in the metalinguistic explanation group developed understanding of the relevant rules if they did not know them before the treatment. As introduced in Section 2.4, informativeness of written CF may impact the understanding of written CF. Hence, in this study, metalinguistic explanation was understood better than direct feedback. However, Shintani and Ellis also found that, like the case of direct feedback group, successful revision and unsuccessful revision co-existed in the revised texts of the metalinguistic explanation group. Such a finding was in line with that in Suzuki's study, where instances of failure in incorporating the corrections in revision was identified even if understanding of the corrections was shown in the written reflections. And like Suzuki's finding, this finding in Shintani and Ellis' study may also suggest the existence of moderating factors in the manifestation of knowledge learnt.

Still focusing on the cognitive processing of written CF, Stefanou (2014) adopted a think-aloud task in her study. The participants were 18 EFL learners in Greece. The students were assigned to two groups: the direct feedback group and the direct feedback plus metalinguistic explanation group. No revision was required. Different from Suzuki's (2012) and Shintani and Ellis' (2013) findings, Stefanou found that instances of failure in noticing written CF existed in both groups. Although written CF can function as a noticing facilitator (as evidenced in Suzuki's (2012) and Shintani and Ellis' (2013) studies discussed in this section), as introduced in Section 2.2.3.1, failure in noticing written CF is theoretically possible: if the learner's attention is not channelled to form/accuracy at the particular moment, he/she would not attend to written CF (Bitchener, 2016, December). Moreover, examination of the noticing episodes revealed the direct feedback group showed no correct understanding of the feedback, but one instance of incorrect understanding. And the rest instances only involved noticing of the feedback. Thus, the relationship between noticing and

understanding introduced in Section 2.2.3.1 was evidenced again after in Suzuki's (2012) and Shintani and Ellis' (2013) studies. By comparison, noticing episodes of the direct feedback plus metalinguistic explanation group revealed one instance of incorrect understanding. And the rest instances involved either only noticing or noticing with correct understanding. Such findings differed from those in Shintani and Ellis' (2013) study, which also explored the processing of metalinguistic explanation. In the latter study, students without pre-knowledge in the metalinguistic explanation group developed understanding of the relevant rules. The difference in the findings of the two studies may be related to that in their study context. Stefanou's study was conducted in the EFL context, while Shintani and Ellis' (2013) study in ESL context. Participants of the latter study may have had richer input of correct forms to facilitate their analyses of metalinguistic explanation in the treatment session due to their continuous exposure to the target language.

To sum up, this body of research supports the function of written CF as a noticing facilitator. It also generated evidence of the claims in Chapter 2, that noticing does not guarantee understanding, and that understanding did not guarantee correct modified output, pointing to the complexity of the cognitive processing of written CF.

Besides the cognitive processing of written CF in the treatment session, to answer whether written CF contributes to the subtle changes in the IL and to explore the causes of the different extents to which learners benefit from written CF, exploration of the learner's cognitive processing of written CF in the subsequent writing tasks is also needed. However, to my knowledge, this issue has not been addressed. This project makes such an attempt.

As gaps in the exploration of the efficacy of written CF have been identified in the above review of empirical studies, they will be summarized in the next section. And based on this summarization, the research questions of this project will be presented.

3.9 Summary of open issues and research questions

This section will summarize the gaps revealed in literature review and will be conclude with the research questions of this project.

3.9.1 Target written CF types

The efficacy of direct feedback and different ways to combine it with metalinguistic explanation have been the foci in the focused written CF research, which revealed that

metalinguistic explanation did not influence the efficacy of direct feedback significantly. As direct feedback and metalinguistic explanation are underpinned by different L2 learning theories, an exploration of the efficacy of direct feedback and metalinguistic explanation separately will be conductive. The separation of the two feedback types were achieved in two recent studies. However, in both studies, errors were located for the direct feedback group, but not for the metalinguistic explanation group. Thus, the efficacy of direct feedback and metalinguistic explanation is still unclear. This project will readdress this issue with improved manipulation. (RQ 1)

3.9.2 Moderating factors

The efficacy of written CF is moderated by a variety of factors such as error type, revision type, L2 motivation and L2 learning strategies. Gaps in these fields have been identified.

3.9.2.1 Error type

Focused written CF studies have mainly focused on the English article system, and revealed the efficacy of written CF on this linguistic domain. By comparison, the efficacy of written CF on more complex syntactic errors, which has rarely been addressed, has been doubted (Truscott, 1996, 2007). To date, two studies have focused on a syntactic feature, the hypothetical conditional. One of the studies confirmed the efficacy of focused written CF with revision on this item (Shintani et al., 2014). However, dictogloss tasks were adopted as writing tasks, which generated "writing of a contrived nature" (Shintani & Ellis, 2015, p. 118). As a result, the L2 writing condition in Shintani et al.'s (2014) study was not identical to that in the real world. As an L2 is learnt for the use in the real world, this project will focus on a little investigated syntactic item, the English passive voice (see Section 2.2.3 for introduction of the target feature), with writing tasks authentic in the real world to explore this issue. (RQ 1)

3.9.2.2 Type of revision

As both focused and unfocused quasi-experiments (Chandler, 2003; Geng, 2016; Shintani et al., 2014) revealed that indirect feedback, direct feedback and metalinguistic explanation accompanied by revision led to greater long-term writing accuracy than without revision, demonstrating the contribution of revision to L2 development, the treatment groups in this project will be required to revise their texts following written CF.

The moderation of revision type has not been investigated systematically (Ellis, 2009). It has been addressed in case studies, which suggested a link between successful revision and long-term writing accuracy (Hyland, 2003; Ferris et al., 2013). For a fuller picture of the moderation of types of revision, this project will address this issue in the quasi-experiment. (RQ 2)

3.9.2.3 L2 motivation
Language learning aptitude and L2 motivation are the most influential learner factors in L2 learning (Ellis, 2008). The moderation of the former on the efficacy of written CF has been addressed, and found to be significantly correlated with the efficacy of written CF (Sheen, 2007; Shintani & Ellis, 2013; Stefanou & Révész, 2015). Moderation of L2 motivation has been explored in case studies, suggesting a link between L2 motivation, types of revision made by the learner and the efficacy of written CF (Ferris et al., 2013; Hyland, 2003). However, with previous relevant research adopting an L2 motivation model that views L2 motivation as a static concept, the impact of the dynamic dimension of L2 motivation has been absent from the literature. Based on the extant case studies addressing the moderation of L2 motivation, and considering the significant correlation between dynamic L2 motivation and L2 learning outcome in literature, this project will address the moderation of dynamic L2 motivation systematically with a questionnaire survey. (RQ 3 & 4)

3.9.2.4 L2 learning strategies
Except for revision, the moderation of strategies adopted in responding to written CF has not been explored. Considering the significant correlation between strategy use and L2 learning outcome in literature, this project will explore the impact of strategies other than revision. (RQ 5)

3.9.3 The contribution of written CF to cognitive processing and causes of the differences in the way that learners benefit from written CF

Besides learners whose writing accuracy improved after the written CF treatment, learners whose writing accuracy did not improve have been observed (Guo, 2015). As both types of learners are part of an understanding of the efficacy of written CF, there is a need to explain, in terms of learning, why such different cases occur.

Additionally, though the quasi-experiments adopted the cognitive framework, the contribution of written CF to the processing stages in L2 learning has not been addressed. As the influence of written CF on L2 development is achieved via its

influence on the L2 learning process, an examination of how written CF contributes to the cognitive processing in L2 learning directly points to the contribution of written CF to L2 development. By examining the processing episodes of learners whose improvements in writing accuracy differ greatly with reference to Bitchener's (2016) processing models of written CF, this project attempts to reveal whether and how written CF contributes to L2 development, and enrich the insight into written CF with some causes of the differences in the way that learners benefit from written CF. (RQ 5)

To sum up, this project will address the following research questions:

Study 1 Research Questions

RQ1 a: To what extent do written CF (direct corrective feedback and metalinguistic explanation) and writing practice without written CF contribute to the development of accuracy in the use of passive voice over time?

RQ1 b: To what extent do written CF (direct corrective feedback and metalinguistic explanation) and writing practice without written CF contribute to a recognition of the need to use passive voice over time?

RQ2 (a): To what extent does revision type influence the contribution of direct feedback and metalinguistic explanation to the development of accuracy in the use of the passive voice?

RQ2 b: To what extent does revision type influence the contribution of direct feedback and metalinguistic explanation to the development of a recognition of the need to use passive voice over time?

RQ3: To what extent does L2 motivation influence the revision type that the learners make?

RQ4 a: To what extent does L2 motivation influence the contribution of direct feedback and metalinguistic explanation to the development of accuracy in the use of the passive voice?

RQ4 b: To what extent does L2 motivation influence the contribution of direct feedback and metalinguistic explanation to the development of the recognition of the need to use passive voice over time?

Study 2 Research Questions

RQ 5: What are some of the factors that contributed to:
  (a) one student's accuracy after receiving written CF and
  (b) another student's lack of accuracy after receiving written CF?

CHAPTER 4

METHODOLOGY

4.1 Introduction

This chapter presents the methodology most appropriate for addressing the research questions raised at the end of Chapter 3. In order to answer the research questions, this project consisted of two studies: a quasi-experiment and a follow-up multi-case study. To provide an overview of this project, first the research questions which formed the basis of each study are presented together with the operationalization of the research questions; then, the research philosophy underpinning this project is explained. After that, the methodological approach, participants and context, data collection instruments and data collection procedures of each study are presented and justified. This is because the quality of the research depends on the quality of data; and the latter is directly influenced by how the data are collected. Subsequently, the data analysis procedures of each study are presented and discussed in detail to justify the choice of the data analysis procedures. This is followed by an evaluation of the validity and reliability/trustworthiness of each study to ensure the quality of each study. Finally, ethical issues involved in the whole research process are clarified because they may influence the quality of data collected.

4.2 The two studies

The quasi-experiment was conducted before the multi-case study. Therefore, the research questions which form the basis of each study are presented in the same order together with the operationalization of the research questions.

4.2.1 The quasi-experiment research questions and their operationalization

The quasi-experiment addressed the first four research questions raised at the end of Chapter 3. These research questions were used to explore the efficacy of written CF on L2 development and the potential moderation of written CF type, revision type and L2 motivation.

RQ1 a: To what extent do written CF (direct corrective feedback and metalinguistic explanation) and writing practice without written CF contribute to the development of accuracy in the use of passive voice over time?

This question investigated the extent to which direct feedback, metalinguistic explanation and writing practice (separately) facilitated improved accuracy in the use of the passive voice over time (from pre-test to delayed post-test new writing tasks). When the direct feedback and metalinguistic explanation groups were treated with written CF, the writing practice group did not receive feedback of any kind. Instead, they completed an extra writing task with a topic different from the pre-test topic, but in the same genre. No attention was drawn to language form. The operationalization of the two written CF types is illustrated as follows with examples in the boxes:

Direct feedback: the correct form is provided in the text (Ellis, 2009).

<div style="border:1px solid">

               are put   sent

e.g., – Then, the beans <u>put</u> in the sacks and <u>send</u> to the factory by lorries.

                        put

    – Then, the beans were <u>putted</u> in sacks…

</div>

Metalinguistic explanation: errors are numbered in the text, and a grammatical description is provided for each numbered error at the bottom of the text (Ellis, 2009).

<div style="border:1px solid">

e.g., The students' texts:

            (1)   (2)

  – Then, beans <u>put</u> in sacks and <u>carry</u> to the factory.

                  (3)

  – Finally, the new bottles are <u>selled</u> in shops.

  Metalinguistic explanation provided at the bottom of the text:

  (1) & (2): When the subject is inanimate, passive voice should be used. Passive structure: auxiliary be + past participle. e.g., Your exercise books will be handed out tomorrow.

  (3): The past participle of "sell" is "sold". It is an irregular verb. Please refer to The list of irregular verbs in the dictionaries.

</div>

RQ1 b: To what extent do written CF (direct corrective feedback and metalinguistic explanation) and writing practice without written CF contribute to a recognition of the need to use passive voice over time?

This question investigated the extent to which direct feedback, metalinguistic explanation and writing practice (separately) facilitated the development of a recognition of the need to use passive voice over time (from pre-test to delayed post-test new writing tasks).

RQ2 (a): To what extent does revision type influence the contribution of direct feedback and metalinguistic explanation to the development of accuracy in the use of the passive voice?

This question was investigated separately with learners in the direct feedback group and the metalinguistic explanation group. It investigated the extent to which the following four types of revision identified in the literature (Elli, 2008; Hyland, 2003) facilitated the improved accuracy in the use of the passive voice over time (from pre-test to delayed post-test with a new writing task):

(a)   successful revision (the marked error being corrected in revision),
(b)   unsuccessful revision (an incorrect change to the marked error in revision),
(c)   deletion of text with the marked error (text with the marked error being deleted in revision), and
(d)   no response to the marked error (no change to the marked error in revision)

RQ2 b: To what extent does revision type influence the contribution of direct feedback and metalinguistic explanation to the development of a recognition of the need to use passive voice over time?

This question was investigated separately with learners in the direct feedback group and the metalinguistic explanation group. It investigated the extent to which the above four types of revision identified in the literature (Elli, 2009; Hyland, 2003) facilitated the development of a recognition of the need to use passive voice over time (from pre-test to delayed post-test new writing tasks).

RQ3: To what extent does L2 motivation influence the revision type that the learners make?

This question was investigated separately with learners in the direct feedback group and the metalinguistic explanation group. It investigated the extent to which different aspects of L2 motivation influenced the learner's adoption of successful revision, unsuccessful revision, deletion of text with the marked error and no response to the marked error respectively.

L2 motivation in this thesis consisted of the learner's Ideal L2 Self, Ought-to L2 Self, L2 learning experience and the discrepancy perceived by the learner between his/her Ought-to L2 Self and actual L2 Self (see Section 2.6). L2 motivation data were collected via a 5-Likert Scale questionnaire.

RQ4 a: To what extent does L2 motivation influence the contribution of direct feedback and metalinguistic explanation to the development of accuracy in the use of the passive voice?

This question was investigated separately with learners in the direct feedback group and the metalinguistic explanation group. It investigated the extent to which the different aspects of L2 motivation (Ideal L2 Self, Ought-to L2 Self, L2 learning experience and the discrepancy perceived by the learner between his/her Ought-to L2 Self and actual L2 Self) influenced the development of accuracy in the use of the passive voice over time (from pre-test to delayed post-test with a new writing task).

RQ4 b: To what extent does L2 motivation influence the contribution of direct feedback and metalinguistic explanation to the development of the recognition of the need to use passive voice over time?

This question was investigated separately with learners in the direct feedback group and the metalinguistic explanation group. It investigated the extent to which the different aspects of L2 motivation (Ideal L2 Self, Ought-to L2 Self, L2 learning experience and the discrepancy perceived by the learner between his/her Ought-to L2 Self and actual L2 Self) influenced the development of a recognition of the need to use passive voice over time (from pre-test to delayed post-test new writing tasks).

4.2.2 The multi-case study research question and its operationalization

The multi-case study addressed the last research question at the end of Chapter 3. This research questions was used to explore the possible causes of the different extents to which the students benefited from written CF.

RQ 5: What are some of the factors that contributed to:
(a) one student's accuracy after receiving written CF and
(b) another student's lack of accuracy after receiving written CF?

This question investigated

a. the changes in accuracy in the use of the passive voice from the pre-test and immediate post-test to the delayed post-test in the multi-case study.
b. one learner whose accurate development benefited most from metalinguistic explanation. It focuses on a learner who had improved the most in accuracy in the quasi-experiment in the metalinguistic explanation group.
c. one learner whose accurate development did not benefit from metalinguistic explanation. It focuses on a learner who had not improved in accuracy in the quasi-experiment in the metalinguistic explanation group.

Text data were collected via a pre-test writing task, a written CF treatment (metalinguistic explanation) and revision session, an immediate post-test writing task and a delayed post-test writing task one month later. In addition, two stimulated recall interviews were conducted to collect data about the learner's cognitive processing in revision and in new writing tasks — one right after the immediate post-test, the other right after the delayed post-test.

As in the quasi-experiment, metalinguistic explanation in the multi-case study consisted of underlining and numbering the error, providing grammar rules underpinning the error, and providing an example outside the same context of the error. For example:

> ①
>
> The erroneous output: *Second, the broken glass bottles will <u>put</u> in the furnace.*
>
> Metalinguistic explanation provided at the bottom of the text:
>
> Subject: bottles, inanimate. They can only be done. The passive voice should be used here. Auxiliary be + the past participle. e.g., The broken glass bottles are heated in the furnace.

4.3 Research philosophy

The philosophy underpinning the present research is post positivism. It assumes the existence of an objective social reality external to human minds and concerns multi perceptions of the reality (Ayiro, 2010; Corbetta, 2001). Hence, to understand knowledge of the reality, one needs to consider the social factors involving in the knowledge derivation process though the reality itself is not a product of the knowledge derivation process (Ayiro, 2010). Thus, the ontology of post positivism is critical realism, which assumes cause-effect relationships existing in reality outside of human minds, and holds that reality is only imperfectly understandable due to the limitation of human perception (Corbetta, 2001).

As a result, the corresponding epistemology is "modified dualism-objectivity" (Corbetta, 2001, p. 20). It considers the researcher and the object researched cannot function independently of each other. Thus, the researcher cannot study the object without influencing or being influenced by the object (Corbetta, 2001). Nonetheless, objectivity can be a regulatory ideal. Thus, objective, general laws are pursued, while it is acknowledged that the laws generated from the research are "limited in scope, probabilistic and provisional", and the objectivity of knowledge can only be achieved approximately (Corbetta, 2001, p. 20).

Therefore, the corresponding methodology is modified experimental-manipulative in the exploration of the cause-effect relationships existing in the single, mind-independent reality. On the one hand, quantitative methods are used to explore the relatively enduring dimension of the reality (Ayiro, 2010), where measures are taken for "a substantial detachment between the researcher and the object studied" (Corbetta, 2001, p. 20). On the other hand, qualitative methods are adopted to explore its changing dimension (Ayiro, 2010), where the researcher interacts with the object being studied.

As revealed in Chapter 2, L2 learning theories predict the efficacy of written CF for L2 development. They also predict the moderations of explicitness and informativeness on the efficacy of written CF as well as the moderations of L2 motivation and revision type on its efficacy. Hence, the L2 learning potential of written CF should be tested to explore whether or not, and the extent to which, it contributes to L2 development. Also, the moderating effects of explicitness and informativeness of written CF, revision type and L2 motivation need to be tested to explore whether or not, and the extent to which, they influence the efficacy of written CF. In addition, post positivism concerns multiple perceptions of the mind-independent reality, and pursues both the relatively enduring dimension and the changing dimension of the reality (Ayiro, 2010). Hence, there is also a need to explore whether or not and why there is any considerable difference in the extent to which learners benefit from written CF.

An experiment is an orderly procedure aiming to test the validity of a theory or hypothesis (Corbetta, 2001). It provides insight into cause-and-effect by demonstrating what outcomes occur when a particular factor (i.e. an independent variable) is manipulated (Corbetta, 2001). A quasi-experiment differs from an experiment in that, in the former, there is some independent variable that cannot be manipulated, and/or there are some extraneous factors that cannot be controlled strictly (Corbetta, 2001), which is the case with the present research (it will be detailed in below in Section 4.4.1). Therefore, a quasi-experiment was designed to address research questions 1-4 with a focus on the efficacy of written CF, together with the moderation of explicitness and informativeness of written CF, L2 motivation and revision type.

Previous quasi-experiments have revealed that there are learners who benefit a lot from written CF, and learners who do not benefit much from written CF. However, no study has addressed the latter group of learners so far. Since the current quasi-experiment also revealed the existence of such learners, it was considered that focusing on these individual learners might contribute to a fuller picture of the role of written CF in L2 development. Hence, a follow-up multi-case study was designed to focus on them and explore why the learners differ in the extent to which they benefit from written CF (research question 5). As the quasi-experiment preceded the multi-case study, the former will be detailed in Section 4.4 before the latter in Section 4.5.

4.4 The quasi-experiment

4.4.1 Overview of the methodological approach

As "quantification represents a reality for a group" (Seliger & Shohamy, 1989, p.115), quantitative research is appropriate to explore the efficacy of written CF on L2 development and the moderation of revision type and L2 motivation. "In particular, experiments are designed to provide clearly observable links between experimentally manipulated causes and well-defined outcomes that serve as effects" (Morgan, 2014, p.56). Hence, an experimental design suits the thesis' purpose of exploring the efficacy of written CF for L2 development and the impact of possible moderating factors.

However, it is impossible to prevent participants from being exposed to L2 input during the experimental period. As quasi-experiments also seek to control the non-experimental influences for a greater confidence in the application of the treatment to other L2 learners of the same basic characteristics (Morgan, 2014), it was considered both feasible and suitable for the purpose of this study. This is true particularly in the sense that, to explore the moderation of revision types and L2 motivation with written CF, these two variables were not manipulated as they were under the control of the learners, but only were measured in this study.

Hence, a quasi-experiment was conducted to address research questions 1- 4, for these research questions involve the manipulation of independent variables (direct feedback, metalinguistic explanation and writing practice) and measurement of independent variables (L2 motivation and revision type) in determining any significant effects on the dependent variables (development of target features and revision type).

4.4.2 Participants and context

Sichuan Business Vocational College in Chengdu, China (SBVC for short hereafter) was the study site. It was chosen because of the representativeness of its International Business and Economics majors in this province. Representing their vocational college peers in the province, they had been participating in the annual Nationwide International Business Skill Competition for three years. The participants of this project were recruited among these students.

Vocational colleges provide three-year programmes. Compared with the first-year students, who are in the transition from being middle school students to being vocational college students, and the third-year students who are in the transition from

being vocational college students to being professionals, the second-year students are better representatives of vocational college students (Li, 2011). Hence, the second-year students majoring in International Business and Economics were targeted for their representativeness of such majors in vocational colleges in the province.

The quasi-experiment was conducted in the participants' English classes. Listening, speaking, reading, writing and translating skills are integrated in their English course. Students meet their respective course teachers twice a week, for 80 minutes each time. Four intact English classes (156 students altogether) were involved in the quasi-experiment. The students' English proficiency was measured using the College English Test in China (CET). At the time of the quasi-experiment, they all passed CET 2. According to the enrolment criteria of the Summer School of University of California at Berkeley, 493 on CET 4 (i.e. the passing score for CET 4) is equivalent to 6.5 on IELTS. Thus, the participants in this project were considered to be intermediate EFL learners.

4.4.3 Data collection instruments

Multi methods were adopted to collect data in the quasi-experiment. They were writing tests, a revision task (feedback groups only) and an L2 Motivation questionnaire.

4.4.3.1 Writing tests

Narrative writing tasks, which dominate in the written CF quasi-experiments, were adopted to facilitate the comparison between this study and the previous ones. Narratives in the form of email writing were adopted because they reflect a real world activity among the participants and serve to satisfy some communicative need. That is, when involved in the task, the participants focused on meaning rather than language form. Thus, because it is sometimes difficult to obtain naturally occurring samples containing the target features, compared with other types of samples of learner language, samples elicited by such tasks are more likely to reflect what learners can do with the L2 when they are engaged in the same kind of L2 use (Ellis & Barkhuizen, 2005). Consequently, such samples are ideal for measuring L2 development.

Three writing tests were designed (the pre-test, the immediate post-test and the delayed post-test). Each test consisted of one narrative writing task. Thus, on each of the three occasions, the participants were given 35 minutes to compose a text of about 90 words each.

Task 1:

> You and your friend Chris at your hometown like chocolate very much. Last week, you visited a food plant, and saw yourself the process of chocolate production there. You want to share with Chris what you have learnt from this visit. Thus, you decide to tell her the process of producing chocolate via email. You begin the email as follows:
>
> Dear Chris,

Task 2:

> After a car accident, you sent your car to a mechanic for repairs. You are satisfied with the repairs, and want to introduce this mechanic to your friend, Alice. You decide to write an email to tell her what happened to your car after the accident and the repairs. You begin the email as follows:
>
> Dear Alice,

Task 3:

> Last week, you visited a glass recycling plant. In order to raise other students' environmental awareness, you decide to email the editor of the campus newspaper to introduce the process of recycling glass bottles. You begin the email as follows:
>
> Dear Editor,

4.4.3.2 The revision task

In the treatment session, the feedback groups revised their pre-test texts according to the written CF provided to them. Revising a text while correcting errors can function as contextualization of explicit knowledge learnt from written CF (Shintani & Ellis, 2013). Moreover, previous research into the impact of revision on the efficacy of written CF revealed that revision helped to enhance the effects of written CF (Chandler, 2003; Geng, 2016; Shintani et al., 2014) (see Section 3.5). In order to make the effects of written CF more transparent for quantitative measurement, the enhancing function of revision was utilized in this project. One form of revision involves the participants revising their texts without access to either written CF or their original texts. However, this type of revision favours the learners in the direct feedback group who have a better memory. Thus, it is a biased treatment, and was not adopted in this project. As a result, both feedback groups copied the whole text for revision, and had access to written CF and their original texts for revision.

4.4.3.3 L2 motivation questionnaire

Questionnaires collect self-report information from the learners and can elicit longitudinal and comparable information from many learners in a short time (Mackey & Gass, 2005). Hence, an L2 Motivation questionnaire is appropriate for collecting the everyday motivation of the sizable sample in this study. It was issued to all the participants after the delayed post-test in order to not alert them before or during the quasi-experiment, for their alertness may have affected the results of the quasi-experiment. If the students responded to the questions according to their everyday experience, the purpose of the questionnaire was achieved. If they responded to the questions according to their experience in the quasi-experiment, the questionnaire data would contribute more to the understanding of the results of the quasi-experiment.

The present questionnaire was adapted from the one used in Taguchi, Magid and Papi's (2009) study among over 1000 Chinese EFL learners. The original questionnaire used by Taguchi et al. was developed in the framework of the L2 Motivational Self System. Recently, the discrepancy perceived by the students between their Ought-to L2 selves and their actual L2 selves has been found to be dominant in the teenage L2 learners in UK and to be influential in some Chinese EFL learners' decisions about whether to respond to written CF in revision (see Section 2.6). Hence, in this study, items addressing the discrepancy perceived by the students between their Ought-to L2 self and their actual L2 self were developed and added to the L2 motivation questionnaire developed by Taguchi et al. e.g., "I do not have to study English hard to pass the English course, because my English proficiency is near to the course requirements".

4.4.4 Treatment

The quasi-experiment participants were allocated to three groups at random: two feedback groups and one writing practice group. Each of the feedback groups was treated with either direct feedback or metalinguistic explanation. As discussed in section 2.4, direct feedback is the most explicit written CF type, while metalinguistic explanation the most informative. Because written CF can function as a noticing facilitator, the degree of explicitness may influence the efficacy of written CF. Similarly, the degree of informativeness may also influence the efficacy of written CF, because written CF is on type of input, and the information used in cognitive processing of L2 input can influence the learner's understanding of the input. As discussed in section 3.4, in order to find out whether the explicitness and informativeness influence the efficacy of written CF, further research is needed to compare the effects of direct

feedback and metalinguistic explanation. Therefore, these two written CF types were investigated in the quasi-experiment.

When the feedback groups were treated with written CF, the comparison group was treated with writing practice. This is because written CF focuses on form, and the comparison group should not focus on form in order to provide evidence of efficacy of written CF. While composing a new text, a member of the writing practice group focused on the meaning to be expressed, not the language form. In addition, Truscott (1996, 2004) has argued that the time spent in error correction should be used in more effective activities such as writing practice. The efficacy of writing practice and written CF has been compared in an unfocused study in the Dutch L2 learning context with authentic L2 use tasks, and in a focused study in an ESL context with reconstruction tasks. Both studies revealed that the writing practice group did not resignificant improvement in the delayed post-test while a written CF group did (Sheen et al., 2009; Van Beuningen et al., 2012). Compared with the authentic L2 use tasks, reconstruction tasks tend to elicit unauthentic L2 use (Shintani & Ellis, 2015). Therefore, L2 development manifested in the output of such tasks is less appropriate for the representation of real L2 development. Hence, Truscott's claim about the comparative effect of writing practice and written corrective feedback needs to be tested further in focused research. With the writing practice group as the comparison group, this project tested his claim with authentic L2 use tasks in the FL context.

4.4.5 Data collection procedure

The quasi-experiment consisted of a pre-test, a treatment session, an immediate post-test and a delayed post-test. The data collection procedure is summarized in Table 4.1.

Table 4.1: Data collection procedure of the quasi-experiment

Week	Activities of the experimental groups	Activities of the control group
1	Pre-test (35 min) (i.e. Writing 1).	Pre-test (35 min) (i.e. Writing 1).
2	Feedback on Writing 1 and revision (20 min); immediate post-test (35 min) (i.e. Writing 2) with removal of written CF, their original texts and revisions to Writing 1.	A new piece of writing (35 min) (i.e. Writing 2).
6	Delayed post-test (35 min) (i.e. Writing 3); answering the questionnaire on L2 motivation (10 min)	Delayed post-test (35 min) (i.e. Writing 3); answering the questionnaire on L2 motivation (10 min)

As shown in Table 4.1, data were collected at three different points of time. The researcher went to the participants' English classes three times to collect data. Each time, the participants' respective English teacher left the classroom so that the researcher could handle the classes independently (this will be explained in Section 4.6: Ethical issues involved in this project). On the first day, the researcher assigned Task 1 (i.e. the pre-test) to all the participants, and monitored their writing process. After that, the researcher photocopied the participants' texts, identified the errors in their use of the target feature, and calculated the accuracy scores of the target feature in each text. Written CF was provided to each text, including the texts written by the members of the writing practice group. Direct feedback was provided on half of the texts, while metalinguistic explanation on the other half. The texts written by members of the writing practice group were handed out to the students after the quasi-experiment was completed (this will be explained in Section 4.6: Ethical issues involved in this project).

Two days after the pre-test, the feedback groups received either direct feedback or metalinguistic explanation to their Writing 1 (i.e. Task 1). They read the feedback and then revise the whole text accordingly. Then, they had the immediate post-test (i.e. Task 2) with removal of everything related to their Writing 1. At the same time, the comparison group did not receive feedback nor their Writing 1. Instead, they were given another writing task (i.e. Task 2) to work on.

One month later, all the participants had the delayed post-test (i.e. Task 3), then answered the L2 Motivation questionnaire. The interval between the treatment and the delayed post-test was one month. This is because it was the longest time that the participants' English teachers agreed that they would not instruct the target feature in any case. Moreover, according to Ebbinghaus' (1885) forgetting curve, after one month, the speed of forgetting after learning something has slowed down considerably and becomes steady. Hence, the chance for considerable loss of the written CF knowledge in the students' memories is narrow after this project. Thus, one month was considered as a decent delay in this project.

4.4.6 Data analysis

This section introduces the scoring criteria (section 4.4.6.1) used in the quasi-experiment and the data analysis of research question 1 – 4 (section 4.4.6.2).

4.4.6.1 Scoring criteria:

Three types of data were collected in the quasi-experiment: the writing test data, the revision type data and L2 motivation questionnaire data. Following this order, the scoring criterion of each type of data is introduced in sections 4.4.6.1.1 - 4.4.6.1.3.

4.4.6.1.1 Scoring criterion of the writing test data

Obligatory occasion refers to anoccasion where the use of the target feature is unavoidable. Obligatory occasion analysis has been adopted frequently in the calculation of accuracy in past written CF research. In two studies (Shintani & Ellis, 2013; Shintani et al., 2014) where there was a possibility of overuse of the target feature, a revised version of this index of accuracy was adopted. Overuse of the target feature refers to the use of the target feature in the context where it should not be used. There are incidences of overuse of the passive voice in this study. For example, a participant wrote "The liquid was flowed into a mould". In this sentence, *was flowed* is an overuse of the passive voice as *flow* is an intransitive verb, which should not be used in the passive voice. Hence, Shintani and colleagues' revised version of obligatory occasion analysis (used in the 2013 study and 2014 study) was adopted. In doing so, the use of the passive voice in each context was checked before incidences of overuse were counted.

Score of accuracy= number of correct forms of passive voice in an obligatory context ÷ (number of obligatory contexts + number of overused forms of passive voice) * 100

In this formula, obligatory context refers to the context where the use of the passive voice cannot be avoided**.** Overused forms of the passive voice refers to the use of the passive voice in the context where this linguistic feature should not be used. It is included in the denominator to take account of the overuse of this feature because an incidence of overuse of this feature indicates a lack of correct knowledge of occasions where the passive voice is to be used, and such knowledge plays a role in the accurate use of this feature.

Scoring system of a recognition of the need to use the passive voice
Score of a recognition of the need to use the passive voice = Number of attempts to use the passive voice on obligatory occasions ÷ (number of obligatory occasions of passive voice + number of overused forms of passive voice) *100%

To facilitate the understanding of this formula, a key term in it, *attempt to use the passive voice*, is explained as follows:

Passive voice, which consists of two linguistic components — auxiliary be and the past participle, has not been investigated in the written CF research. Nonetheless, the hypothetical conditional, which also consists of more than one linguistic component, was targeted in Shintani et al.'s (2014) written CF study. Their accuracy scoring system of the hypothetical conditional was adapted from that in Isumi, Bigelow, Fujiwara and Fearnow's (1999) study testing the output hypothesis, where 1 point was equally awarded to each of the components. It has been noted that , in Shintani et al's scoring system, though the use of the perfect aspect, a component of the hypothetical conditional, gained 1 point respectively in the *if* clause and the main clause, accuracy of each of the components of the perfect aspect in the hypothetical conditional gained 0.5 point respectively. Hence, both accuracy in using the hypothetical conditional and a recognition of the need to use it were considered in their scoring system. As a result, a full development of the target feature (accuracy in using it) cannot be differentiated from a partial development of it (recognition of the need to use it, which underpins the attempt to use it). That is why accuracy in using the target feature and a recognition of the need to use it were considered separately in this project.

The scoring system of a recognition of the need to use the passive voice in this study draws on the scoring system of the hypothetical conditional in Shintani et al's (2014) study and the multi-case study participants' recall of their cognitive processing in writing. One participant reported after the immediate post-test in the case study that she decided whether the English version of a sentence should be in the passive voice or the active voice before she translated it word for word. If she decided the passive voice should be used in the English version, when she encountered a verb while translating, she stopped to recall the construction of the passive voice as "auxiliary be + a verb". In the recall after the delayed post-test in the case study, she reported that if she decided to use the passive voice before translating a sentence into English, when she encountered a verb in translation, she stopped to recall the construction of the passive voice as "auxiliary be + the past tense". According to her recall, she was consistent with this cognitive process in the second writing task.

By comparison, another case study participant reported after the delayed post-test that she also first decided whether the passive voice should be used in the English version of a sentence. Then, while translating word for word, she stopped to recall the construction of the passive voice as "auxiliary be + the past participle" before she wrote down the verbs. However, for the last obligatory context, because of time pressure, she omitted

the recall of construction of the passive voice, and wrote down the verb subconsciously. Such omission led to the loss of auxiliary be and the retention of the past participle (ended with *ed*), for there is no auxiliary verb in the Chinese version ─ the only verb is an action verb.

It can be seen, both participants were trying to use the passive voice, but both only captured one of its linguistic components. As the multi-case study participants came from those in the quasi-experiment, to cover such cases of attempts to use the passive voice, 0.5 point was given to each of the two components of the passive voice (i. e. auxiliary be and the past participle). Thus, when both components were captured in a sentence, 1 point was awarded to this sentence.

There are four possible types of attempt that a learner may make when attempting to use the passive voice.

1. The successful formation of the passive voice. That is, both components are captured and both are in correct form on an obligatory occasion (i.e. an occasion where the use of the target feature is unavoidable). For example, in "The beans are squeezed", *are* (auxiliary be in the correct form) and *squeezed* (the past participle in the correct form) gain 0.5 respectively. Thus, this sentence gains 1 point altogether.

2. Both components are captured, but auxiliary *be* is not in the correct form**.** As accuracy in using passive voice and attempts to use it are considered separately in this study, the scoring system of a recognition of the need to use the passive voice did not consider the issue of accuracy. Moreover, the present participants are lower intermediate learners of English, their command of tenses and aspects is poor, and auxiliary be is related to tense and aspect. Thus, it would be better to consider its accuracy after basic tense and aspect are consolidated. Therefore, any form of auxiliary be is taken to be correct in this scoring system, just like "any suppliance of the auxiliary have, in any form, along with another verb following it " was considered as the perfect aspect in the hypothetical conditional, and given 1 point in Isumi et al's (1999) study (p. 432). For example, in "The liquid be poured into a mould", *be* (auxiliary be) and *poured* (the past participle) gain 0.5 respectively though in this sentence, *poured* is the correct form of the past participle, while *be* is not the correct form of auxiliary be. As a result, this sentence gains 1 point altogether.

3. Only auxiliary be (in any form) is captured. For example, in "They were send to a factory", only *were* (auxiliary be in the correct form) gains 0.5 as there is no past participle in this sentence. Thus, this sentence gains 0.5 altogether. The same is true with "The windows was broke", where only *was* (auxiliary be not in the correct form) gains 0.5. However, auxiliary be followed by a present participle of an action verb gains no point as it is a component of continuous tense in this case. For example, in "They were sending to a factory", *were* (auxiliary be) gains no point as it is part of the past continuous tense, not the passive voice, in this sentence. Thus, this sentence gains no point.

4. Only the past participle is captured. For example, in "My car window broken", only *broken* (the past participle) gains 0.5. As a result, this sentence is awarded 0.5 altogether. However, it is difficult to infer whether *breaked* in "The window was breaked" is a misspelling of *broken* (the past participle), for which it would gain 0.5, or a misspelling of *broke* (the past form), for which it would gain no points. Hence, in the fourth possibility, only the correct form of the past participle is considered as the past participle when attempts to use passive voice are concerned. As a result, *breaked* gains no point, and only *was* (auxiliary be) results in 0.5 for this sentence.

In addition, the past participle (in the correct form) following auxiliary have (i.e. *have* in "have + a verb") gains no point either, for it is a component of perfect tense in this case. For example, in "My car window has broken", *broken* (the past participle) gains no point, for it is not a component of the passive voice, but a component of the present perfect tense in this sentence. Thus, this sentence gains no point.

This scoring system is summarized in Table 4.2, and the examples illustrating how the points are awarded are summarized in Table 4.3.

Table 4.2: Criteria for scoring the attempt to use passive voice

Criteria	Component	Form	point
a	auxiliary be +a verb	any form of auxiliary be + bare infinitive/past form/the past participle	0.5
b	the past participle	the correct form of the past participle	0.5
		total possible	1

Table 4.3: Examples of the scoring system

Sentences	Criteria		Total points
	a	b	
The beans <u>are</u> <u>squeezed</u>. a b	0.5	0.5	1
The liquid <u>be</u> <u>poured</u> into a mould. a b	0.5	0.5	1
They <u>were send</u> to a factory. a	0.5	—	0.5
The windows <u>was broke</u>. a	0.5	—	0.5
My car window <u>broken</u>. b	—	0.5	0.5
The window <u>was breaked</u>. a	0.5	—	0.5
They were sending to a factory.	—	—	—
My car window has broken.	—	—	—

However, for the following sentence, it is difficult to decide whether *put* and *carried* are used as the past participles (where they should be awarded 0.5 point respectively) or as the past forms of the verbs (where no point should be awarded).

    The beans *put* and *carried* to the factory.

To solve this issue, following Shintani et al's (2014) example, conditions to award them points are set. That is, when the major tense of the text is the simple past, and the passive voice with both components is not used in the whole text, the above verb forms are considered as the past forms of the verbs rather than the past participles. Thus, no points are awarded to them. Otherwise, they are considered as the past participle forms, and are awarded 0.5 respectively.

4.4.6.1.2 Scoring criterion of the revision types

Score of each revision type = (number of each revision type/ number of all the marked errors) * 100

In this formula, the number of all the marked errors refers to the number of all the marked errors in the pre-test text; while the number of each revision type refers to the number of incidences of successful revision, unsuccessful revision, deletion of text with the marked error, and no response to the marked error in the corresponding revision text.

4.4.6.1.3 Scoring criterion of the L2 motivation questionnaire data

Score of each aspect of L2 motivation = Mean of the scores of all the items in the questionnaire corresponding to each L2 motivation aspect

In this formula, each aspect of L2 motivation refers to the learner's Ideal L2 Self, Ought-to L2 Self, L2 learning experience and the discrepancy perceived by the learner between his/her Ought-to L2 Self and actual L2 Self. The aspects of L2 motivation and their corresponding items in the questionnaire are pre-set (see Appendix E for the questionnaire and Appendix H for the dimensions and variables of L2 motivation).

4.4.6.2 Data analysis for research questions 1-4

To address RQ 1, which explores the contribution of written CF (including both direct corrective feedback and metalinguistic explanation) and writing practice without written CF to the development of the passive voice, after the one-way ANOVA revealed no significant difference between the two groups (i.e. written CF group vs. writing practice group) in Time 1 concerning either accuracy in using the passive voice or a recognition of the need to use the passive voice, a mixed ANOVA (*2 (treatment group) * 3 (time)*) was conducted to test the comparative effects of different treatments (i.e. written CF vs. writing practice) to the groups.

When the mixed ANOVA revealed a significant time and group interaction, first independent-samples *t-tests* between the written CF group and the writing practice group at each time were adopted to establish where the significant difference occurred. In doing so, a Bonferroni adjustment for three comparisons was required ($p = .017$). After that, the written CF group was separated into the direct feedback group and the metalinguistic explanation group, and the above procedures of data analysis were repeated with data of every two groups (i.e. direct feedback vs. metalinguistic explanation, direct feedback vs. writing practice, and metalinguistic explanation vs. writing practice) for a closer look at the contribution of written CF and writing practice to L2 development.

To address RQ 2, which explores the influence of types of revision on the contribution of direct feedback and metalinguistic explanation to the development of the passive voice, the revised drafts were examined and revealed that three types of revision were adopted by the participants in the two feedback groups (direct feedback and metalinguistic explanation): successful revision, unsuccessful revision, and no response to the written CF. To explore respectively the possible moderation of revision types on the effects of written CF on accuracy and a recognition of the need to use the passive

voice (i.e. RQ 2 a & b), a series of *2 (treatment group) * 3 (time)* ANOVAs were performed respectively with the score of each revision type as the continuous moderator.

To address RQ 3, which explores the influence of L2 motivation on the types of revision that the learners make, first the L2 motivation profile of each feedback group (direct feedback and metalinguistic explanation) was revealed. Then, correlation between the three revision types (successful revision, unsuccessful revision, and no response) and the four L2 motivation variables (Ideal L2 self, L2 learning experience, Ought-to L2 self, and the discrepancy between Ought-to L2 self and the actual L2 self-perceived by the learner) were examined to detect if there is an issue of multicollinearity. As no type of revision significantly correlated with any L2 motivation variables, multiple regressions were conducted across the groups without consideration of multicollinearity.

To address RQ 4, which explores the influence of L2 motivation on the contribution of direct feedback and metalinguistic explanation to the development of the passive voice, after the L2 motivation profile of each group (direct feedback and metalinguistic explanation) was revealed, a series of 2 *(treatment group) * 3 (time)* ANOVAs were performed with each L2 motivation variable (Ideal L2 self, L2 learning experience, Ought-to L2 self, and the discrepancy between Ought-to L2 self and the actual L2 self-perceived by the learner) as the continuous moderator to examine the interaction among time, treatment and each L2 motivation variable.

When a significant *time * treatment * L2 motivation variable* interaction was detected, the repeated measures ANOVA (three times) with the same L2 motivation variable as the continuous moderator was performed with each group separately to determine where this significant effect occurred.

4.4.7 Data validity and reliability

"Validity refers to the extent to which the data collection procedure measures what it intends to measure" (Seliger & Shohamy, 1989, p.188). *Internal validity* concerns the extent to which the results of a study are attributed to the factors under investigation (Seliger & Shohamy, 1989). Measures were taken to eliminate or control the impact of other factors to ensure that changes in the use of target features over time were attributed to the treatment in the quasi-experiment. First, teachers of the participants did not instruct the target feature during the period of the quasi-experiment. Second, the participants were highly homogenous: similar age (18-20), in the same learning context

(the second-year students majoring in International Business and Economics in the same college) and of the same English proficiency (all passed CET 2 at the end of the previous semester, and this project started at the beginning of a new semester). Thirdly, data were collected under identical condition (in an English class or a self-study session of each class), and students in each class were assigned at random to three groups (i.e. direct feedback, metalinguistic explanation and writing practice) to minimize the impact of differences among classes and sub-majors (different foci in International Business and Economics).

Moreover, the pre-test provided a baseline to control the impact of any possible initial difference. Also, the difficulty of the three writing tests was established among a similar group of learners (vocational college students in another suburb of the same city) after this quasi-experiment came to an end to counterbalance the possible effects that the order of issuing the writing tasks may have had on the findings. This is because all the participants lived in the same dormitory on campus, and it was easy for them to exchange information about their writing tasks to each other. Furthermore, the data collection instruments had been piloted and revised accordingly to ensure they would elicit data needed for this study. In addition, this was a longitudinal quasi-experiment, and data were collected among the same participants at repeated times to ensure that what was presented in the data was more than a snapshot view of the efficacy of written CF among the participants.

A pilot study was conducted in an ESL school in Auckland among a small group of learners from China. Among the original six writing tasks, the top-three in generating the obligatory occasions of the passive voice use were chosen for the quasi-experiment. Also, the pilot participants did not feel fatigued during each session (i.e. the pre-test, the treatment with revision and the following immediate post-test, and the delayed post-test and the following questionnaire survey). Besides testing the data collection instruments, the pilot study also provided information about the time needed for each session. In addition, although only quantitative data were collected in the quasi-experiment, the data generated by the quasi-experiment were triangulated with two participants' stimulated recall of their cognitive processing in the treatment and two post-tests in the follow-up multi-case study. Such triangulation further improved the validity of the data generated by the quasi-experiment (triangulation and stimulated recall will be detailed in Section 4.5.1 and 4.5.3).

External validity concerns the issue of generalization, and "the base of generalizability is the particular sample selected" (Mackey & Gass, 2005, p. 119). To improve the external validity of the data, this project targeted all the students in the study site who met the participation criteria. Representation of the participants is another factor affecting generalizability (Mackey & Gass, 2005). As discussed in Section 4.3, the International Business and Economics majors in SBVC had been representing their vocational college peers in the same province for three years in the annual Nationwide International Business Skill Competition before this project was conducted. The present participants were recruited from among these students. Thus, they were representatives of their peers in the same province.

Data reliability concerns the consistency in data collection procedures (Dörnyei, 2007; Mackey & Gass, 2005). Though the L2 motivation questionnaire was tested in Taguchi et al.'s (2009) study, adaptation of it in this study means that a new procedure has been created, and thus should be tested for quality (Seliger & Shohamy, 1989). Therefore, item analysis was conducted for the internal consistency of the variables based on the students' responses to the questions. The questionnaire were adjusted according to the results of item analysis. Moreover, pre-pilot tests of instruments and a pilot study contributed to data reliability, too.

Regarding the reliability of the analysis of the data generated by the writing tests and the revision task, both inter-rater and intra-rater reliability were examined. A peer was trained for the inter-rater reliability check. The researcher worked with her through 5 texts to familiarize her with the use of the formula. Then, she was given 27 texts randomly (10% of the texts) to work with independently. The initial agreement between her and the researcher was 96.3% for accuracy in using the passive voice, and 88.9% for attempts to use the passive voice. Then, they met to discuss the discrepancies. They could not agree with each other on one item. This dispute was settled by Susan Sun from the Chinese section of the School of Languages and Culture, AUT. Thus, finally, all the discrepancies were settled.

The same proportion of texts was re-scored by the researcher one month and a half after the initial scoring. The agreement between the scoring at the two different times was 96.3% for accuracy, and 92.6% for a recognition of the need to use the passive voice.

Besides revealing the efficacy of written CF typical among a learner group, this quasi-experiment, like the quasi-experiments in the written CF literature, revealed that there

were learners who benefited most from written CF, and learners who benefited least from written CF. However, the quasi-experiment could not inform the causes of such difference in the extent to which learners benefit from written CF. For a better understanding of the efficacy of written CF (RQ 5), a multi-case study was conducted subsequently to address this issue. Hence, the next section will turn to the multi-case study.

4.5 The multi-case study

4.5.1 Overview of the methodological approach

A case is unique and specific. However, it is also related to something in general. Thus, a case is subjected to investigation due to a practical interest linked to it (Scholz & Tietje, 2002). Aiming to generalize across a larger set of cases, a case study is an in-depth investigation of the current situation and environmental interaction of an individual (Brown, 2002). Themes emerge in the investigation, and contribute to the explanation of "why things happen as they do" (Sturman, 1999, p. 103). It should be noted that the focus of a case study is not the individual him/herself, but rather the issue under investigation, and the individual is used to understand the issue (Creswell, Hanson, Clark Plano & Morales, 2007).

As the case study approach describes in detail specific L2 learners in their learning context (Mackey & Gass, 2005), it contributes to an in-depth and holistic understanding of their L2 learning process (Stake, 2005). Hence, a case study is appropriate to address "how" and "why" questions and to consider contextual factors related to the issue under investigation; and it is used in cases where the participants' behaviours are not manipulated (Yin, 2003).

A multi-case study investigates a number of cases jointly in the investigation of a phenomenon (Dörnyei, 2007). Thus, it enables the exploration of differences within and between cases with the aim of replicating findings across cases (Yin, 2003). The generalizability of the findings helps to improve the robustness and credibility of a multi-case study. Hence, a multi-case study is suitable to examine whether and how written CF contributes to each student's cognitive process in L2 development in order to understand the different extents to which learners may benefit from written CF. Therefore, a multi-case study was conducted to address research question 5 about the possible causes of the different extents to which learners benefited from written CF revealed in the quasi-experiment.

However, in case studies, the complexity of one case may be oversimplified. Thus, "unwarranted claims based on spurious interpretations of data" may be made (Sturman, 1999, p. 380). Therefore, triangulation is needed to improve the credibility of a case study (Sturman, 1999).

Triangulation identifies the same case from different perspectives (Stake, 2005). To achieve this aim, mixed methods are adopted and findings generated by different methods are compared for corroboration and correspondence (Greene, 2001). Triangulation can be achieved in data sources, data collection and analytical methods as well as data collection time (Freeman, 1998). All of these were adopted in the present multi-case study. They will be detailed in Section 4.5.5: Trustworthiness of the study.

Following this overview of the methodological approach, the following sections introduce the participants and context of this multi-case study, the data collection instruments, data collection and analytical procedures as well as measures to enhance the trustworthiness of this study.

4.5.2 Participants and context

Participants of the longitudinal multi-case study were two students from the metalinguistic explanation group in the quasi-experiment. They were the ones who made the most and least improvements in writing accuracy in their group. In the pre-test, both students scored 0 on both "accurate use of the passive voice" (RQ 1 a) and "a recognition of the need to use the passive voice" (RQ 1 b). The accuracy of one student (i.e. Jane) improved to 71.4 in the immediate post-test; then, to 75 in the delayed post-test. By comparison, the accuracy of the other (i.e. Kate) remained at 0 on all three tests in the quasi-experiment.

4.5.3 Data collection instruments

Three writing tests, one revision task and two stimulated recall interviews were used to collect data in the multi-case study. As the revision task was the same as the one in the quasi-experiment (see Section 4.4.3.2), only the writing tests and the stimulated recall interviews are detailed hereafter.

4.5.3.1 Writing tests

The multi-case study followed the design of the quasi-experiment since it aimed to understand why the extent to which the learners benefited from written CF differed in the quasi-experiment. Thereby, it also consisted of a pre-test, one treatment session

(with revision embedded), an immediate post-test and a delayed post-test. The delayed post-test in the quasi-experiment served as the pre-test in the multi-case study. Each test also consisted of one email (narrative) writing task. A rewriting task is different from a new writing task, and the multi-case study participants had participated in the quasi-experiment. Among the six writing tasks tested in the pilot study, the top-three in generating the obligatory occasions of the passive voice use had been adopted in the quasi-experiment (see Section 4.4.7). Therefore, the two writing tasks that were ranked the fourth and fifth in generating the obligatory occasions of the passive voice use were adopted in the multi-case study.

Task 1 (i.e. the immediate post-test)

> You read that the Egyptians moved the Temple of Isis at Philae to Agilkia in order to protect it from the rising water level (水位) of the Nile caused by the construction (建造) of the Aswan High Dam. You think this is a way to protect cultural heritage (文化遗产), and decide to email the editor of a local newspaper to introduce what happened to the temple in this project (工程). You begin the email as follows:
>
> Dear Editor,
>
> *Note*：
> The Nile: 尼罗河
> Philae and Agilkia: 尼罗河上两岛名。
> Ptolemy II: 托勒密二世， 公元前 274 年至公元前 264 年在位。修伊西斯神庙。
> The Aswan High Dam: 阿斯旺大坝，1970 年修建，致使尼罗河水位上涨。

Task 2 (i.e. the delayed post-test)

> The editor of the campus newspaper is inviting the students to contribute (投稿) to a new column, "Fantastic (奇异的，异想天开的) stories". When tidying your nephew's room, you found a pictorial story book. The story is about Tom, a boy who was looking for his pet frog with his dog. You think this is a fantastic story. Thus, you decide to email the editor to tell him what happened to Tom and his dog on the way based on the information in the pictures. You begin the email as follows:
>
> Dear Editor,

4.5.3.2 Stimulated recall

A stimulated recall interview was conducted immediately after each post-test to explore the contribution of written CF to each student's cognitive information processing as well as to how the knowledge gained from written CF was being used in the revision task and the two new writing tasks (i.e. the two post-tests).

Stimulated recall is an introspective data collection technique. Some sort of stimulus is used as a reminder to facilitate the respondents' retrieval, so they can "verbalize what

was going on in their minds during the event" (Dörnyei, 2007, p.149). Therefore, it has the potential to help the researcher to understand the mental processes that are central to L2 processing and production without influencing the targeted thought processes (Dörnyei, 2007). Hence, stimulated recall was considered appropriate to explore the contribution of written CF to each student's cognitive process in L2 learning.

Although only the introspective data collection techniques have the potential to help the researcher to access L2 learners' cognitive processing, it has been acknowledged that "much of cognitive processing is inaccessible because it is unconscious, and even certain conscious processes can be argued to be too complex to be captured in verbal protocols" (Dörnyei, 2007, p.151). Moreover, the validity of stimulated recall suffers from the time lapse between the task and the retrospective interview (Dörnyei, 2007). Therefore, stimulated recall interviews were conducted immediately after the two post-tests. Moreover, to distinguish the possible treatment effect of the data collection method (i.e. stimulated recall) from the effect of written CF, the possible treatment effect of stimulated recall on each student's cognitive processing of written CF in the delayed new writing task was explored in the last stimulated recall interview.

4.5.4 Data collection procedure

The data collection procedure of the multi-case study is summarized in Table 4.4.

Table 4.4: Data collection procedure of the multi-case study

Week	Activity
1	Pre-test (Writing 1, 35 min).
2	Written CF (i.e. metalinguistic explanation) on Writing 1 and independent revision (20 min); immediate post-test (Writing 2, 35 min); stimulated recall interview.
6	Delayed post-test (Writing 3, 35 min); stimulated recall interview.

In Week 1, both participants completed the pre-test, which was also the delayed post-test in the quasi-experiment. Two days later (i.e. Week 2), they received the type of written CF they had received in the quasi-experiment (i.e. metalinguistic explanation). Then, each participant revised her own text independently with access to her last original text (Writing 1) and the written CF provided on it. Finally, they completed in 35 minutes the immediate post-test (Writing 2) independently without access to anything related to their previous writing texts. Immediately after that, each participant recalled, with the help of her revised text and her new writing text, how she processed

written CF in the treatment session (including revision) and utilized it in the immediate post-test.

One month later, in Week 6, the participants completed a delayed post-test in 35 minutes (Writing 3). Immediately after that, each recalled, with the help of her writing text, how she utilized written CF in the delayed post-test.

4.5.5 Data analysis

As both quantitative data (written texts) and qualitative data (stimulated recall) were collected in the multi-case study, the data analysis involved quantitative analysis of the text data and the qualitative analysis of the transcriptions of the stimulated recall. Finally, the results of the quantitative analysis and qualitative analysis were synthesized.

4.5.5.1. Quantitative data analysis
4.5.5.1.1 Scores of accuracy

Following the formula in the quasi-experiment, accuracy of each student's text in the pre-test, the immediate post-test and the delayed post-test were calculated. Then, descriptive statistics were presented.

4.5.5.1.2 Scores of each revision type

Following the formula in the quasi-experiment, scores of each revision type in each revised text were calculated. Then, descriptive statistics were presented.

4.5.5.2. Qualitative data analysis

This section introduces the coding of stimulated recall data about the treatment session (section 4.5.5.2.1) and the coding of stimulated recall data about the post-tests (section 4.5.5.2.2).

4.5.5.2.1 Coding of stimulated recall about the treatment session

Stimulated recall data about treatment session (i.e. the initial written CF episode) were analysed with reference to Bitchener's (2016) model of cognitive processing of written CF input for L2 development. Six stages of cognitive processing of written CF in the initial written CF episode were identified in that model:

- conscious attention to written CF
- noticing of the difference between the learner's own output and written CF as input
- understanding of written CF
- analyses and comparisons between written CF input and the learner's present knowledge
- hypothesis formation and testing of the knowledge in written CF
- production of the modified output (i.e. revision)

(see Section 2.2.3 for details on what is meant by these stages)

Hence, in this study, textual segments illustrating the cognitive processing at each of the six stages were highlighted and coded under each stage. Unexpected themes generated new categories. For example, Jane's recall showed that she reflected on her cognitive processing while writing the original sentence. Thus, a new category, self-reflection, was generated by the data.

It should be noted that output was evidenced in the written text rather than in the recalls, and due to the retrospective nature of the data collection method − stimulated recall, two stages in Bitchener's (2016) model – "analyses and comparison between written CF and the existing knowledge" and "hypothesis formation and testing", cannot be revealed in the data collected. On-line data collection methods such as think-aloud and note-taking, guided by pre-set questions (Hanaoka & Izumi, 2012), are needed to collect data related to these two stages. As a result, the following stages of cognitive processing of written CF in the treatment session were identified: attention to from/accuracy and written CF → noticing the gap pointed out by written CF → understanding of written CF → self-reflection → application of written CF in revision → and modified output.

Thus, in the treatment session, the learner's attention was first channelled to form/accuracy. As a result, written CF, which focused on form, was attended to by the learner. Then, the learner would notice the difference between her output and the written CF input. That is, the gap pointed out by written CF was noticed. After that, the learner tried to determine what the written CF said about the error, that is, the learner tried to understand the written CF. Then, the learner might reflect her cognitive processing (what she was thinking) while writing the original, erroneous output before she used the written CF knowledge to modify the erroneous output. The stages are defined in the following box:

Attention to form/accuracy and written CF means that the learner signalled attending to the accuracy of the text and written CF in the treatment session. For example: "Wanted to correct the error successfully" and "Focused on errors pointed out by written CF." (Kate)

Noticing the gap pointed out by written CF means that the learner verbally referred to the error marked by written CF or the target form "without any mention of rules" (Rosa & O' Neill, 1999, p.529). For example: "Focused on errors pointed out by written CF" and "When I saw the cross, I knew it was incorrect." (Kate)

Understanding of written CF means that the learner either repeated, elaborated or paraphrased the metalinguistic explanation in the stimulated recall without access to written CF. For example: "It's an object. It is utilized and re-created by people. It cannot do anything itself." (Jane)

Self-reflection means that the learner recalled in the treatment session her cognitive processing while writing the original text. This reflection was initiated by written CF. For example: "When I was writing it, I didn't think about the passive voice. Just literally translated the sentence from Chinese. Because no 'bei' construction in the Chinese version. Then, remembered to use the passive voice (here). Auxiliary be + the past participle." (Jane)

Application of written CF in revision means that the learner used written CF to correct the error and construct the correct target form (the passive voice). For example: "When I started to revise this sentence, I copied the whole sentence. Then, I read the explanation, 'no passive from'. Thus, I crossed out 'be'." (Kate)

Modified output refers to the occasions in the revised written text where modification/non-modification in the use of the target form (the passive voice) was evidenced. For example:

The original, erroneous sentence: *The last, the melt glass bottles can be flow into mould.* Modification: *The last, the melt glass bottles can flow into mould*. (Kate)

Table 4.5 summarizes the coding examples of each stage. Some segments were related to more than one stage. Thus, the same segment may be used for illustration of more than one stage.

Table 4.5: Category coding examples for cognitive processing in the initial written CF episode

Category	Example
	Kate: "Wanted to correct the error successful." "Focused on errors pointed out by written CF."
	Jane: "Focused on subject…Glass bottles. It is re-created by people. I always remembered to use the passive voice (in revision)."
	Kate: "Focused on errors pointed out by written CF." "When I saw the cross, I knew it was incorrect."
	R: "Why focused on it (the passive voice) then? Can you say more about it?" Jane: "Because you pointed it out (in the written CF)…Also, I did not have that sense while writing the first draft. The sense of voice."
	Jane: "It's an object. It is utilized and re-created by people. It cannot do anything itself." "Should use the passive voice (here). Auxiliary be + the past participle."
	Kate: "First, I saw 'transport' was crossed. Thus, I knew it was incorrect. Then, I read the explanation. Thus, I knew it's a regular verb, should add 'ed'."
	R: "What were you thinking while revising it?" Jane: "When I was writing it, I didn't think about the passive voice. Just literally translated the sentence from Chinese. Because no 'bei' construction in the Chinese version. Then, remembered to use the passive voice (here). Auxiliary be + the past participle."
	Note: At the end of the stimulated recall about Writing 3, the researcher explored the treatment effect of the data collection method (i..e. the treatment effect of stimulated recall), Jane said "After I receive the written CF (without the stimulated recall), I still will reflect why I made the error in writing."
	R: "Originally, you used the active voice − " Jane: "Literal translation from Chinese." R: "What were you thinking when revising it?" Jane: "Should use the passive voice here…Because the subject is an object." Output: The melted glass bottles are flowed into the mould.
	Kate: "When I started to revise this sentence, I copied the whole sentence. Then, I read the explanation, 'no passive from'. Thus, I crossed out 'be'." (for the error of overuse of the passive voice, no example was provided) Output: The last, the melt glass bottles can flow into mould.
	Jane: Second, the broken glass bottles will put in the furnace. Modification: Second, the broken glass bottles are putted in the furnace.
	Kate: The last, the melt glass bottles can be flow into mould. Modification: The last, the melt glass bottles can flow into mould.

4.5.5.2.2 Coding of stimulated recall data about the post-tests

As explained in section 2.2, L2 writing consists of three stages — planning, execution and monitoring — with different functions. Therefore, the learner's focus could differ from stage to stage (see Section 2.2). For example, the learner's focus may shift from message conveyance in execution to language form in monitoring. Therefore, the learner monitors his/her language errors and clarity of the language at the last stage, monitoring (Polio, 2012). Hence, the learner's cognitive processing of written CF may differ from stage to stage in new writing tasks. Therefore, in the multi-case study, stimulated recall data about the post-tests were first categorised according to the stages they were illustrating. That is, data illustrating the stage of planning, execution and monitoring were first categorised under planning, execution and monitoring, respectively (see Table 4.6 for examples).

Table 4.6: Category coding examples for the stages in L2 writing

Category	Example
Planning	R: "What did you focus in planning?" Kate: "Focused on content, tense and voice."
Execution	R: "When you were writing this sentence, what were you thinking?" Jane: "Should use the passive voice…The passive structure: auxiliary be + the past participle"
monitoring	R: "What did you focus in monitoring?" Jane: "When I read those verbs, I thought about whether the form was correct. The form of the past participle. "

Then, data in these three categories were coded with reference to Bitchener's (2016) model of cognitive processes of retrieval and use of new knowledge in the new written text. Six stages of cognitive processing of written CF in a new writing task are identified in this model:

- orientation to form and meaning
- identification of the need to use written CF knowledge
- recognition of the relationship between the knowledge learnt from written CF and the meaning to be expressed
- retrieval of written CF
- hypothesis formation and testing
- output

(see Section 2.2.3 for details on what is meant by these stages)

Thus, in this study, textual segments illustrating the cognitive processing at each of the six stages were highlighted and coded under each stage, respectively. Unexpected themes generated new categories. For example, at the stage of monitoring, the recall of

both students showed that they either confirmed or modified the output they produced at the stage of execution rather than producing new output. Thus, a new category, confirmation/modification of the output, was generated by the data.

Like the case with stimulated recall data about treatment session, output was evidenced in the written text rather than in the recalls. Also, due to the retrospective nature of the data collection method − stimulated recall, "hypothesis formation" cannot be revealed in the data collected. On-line data collection methods such as think-aloud and note-taking, guided by pre-set questions (Hanaoka & Izumi, 2012), are needed to collect the relevant data. As a result, the following stages of cognitive processing of written CF in a new writing task (i.e. a post-test) were identified in planning, execution and monitoring, respectively. Some stages of cognitive processing of written CF occurred in more than one stage of L2 writing. Hence, each recurrent stage was defined in its initial stage of L2 writing to avoid redundancy.

In planning

While planning a piece of writing, the learner first considered what to write in general and the forms that would be used often in this piece of writing. Because the learner had attended to form, the need to use the written CF knowledge might be identified. As a result, the retrieval of written CF was triggered. Thus, the learner went through: attention to meaning and form → identification of the need to use the knowledge newly learnt from written CF → retrieval of the knowledge newly learnt from written CF. The stages are defined in the following box:

Attention to meaning and form means that the learner signalled concern of the content of writing and the language form to be used simultaneously. For example, "I first thought what to write, found out its subject and tense." (Kate)

Identification of the need to use knowledge newly learnt from written CF means that the learner recognized that the form to be used is targeted in written CF. Thus, she recognized the need to use the knowledge newly learnt from written CF for accuracy. For example: "Because I thought of the voice and tense to be used, I recalled the errors you pointed out…Easy to make the same error." (Kate)

Retrieval of the knowledge newly learnt from written CF means that the learner retrieved from her long-term memory the knowledge newly learnt from written CF. What is retrieved reveals the learner's understanding of written CF on the spot of retrieval (i.e. correct/incorrect understanding and complete/incomplete understanding). For example: "When to use the passive voice, its structure, whether the subject was animate." (Jane)

In execution

While expressing herself with the pen, the learner first established the relationship between the meaning to be expressed and the form to be used for the expression. On the obligatory occasion to use the target form (the passive voice), the learner established the relationship between what to write and the form targeted by written CF. Once such a relationship was established, the learner would recognize the need to use written CF knowledge. Such recognition triggered the learner's retrieval of the written CF knowledge. Finally, the learner used the retrieved written CF knowledge to express what she wanted to express. That is, the retrieved written CF knowledge was applied in the production of the output. The process is summarized and the stages are defined in the following box:

Establishment of the relationship between the meaning to be expressed and the form targeted in written CF → identification of the need to use the knowledge newly learnt from written CF → retrieval of the knowledge newly learnt from written CF → application of the retrieved written CF knowledge → output.

Establishment of the relationship between the meaning to be expressed and the form targeted in written CF means that the learner recognized what she wanted to express required the use of the language form targeted in written CF while writing a sentence. For example: "My subject is temple, so should use the passive voice here." (Jane)

Application of the retrieved written CF knowledge means that the learner used the retrieved written CF knowledge to produce output or to monitor the output. For example: "The passive structure: Auxiliary be + the past participle. Then, started to write this sentence." (Jane)

Output refers to the occasions in the written text that revealed the learner's application of written CF knowledge in writing. For example: *"*The temple *was moved* the Agilkia." (Jane)

In monitoring

While proofreading the text, the learner had a general tendency to attend to form. Based on this attention, the need to use written CF knowledge may be identified on the obligatory occasion to use the form targeted by written CF (the passive voice). Thus, the retrieval of written CF might be triggered. Then, the learner used the retrieved written CF knowledge either to confirm or to modify the output that she was proofreading. The process is summarized and the stages are defined in the following box:

Attention to form → identification of the need to use the knowledge newly learnt from written CF → retrieval of the knowledge newly learnt from written CF → application of the retrieved knowledge →confirmation/modification of the output.

Attention to form means that the learner focused on form rather than meaning. For example:

> R: "What did you focus in monitoring?"
> Jane: "Grammar and spelling."
>
> *Confirmation/modification of the output* refers to the occasions in written text that revealed the learner's application of written CF knowledge in writing with/without traces of revision. For example: "the boy was (thrown) threw down a pond". (Jane: modification)

Table 4.7 summarizes the examples illustrating each stage. Some segments were related to more than one stage. Thus, the same segment may be used for illustration of more than one stage.

Table 4.7: Category coding examples for the retrieval and application of written CF in new writing

Category	Example
	Kate: "I first thought what to write, found out its subject and tense." Writing 2
	R: "What did you focus in planning?" Jane: "Focused on explanations under the pictures in order to write from beginning to the end in order…Because you reminded in written CF, I thought if the object was the subject, the passive voice should be used." Writing 2
	Kate: "Because I thought of the voice and tense to be used in the writing, I recalled the errors you pointed out…Easy to make the same error." Writing 3
	Jane: "(I recalled written CF in planning) to avoid making the same error this time." Writing 2 & 3
	R: "What did you retrieve?" Jane: "When to use the passive voice, its structure, whether the subject was animate." Writing 3
	Kate: "Errors in the past participle. I couldn't distinguish the bare infinitive, the past tense and the past participle at that time." Writing 3
	Jane: "My subject is temple. So, I should use the passive voice here." Writing 2 (underpinning this stage)
	Kate: "Because it was built… (To form the past participle) I should distinguish the regular and irregular verbs. Add 'ed' (for the former), or in that table (the table of irregular verbs). But the word 'built' has no passive form…It's an intransitive verb. Thus, I should use its bare infinitive. But the meaning is passive, the verb form should be changed." Writing 2

Application of the retrieved written CF knowledge	R: "What were you thinking while writing this sentence?" Jane: "Should use the passive voice." R: "Then?" Jane: "The passive structure: Auxiliary be + the past participle. Then, started to write this sentence." Output: Tom was picked up. Writing 3
	Kate: "I remembered, but not sure, I had seen 'was thrown' somewhere. Thus, I wrote it subconsciously." R: "Subconsciously? It means you didn't think?" Kate: "No thinking." R: "Then, when monitoring it, you used your criterion to − " Kate: "Check it." R: "Recognized it was wrong. It should be 'auxiliary be + the past tense' − " Kate: "It was the past participle." R: "Thus, you revised the verb form from the past participle to the past tense?" Kate: "Yeah." Output: The boy was threw down. Writing 3
Output	Jane: The temple was moved the Agilkia. W2 Kate: The temple of Isis at Philae was build up by Potolemy II. Writing 2
	R: "What did you focus in monitoring?" Jane: "Grammar and spelling." Writing 2
	R: "What did you focus in monitoring?" Kate: "Voice." Writing 2
Confirmation/modification of the output	Jane: All confirmed. Kate: the boy was ~~thrown~~ down a pond. threw Writing 3 (modification)

After the coding, a narrative account of each student's cognitive processing of written CF, in the treatment session, in the immediate post-test and in the delayed post-test, was generated. Then, the two students' cognitive processes in the treatment session were compared. After that, the two students' cognitive processes in the two post-tests were compared with a focus on the consistency of their processing of written CF. *Consistency* here refers to whether the two students went through the same stages of cognitive processing of written CF in the same phase of the two post-tests, whether their retrieval of written CF in both post-tests revealed the same understanding of written CF, and whether they processed written CF in the same stages of L2 writing in the two post-tests.

4.5.5.3 Synthesizing the results of quantitative and qualitative data analysis

When drawing conclusions, results of quantitative analysis were triangulated with the results of qualitative data analysis. Thus, corroboration and correspondence of the results generated from both quantitative and qualitative data collection methods were sought. As a result, some causes of the different extent to which the two learners benefited from written CF were revealed, and RQ 5 was answered.

4.5.6 Trustworthiness of the study

Trustworthiness of qualitative research concerns mainly *credibility, fittingness* and *auditability* (Beck, 1993). Credibility "measures how vivid and faithful the description of the phenomenon is", fittingness "measures how well the working hypotheses or propositions fit into a context other than the one from which they were generated", and auditability is "the ability of another investigator to follow the decision or audit trail" (Beck, 1993, p. 264).

The trustworthiness of the multi-case study was established in both data collection and data analysis. As discussed in Section 4.5.1, triangulation occurred at both phases. It helped to enhance the credibility of the study (Beck, 1993; Yin, 2003). Text writing, revision and stimulated recall were adopted for data collection. Data were collected at repeated times from the same two students. Triangulation also occurred during data analysis and writing up the report with the researcher being "sceptical in seeing, hearing, coding, analysing and writing" (Stake, 2006, p.77). Hence, triangulation contributes to a more holistic look at the issue by helping to ensure that the researcher has not "studied only a fraction of the complexity" or has only "a snapshot view" of the complexity (Rossaman & Rallis, 2003, p.69).

Credibility was enhanced by a recording of the informants' words and double coding (Beck, 1993). The stimulated recall interviews were audio-recorded so that they could be reviewed repeatedly for analysis. Since the participants had been informed of the recording ahead of time, and had given explicit consent to all the events in the data collection by signing the Consent Form, they should have been able to behave as naturally as possible.

Following the same procedure described in Section 4.5.5.1, the previously mentioned trained peer (see Section 4.4.7) coded 1/3 of the data generated by the writing tests and the revision task. 100% inter-rater agreement was achieved. The researcher recoded all the stimulated recall data one month after the initial coding. The first and second coding reached 98.2% agreement. The stimulated recall data were recoded again where the discrepancies occurred. Hence, both inter-rater and intra-rater agreements contributed to the faithfulness of the description of the phenomenon under investigation. Thus, the credibility of the multi-case study was enhanced.

Credibility was also enhanced by exploring the possible treatment effect of the data collection method, stimulated recall, on each student's cognitive processing of written

CF in the delayed new writing task (see Appendix G). Moreover, the corresponding, original Chinese version was presented in the excerpt about the cognitive processing of written CF to ensure that the information contained was not distorted in translation (see Appendix J). And presentation of rich excerpts from the transcripts also enhanced credibility (Beck, 1993).

Consistency in the design of the writing tests, and in the criteria used in the quantitative data analysis in the quasi-experiment and in the multi-case study also contributed to the credibility of data in the multi-case study, for the multi-case study aimed to explain the different extent to which learners benefited from written CF in the quasi-experiment. Moreover, to improve the credibility of the stimulated recall data, there were no intervals between the tasks and the stimulated recall interviews.

Fittingness was achieved by the typicality of the two participants (Beck, 1993). The sample consisted of a balance of learners in terms of the extent to which they benefited from written CF in the quasi-experiment (i.e. one learner benefited most, while the other benefited least in terms of writing accuracy). Hence, the participants were typical of their group when differences in accurate development after the written CF treatment (RQ 5) were concerned.

Auditability was achieved with detailed description of data collection and analysis procedures, characteristics of the informants and the criterion for sampling. In addition, specific definitions of categories were developed. Categories developed during data analysis were substantiated with the informants' verbatim accounts. This also contributed to auditability, as does double coding mentioned previously (Beck, 1993).

Finally, trustworthiness was also shown in the recognition of the limitations of the study (Glesne, 1999). The limitations will be discussed in the Conclusion Chapter.

4.6 Ethical issues involved in this project

This project, consisting of a quasi-experiment and a follow-up multi-case study, followed the regulations of AUT Ethics Committee (AUTEC). Data collection started after the Ethics Approval had been issued by AUTEC (see Appendix A for Ethics Approval). SBVC, the site of data collection, authorized data collection before the researcher approached to the potential participants (see Appendix B for the Letter of Consultation). The researcher first approached the English teachers of the four classes herself, and sought their support for data collection. The teachers agreed to cooperate

and gave their classes to the researcher to handle independently. As a result, the quasi-experiment was conducted in the participants' English classes. All the participant were fully informed and volunteered. Also, they had given explicit consent before participation (See Appendices C and D for Participant Information Sheet and Consent Form). The students who did not want to participate were free to not be included. They did the English exercises set by their respective English teacher and distributed by the researcher while the other students participated in the quasi-experiment. Privacy and confidentiality were respected in data collection, analysis and reports. Written CF was provided to the writing practice group, too. After the quasi-experiment was completed, members of the writing practice group received the written CF on their pre-test texts.

The pre-test in the multi-case study was also the delayed post-test in the quasi-experiment. The other activities in the multi-case study took place in the participants' spare time on two weekdays in the English teaching and researching office. The researcher recruited the multi-case study participants independently. Both participants were fully informed and volunteered. Both had given explicit consent before participation (See Appendices C and D for Participant Information Sheet and Consent Form). Privacy and confidentiality were respected in data collection, analysis and reports. Pseudonyms were used in the thesis.

CHAPTER 5

THE QUASI-EXPERIMENT:
RESULTS AND DISCUSSION

5.1 Introduction

This chapter presents the findings of the quasi-experiment together with the discussion of the findings. The quasi-experiment addressed the first four research questions raised at the end of Chapter 3. RQ 1 focused on the efficacy of written CF, in comparison with writing practice, for the development of the English passive voice. RQ 2 focused on the moderation of revision type on the efficacy of written CF. RQ 3 focused on the moderation of L2 motivation on the revision type adopted by the learners. RQ 4 focused on the moderation of L2 motivation on the efficacy of written CF. In the investigation of the efficacy of written CF (i.e. to answer RQ 1, RQ2 and RQ 4), the accurate development and partial development of the target feature (i.e. a recognition of the need to use the passive voice) were investigated separately. As presented in Chapter 4: Methodology, in order to address RQ 1, a 2 (treatment group) * 3 (time) ANOVA was conducted to test the comparative effects of different treatments (i.e. written CF vs. writing practice) to the groups. To address RQ 2, a series of 2 (treatment group) * 3 (time) ANOVAs were performed respectively with the score of each revision type as the continuous moderator to examine the interaction among time, treatment and each revision type. To address RQ 3, multiple regressions were conducted across the two feedback groups. To address RQ 4, a series of 3 (treatment group) * 3 (time) ANOVAs were performed with each L2 motivation variable (Ideal L2 self, L2 learning experience, Ought-to L2 self, and the discrepancy between Ought-to L2 self and the actual L2 self-perceived by the learner) as the continuous moderator to examine the interaction among time, treatment and each L2 motivation variable.

The following sections are organized by referring to each research question. In each section, findings which answer the research question are presented first. Then, the findings are discussed with the reference to the research question, the relevant theoretical claims and the relevant previous studies reviewed in Chapter 2 and Chapter 3 respectively. A summary of the findings and discussions is presented at the end of this chapter.

5.2 To what extent do written CF (including direct corrective feedback and metalinguistic explanation) and writing practice without written CF contribute to the development of accuracy in the use of passive voice over time? (RQ 1 a)

Results

Table 5.1 shows the descriptive statistics for the accuracy scores in using the passive voice in the writing tasks. It indicates that the accuracy of both groups kept improving over time, and the improvement is greater for the written CF group than the writing practice group. The somewhat high deviation in each group indicates wide variability within groups, which may limit the ability to find significant differences among groups.

Table 5.1: Descriptive statistics for the scores of accuracy in using the passive voice

Group	N	Time 1		Time 2		Time 3	
		Mean	SD	Mean	SD	Mean	SD
Written CF	59	37.59	29.04	51.45	31.35	60.17	31.03
WP	28	38.16	32.86	41.26	29.85	48.64	35.19

Note: WP = writing practice

A mixed ANOVA found a significant main effect of time averaging across the groups ($F(2, 170) = 7.95$, $p < .001$, $\dot{\eta}^2 = .09$), but no significant main effect of group collapsing across time ($F(1, 85) = 1.75$, $p = .19$, $\dot{\eta}^2 = .02$). Further comparison between pairs of time points indicate participants demonstrate a significant improvement in accuracy from Time1 to Time 2 ($F(1, 85) = 4.05$, $p < .05$, $\dot{\eta}^2 = .05$) and from Time 1 to Time 3 ($F(1, 85) = 17.34$, $p < .001$, $\dot{\eta}^2 = .17$), while a marginally non-significant improvement from Time 2 to Time 3 ($F(1, 85) = 3.60$, $p = .06$, $\dot{\eta}^2 = .04$). These indicate, ignoring differences in the treatment, treatment (written CF and writing practice combined) contributed to the improvement in accuracy over time, and this is in accordance with the results of descriptive analyses reported above. The mixed ANOVA also reveals there was no significant time and group interaction ($F(2, 170) = 1.28$, $p = .28$, $\dot{\eta}^2 = .02$), which indicates there were no significant differences in the patterns of improvement amongst the groups. In other words, neither written CF nor writing practice is significantly more effective than the other in producing improved accuracy in the use of the passive voice.

Discussion

This project found written CF and writing practice did not differ significantly in efficacy for improvements in the accurate use of the English passive voice over time. Compared with the previous empirical work, on the one hand, the present finding was in line with those of Shintani and Ellis' (2013) study in the US and Guo's (2015) study in China targeting the English morphology. However, as discussed in Section 3.2.2 and Section 3.3 respectively, metalinguistic explanation, a type of written CF, was provided without error location in Shintani and Ellis' (2013) study, and Guo's (2015) study was conducted in the EFL context; therefore, both conditions may have contributed to the inefficacy of written CF in these two studies. On the other hand, the present finding differed from those of many other studies targeting English morphology with one to three written CF treatments (Bitchener, 2008; Bitchener & Knoch, 2009a; Frear & Liu, 2015; Sheen, 2007; Stefanou & Révész, 2015). The differences in the findings may be attributed to the difference in the target features in the studies. As discussed in Section 2.3, syntax, morphology and lexis are different linguistic domains. The way syntax is learnt may differ from the ways morphology and lexis are learnt (Ferris, 1999; Truscott, 1996). Syntax is more complex than morphology (Truscott, 2007). Thus, one to three written CF treatments may lead to significant improvement in the accurate use of the target morphology as evidenced in the many studies targeting morphology, but may not be enough for improvement in the target syntax as shown in this project.

As introduced in Section 3.2.2, there are two written CF studies targeting syntax up to now: Shintani and colleagues (2014, 2016). Both targeted the same feature, the English hypothetical conditional, among EFL learners in Japan. The members of the control group of both studies received their original texts to process themselves in the treatment session. The former study revealed that, when accompanied by revision, the written CF group (including both direct corrective feedback and metalinguistic explanation) significantly outperformed the comparison treatment group in both post-tests. However, the latter study revealed that, when accompanied by revision, the written CF group (including only metalinguistic explanation) did not significantly outperform the comparison treatment group in both post-tests. As direct corrective feedback and metalinguistic explanation are underpinned by Interactionist theories and Skill acquisition theories respectively, their L2 learning potentials may be different (see Section 2.4). Hence, because direct corrective feedback with revision was not examined in the latter study, its finding did not support or challenge the finding of the former study. Both direct corrective feedback with revision and metalinguistic explanation with

revision were examined in this project. Different from Shintani et al.'s (2014) study, this project revealed that, when accompanied by revision, written CF (including both direct corrective feedback and metalinguistic explanation) did not significantly outperform the comparison treatment (i.e. writing practice) in both post-tests. Such a difference in the findings of this project and Shintani et al.'s (2014) study may be attributed to two differences in the methodology of the two studies.

One difference is in the type of writing tasks. Dictogloss tasks were adopted in Shintani et al.'s (2014) study, while email writing was adopted in this project. As discussed in Section 3.9, dictogloss tasks generated contrived language, which is different from the language in authentic language use. By comparison, email writing is commonly used in daily communication nowadays. As a result, it can generate authentic language use. Moreover, as both studies were focused studies, it is easy for the members of the written CF groups in both studies to figure out the target feature. As a result, some of them in both studies may have paid special attention to the target feature in the post-test sessions. However, such participants in the two studies differed in that, compared with those in this project, those in Shintani et al.'s study received target language input in the post-test sessions just before they did the writing tasks. According to the DST theory, L2 learning is an iterative process consisting of interactions between input and IL (see Section 2.9). Hence, compared with the members of the written CF groups in this project, those in Shintani et al.'s study may have experienced learning of the target feature when they received the target language input in the post-test sessions. In addition, compared with the members of the control group in Shintani et al.'s study, those of their written CF groups may have figured out the target feature. Thus, they were more likely to have noticed the target feature in the target language input. From the micro perspective of cognitive processing, noticing is the first stage of L2 learning (see Section 2.2.1). Therefore, the members of the written CF groups in Shintani et al.'s study were more likely to have experienced learning of the target feature from the target language input in the post-test sessions just before they fulfilled the writing tasks than their peers in the control group. As a result, written CF accompanied by revision achieved a better effect in Shintani et al.'s study than in this project, and significantly outperformed the comparison treatment in their study.

The second difference in the methodology of Shintani et al.'s (2014) study and this project is in the scoring criterion. As discussed in the Methodology Chapter, the scoring criterion in Shintani et al.'s (2014) study was a mixture of grammatical accuracy and

partial development of the target feature with certain credits given to partial development of the target feature. By comparison, the scoring criterion of this project only concerned grammatical accuracy. In other words, the present scoring criterion for accuracy only reflected the learner's final achievement of L2 learning, while that of Shintani et al.'s reflected both the final achievement and partial development of L2 learning. According to the DST theory, there are both abrupt and subtle changes in the IL in the L2 learning process. The final achievement of L2 learning is an abrupt change in the IL, while the partial development is a subtle change in the IL. When abrupt changes in the IL are considered together with the subtle changes, the effect of written CF is greater than when only the abrupt changes are considered. As a result, findings of the two studies differed although both studies targeted syntax in the EFL context with one written CF treatment. Hence, although literature has repeatedly revealed that one to three written CF treatments are effective for the full development of the target features, mainly morphology (see Section 3.2.2), the present finding may suggest that one written CF treatment is not enough to lead to a significant improvement in the accurate use of a syntactic feature because syntax is more complex than morphology. However, more research into the effect of written CF on syntax is needed for clarification.

5.3 To what extent do written CF (including direct corrective feedback and metalinguistic explanation) and writing practice without written CF contribute to the development of a recognition of the need to use passive voice over time? (RQ1 b)

Results

Table 5.2 shows the descriptive statistics for the scores of a recognition of the need to use the passive voice in the writing tasks. It reveals a continuous improvement among both groups from Time 1 to Time 3 in a recognition of the need to use the passive voice. It also reveals that the improvement of the written CF group is notably more drastic than that of the writing practice group.

Table 5.2: Descriptive statistics for the scores of a recognition of the need to use the passive voice (written CF & WP)

Group	N	Time 1		Time 2		Time 3		Total	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Written CF	59	52.50	28.99	72.41	20.71	78.76	20.31	67.89	2.41
WP	28	52.80	38.05	55.89	26.26	62.43	28.62	57.04	3.50
Total	87	52.60	31.96	67.09	23.79	73.50	24.38		

Note: WP = writing practice

A mixed ANOVA found a significant main effect of time averaging across groups ($F(2, 170) = 11.84$, $p < .01$, $\dot\eta^2 = .12$), and a significant main effect of group collapsing across time ($F(1, 85) = 6.53$, $p = .01$, $\dot\eta^2 = .07$). Further comparison between pairs of time points indicate participants demonstrate a significant improvement in a recognition of the need to use the passive voice from Time 1 to Time 2 ($F(1, 85) = 7.76$, $p = .01$, $\dot\eta^2 = .08$) and from Time 1 to Time 3 ($F(1, 85) = 26.05$, $p < .001$, $\dot\eta^2 = .24$), while a marginally non-significant improvement from Time 2 to Time 3 ($F(1, 85) = 3.33$, $p = .07$, $\dot\eta^2 = .04$). These indicate, ignoring differences in the treatment, treatment (written CF and writing practice combined) contributed to an improvement in partially successful a recognition of the need to use the passive voice over time, and this is in accordance with the results of descriptive analyses reported above.

Besides, the mixed ANOVA reveals there was a significant time and group interaction ($F(2, 170) = 3.34$, $p = .04$, $\dot\eta^2 = .04$) regarding a recognition of the need to use the passive voice (see Figure 5.1). This pattern indicates that both written CF and writing practice contribute to the development of the recognition of the need to use the passive voice over time, but their contribution is significantly different. The independent-samples t-tests reveal the written CF group significantly outperformed the writing practice group at both Time 2 ($t(43.53) = -2.93$, $p = .01$) and Time 3 ($t(85) = -3.06$, $p < .01$), i.e. after the treatment, but not at Time 1 ($t(42.43) = 0.04$, $p = .97$) before the treatment. Regarding the respective df value at Time 1 and Time 2, Levene's test indicated the equality of variances assumption may be violated ($P = .01$ for Time 1, $P < .05$ for Time 2). Therefore, the df used in the analysis were adjusted to account the fact of Levene's test.
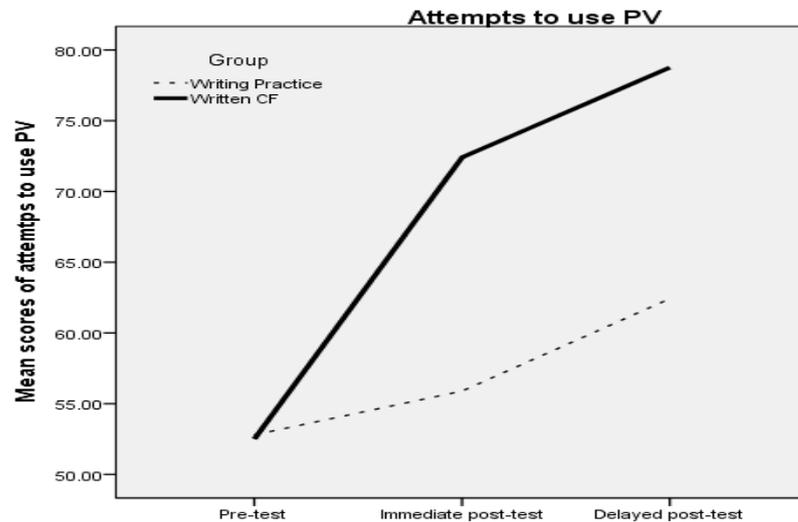
Figure 5.1 Scores of a recognition of the need to use the passive voice over time (written CF & writing practice group)

As the L2 learning potential of written CF is embodied in that of specific written CF types, the written CF group was separated into the direct feedback group and the metalinguistic explanation group for a closer look at the contribution of written CF and writing practice to the development of the recognition of the need to use the passive voice. In doing so, a mixed ANOVA was conducted with data of every two groups (i.e. direct feedback vs. metalinguistic explanation, direct feedback vs. writing practice, and metalinguistic explanation vs. writing practice) after one-way ANOVAs revealed no significant initial differences between each pair.

Comparison between the direct feedback and the writing practice group revealed that the main effect of time was significant averaging across groups ($F(2, 110) = 6.23, p <$ .01, $\acute{\eta}^2 = .10$), while both the main effect of group collapsing across time ($F(1, 55) =$ 3.32, $p = .07$, $\acute{\eta}^2 = .06$) and the interaction between time and group were not significant ($F(2, 110) = 1.48, p = .23$, $\acute{\eta}^2 = .03$). The same pattern was found in the comparison between the DCF group and the ME group: a significant effect of time averaging across groups ($F(2, 114) = 25.18, p < .001, \acute{\eta}^2 = .31$), but no significant effect of group collapsing across time ($F(1, 57) = .25, p = .62, \acute{\eta}^2 < .01$). Neither was there a significant interaction between time and group ($F(2, 114) = 1.02, p = .37, \acute{\eta}^2 = .02$). These indicate that both direct feedback and writing practice contribute to the development of partially successful a recognition of the need to use the passive voice over time, and their contribution does not differ significantly. The same is true with another pair: direct feedback and metalinguistic explanation.

By comparison, the analyses of the data of the metalinguistic explanation group and the writing practice group reveals a slightly different pattern. Like the findings of the two pairs mentioned above, the main effect of time was significant averaging across groups ($F(2, 112) = 10.29$, $p < .001$, $\dot{\eta}^2 = .16$). However, in this case, there was a significant time and group interaction ($F(2, 112) = 3.40$, $p = .04$, $\dot{\eta}^2 = .06$). A significant main effect of group across time was found, too ($F(1, 56) = 5.74$, $p = .02$, $\dot{\eta}^2 = .09$) (see Figure 2).

Table 5.3 shows the descriptive statistics for the scores of the two groups on a recognition of the need to use the passive voice in the writing tasks. It reveals a continuous improvement among both groups from Time 1 to Time 3 in a recognition of the need to use the passive voice. It also reveals that the improvement of the written CF group is notably more drastic than that of the writing practice group.

Table 5.3: Descriptive statistics for the scores of a recognition of the need to use the passive voice (ME & WP)

Group	N	Time 1		Time 2		Time 3		Total	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
ME	30	50.99	29.57	73.20	23.55	82.63	15.68	68.94	3.45
WP	28	52.80	38.05	55.89	26.26	62.43	28.62	57.04	3.57
Total	58	51.87	33.61	64.85	26.17	72.88	24.83		

Note: ME = metalinguistic explanation, WP = writing practice.

This pattern indicates that both metalinguistic explanation and writing practice contribute to the development of partially successful a recognition of the need to use the passive voice over time, but their contribution is significantly different. The independent-samples t-tests reveal the metalinguistic explanation group significantly outperformed the writing practice group at both Time 2 ($t(56) = 2.65$, $p = .011$) and Time 3 ($t(56) = 3.37$, $p = .001$), i.e. after the treatment, but not at Time 1 ($t(50.90) = 0.20$, $p = .84$) before the treatment. Regarding the df value at Time 1, Levene's test indicated the equality of variances assumption may be violated (P = .03). Therefore, the df used in the analysis were adjusted to account the fact of Levene's test.
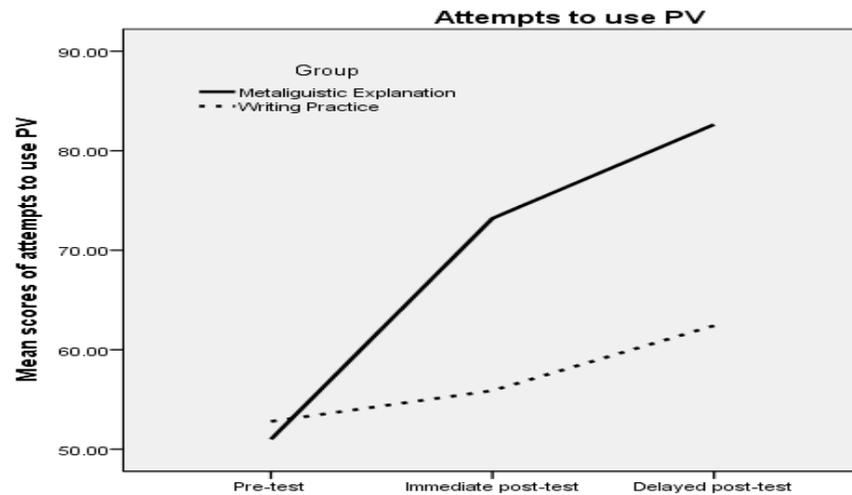
Figure 5.2 Scores of a recognition of the need to use the passive voice over time (metalinguistic explanation & writing practice group)

Discussion

It is interesting to note that written CF significantly outperformed writing practice in the contribution to the development of the recognition of the need to use passive voice over time although not significantly to the accurate use of the passive voice. The recognition of the need to use passive voice means the learner has sensed the passive meaning of the sentence, while accurate use of the passive voice involves correct formation of the passive structure besides the recognition of the need to use passive voice. Both the occasions to use the passive voice (i.e. the meaning of the passive voice) and the passive structure (i.e. the form of the passive voice) are difficult for Chinese learners of English (see Section 2.3), and were provided in the metalinguistic explanation in the quasi-experiment.

This project revealed the learners developed meaning prior to the form of the target feature after one written CF treatment. The process of developing a feature has not been addressed in written CF research. Nonetheless, the present finding about the development sequence of the target feature was in line with Caspi's (2010) study focusing on the development of language complexity (meaning related) and accuracy (form related) for nine months (see Section 3.7). She found, among all the four EFL learners with different L1s, lexical complexity was developed prior to lexical accuracy, and the development of the latter was followed by the development of syntax in the same pattern. Hence, both this project and Caspi's study revealed that meaning of a feature developed earlier than its form.

This can be understood from both the cognitive and DST perspectives. From the cognitive perspective, the second stage of micro L2 learning process, understanding, is gradual. Thus, meaning of a feature can be understood prior to its form because meaning is universal, while the form varies from language to language (see Section 2.2.1.1). From the DST perspective, L2 development involves both abrupt changes and subtle changes in the learner's IL. The abrupt changes are easy to observe, while the subtle changes may be difficult to perceive from the outside. Success in the accurate use of the target feature is an abrupt change in IL, and has been targeted and revealed in the previous written CF research. By comparison, partial development of the target feature, like the success in the recognition of the need to use passive voice in this project, is a subtle change in IL, and needs more nuanced examination to be revealed. By adopting a scoring criterion that considered signals of the learner's attempts to use passive voice when it is obligatory, which are underpinned by the learner's recognition of the need to use passive voice, as well as signals of his/her attempts to overuse passive voice, this project revealed a subtle change in the IL of the members of the written CF group (including both direct corrective feedback and metalinguistic explanation), which may have manifested a change in their underlying processes (see Section 2.9).

This was evidenced in Kate's stimulated recall in the multi-case study. Kate was a member of the metalinguistic explanation group in the quasi-experiment, in which she kept scoring zero on accuracy. As her text in the delayed post-test showed no problem with the recognition of the need to use passive voice, only information about the passive structure was provided in the metalinguistic explanation to her delayed post-test text in the multi-case study (See Methodology Chapter for details of the design of the multi-case study). Kate's stimulated recall of the immediate post-test in the multi-case study revealed that her syntactic processing switched from the one required in the Chinese language to that required in the English language, although she was thinking in Chinese (see the following transcript):

> K: "I thought about what to write in Chinese. Put 'temple' as the
>   subject. This picture shows 'The temple was built in —"
>   (stressed 'bei' construction in Chinese)
> R: "Usually, no 'bei" construction in Chinese for such a sentence
>   structure."
> K: "Inanimate subject. PV should be used."
> R: "Can I interpret it like this: although you thought in Chinese,
>   you deliberately adopted the way of thinking in English?"
> K: "Yes."

As a result, Kate succeeded in noticing and understanding the obligatory occasions to use passive voice at that moment, which was manifested in her written output although she still had difficulties with the correct form (Output: *was build*). Hence, the present finding (i.e. written CF significantly outperformed writing practice in the contribution to the development of the recognition of the need to use the passive voice) refutes Truscott's (1996, 2004) claim that written CF cannot affect the IL and is less effective than writing practice for L2 learning (see Section 2.2.4). It should be reminded that the delayed post-test took place one month after the treatment, and the passive voice was not instructed by the English teachers of the participating classes during the period of the quasi-experiment. Therefore, the present finding demonstrated that, although one written CF treatment was not enough for the full development of the target syntactic feature, it had triggered L2 learning, and led the learners on the right track of developing the target feature.

As the L2 learning potential of written CF is embedded in that of the specific written CF types, further detailed analyses revealed that direct corrective feedback and metalinguistic explanation did not differ significantly regarding their contributions to the development of the recognition of the need to use passive voice. However, only metalinguistic explanation significantly outperformed the comparison treatment, writing practice, in the two post-tests. This is understandable from the cognitive perspective. Direct corrective feedback provides correct forms, but not the rule underpinning the correction; while metalinguistic explanation vice versa. With the reason for the correction, learners can understand the written CF better. This is very important for learners without pre-existing knowledge because previous studies revealed that such learners could not figure out the rules underpinning the direct corrective feedback (Shintani & Ellis, 2013; Stefanou, 2014). In other words, learners without pre-existing knowledge could understand the written CF better if they are aided with metalinguistic explanation. As understanding is the second stage of micro cognitive processing of the new input, it is the prerequisite of internalisation (see Section 2.2.1). Hence, the quality of understanding influences the quality of internalisation. As a result, in this project, the members of the direct feedback group who did not have pre-existing knowledge may have failed to develop the rule underpinning the correction. Thus, they may have only understood and memorized the correct forms provided by the direct feedback. Without the rule to apply the written CF knowledge, compared with members of the metalinguistic explanation group, who learned the rule from the written CF, it was more

difficult for such members of the direct feedback group to use the written CF knowledge in new context (i.e. new writing tasks). Therefore, although direct feedback and metalinguistic explanation did not differ significantly regarding their contributions to the development of the recognition of the need to use passive voice, the effect of direct feedback was weaker than that of metalinguistic explanation in this project, and only metalinguistic explanation significantly outperformed writing practice in this situation. As there is no other written CF study available adopting authentic written communication tasks among FL learners, and direct feedback is the most explicit written CF type, while metalinguistic explanation the most informative, the present finding may suggest that the informativeness of the written CF is more important for the effect of written CF on the development of authentic L2 use in the FL context. However, more written CF studies with authentic written communication tasks are needed for clarification.

5.4 To what extent do types of revision influence the contribution of direct feedback and metalinguistic explanation to the development of accuracy in the use of the passive voice? (RQ 2 a)

Results

Table 5.4: Descriptive statistics for scores of successful revision

Group	N	Mean	SD	Min	Max
DCF	29	93.97	13.88	50	100
ME	30	85.89	25.59	0	100

Note: DCF = direct feedback, ME = metalinguistic explanation.

Table 5.5: Descriptive statistics for scores of unsuccessful revision

Group	N	Mean	SD	Min	Max
DCF	29	2.01	7.6	0	33.3
ME	30	14.11	25.59	0	100

Note: DCF = direct feedback, ME = metalinguistic explanation.

Table 5.6: Descriptive statistics for scores of no response to written CF

Group	N	Mean	SD	Min	Max
DCF	29	4.02	12.32	0	50
ME	30	—	—	—	—

Note: DCF = direct feedback, ME = metalinguistic explanation.

Tables 5.4 - 5.6 present the descriptive statistics for scores of the three revision types respectively in the revised drafts. They demonstrate that the two feedback groups were

alike regarding the types of revision they adopted, and both groups adopted clearly more successful revision than the other types of revision. Besides, all the errors marked by written CF were responded to in the metalinguistic explanation group, while few marked errors were not responded to in the direct feedback group. It is also noted that there were few instances where the marked errors were corrected unsuccessfully in the direct feedback group and their mean score of successful revision was a bit higher than that of the metalinguistic explanation group. The latter indicates that the participants in the direct feedback group were more able to correct the marked errors successfully in the revised drafts than their peers in the metalinguistic explanation group.

Despite of these minor discrepancies between the two groups, their very similar pattern of adoption of revision types and their overwhelmingly adoption of successful revision limit the possibility of finding significant differences between them.

The results of the *2 (group) * 3 (time)* ANOVA for scores of accuracy with successful revision as the continuous moderator revealed no significant *time * treatment * successful revision* interaction (F(2, 110)= 1.36, $p = .26$, $\dot{\eta}^2 = .02$), indicating successful revision did not significantly moderate the effects of direct feedback and metalinguistic explanation on accuracy over time. Neither was there a significant *time * treatment* interaction (F(2, 110) = 1.64, $p = .20$, $\dot{\eta}^2 = .03$), indicating when moderation of successful revision was ignored, the contribution of direct feedback and metalinguistic explanation on accuracy over time was not significantly different. By comparison, the *time * successful revision* interaction was significant (F(2, 110) = 3.74, $p = .03$, $\dot{\eta}^2 = .06$), indicating ignoring differences in treatment, successful revision significantly affected accuracy over time.

The results of the *2 (group) * 3 (time)* ANOVA for scores of accuracy with unsuccessful revision as the continuous moderator revealed no significant *time * treatment * unsuccessful revision* interaction (F(2, 110) = 1.76, $p = .18$, $\dot{\eta}^2 = .03$), indicating unsuccessful revision did not significantly moderate the effects of direct feedback and metalinguistic explanation on accuracy over time. Neither was there a significant *time * treatment* interaction (F(2, 110) = 1.71, $p = .19$, $\dot{\eta}^2 = .03$), indicating when moderation of unsuccessful revision was ignored, the contribution of direct feedback and metalinguistic explanation on accuracy over time was not significantly different. The *time * unsuccessful revision* interaction was not significant either (F(2,

110)=1.03, *p* = .36, η̇^{2} = .02), indicating ignoring differences in treatment, unsuccessful revision did not significantly affected accuracy over time.

As no response was only adopted by the direct feedback group, there were no relevant data for the *2 (group) * 3 (time)* ANOVA for scores of accuracy with no response as the continuous moderator. Hence, there is no report about this analysis.

Discussion

This project revealed that neither successful revision nor unsuccessful revision significantly moderated the effects of direct feedback and metalinguistic explanation on accuracy over time. The finding about the moderation potential of successful revision was in line with Van Beuningen's (2011) finding. Her analyses of the texts, including the revised texts, of four participants in a quasi-experiment revealed that successful revision did not guarantee improvement in writing accuracy (see Section 3.5.2). This is reasonable from the micro perspective of cognitive processing. The initial processing of written CF (i.e. in the treatment session) may lead to uptake, which is manifested by successful revision. However, as an initial step to internalization of the written CF knowledge, uptake does not guarantee internalization. Therefore, successful revision may suggest internalization, but does not prove it. In Section 2.5, the assumption was proposed that successful revision may contribute to L2 development more effectively than other types of revision because among the four types of revision, only successful revision can manifest the internalization of the correct understanding of written CF. The present finding did not support such an assumption.

It is noted that the present finding and Van Beuningen's (2011) finding were different from Hyland's (2003) finding in the naturalistic setting, which suggested a link between successful revision and the improvement of writing accuracy over a period of a course of study. However, both kinds of findings are reasonable because the present quasi-experiment and the one conducted by Van Beuningen involved only one treatment with one revision, while L2 learning is an iterative process from both the cognitive and DST perspectives. From the cognitive perspective, micro cognitive processing will snowball into macro cognitive processes. From the DST perspective, "the more frequently one hears something, the more easily it is activated, the more frequently it is used and the faster it is learned" (de Bot et al., 2013, p. 210). As Hyland's study was conducted in the naturalistic setting, the students received multi-treatments with the requirement of revision. Moreover, the students kept the written CF themselves. Thus, they could

review written CF any time they wanted. Hence, the positive link suggested in Hyland's study between successful revision and the improvement of writing accuracy may have been the result of multi-treatments (including the students' review of written CF) with revisions, which activated their processing of written CF. As a result, Hyland's finding did not conflict with the present finding and Van Beuningen's finding. Instead, the two kinds of findings can be complementary regarding the moderating potential of successful revision. However, because there is a need to compare the effect of the first written CF treatment followed by revision with the general effect of multiple written CF treatments followed by revisions, more quasi-experiments with multi-treatments followed by revisions are needed for clarification.

This project also revealed that unsuccessful revision did not significantly moderate the effects of direct feedback and metalinguistic explanation on accuracy over time. In other words, although the present participants failed to correct their marked errors successfully, in some cases, their writing accuracy still improved. This finding differed from Van Beuningen's (2011) finding, for she found a link between unsuccessful revision and the failure in the improvements of writing accuracy. As successful revision manifests uptake, an initial step to internalization, unsuccessful revision shows that uptake has not happened, to say nothing about internalization. Thus, in Van Beuningen's study, a link between unsuccessful revision and the failure in the improvements of writing accuracy was found. However, because L2 learning is an iterative process, the present finding about the moderating potential of unsuccessful revision is also reasonable. From the micro perspective of cognitive processing, there are two occasions where the cognitive processing of written CF takes place: one in the treatment session (i.e. the initial processing of written CF), the other in the subsequent writing tasks (see Section 2.2.3). That is, the cognitive processing of written CF also contributes to L2 development. In the focused written CF studies, it is easy for members of the feedback groups to figure out the target feature (Van Beuningen's was an unfocused study). During the one month delay period, some present participants who figured out the target feature may have reviewed the grammar of the target feature themselves although their English teachers did not instruct them on it during the period of the quasi-experiment. Regarding the students who failed to correct their marked errors successfully under the guidance of written CF, but reviewed the grammar of the target feature themselves, it was natural that their writing accuracy of the target feature would improve in the delayed post-test. As a result, unsuccessful revision did not

significantly moderate the effects of direct feedback and metalinguistic explanation on accuracy in this project. However, interviews with the participants are needed to check this assumption because texts themselves cannot explain the changes in the texts.

5.5 To what extent do types of revision influence the contribution of direct feedback and metalinguistic explanation to the development of a recognition of the need to use the passive voice? (RQ 2 b)

Results

The results of the *2 (group) * 3 (time)* ANOVA for scores of a recognition of the need to use the passive voice with successful revision as the continuous moderator revealed no significant *time * treatment * successful revision* interaction ($F(2, 110) = 2.21$, $p = .12$, $\dot{\eta}^2 = .04$), indicating successful revision did not significantly moderate the effects of direct feedback and metalinguistic explanation on a recognition of the need to use the passive voice over time. Neither was there a significant *time * treatment* interaction ($F(2, 110) = 1.64$, $p = .20$, $\dot{\eta}^2 = .03$), indicating when moderation of successful revision was ignored, the contribution of direct feedback and metalinguistic explanation on a recognition of the need to use the passive voice over time was not significantly different. The *time * successful revision* interaction was not significant either ($F(2, 110) = 2.94$, $p = .06$, $\dot{\eta}^2 = .05$), indicating ignoring differences in treatment, successful revision did not significantly affect a recognition of the need to use the passive voice over time.

The results of the *2 (group) * 3 (time)* ANOVA for scores of a recognition of the need to use the passive voice with unsuccessful revision as the continuous moderator revealed no significant *time * treatment * unsuccessful revision* interaction ($F(2, 110) = .79$, $p = .46$, $\dot{\eta} = .01$), indicating that unsuccessful revision did not significantly moderate the effects of direct feedback and metalinguistic explanation on a recognition of the need to use the passive voice over time. Neither was there a significant *time * treatment* interaction ($F(2, 110) = 1.74$, $p = .18$, $\dot{\eta} = .03$), indicating when moderation of unsuccessful revision was ignored, the contribution of direct feedback and metalinguistic explanation on a recognition of the need to use the passive voice over time was not significantly different. The *time * unsuccessful revision* interaction was not significant either ($F(2, 110) = 1.52$, $p = .22$, $\dot{\eta} = .03$), indicating ignoring differences in treatment, unsuccessful revision did not significantly affected a recognition of the need to use the passive voice over time.

As no response was only adopted by the direct feedback group, there were no relevant data for the *2 (group) * 3 (time)* ANOVA for scores of a recognition of the need to use the passive voice with no response as the continuous moderator. Hence, there is no report about this analysis.

Discussion

This project revealed that neither successful revision nor unsuccessful revision significantly moderate the effects of direct feedback and metalinguistic explanation on the development of the recognition of the need to use the passive voice over time. Although, to the best of my knowledge, there is no empirical study available addressing the relationship between revision and partial development of a linguistic feature, the present finding was reasonable from the cognitive perspective. It was stated in Section 2.2.1 that because understanding is a gradual process, meaning can be learned earlier than form. Successful revision and unsuccessful revision involve both meaning (i.e. the recognition of the need to use the passive voice) and form (i.e. correct formation of the passive structure). As the recognition of the need to use the passive voice is only meaning-related, its development is not related to the development of form. Therefore, this project revealed the contributions of direct feedback and metalinguistic explanation to the development of the recognition of the need to use the passive voice was not significantly moderated by successful revision and unsuccessful revision, both of which involve correct form.

This can be evidenced in Kate's stimulated recall in the multi-case study introduced in the discussion of RQ 1 b Kate received written CF on the occasion to use the passive voice only in the quasi-experiment, and her stimulated recall in the multi-case study revealed that her syntactic processing shifted from the one required in the Chinese language to that required in the English language, although she was thinking in Chinese. However, she kept struggling with the correct formation of the passive structure. Particularly, she kept scoring zero on accuracy in the quasi-experiment. Nonetheless, more written CF studies targeting the impact of revision types on the development of the target feature are needed for clarification.

5.6 To what extent does L2 motivation influence the types of revision that the learners make? (RQ 3)

Results

Table 5.7: Descriptive statistics for L2 motivational profile of DCF and ME group

Group	L2 motivation							
	Ideal L2 self		L2 learning experience		Ought-to L2 self		Discrepancy	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
DCF	3.63	.66	3.36	.71	2.79	.88	3.06	.78
ME	3.63	.60	3.58	.68	3.05	.69	3.01	.62

Note: DCF = direct feedback, ME = metalinguistic explanation,
Discrepancy = Discrepancy between Ought-to L2 self and   actual self

Table 5.7 presents the descriptive statistics for the scores of the four L2 motivation variables of DCF and ME group. It shows the two groups were similar regarding their L2 motivation profile. Both groups scored most highly on Ideal L2 self with the same mean score, while low on Ought-to L2 self and the discrepancy between Ought-to L2 self and the actual L2 self perceived by the learner (discrepancy for short hereafter) with similar mean scores.

It was revealed in the analyses of RQ2, which addresses the influence of types of revision adopted by the learners on the contribution of direct feedback and metalinguistic explanation to the development of the passive voice, that these two feedback groups adopted similar types of revision in their revised drafts. Hence, the similarity in both their L2 motivation profile and their adoption of revision types could limit the possibility to find any significant difference between them.

Table 5.8: Regression analysis summary for motivation variables predicting no response in both feedback groups

Variable	*b*	*SE*	*p*
Ideal L2 self	1.48	2.15	.49
L2 learning experience	-.54	1.86	.77
Ought-to L2 self	-.29	1.83	.87
Discrepancy	-.21	2.00	.92

Table 5.9: Regression analysis summary for motivation variables predicting successful revision in both feedback groups

Variable	b	SE	p
Ideal L2 self	4.08	5.08	.43
L2 learning experience	1.18	4.39	.79
Ought-to L2 self	-2.56	4.32	.56
Discrepancy	1.58	4.73	.74

Table 5.10: Regression analysis summary for motivation variables predicting unsuccessful revision in both feedback groups

Variable	b	SE	p
Ideal L2 self	-5.56	4.78	.25
L2 learning experience	-.64	4.13	.88
Ought-to L2 self	2.85	4.06	.49
Discrepancy	-1.36	4.45	.76

The multiple regression revealed that this combination of L2 motivation variables did not significantly predict no response ($F(4, 54) = .13$, $p = .97$, $Adj. R^2 = -.06$) or successful revision ($F(4, 54) = .28$, $p = .89$, $Adj. R^2 = -.05$) across the two feedback groups, with no L2 motivation variable significantly contributing to the prediction (see Table 5.8 and 5.9).

Neither did this L2 motivation model significantly predict unsuccessful revision across the groups ($F(4, 54) = .46$, $p = .76$, $Adj. R^2 = -.04$), with no L2 motivation variable significantly contributing to the prediction (see Table 5.10).

To sum up, both the L2 motivation profiles of direct feedback and metalinguistic explanation group and their adoption of revision types were alike. In accordance, regression analyses revealed, this combination of L2 motivation variables (Ideal L2 self, L2 learning experience, Ought-to L2 self, and the discrepancy between Ought-to L2 self and the actual L2 self perceived by the learner) did not significantly predict any revision type (successful revision, unsuccessful revision, and no response) adopted by the feedback groups, with no L2 motivation variable significantly contributing to the prediction.

Discussion

This project revealed that L2 motivation, including each of the L2 motivation variables (i.e. Ideal L2 self, L2 learning experience, Ought-to L2 self, and the discrepancy between Ought-to L2 self and the actual L2 self perceived by the learner), did not significantly affect any of the revision types (i.e. successful revision, unsuccessful revision, and no response) adopted by the feedback groups. Such findings seems to contradict to the assumption stated in Section 2.6 that L2 motivation can impact learners' utilization of the L2 learning opportunities brought about by written CF, including revisions (Kormos, 2012). However, from both the cognitive and DST perspectives, L2 learning is a complex process (see Section 2.2 and 2.9). As a result, the revision type adopted by the learner is not the only learning behaviour in the learner's response to written CF. No significant effect of L2 motivation on revision types did not mean that L2 motivation did not significantly affect other learning behaviours in the learner's responding to written CF. As proposed in the discussion of the result of RQ 2 a, after figuring out the target feature, some members of the feedback groups may have studied the target feature themselves during the one month delay. Such a learning behaviour may have been related to certain L2 motivation profiles. However, interviews exploring the actions of the learners take after receiving written CF are needed to check this inference.

Regarding the influence of L2 motivation on revision stated above, as it is unlikely that a learner always adopts the same type of revision, what is influenced by L2 motivation is not necessarily the revision type adopted by the learner at a specific point in time, but rather the pattern of adopting a certain revision type for a period of time. This is because cognitive processing is complex, and L2 motivation is not the only moderating factor in cognitive processing. Other factors like L2 belief and language learning aptitude have already been found to significantly moderate the effects of written CF (Rummel & Bitchener, 2015; Sheen, 2007; Shintani & Ellis, 2015; Stefanou & Révész, 2015) (see Section 3.6.2). Moreover, learners' pre-existing knowledge has been found to influence their understanding of written CF, which in turn could influence the modified output — the revised text (Shintani & Ellis, 2013) (see Section 3.8). Furthermore, previous studies (Shintani & Ellis, 2013; Suzuki, 2012) revealed that correct understanding of written CF did not guarantee the correct modified output (see Section 3.8). As this project addressed the influence of L2 motivation on the revision type adopted by the learner in a systematic but cross-sectional manner (i.e. only one written CF treatment with one

opportunity for revision), it is difficult for this project to reveal the long-term relationship between the two variables. Therefore, the present findings neither support nor object to the theoretical assumption that L2 motivation can influence the learners' learning behaviours after receiving written CF, including revisions.

The issue between the complexity of L2 learning and the cross-sectional manner of this project in addressing the influence of L2 motivation on the revision type adopted by the learner may also explain the difference between the present findings and the findings of Hyland's (2003) and Ferris et al.'s (2013) multi-case studies. Hyland found both of her participants were concerned about writing accuracy, and followed written CF closely with a high accuracy rate in revision, while Ferris et al. found an overly confident participant was reluctant to respond to written CF in revision. Hence, both multi-case studies suggested a link between L2 motivation and the revision type adopted by the learner.

It is noted that both multi-case studies viewed L2 motivation as a static concept (see Section 3.6.2.3), while this project concerned the dynamic dimension of L2 motivation. Kim and Kim's (2014) large-scale questionnaire survey targeted the relationship between Ideal L2 self (one aspect of the dynamic dimension of L2 motivation) and the general motivated L2 learning behaviours (see Section 3.6.2.3). As Kim and Kim's survey revealed that Ideal L2 self significantly correlated with the general motivated L2 learning behaviours, the differences between the findings of this project and those of Hyland's (2003) and Ferris et al.'s (2013) multi-case studies may not lie in the difference in the aspects of L2 motivation investigated in the three studies, but rather in the difference in their study settings.

The two multi-case studies were conducted in naturalistic settings. Among the different revision types adopted by a participant during the whole course, only the major one was reported in the two multi-case studies. For example, in Ferris et al.'s (2013) study, the overly confident participant sometimes modified the marked errors, but clearly no response to written CF was the theme in his revised texts during the course period. Therefore, this participant was considered reluctant to respond to written CF. By comparison, this project involved only one written CF treatment with one opportunity for revision. Thus, there may be a possibility that the present finding arose by chance rather than reflecting the long-term relationship between the two variables. For a more reliable relationship between L2 motivation and the revision type adopted by the

learners in responding to written CF, quasi-experiments with multi-treatments and multi-revisions are needed.

5.7 To what extent does L2 motivation influence the contribution of direct feedback and metalinguistic explanation to the development of accuracy in the use of the passive voice? (RQ4 a)

Results

Table 5.7 (see Section 5.6) presents the L2 motivation profile of each group (direct feedback and metalinguistic explanation). It shows the L2 motivation profile of the two groups were similar: they all scored higher on Ideal L2 self and L2 learning experience than on Ought-to L2 self and the discrepancy between Ought-to L2 self and the actual L2 self perceived by the learner (discrepancy hereafter). Particularly, the two groups were more identical on Ideal L2 self with the same mean score.

The results of the *2 (group) * 3 (time)* ANOVA for the scores of accuracy with Ideal L2 self as the continuous moderator revealed there was a significant *time * treatment * Ideal L2 self* interaction ($F(2, 110) = 5.03$, $p = .01$, $\acute{\eta}^2 = .08$), indicating Ideal L2 self significantly moderated the effects of direct feedback and metalinguistic explanation on accuracy over time (see Figure 5.3 and 5.4). By comparison, there was no significant *time * treatment* interaction ($F(2, 110) = .84$, $p = .44$, $\acute{\eta}^2 = .02$), indicating there was no significant difference in the contribution of direct feedback and metalinguistic explanation to accuracy over time when the moderation of Ideal L2 self was ignored. Moreover, there was no significant *time * Ideal L2 self* interaction ($F(2, 110) = .71$, $p = .49$, $\acute{\eta}^2 = .01$), indicating no significant effect of Ideal L2 self on accuracy over time ignoring differences in treatment.
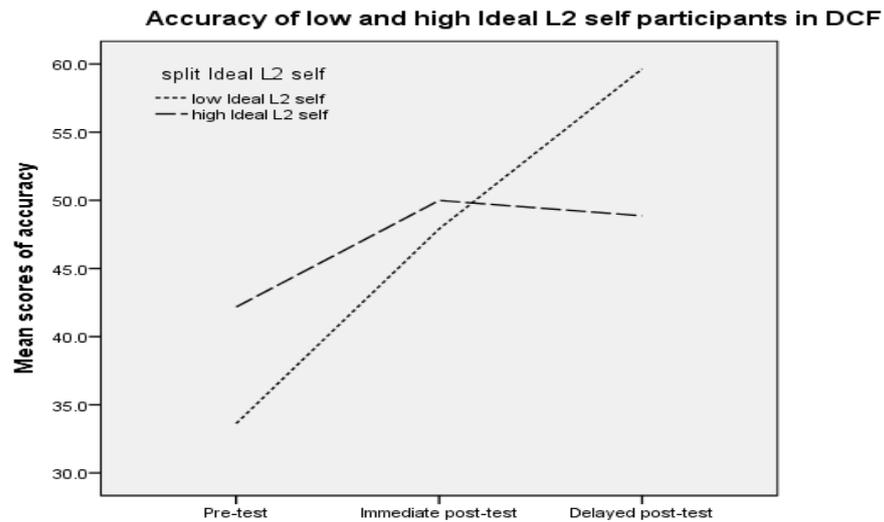
Figure 5.3 Scores of accuracy of participants' with low and high Ideal L2 self over time (the direct feedback group)
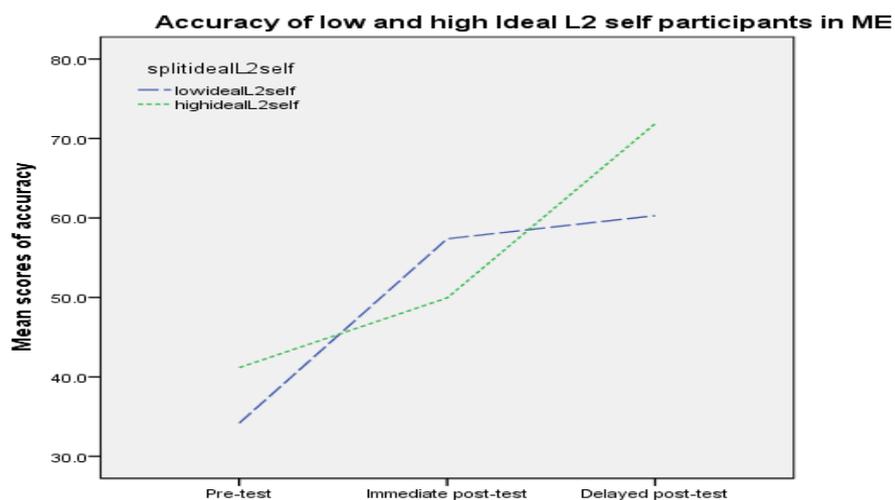
Figure 5.4 Scores of accuracy of participants' with low and high Ideal L2 self over time (the metalinguistic group)

To explore where the significant *time * treatment * Ideal L2 self* effect occurred, the repeated measures ANOVA (three times) with Ideal L2 self as the continuous moderator was performed with each group separately. The repeated measures ANOVA performed with the direct feedback group revealed that there was a significant *time * Ideal L2 self* effect ($F(2, 54) = 5.99$, $p < .01$, $\acute{\eta}^2 = .18$), indicating Ideal L2 self significantly affected the accuracy of the direct feedback group over time. That is, it significantly moderated the effect of direct feedback on accuracy over time (see Figure 5.3).

To explore the pattern of the moderation of Ideal L2 self on the efficacy of the direct feedback over time, a simple linear regression was conducted with the accuracy scores

of the direct feedback group on the three tests (the pre-test, the immediate post-test and the delayed post-test) as the dependent variable respectively. This serial of simple regression revealed that Ideal L2 self did not significantly predict the accuracy scores on the pre-test ($F(1, 27) = 1.76$, $p = .20$, *Adj. $R^2 = .03$*), or the accuracy scores on the immediate post-test ($F(1, 27) = .20$, $p = .47$, *Adj. $R^2 = -.03$*). Neither did it significantly predict the accuracy scores on the delayed post-test ($F(1, 27) = 3.46$, $p = .07$, *Adj. $R^2 = .08$*). Moreover, it was a nonsignificant but negative predictor of the accuracy scores on the delayed post-test with *Beta* = .34.

The repeated measures ANOVA performed with the metalinguistic explanation group revealed that there was no significant *time * Ideal L2 self* effect ($F(2, 56) = 1.05$, $p = .36$, $\dot{\eta}^2 = .04$), indicating Ideal L2 self did not significantly affected the accuracy of the metalinguistic explanation group over time. That is, it did not significantly moderate the effect of metalinguistic explanation on accuracy over time.

The *2 (group) * 3 (time)* ANOVA for the scores of accuracy with L2 learning experience as the continuous moderator revealed there was no significant *time * treatment * L2 learning experience* interaction ($F(2, 110) = 3.02$, $p > .05$, $\dot{\eta}^2 = .05$), indicating L2 learning experience significantly did not moderate the effects of direct feedback and metalinguistic explanation on accuracy over time. There was also no significant *time * treatment* interaction ($F(2, 110) = 1.09$, $p = .34$, $\dot{\eta}^2 = .02$), indicating there was no significant difference in the contribution of direct feedback and metalinguistic explanation to accuracy over time when the moderation of L2 learning experience was ignored. Moreover, there was no significant *time * L2 learning experience* interaction ($F(2, 110) = .94$, $p = .40$, $\dot{\eta}^2 = .02$), indicating no significant effect of L2 learning experience on accuracy over time ignoring differences in treatment.

The *2 (group) * 3 (time)* ANOVA for the scores of accuracy with Ought-to L2 self as the continuous moderator revealed there was no significant *time * treatment * Ought-to L2 self* interaction ($F(2, 110) = .31$, $p = .73$, $\dot{\eta}^2 = .01$), indicating Ought-to L2 self did not significantly moderate the effects of direct feedback and metalinguistic explanation on accuracy over time. Neither was there a significant *time * treatment* effect ($F(2, 110) = 1.07$, $p = .35$, $\dot{\eta}^2 = .02$), indicating the contribution of direct feedback and metalinguistic explanation to the development of accuracy was not significantly different when the moderation of Ought-to L2 self was ignored. The *time * Ought-to L2*

self interaction was not significant either ($F(2, 110) = 1.56$, $p = .22$, $\dot{\eta}^2 = .03$), indicating when differences in treatment was ignored, Ought-to L2 self did not significantly affect the development of accuracy.

The *2 (group) * 3 (time)* ANOVA for the scores of accuracy with Discrepancy as the continuous moderator revealed there was no significant *time * treatment * Discrepancy* interaction ($F(2, 110) = .59$, $p = .56$, $\dot{\eta}^2 = .01$), indicating Discrepancy did not significantly moderate the effects of direct feedback and metalinguistic explanation on accuracy over time. Neither was there a significant *time * treatment* effect ($F(2, 110) = .84$, $p = .44$, $\dot{\eta}^2 = .02$), indicating the contribution of direct feedback and metalinguistic explanation to the development of accuracy was not significantly different when the moderation of Discrepancy was ignored. The *time * Discrepancy* interaction was not significant either ($F(2, 110) = 1.02$, $p = .36$, $\dot{\eta}^2 = .02$), indicating when differences in treatment were ignored, Discrepancy did not significantly affect the development of accuracy.

In short, the series of ANOVAs for scores of accuracy with each L2 motivation variable as the continuous moderator revealed that only Ideal L2 self significantly moderated the effects of direct feedback and metalinguistic explanation on accuracy over time. Moreover, Ideal L2 self was found only significantly moderated the effects of direct feedback.

Discussion

This project revealed that one L2 motivational variable, Ideal L2 self, significantly moderated the effects of direct feedback and metalinguistic explanation on the accurate use of the passive voice over time. Although the moderating potential of the dynamic dimension of L2 motivation on the effects of written CF has not been addressed to my knowledge, such findings were in line with findings of Hyland's (2003) and Ferris et al.'s (2013) multi-case studies to some extent. Both multi-case studies suggested a link between L2 motivational variables under investigation in each study and the improvements in the long-term writing accuracy although they both viewed L2 motivation as static (see Section 3.6.2.3). Moreover, the present finding conformed to the theory of L2 motivation. As "if the person we would like to become speaks an L2, the ideal L2 self is a powerful motivator to learn the L2 because of the desire to reduce the discrepancy between our actual and ideal selves" (Dörnyei, 2009, p.217), Ideal L2 self can greatly influence L2 learning. Hence, theoretically, Ideal L2 self has the

potential to significantly moderate the effects of written CF. Nonetheless, more research into the moderating potential of Ideal L2 self on the effects of written CF is needed for clarification.

Further analyses revealed that Ideal L2 self only significantly moderated the effect of direct feedback, but not that of metalinguistic explanation. This may be related to the relationship between the effort needed to understand the rule underlying the written CF and the informativeness of the written CF. Direct feedback provides the correct form, but not the rule underlying the correction. For the members of the present direct feedback group to understand the why they were corrected, they needed to make some effort to figure out the rule underlying the correction. Because L2 motivation refers to the effort in L2 learning resulting from the desire to learn the L2 (Kormos, 2012), L2 motivation may have impacted the learners in the present direct feedback group in figuring out the underlying rule, thus impacting the effect of direct feedback. By comparison, metalinguistic explanation not only points out the error, but also provides the rule underlying the error. That is, metalinguistic explanation is more informative than direct feedback. Therefore, all members of the present metalinguistic explanation group could understand why they were corrected directly from the written CF they received without the extra effort that their peers in the present direct feedback group made in order to achieve the same quality of understanding of written CF. Because understanding is the prerequisite of intake, which is in turn the prerequisite of internalization, the quality of understanding of written CF influences the quality of internalization (see Section 2.2.1), Ideal L2 self significantly moderated the effect of direct feedback, but not that of metalinguistic explanation, in this project. Nonetheless, more research into the moderating potential of Ideal L2 self on the effects of written CF types with different informativeness is needed for clarification.

Further analyses (i.e. a series of simple linear regressions) of the data of the direct feedback group for the moderation pattern revealed that Ideal L2 self did not significantly correlate with accuracy scores on any of the three tests in the quasi-experiment. Considering the small sample size of both the higher Ideal L2 self group and the lower Ideal L2 self (n < 15 for one group, n = 15 for the other) and the reasonably large *Beta* (*Beta* = .34), future research with a larger sample size is needed to explore the pattern of moderation. Nonetheless, from the pre-test to the immediate post-test, learners with low Ideal L2 self were found to have improved faster in the accuracy of the target feature than their peers with higher Ideal L2 self. Moreover, Ideal L2 self

was found to be a marginally non-significant but negative predictor of the accuracy scores in the delayed post-test. Such findings seem to contradict to both the findings of Kim and Kim's (2014) survey on the relationship between Ideal L2 self and general L2 proficiency and the theory of L2 motivation. Kim and Kim found that Ideal L2 self was the most substantial predictor of L2 proficiency. That is, Ideal L2 self has a positive correlation with L2 proficiency. L2 Motivational Self System also indicates that Ideal L2 self has a positive relationship with L2 learning outcomes, for it "is a powerful motivator to learn the L2" (Dörnyei, 2009, p.217) and the stronger the L2 motivation, the better the learning outcomes (Dörnyei, 2005; Ellis, 2008). However, the present finding is reasonable even from the perspective of the definition of Ideal L2 self and the relationship between the amount of L2 motivation and L2 learning outcomes. It should be pointed out that "the desire to reduce the discrepancy between our actual and ideal selves" (Dörnyei, 2009, p.217) is stated in the explanation of Ideal L2 self, while the discrepancy between the actual and ideal selves was not considered in this project. In the present questionnaire, Ideal L2 self was measured by the learner imagining a situation that he/she is using English in the future, or by the learner planning to use English in the future (see Appendix E for the questionnaire). Compared with their peers with lower L2 proficiency who perceived a larger discrepancy between their actual and ideal selves, the learners with higher L2 proficiency thus perceived a smaller discrepancy between their actual and ideal selves and could imagine more easily a situation in which they were using English in the future, and tended more to have plans to use English in the future. As a result, the higher proficiency learners may have scored higher on Ideal L2 self in this project. As learners are motivated to learn the L2 by the desire to reduce the discrepancy between their actual and ideal selves (see Section 2.6), learners with higher L2 proficiency may have had less desire to reduce the discrepancy between their actual and ideal selves (i.e. they were less motivated to learn the L2) although they scored higher on Ideal L2 self in this project.

As introduced previously, direct feedback provides the correct form, but not the rule underlying the correction. In order to understand why they are corrected, learners have to make some effort to figure out the rule underlying the correction. According to the definition of Ideal L2 self, the learners who scored low on Ideal L2 self in this project may have made more effort to figure out the underlying rules than their peers with higher Ideal L2 self scores. As a result, the accuracy scores of the learners with lower Ideal L2 self increased faster than the scores of the learners with higher Ideal L2 self

from the pre-test to the immediate post-test. This project was a focused study. Therefore, members of the written CF groups could easily figure out the target feature. Previous research has revealed that the learners without pre-existing knowledge could not figure out the underlying rules themselves from direct feedback (Shintani & Ellis, 2013) (see Section 3.8). Regarding such learners in the present direct feedback group, those with lower scores on Ideal L2 self were more likely to have studied the grammar of the target feature in the one month delay themselves than their peers with higher scores on Ideal L2 self. As the quality of the understanding of written CF is related to the quality of internalization of the written CF knowledge, with the rule underlying the correction, the learners who studied the grammar of the target feature in the one month delay themselves could improve their accuracy in using the target feature in the delayed post-test. Hence, the accuracy scores of the learners with lower Ideal L2 self kept increasing from the immediate post-test to the delayed post-test.

By comparison, it may have been easier for the learners with higher Ideal L2 self to figure out the underlying rules because it is more likely that higher proficiency learners (i.e. the learners who scored high on Ideal L2 self in this project) have the pre-existing knowledge to some extent. Hence, their accuracy scores increased from the pre-test to the immediate post-test. However, as such learners may be less motivated to learn English due to the small discrepancy between their actual and ideal selves, they were less likely to have studied the grammar of the target feature in the one month delay. Written CF leads to explicit knowledge (see Section 2.2.2.2), which is speculated to be subject to regression (Shintani et al., 2014). Without further consolidation activities, the underlying rule that the present learners with higher Ideal L2 self figured out with the aid of direct feedback would regress over time. As such learners were less likely to study the grammar of the target feature after the written CF treatment (i.e. a consolidation activity initiated by the learners themselves), the knowledge they learned from the direct feedback (i.e. the rule underlying the correction) regressed over time. Such a regression was shown in the drop of their accuracy scores from the immediate post-test to the delayed post-test. Hence, this project found Ideal L2 self was a marginally non-significant but negative predictor of the accuracy scores in the delayed post-test. However, empirical studies addressing the discrepancy between the actual and ideal selves are needed to validate this inference.

5.8 To what extent does L2 motivation influence the contribution of direct feedback and metalinguistic explanation to a recognition of the need to use the passive voice over time? (RQ4 b)

Results

The *2 (group) * 3 (time)* ANOVA for the scores of a recognition of the need to use the passive voice with Ideal L2 self as the continuous moderator revealed there was no significant *time * treatment * Ideal L2 self* interaction ($F(2, 110) = .07$, $p = .93$, $\dot{\eta}^2 < .01$), indicating Ideal L2 self did not significantly moderate the effects of direct feedback and metalinguistic explanation on a recognition of the need to use the passive voice over time. Neither was there a significant *time * treatment* effect ($F(2, 110) = 1.00$, $p = .37$, $\dot{\eta}^2 = .02$), indicating the contribution of direct feedback and metalinguistic explanation to the development of a recognition of the need to use the passive voice was not significantly different when the moderation of Ideal L2 self was ignored. The *time * Ideal L2 self* interaction was not significant either ($F(2, 110) = 1.01$, $p = .37$, $\dot{\eta}^2 = .02$), indicating when differences in treatment was ignored, Ideal L2 self did not significantly affect the development of a recognition of the need to use the passive voice.

Likewise, the *2 (group) * 3 (time)* ANOVA for the scores of a recognition of the need to use the passive voice with L2 learning experience as the continuous moderator revealed there was no significant *time * treatment * L2 learning experience* interaction ($F(2, 110) = 1.37$, $p = .26$, $\dot{\eta}^2 = .02$), indicating L2 learning experience did not significantly moderate the effects of direct feedback and metalinguistic explanation on a recognition of the need to use the passive voice over time. Neither was there a significant *time * treatment* effect ($F(2, 110) = 1.50$, $p = .23$, $\dot{\eta}^2 = .03$), indicating the contribution of direct feedback and metalinguistic explanation to the development of a recognition of the need to use the passive voice was not significantly different when the moderation of L2 learning experience was ignored. The *time * L2 learning experience* interaction was not significant either ($F(2, 110) = .92$, $p = .40$, $\dot{\eta}^2 = .02$), indicating when differences in treatment was ignored, L2 learning experience did not significantly affect the development of a recognition of the need to use the passive voice.

Similarly, the *2 (group) * 3 (time)* ANOVA for the scores of a recognition of the need to use the passive voice with Ought-to L2 self as the continuous moderator revealed there was no significant *time * treatment * Ought-to L2 self* interaction ($F(2, 110) = .31$, $p = .74$, $\dot{\eta}^2 = .01$), indicating Ought-to L2 self did not significantly moderate the effects of direct feedback and metalinguistic explanation on a recognition of the need to use the

passive voice over time. Neither was there a significant *time * treatment* effect ($F(2,$ 110$) = .81$, $p = .45$, $\dot{\eta}^2 = .01$), indicating the contribution of direct feedback and metalinguistic explanation to the development of a recognition of the need to use the passive voice was not significantly different when the moderation of Ought-to L2 self was ignored. The *time * Ought-to L2 self* interaction was not significant either ($F(2,$ 110$) = 1.74$, $p = .23$, $\dot{\eta}^2 = .03$), indicating when differences in treatment was ignored, Ought-to L2 self did not significantly affect the development of a recognition of the need to use the passive voice.

Moreover, the *2 (group) * 3 (time)* ANOVA for the scores of a recognition of the need to use the passive voice with Discrepancy as the continuous moderator revealed there was no significant *time * treatment * Discrepancy* interaction ($F(2, 110) = .27$, $p = .77$, $\dot{\eta}^2 = .01$), indicating Discrepancy did not significantly moderate the effects of direct feedback and metalinguistic explanation on a recognition of the need to use the passive voice to use the passive over time. Neither was there a significant *time * treatment* effect ($F(2, 110) = 1.04$, $p = .36$, $\dot{\eta}^2 = .02$), indicating the contribution of direct feedback and metalinguistic explanation to the development of a recognition of the need to use the passive voice was not significantly different when the moderation of Discrepancy was ignored. The *time * Discrepancy* interaction was not significant either ($F(2, 110) =$ 1.06$, p = .35$, $\dot{\eta}^2 = .02$), indicating when differences in treatment was ignored, Discrepancy did not significantly affect the development of a recognition of the need to use the passive voice.

In brief, the series of ANVOVAs for scores of a recognition of the need to use the passive voice with each L2 motivation variable as the covariate revealed the effects of direct feedback and metalinguistic explanation on the a recognition of the need to use the passive voice over time was not significantly moderated by any of the L2 motivation variables. Hence, the contribution of direct feedback and metalinguistic explanation to the development of a recognition of the need to use the passive voice was not significantly moderated by L2 motivation.

Discussion

This project revealed that L2 motivation, including each of the L2 motivational variables, did not significantly moderate the effects of direct feedback and metalinguistic explanation on the development of the recognition of the need to use passive voice over time. No written CF study is available on the partial development of

a target feature, to say nothing about research into the moderating factors in such processes to my knowledge. Nonetheless, the present finding conforms to the cognitive theories. First, as metalinguistic explanation provides the rule underlying the error it points out, it informs the learner not only what is wrong, but also why the text is wrong. As a result, metalinguistic explanation helps the learners to achieve a higher quality of understanding of written CF with less effort. Hence, L2 motivation, which refers to the effort in L2 learning (Kormos, 2012), did not significantly moderate the effect of metalinguistic explanation in this project. This may be particularly true with the effect of metalinguistic explanation on the development of the recognition of the need to use passive voice because such a development is meaning-related, and meaning can develop faster than form (see Section 2.3). The finding of RQ 1 b may lend some support to this inference: one treatment of metalinguistic explanation significantly outperformed writing practice in the contribution to the development of the recognition of the need to use passive voice.

Second, as pointed out in the discussion of RQ 4 a, the members of the present direct feedback group needed to make some effort in order to figure out the rule underlying the correction. As meaning is universal, it can develop faster than form, figuring out the occasions to use the passive voice, which is meaning-related, demanded less effort than figuring out the passive structure, which is form-related. Hence, L2 motivation, which refers to the effort in L2 learning (Kormos, 2012), did not significantly moderate the effect of direct feedback on the development of the recognition of the need to use passive voice, which resulted from the application of the knowledge about the occasions to use the passive voice. Findings of RQ 1 b about the contribution of different treatments on the development of the recognition of the need to use passive voice may shed some light on this inference. It is noted in the findings of RQ 1 b that direct feedback did not significantly outperform writing practice on this point. However, it is also noted that, regarding this issue, direct feedback did not significantly differ from metalinguistic explanation. The latter was significantly more effective than writing practice. Moreover, ignoring the differences in direct feedback and metalinguistic explanation, written CF (i.e. the two written CF groups combined into one group) was significantly more effective than writing practice. Nonetheless, more research into the issue of the moderation of L2 motivation on the effects of written CF on partial development of a target feature is needed for clarification.

5.9 Summary

To sum up, this project adopted authentic L2 use tasks among FL leaners. It revealed that written CF did not significantly differ from writing practice regarding their contributions to the development of accurate use of the passive voice. Such a finding may suggest that one treatment is not enough for the FL learners to develop accurate and authentic L2 use of the target syntactic feature because syntax is complex. On the other hand, this project revealed that written CF significantly outperformed writing practice in the contribution to the development of the recognition of the need to use the passive voice. As occasions to use the passive voice is a component of the target feature, the passive voice, this finding may suggest that one treatment can lead to partial development of the target syntactic feature because understanding is a gradual process, and subtle changes in the IL may be difficult to perceive externally, but the underlying processes may have changed. As a result, these two present findings refuted Truscott's (1996, 2004) claim that written CF harms L2 development by taking time and effort that should have been allocated to more productive activities such as writing practice (see Section 2.2.4). Further analyses revealed that metalinguistic explanation, not direct feedback, significantly outperformed writing practice after the treatment. As metalinguistic explanation is the most informative written CF type, while direct feedback the most explicit, such a finding seemed to suggest informativeness of written CF is more important than explicitness for the effect of written CF on the FL learners' development of authentic L2 use. However, more research into the syntax learning potential of written CF among FL learners with authentic L2 use tasks is needed for the clarification of the above implications.

This project also revealed that the revision type adopted by the learners during a single opportunity to revise the text did not significantly moderate the L2 learning potential of written CF. Such a finding seems to contradict to the theoretical assumption stated in Section 2.5 that successful revision may contribute to L2 development more effectively than other types of revision because among the four types of revision, only successful revision may manifest the internalization of the correct understanding of written CF. However, L2 learning is an iterative process from both the cognitive and DST perspectives because L2 learning consists of the interactions between input and the learner's IL (see Section 2.2 and 2.9). In a naturalistic instruction setting, learners usually receive multiple treatments, and revise their texts more than once. It is unlikely that the learner adopts the same revision type every time while revising his/her text due

to the learner's interaction with the learning context. Hence, the revision type revealed in the present quasi-experiment with only one opportunity for revision may not represent the pattern of revision type adopted by a learner over a period of time. Hence, quasi-experiments with multiple treatment occasions, each followed by an opportunity for revision, are needed to explore the possible moderating effect of revision type.

Moreover, this project revealed that L2 motivation did not significantly influence the revision type adopted in one-shot revision. Such a finding seems to contradict to the assumption stated in Section 2.6 that L2 motivation can impact learners' utilization of the L2 learning opportunities brought about by written CF, including revisions (Kormos, 2012). However, from both the cognitive and DST perspectives, L2 learning is complex because it can be influenced by a variety of factors. Hence, L2 motivation is not the only factor that may influence the revision type adopted by the learner in each single opportunity for revision. As a result, the revision type revealed in the present quasi-experiment with only one opportunity for revision may not represent the pattern of revision type adopted by a learner over time. Hence, quasi-experiments with multiple treatment occasions, each followed by an opportunity for revision, are needed to explore the long-term relationship between L2 motivation and revision type adopted by learners in responding to written CF.

In addition, this project explored the moderation of L2 motivation on the efficacy of written CF. On the one hand, it revealed that one L2 motivational variable, Ideal L2 self, significantly moderated the effects of direct feedback and metalinguistic explanation on the accurate use of the passive voice over time, suggesting that the dynamic dimension of L2 motivation can significantly impact the effects of written CF. Moreover, this project revealed further that only the effect of direct feedback, not that of metalinguistic explanation, on accuracy development was significantly moderated by Ideal L2 self. This may suggest that the less informative the written CF is, the greater its effect is impacted by Ideal L2 self. This may be because direct feedback is less informative than metalinguistic explanation. Thus, a higher quality of internalization demands more effort from the learners in the direct feedback group in order for them to understand why they are corrected. However, empirical studies on the moderating potential of Ideal L2 self on the effects of written CF types differing in informativeness is needed to validate this inference. Furthermore, this project revealed that Ideal L2 self did not significantly correlate with accuracy scores of the direct feedback group on any of the three tests in the quasi-experiment. Considering the small sample size of both the

higher Ideal L2 self group and the lower Ideal L2 self (n < 15 for one group, n = 15 for the other) and the reasonably large *Beta* (*Beta* = .34), future studies with a larger sample size are needed to explore the moderating pattern of Ideal L2 self. Nonetheless, it was found in the direct feedback group that the learners with lower Ideal L2 self improved faster in accuracy than their peers with higher Ideal L2 self. Besides, Ideal L2 self was a marginally non-significant but negative predictor of the accuracy scores in the delayed post-test. According to the L2 Motivational Self System, learners are motivated to learn an L2 by the desire to reduce the discrepancy between their actual and ideal selves (Dörnyei, 2009). However, such a discrepancy was not addressed in this project. Hence, this present finding may suggest that the discrepancy between the actual and ideal selves, not necessarily Ideal L2 self, has a positive relationship with the effects of direct feedback. However, empirical studies addressing this discrepancy are needed to test this inference.

On the other hand, this project revealed that L2 motivation, including each of the L2 motivational variables, did not significantly moderate the effects of direct feedback and metalinguistic explanation on the development of the recognition of the need to use passive voice over time. As metalinguistic explanation provides the rule underlying the error it points out, the learner can achieve a higher quality of understanding of written CF with less effort. By comparison, direct feedback provides the correct form, but not the rule underlying the correction. In order to understand why he/she is corrected, the learner needs to make some effort to figure out the underlying rule. Nonetheless, as meaning is universal, and thus can develop faster than form. Figuring out the occasions to use the passive voice, which is meaning-related and contributes to the development of the recognition of the need to use passive voice, demands less effort than figuring out the passive structure, which is form-related and contributes to the development of accurate use of the passive voice. As a result, L2 motivation, the effort in L2 learning (Kormos, 2012), did not significantly moderate the effect of direct feedback on the development of the recognition of the need to use passive voice in this project. However, more research into the issue of the moderation of L2 motivation on the effects of written CF on partial development of a target feature is needed to test these inferences.

CHAPTER 6

THE MULTI-CASE STUDY:
RESULTS AND DISCUSSION

6.1 Introduction

The quasi-experiment revealed the efficacy of written CF among a group of learners, and this efficacy has been presented in Chapter 5. The quasi-experiment also revealed that the learners differed in the extent to which they benefited from written CF in terms of accurate development. As stated in Chapter 4: Methodology, two quasi-experiment participants in the metalinguistic explanation group were invited to participated in the follow-up multi-case study. Regarding the accurate use of the target feature, one of them improved most in the metalinguistic explanation group, the other made no improvement at all. Addressing RQ 5, the multi-case study explored the possible causes of the different extents to which the two learners benefited from written CF. Both quantitative data generated by writing tests and the revision task and qualitative data generated by stimulated recall interviews were analysed. As presented in Chapter 4: Methodology, the quantitative data analysis focused on the accurate use of the target feature in the texts. Descriptive statistics of writing accuracy are presented in Table 6.1. As there were only two kinds of revision types in the multi-case study (i.e. successful and unsuccessful revision), only scores of successful revision were presented in Table 6.1.

Table 6.1: Scores of accuracy of the two participants in the multi-case study

Scores	Jane	Kate
Pre-test (i.e. Writing 1)	75	0
Revision	0	80
The immediate post-test (i.e. Writing 2)	85.7	60
The delayed post-test (i.e. Writing 3)	25	50

The qualitative data about the cognitive processing of written CF in the treatment session and the data about the cognitive processing of written CF in a new writing task were analysed separately. The analysis of the former instances was conducted with reference to Bitchener's (2016) model of initial cognitive processing of written CF; the

analysis of the latter instances was conducted with reference to Bitchener's (2016) model of cognitive processing of written CF in a new writing task (see Section 4.5.5.2).

The following sections will present, then discuss the synthesis of the results of quantitative data analysis with those of qualitative data analysis. First, the two participants' cognitive processing of written CF in the three sessions (the treatment session, the immediate post-test and the delayed post-test) is presented subsequently, followed by the consistency in their cognitive processing of written CF in the two post-tests. Then, the treatment effect of stimulated recall on each participant's cognitive processing of written CF in the delayed post-test is presented for an objective evaluation of the long-term effect of written CF on their cognitive processing in a new writing task before the findings are summarized. Finally, the key findings which answer RQ 5 are discussed with reference to the relevant theoretical claims and the relevant previous studies reviewed in Chapter 2 and Chapter 3 respectively.

6.2 Results

6.2.1 Both students' cognitive processing of written CF in the treatment session

The analyses of Jane and Kate's cognitive processing of written CF in the treatment session, revealed both similarities and differences in their initial cognitive processing of written CF.

6.2.1.1 Similarities in their initial cognitive processing of written CF

Similarities in the two students' cognitive processing of written CF in the initial written CF episode were found at the stages of cognitive processing which both students went through:

• attention to form/accuracy and written CF
• noticing the gap pointed out by written CF
• understanding of written CF
• application of written CF in revision
• production of the modified output

First, Jane showed a general tendency to form/accuracy and written CF in the treatment session. This was illustrated in her general comment on her focus in revision:

J: I focused on the subject of the composition.
R: What was the subject?
J: The glass bottle. It has always been re-created by people (Here, she used and stressed the "bei" construction in Chinese). I have always

been remembering to use the passive voice.

This excerpt revealed that Jane kept attending to the passive voice, the form targeted by written CF.

Likewise, Kate's general tendency to form/accuracy and written CF was illustrated in her general comment on her focus in revision, too: "I focused on the marked errors". This tendency was shown again in her recall of a specific revision: "I just thought that I should correct it successfully."

The gap pointed out by written CF was noticed by Jane. This was illustrated in her final comment on her focus in revision: "Because you pointed it out to me (in the written CF)."

Kate also noticed the gap pointed out by the written CF. This was illustrated in her explanation of how she focused on the marked errors in revision: "Read all the written CF first. Then, started to copy the text for revision. Stopped at the marked errors while copy. Read the relevant explanation again." Her noticing of the gaps was revealed again and again while she was recalling the revision of specific errors. For example, "when I saw the cross, I knew the word was incorrect. Read the explanation… (revised 'throw' into 'thrown')" and "first, I saw 'transport' was crossed, I knew it was incorrect. Then, I read the explanation…(revised 'transport' into 'transported')".

Messages conveyed in written CF were understood by Jane as she recalled her cognitive processing while revising the marked error: "Then, I remembered to use the passive voice. 'Auxiliary be' plus the past participle". Her understanding of written CF was further illustrated in her recall of a self-initiated revision: "Still, needed to use the passive voice… Because the subject of the sentence is an object (revised 'flow' into 'flowed')."

Similarly, Kate's understanding of written CF was illustrated in her recall of specific revised points, too. For example, "Then I read the explanation, knew it was a regular verb, should add 'ed' (revised 'wash' into 'washed'", and "I read the explanation again, 'no passive form' (revised 'can be flow' into 'can flow')".

Finally, Jane's application of written CF in revision was also illustrated in her recall of specific revised points. For example, "the passive voice should be used here. 'Auxiliary be' plus the past participle …I was retrieving the past participle of 'put'. Thought

should add 'ed' (a self-initiated revision: added 'ed' to 'put')", 'I remembered to use the passive voice. Auxiliary be + the past participle (the marked error; revised 'put' into 'be putted')", and "still needed to use the passive voice… Because the subject of the sentence is an object (a self-initiated revision: revised 'flow' into 'are flowed')." Hence, Jane's recall of her cognitive processing of written CF while revising this point was in line with her score of successful revision: 0.

Like Jane, Kate's application of written CF was revealed in her recall of specific revised points, too. For example, "I read the explanation again, 'no passive form'. Thus, I crossed out 'be' (revised 'can be flow' into 'can flow')." In addition, Kate's application of written CF was also revealed in her explanation of how she focused on the marked errors in revision in general: "When I saw the cross, I knew it was incorrect. Then, I read the explanation and example at the bottom of the page. After that, I corrected it with reference to the example."

An examination of their original texts and the revised texts (i.e. the modified output), revealed that there were errors in formation of the passive structure in both students' revised texts.

In Jane's revised text, the only marked error was not modified successfully:

"Second, the broken glass bottles will put in the furnace". →
"Second, the broken glass bottles are putted in the furnace".

Although she showed recognition of the need to use the passive voice in the revision, her formation of the passive structure was unsuccessful with the incorrect past participle form of "put". The same error occurred in one of her self-initiated revised points, too:

"Then, them will be put in a recycling bin".→
"Then, them will be putted in a recycling bin".

Similarly, in Kate's revised text, one of the marked errors was modified unsuccessfully:

"The glass bottles can be throw in recycling bin".→
"The glass bottles to thrown in recycling bin".

Although Kate successfully formed the past participle of "throw" in revision, her formation of the passive structure was unsuccessful because the "auxiliary be" in the original sentence was missed out in the revision.

In short, both Jane and Kate generally attended to form/accuracy and written CF in the treatment session. Moreover, both noticed the gap pointed out by written CF, understood written CF and applied written CF in revision. In addition, their modified output revealed that there were errors in both students' formation of the passive structure.

Apart from the above similarities, differences were found in their cognitive processing of written CF in the initial written CF episode, too.

6.2.1.2 Differences in their initial cognitive processing of written CF

Differences in their cognitive processing of written CF in the initial episode were found in the stage of self-reflection, in the degree of active application of written CF, in the frequency of noticing of the gap pointed out by written CF, and in the extent of accuracy of the modified output.

6.2.1.2.1 Difference in reflection

Reflection is a stage existing in Jane's cognitive processing of written CF, but not in Kate's. After understanding written CF, Jane reflected on her cognitive processing while writing the original sentence. This was first revealed in her recall of the revision of the marked error:

> R: What were you thinking while revising it?
> J: When I was writing this point, I didn't think about the passive voice.
>   I just used it as the subject and translated the sentence word for
>   word from Chinese. Because there was no "bei" construction in its
>   Chinese version…Then, remembered to use the passive voice."

Jane's self-reflection was further illustrated in her final comment on her focus in revision: "Because you pointed it (the passive voice) out to me (in the written CF)… Also because I didn't have that sense while writing the first draft…The sense of voice."

6.2.1.2.2 Difference in the degree of active application of written CF in revision

Jane's application of written CF in revision was not confined to the marked error. Besides the marked error, she revised two unmarked points:

> "Then, them will be put in a recycling bin". →
> *"Then, them will be putted in a recycling bin".*

> And

> "Last, them will flow into other box". →
> *"Last, them are flowed into other box".*

Jane's recall of these self-initiated revisions revealed she was applying written CF to detect and correct errors herself:

> J: Should use the passive voice here. Auxiliary be +the past participle.
> R: You thought I missed out this error?
> J: You didn't pointed out all my errors (the former self-initiated revision).
>
> And
>
> R: What were you thinking while revising it?
> J: "Still, needed to use the passive voice…Because the subject is an object (the latter self-initiated revision)."

It should be pointed out that, in both cases, Jane's self-initiated application of written CF resulted in modification of the originally correct forms into incorrect forms. However, these modifications revealed her active application of written CF.

In contrast, Kate's application of written CF was confined to the marked error. This was illustrated in her explanation of how she focused on the marked errors in general: "I copied the original text. Stopped at the marked errors, read the relevant explanation again, paid special attention to the example and corrected the errors with reference to the example." In other words, Kate applied written CF only on the occasions where an error was pointed out by written CF. For the rest of the text, she just copied them. Hence, though both students applied written CF in revision, Jane was more active than Kate in the application.

6.2.1.2.3 Difference in the frequency of noticing of the gap pointed out by written CF

In Jane's original draft, there was only one marked error: underuse of the passive voice (i.e. the active voice was used on the occasion where the passive voice should have been used). Both "occasion to use the passive voice" and "the passive structure" were provided in the written CF. Jane's recall showed she noticed the gap pointed out by written CF only when she was modifying the sentences. For example, "the passive voice should be used here. Auxiliary be + the past participle (a self-initiated revision: added 'ed' to 'put')", "then, I remembered to use the passive voice. 'Auxiliary be + the past participle' (revision of the marked error: revised 'put' into "are putted')", and the following excerpt:

> J: Still, needed to use the passive voice.
> R: Then, the structure of the passive voice came out: "Auxiliary be" plus

> the past participle?
> J: Yeah.
> R: You had a strong sense to use the passive voice in revision.
> J: Yes, because the subject of the sentence is an object (a self-initiated revision: revised 'flow' into 'are flowed').

Hence, Jane noticed the gap (both occasion to use the passive voice and the passive structure) three times in the treatment session.

In Kate's original draft, there were five errors: one in the formation of the past participle for irregular verbs, three in the formation of the past participle for regular verbs, and one in the overuse of the passive voice with the intransitive verb. According to Kate's explanation of how she focused on the marked errors in revision, she "read all the written CF first. Then (she) started to copy the text for revision. Stopped at the errors. Read the explanation and example, and corrected the errors with reference to the example." Hence, the formation of the past participle for the irregular verbs and overuse of the passive voice with the intransitive verb were noticed twice respectively, while the formation of the past participle for the regular verbs were noticed six time in the treatment session.

Therefore, no matter whether written CF in general or a single written CF component is concerned, Kate noticed the gaps pointed out by written CF more frequently than Jane. The frequency of both students' noticing of gaps pointed out by written CF in general and each written CF component is summarized in Table 6.2 below.

Table 6.2: Summary of frequency of noticing of the gaps

Times of Jane's noticing of the gaps (total: 6)		Times of Kate's noticing of the gaps (total: 10)		
Occasion to use pv	The pv structure	Formation of pp for regular verbs	Formation of pp for irregular verbs	Overuse of pv with vi.
3	3	6	2	2

Note: pv = the passive voice; pp = the past participle; vi. = the intransitive verb

6.2.1.2.4 Difference in the extent of accuracy of their modified output

In Jane's revised text, there were three cases of modification, and all were incorrect when the target form (the passive voice) was concerned:

> S1: "Then, them will be put in a recycling bin". →
>   *"Then, them will be putted in a recycling bin"*.
> S2: "Second, the broken glass bottles will put in the furnace". →

> *"Second, the broken glass bottles are putted in the furnace".*
> S3: "Last, them will flow into other box".→
> *"Last, them are flowed into other box".*

It should be noted that revision of S1 and S3 were self-initiated.

In Kate's revised text, there were five cases of modification, all involved the marked errors:

> S1: "The glass bottles can be throw in recycling bin".→
> *"The glass bottles to thrown in recycling bin".*
> S2: "Those glass bottles can be transport to factory by car".→
> *"Those glass bottles can be transported to factory by car".*
> S3: "Then, those glass bottles can be wash in factory".→
> *"Then, those glass bottles can be washed in factory".*
> S4: "Glass bottles can be heat in furnace".→
> *"Glass bottles can be heated in furnace".*
> S5: "The last, the melt glass bottles can be flow into mould".→
> *"The last, the melt glass bottles can flow into mould".*

Among them, four were correct, and one was incorrect when the target form was concerned. Hence, in general, Kate's modified output was more accurate than Jane's.

In short, the two students differed in that Jane reflected on her cognitive processing in writing the original draft in the treatment session, while Kate did not. Moreover, although both students applied written CF in revision, Jane's application was more active with the application not confined to the marked error. Nonetheless, Kate noticed the gaps pointed out by written CF more frequently than Jane. And generally speaking, Kate's modified output was more accurate than that of Jane's.

To sum up, the recall of Jane and Kate's treatment session revealed both similarities and differences in their cognitive processing of written CF in the initial written CF episode. On the one hand, both students showed a general tendency to form/accuracy and written CF. And both noticed the gaps pointed out by written CF, understood the written CF and applied it in revision. Moreover, their modified output revealed both had problems with the formation of the passive structure. On the other hand, the recall showed that written CF triggered Jane's reflection of her cognitive processing in writing the original draft, but not Kate's. Also, while Kate's application of written CF was confined to the marked errors, Jane's was not. Jane actively used what was learnt from written CF to monitor the whole original text. Thus, she detected and "corrected" two "errors" that were "missed out" by the researcher in her eyes. Besides, Kate noticed the gaps pointed

out by written CF more frequently than Jane, and Kate's modified output was generally more accurate than Jane's.

6.2.2 Both students cognitive processing of written CF in the immediate post-test

The analyses of Jane and Kate's recalls of written CF in the immediate post-test revealed more similarities than differences in their processing of written CF in this piece of writing.

6.2.2.1 Similarities in their cognitive processing of written CF in immediate post-test

Similarities in the two students' cognitive processing of written CF in immediate post-test were found in all the three phases of writing (i.e. planning, execution and monitoring) as well as in the components of written CF they retrieved in writing.

6.2.2.1.1 Similarities in their cognitive processing of written CF in planning

Both Jane and Kate attended to meaning and form in planning. Jane's attention to meaning in planning was illustrated in her response to the question about her focus in planning: "(I focused on) the explanation under the pictures… (They) told me what to be emphasized in the picture. Thus helped me to figure out the logic in writing…" Jane's attention to form in planning was illustrated in her explanation about why she retrieved written CF in planning: "In planning, I retrieved your last written CF to avoid the same error."

Similarly, Kate attended to both meaning and form in planning, too. This was illustrated in her recall about her focus in planning: "First, I thought about the content of writing, and found out the subject and tense to be used."

6.2.2.1.2 Similarities in their cognitive processing of written CF in execution

Both Jane and Kate went through all the stages of execution when cognitively processed written CF:

• establishment of the relationship between the meaning to be expressed and the form targeted in written CF
• identification of the need to use the knowledge newly learnt from written CF
• retrieval of the knowledge newly learnt from written CF
• application of the retrieved written CF knowledge
• output.

Jane's recall of writing of a sentence in the passive voice revealed that she established the relationship between the meaning to be expressed and the form targeted in written

CF: "What's this? Stones. I thought it was inanimate too. So, the passive voice should be used here." Her identification of the need to use written CF and retrieval of written CF were illustrated in her recall of her writing of another sentence in the passive voice: "I used 'temple' as the subject. So, the passive voice should be used."

Her general comment on her cognitive processing in execution illustrated how she first established the relationship between the meaning to be expressed and the form targeted in written CF, then identified the need to use written CF and retrieved written CF:

> R: That is, whenever you saw the subject was inanimate (establishment of the relationship between meaning to express and the form targeted in written CF) —
> J: I would think of the passive voice (identification of the need to use written CF + retrieval of written CF).

Her recall of writing of another sentence illustrated her cognitive processing from identification of the need to use written CF to application of the retrieved written CF knowledge:

> J: At the beginning, I wanted to write "It will move to the new site" (the Chinese version of this sentence).
> R: Then?
> J: Then, the passive voice flashed by because I saw "temple" at the beginning of the sentence (identification of the need to use written CF + retrieval of written CF). So, I still wrote in the passive voice, and didn't wrote "will move to" (application of the retrieved written CF).

An examination of her output confirmed this recall of application: *The temple will be moved to Agilkia.*

Likewise, Kate's recall of writing of specific sentences revealed the cognitive processing stages she went through in execution. Her establishment of the relationship between the meaning to be expressed and the form targeted in written CF was illustrated in her recall of writing of the first sentence in the passive voice: "Felt quite self-contradictory. It is an intransitive verb. But in meaning, it is passive, and demands change of the verb form." Her recall of writing of the verb illustrated her identification of the need to use written CF and retrieval of written CF: "When I was writing the intransitive verb, I thought about my errors in last writing and the written CF to them." What was retrieved at that moment was revealed in her elaboration of the process of reconciliation: "the passive voice: auxiliary be + the past participle. There are regular

verbs and irregular verbs. For the regular ones, add 'ed'. Irregular ones are in that table (the table of irregular verbs)," and "But I remember the word 'build' has no passive form. It is an intransitive verb". With the feeling of contradicting herself, she applied the retrieved written CF knowledge: "I felt self-contradictory. Because it was built (stressed 'bei' construction in Chinese). But I remember the word 'build' has no passive form. It is an intransitive verb. Thus, I reconciled the two together."

Kate's recall of this application revealed that she noticed the contradiction between the two kinds of components in written CF — overuse of the passive voice with the intransitive verb and the formation of the past participle for regular and irregular verbs respectively, and tried to use both kinds of written CF components in the formation of the predicate of this sentence. An examination of her output confirmed this recall of application: *The temple of Isis was build with Potolemy II.*

Kate's recall of the third sentence in the passive voice showed more fluently how she went through all the cognitive processing stages of execution as she did not report feeling of contradicting herself while producing this sentence:

> K: Because the stone carvings were inanimate, they were submerged by water. So, I used the passive voice (establishment of the relationship between meaning to express and the form targeted in written CF).
> R: The form of the verb?
> K: Actually, I didn't know this word. For the unknown verbs, I usually consider them as regular (identification of the need to use written CF). Thus, added "ed" (retrieval of written CF + application of the retrieved written CF).

An examination of her output confirmed this recall of application: *The stones carvings of temple were submerged.*

6.2.2.1.3 Similarities in their cognitive processing of written CF in monitoring

Like their cognitive processing in execution, both students went through all the stages of monitoring:

- attention to form
- identification of the need to use the knowledge newly learnt from written CF
- retrieval of the knowledge newly learnt from written CF
- application of the retrieved knowledge
- confirmation/modification of the output.

Jane's attention to form in monitoring was first illustrated in her recall of her focus in monitoring in general: "(I focused on) grammar and spelling." Later, it was shown again in her elaboration of how she proofread the verbs in the sentences in the passive voice in general: "When I proofread these verbs, I thought whether the form was correct. The form of the past participle."

How Jane went through all the cognitive processing stages in monitoring was completely illustrated in her recall of proofreading of the last sentence in the passive voice:

> J: I was thinking whether I should add "ed" or not (attention to form).
> R: Can you elaborate this process?
> J: I thought: add, don't add. Thought like this for a while, then decided: don't add to save some work. I sometimes behave like that.
> R: How did you decided whether to add "ed" or not? You weren't throwing the coin, were you?
> J: How to say? I was thinking: it is a verb (identification of the need to use written CF), auxiliary be plus verb (retrieval of written CF). So neglected "ed" (application of retrieved written CF).

An examination of her output confirmed this recall of application: *So, the temple of Isis was reopen in 1980.*

It should be noted that the written CF Jane retrieved here (i.e. auxiliary be + verb), is a distorted version of the passive structure in written CF. This revealed that Jane did not correctly understand this written CF component (i.e. the passive structure) at this moment. As a result, application of this incorrect knowledge in the phase of monitoring led to the error in the final output. Hence, Jane's recall of her cognitive processing of written CF while monitoring this point was in line with her accuracy score in the immediate post-test: 85.7.

Likewise, Kate also went through all the cognitive processing stages of monitoring. Kate's attention to form in monitoring was illustrated in her recall of her focus in this phase in general: "I focused on the tense and the passive voice." Her recall of proofreading of the first sentence in the passive voice revealed how she identified the need to use written CF, retrieved written CF, then, applied the retrieved written CF and confirmed the output produced in execution:

> R: Take this word as an example.
> K: Because I remembered it was an intransitive verb (identification of the need to use written CF). But felt that the passive voice should

be used here. And this verb shouldn't be used in the passive voice (retrieval of written CF). Quite self-contradictory. Thus, kept the reconciliation (application of the retrieved written CF + confirmation of the output produced in execution).

An examination of her output confirmed this recall of application and confirmation: *The temple of Isis was build with Ptolemy II.*

Later, her recall of proofreading of the second sentence in the passive voice illustrated her complete cognitive processing of written CF in monitoring:

> R: What were you thinking while proofreading it?
> K: I was thinking whether the form was correct (attention to form). The past participle form (identification of the need to use written CF).
> R: Can you detail it?
> K: I didn't know this verb. Guessed as usual. Considered it as a regular verb. Thus, added "ed" (retrieval of written CF + application of the retrieved written CF).

An examination of her output revealed the output produced in execution was confirmed: *The stones carvings of temple were submerged.*

6.2.2.1.4 Similarities in the components of written CF they retrieved in the immediate post-test

Both students retrieved all the components of written CF in the immediate post-test. Jane retrieved both "occasion to use the passive voice" and "the passive structure" in planning. This was illustrated in her response to questions exploring her cognitive processing in planning:

> R: You thought about to use the passive voice while planning. Then, did you thought further about the passive voice in details?
> J: I thought if the temple was the subject, I would use the passive voice (retrieval of written CF: occasion to use the passive voice).
> R: Then, did you thought about things such as the structure of the passive voice?
> J: Yes (retrieval of written CF: the passive structure).
> R: During planning or execution?
> J: In planning.

Likewise, Kate also retrieved all the components of written CF, overuse of the passive voice with the intransitive verb and respective formation of the past participle for regular and irregular verbs, but in execution. This was illustrated in her recall of her writing of the first sentence in the passive voice:

R: What were you thinking while writing? Writing these two words, "was build".

K: I felt self-contradictory. Because it was built (stressed 'bei' construction in Chinese). But I remember the word 'build' has no passive form. It is an intransitive verb (retrieval of written CF: overuse of the passive voice with the intransitive verb) Thus, I reconciled the two together.

R: Reconciled the two together. Can you speak out the processes of reconciliation?

K: The passive voice: auxiliary be + the past participle. There are regular verbs and irregular verbs. For the regular ones, add 'ed'. Irregular ones are in that table (the table of irregular verbs) (retrieval of written CF: the respective formation of the past participle for regular and irregular verbs).

R: You recalled all these at that time?

K: Yeah. Felt quite self-contradictory. It is an intransitive verb. But in meaning, it is passive, and demands change of the verb form.

In short, the immediate post-test of both Jane and Kate consisted of three phases: planning, execution and monitoring. Both students went through all the stages of cognitive processing of written CF in both execution and monitoring after they both attended to meaning and form in planning. Besides, they both retrieved all the components of written CF in the immediate post-test.

Apart from the above similarities, differences were found in their cognitive processing of written CF in the immediate post-test.

6.2.2.2 Differences in their cognitive processing of written CF in the immediate post-test

Differences in their cognitive processing of written CF in the immediate post-test were found in the phases of planning and monitoring as well as in the phases where the retrieval of all the written CF components took place.

6.2.2.2.1 Differences in their cognitive processing of written CF in planning

Although both students attended to meaning and form in planning, Jane went through all the stages of planning when cognitively processed written CF, while Kate moved on to the next phase, execution, after attending to meaning and form in this phase.

Besides attention to meaning and form, Jane also identified the need to use written CF in planning. This was revealed in her responses to questions exploring her cognitive processing in planning:

R: Did you plan in Chinese or in English?
J: In Chinese.

> R: Then, which voice was used more often in planning?
> J: The passive voice. Because your written CF reminded me just now.
>   I have memorized that the passive voice should be used when the
>   subject of a sentence is an object.

In Chinese, the active voice is used more often than the passive voice. In some cases, even if the meaning is passive, the passive voice is not used (see Section 2.3). Jane's responses in this excerpt revealed that she noticed the issue of voice, and identified the need to use written CF in planning.

How Jane retrieved the written CF in planning was illustrated in her responses to the question in further exploration:

> R: You thought about to use the passive voice while planning. Then,
>   did you think further about the passive voice in details?
> J: I thought if the temple was the subject, I would use the passive voice
>   (retrieval of written CF: occasion to use the passive voice).
> R: Then, did you think about things such as the structure of the passive
>   voice?
> J: Yes (retrieval of written CF: The passive structure).
> R: During planning or execution?
> J: In planning.

In contrast, Kate attended to meaning and form in planning, but her cognitive processing of written CF was not developed in planning: she did not identify the need to use the passive voice. Nor did she retrieve written CF in planning. This was illustrated in the following excerpt:

> R: Then, in planning, after you noticed that "temple" would be the subject
>   recurrently, to what extent did you notice the passive voice would be used
>   recurrently?
> K: No. I only thought about the voice when I was writing about each picture.

The passive voice was targeted in written CF. This excerpt showed that, as Kate did not think about voice in planning, she did not notice the passive voice at all at that time. Thus, she failed to identify the need to use the passive voice and retrieve written CF in planning.

6.2.2.2.2 Differences in their cognitive processing of written CF in monitoring
Although both students went through all the stages of monitoring when cognitively processed written CF, their retrieval of written CF in this phase revealed a difference in the consistency in their understanding of written CF: Jane's understanding was not consistent, while Kate's was.

In monitoring, when Jane was retrieving written CF, one incident of misunderstanding of written CF was revealed in her retrieval. The excerpt below is her recall of proofreading the last sentence in the passive voice:

> J: I was thinking whether I should add "ed" or not (attention to form).
> R: Can you elaborate this process?
> J: I thought: add, don't add. Thought like this for a while, then decided: don't add to save some work. I sometimes behave like that.
> R: How did you decided whether to add "ed" or not? You weren't throwing the coin, were you?
> J: How to say? I was thinking: it is a verb (identification of the need to use written CF), auxiliary be plus verb (retrieval of written CF). So neglected "ed" (application of retrieved written CF).

It was noted that the passive structure she retrieved here was incorrect with "the past participle" replaced by "verb".

In contrast, Kate reported retrieval of written CF only on two occasions in monitoring. And neither showed incorrect understanding of written CF (see the last two excerpts in Section 6.2.1.3).

6.2.2.2.3 Differences in the stages where all the components of written CF were retrieved

As revealed in Section 6.2.1.4, both students retrieved all the written CF components in the immediate post-test. However, Jane did it in planning, while Kate did it in execution (see Section 6.2.1.4 for the relevant excerpts).

In short, Jane and Kate's cognitive processing of written CF in the immediate post-test differed in that Jane went through all the cognitive processing stages in planning, while Kate did not. Moreover, one incident of misunderstanding of written CF was revealed in Jane's retrieval of written CF in monitoring, while no such incident was observed with Kate's retrieval of written CF. Finally, Jane retrieved all the written CF components in planning, while Kate did so in execution.

To sum up, the two students' cognitive processing of written CF in the immediate post-test shared something in common and displayed the uniqueness of each student simultaneously. On the one hand, both students went through planning, execution and monitoring while writing the text. They both attended to meaning and form in planning, then went through all the stages of execution and monitoring when cognitively processed written CF. Moreover, both students retrieved all the written CF components in the immediate post-test.

On the other hand, differences in their cognitive processing of written CF were found first in planning. Jane identified the need to use written CF, and consequently retrieved written CF in planning. In contrast, Kate did not go through these two stages of planning. Secondly, they differed in the consistency in understanding of written CF in the immediate post-test. According to their recalls, Jane misunderstood one component of written CF, the passive structure, once in the phase of monitoring, while Kate's understanding of all the written CF components was correct all the time. Finally, they differed in the stages where they retrieved all the written CF components: Jane did it in planning, while Kate did it in execution.

6.2.3 Both students' cognitive processing of written CF in the delayed post-test

The analyses of Jane and Kate's recalls of written CF in the delayed post-test revealed both similarities and differences in their processing of written CF in this session. They will be presented subsequently in this section.

It should be pointed out that, as Jane reported that she had not time to proofread her text in this session, her delayed post-test consisted of two phases: planning and execution. By comparison, according to Kate's recall, her delayed post-test consisted of three phases: planning, execution and monitoring. Hence, data from Kate's monitoring phase were analysed and used to illustrate findings generated from the data from both students in the phases of planning and execution.

6.2.3.1 Similarities in their cognitive processing of written CF in the delayed post-test

Similarities in the two students' cognitive processing of written CF in the delayed post-test were found in the two writing phases that both students experienced in writing (i.e. in planning and execution) as well as in the consistency in their understanding of written CF in the delayed post-test.

6.2.3.1.1 Similarity in their cognitive processing of written CF in planning

Both Jane and Kate went through all the stages of planning when cognitively processed written CF:

• attention to meaning and form
• identification of the need to use the knowledge newly learnt from written CF
• retrieval of the knowledge newly learnt from written CF.

Jane's attention to meaning and form as well as her identification of the need to use written CF were illustrated in her recall of her focus in planning:

> R: What did you focus on while planning?
> J: To tell the story from the beginning to the end. That is, what was the
>   story about (attention to meaning).
> R: Why focused on it?
> J: To be more logic while writing.
> R: Then?
> J: Focused on what the subject was (attention to form). Then, decided
>   whether I should use the active voice or the passive voice
>   (identification of the need to use written CF).
> R: Why focused on subject?
> J: According to the task requirement (Pointing to the sheet of task
>   requirement). What happened to the boy and the dog.
> R: Why focused on the active voice or the passive voice?
> J: So that I could know where to use them.

Her retrieval of written CF was illustrated in her recall about what was retrieved in planning:

> R: What did you recall?
> J: On what occasions that the passive voice should be used. Its
>   structure. Whether the subject is inanimate (retrieval of written CF:
>   occasion to use the passive voice + the passive structure).

Likewise, Kate also went through all the cognitive processing stages of planning. Her attention to meaning and form was illustrated in her recall of her focus in planning: "Focused on content, tense and voice." Her identification of the need to use written CF and retrieval of written CF were illustrated in the following excerpt:

> R: Did you recall my written CF given to you last month?
> K: Yes.
> R: When?
> K: In planning. Because I noticed the voice and tense to be used in this
>   Writing (identification of the need to use written CF). I retrieved
>   my errors pointed out by your last written CF (retrieval of written
>   CF).
> R: What were the errors?
> K: Errors in the past participle. I didn't differentiate the bare infinitive,
>   past tense and past participle of verbs (retrieval of written CF:
>   distorted version).

It should be noted that the written CF Kate retrieved here was a completely distorted version of the last written CF given to her. The last written CF consisted of three

components: overuse of the passive voice with the intransitive verb and the formation of the past participle for regular and irregular verbs respectively.

6.2.3.1.2 Similarity in their cognitive processing of written CF in execution

First, like the case in planning, both students went through all the cognitive processing stage of execution:

• establishment of the relationship between the meaning to be expressed and the form targeted in written CF
• identification of the need to use the knowledge newly learnt from written CF
• retrieval of the knowledge newly learnt from written CF
• application of the retrieved written CF knowledge
• output.

Jane's recall of writing the first sentence in the passive voice illustrated how she went through all the cognitive processing stage in execution:

> R: What were you thinking while writing these? (Pointing to "The dog was chased").
> J: I saw, in the picture, the dog was chased by a swarm of bees (Stressed "bei" construction in Chinese) (establishment of the relationship between the meaning to be expressed and the form targeted in written CF + identification of the need to use written CF).
> R: "Bei". So, you used the passive voice.
> J: Yeah.
> R: I mean, what were you thinking and focusing on in implementation?
> J: Should use the passive voice (retrieval of written CF: occasion to use the passive voice).
> R: Then?
> J: Thought about the structure of the passive voice.
> R: Then?
> J: Nothing else.
> R: Nothing else. Then, you added 'ed" naturally while writing?
> J: Also thought about this word. Should add "ed" or change it into other forms.
> R: How did you make the decision?
> J: Decided whether it was regular.
> R: How?
> J: According to my memory, it was regular.
> R: That is, in planning, you thought about "chase", there was "bei" construction. So, you should use the passive voice. Also, you thought about the structure of the passive voice: "auxiliary be" plus the past participle Then, thought about the form of the past participle was related to the distinction between regular and irregular verbs. You thought about it in such details. Then, in implementation, this cognitive process was repeated.
> J: Yes.

R: Then, because you were going to write this word, you thought
   further Whether "chase" was regular. And this step involved
   retrieval from your memory.
J: Yeah.
R: In your memory, it is a regular verb. So you added—
J: "d" (application of written CF retrieved).

An examination of her output confirmed this recall of application: *The dog was chased.*

Jane's retrieval and application of written CF were also illustrated in her recall of

writing another sentence in the passive voice:

R: What were you thinking while writing?
J: Should use the passive voice (retrieval of written CF: occasion to
   use the passive voice).
R: Then?
J: The structure of the passive voice: auxiliary be plus the past
   participle (retrieval of written CF: the passive structure). Then,
   started to write (application of written CF retrieved).

An examination of her output confirmed this recall of application: *Tom was picked up.*

These two stages of cognitive processing of written CF were revealed again in her recall

of writing a sentence in the passive voice, but with the incorrect past participle form:

R: What were you thinking in execution?
J: Execution? Just thought I should use the passive voice. The
   structure of the passive voice (retrieval of written CF: occasion to
   use the passive voice + the passive structure). Then added the past
   participle form (application of written CF retrieved).

An examination of her output revealed that past tense of the main verb, "throw", not the

past participle, was used: *The boy was threw down.*

Nonetheless, according to Jane's recall, she figured out the past participle of "throw" in

planning, and considered "threw", not "thrown" as the past participle at that time:

J: I was recalling "threw, thrown".
R: What were you thinking at that time, not now.
J: Thought to change "o" into "e" at that time.
R: You thought "e" is the past participle at that time?
J: Yeah.

As Jane considered "threw" as the past participle form of "throw" at that time, her

output, "The boy was threw down", confirmed this recall of application: she was using

the passive structure, auxiliary be + the past participle.

Like the case of Jane, Kate also went through all the cognitive processing stages of execution. And this was fully illustrated in her recall of writing the first sentence in the passive voice, too:

> R: What were you thinking then?
> K: Because in Chinese, it was "the boy was bitten" (stressed "bei" construction in Chinese) (establishment of the relationship between the meaning to be expressed and the form targeted in written CF). I thought about the past participle of "bite" (retrieval of written CF: errors in the past participle).
> R: Please slow down. When you noticed "bei" construction in Chinese, you thought about —
> K: The passive voice (identification of the need to use written CF) and the past participle of "bite" (retrieval of written CF: errors in the past participle).
> R: Then?
> K: Thought about the tense. Past tense.
> R: Then?
> K: The passive voice: auxiliary be + the past participle. The past tense of "be" is "was".
> R: What did you attended to next?
> K: The past tense of "bite" (retrieval of written CF: differentiation of verb forms). Then, wrote (application of written CF retrieved).
> R: Not the past participle of "bite" this time?
> K: No. Because auxiliary be + past tense. Not the past participle Different forms (retrieval of written CF: differentiation of verb forms).

An examination of the output confirmed this recall of application: *The boy was bit.*

Kate's identification of the need to use written CF, retrieval of and application of the retrieved written CF (still the distorted version of written CF) were illustrated again and again in her recalls of writing the subsequent sentences in the passive voice:

> R: What were you thinking while writing this sentence?
> K: The passive voice and past tense need to be used (identification of the need to use written CF).
> R: Then?
> K: I wrote "was + past tense" The "ed" form of the verb (retrieval of written CF: differentiation of verb forms + application of written CF retrieved).
>
> And
>
> R: What were you thinking while writing this sentence? Particularly, your processing while writing these two words (pointing to "was frightened")?
> K: The same as above.

An examination of her output confirmed these recalls of application:

> *The boy was chased* (for the former excerpt).
> *The boy was frightened to fall* (for the latter excerpt).

It should be noted that, as in the cases of both "chase" and "frighten", the past tense and the past participle share the same form, both sentences are correct when only the target form (the passive voice) is concerned. As a result, according to obligatory occasion analysis, Kate scored 50 in the delayed post-test (i.e. writing 3) due to the correct output of the target feature on these two occasions (see Table 6.1 for the participants' accuracy scores). Hence, both sentences (i.e. Kate's output here) seemed to illustrate her mastery of the target form and the knowledge in written CF. However, her recall of her cognitive processing while writing these two sentences revealed the opposite, for she was consciously using the past tense, not the past participle in these sentences. Therefore, the points Kate gained for accuracy on these two occasions (i.e. 50 in the delayed post-test) cannot represent the development of the target feature in her IL.

Secondly, both students failed to process written CF on the last obligatory occasion of the passive voice in execution. Jane's failure in processing written CF was illustrated in her recall of writing the last sentence in the passive voice, which was also the last sentence in the text:

> R: But how about this point? (Pointing to the next sentence and the last
>   sentence in the text: "The dog was throw down").
> J: I don't know what happened. I wrote its bare infinitive.
> R: Yeah. Why?
> J: I was writing in a hurry. Running out of time. So, wrote naturally,
>   didn't notice it.
> R: That is, when you were writing this word, you didn't notice it.
> J: No, I didn't.

It was noted that the need to use the passive voice was recognized in the output. However, with "bei" construction in the Chinese version of this sentence, recognition of the need to use the passive voice in this sentence does not necessarily demand the knowledge provided in the written CF (i.e. occasion to use the passive voice). Moreover, due to the limited time, the monitoring phase was absent in this post-test. Also, Jane could only recall she was writing "in a hurry" and "subconsciously". Hence, it can be inferred, due to time pressure, Jane did not process written CF while writing this sentence although she recognized the need to use the passive voice while writing this sentence. As a result, an error with the formation of the passive structure occurred in her output.

Likewise, Kate did not process written CF while writing her last sentence in the passive voice, either. This was illustrated in her recall of writing this sentence:

> R: What were you thinking while writing (pointing to the sentence: The boy was threw down the cliff)?
> K: Actually, I wrote "thrown" in execution. Revised it into "threw" while proofreading.
> R: Why did you write "thrown" in execution?
> K: I felt I had seen "was thrown" before. Thus, wrote like that without more thinking.

An examination of the output confirmed her recall of revising "thrown" into "threw":

> *threw*
> *The boy was* ~~*thrown*~~ *down the cliff.*

Hence, as Kate remembered that she had seen "was thrown" before, she considered and used "was thrown" as a chunk while writing this sentence, as a result, she failed to process written CF while writing this sentence.

6.2.3.1.3 Similarity in the consistency of understanding of the written CF in the delayed post-test

Jane and Kate's retrievals of written CF in the delayed post-test revealed that they both have a consistent understanding of written CF in this session. Jane's delayed post-test consisted of two phases: planning and execution. Her retrieval of written CF in these phases revealed her understanding of written CF in this session was consistent. She retrieved both "occasion to use the passive voice" and "the passive structure" in both planning and execution (see Section 6.3.1.1 and 6.3.1.2 for the relevant excerpts).

Although Kate's delayed post-test consisted of one more phase: monitoring, her retrieval of written CF in the three phases (planning, execution and monitoring) revealed her understanding of written CF in this session was consistent, too. Kate consistently retrieved "errors in the past participle" and "differentiation of verb forms" in the three phases of writing (see Section 6.3.1.1 and 6.3.1.2 for the relevant excerpts). The following excerpt illustrates her retrieval of written CF in the phase of monitoring:

> R: What were you thinking while (pointing to the sentence: The boy was threw down the cliff)?
> K: Actually, I wrote "thrown" in execution. Revised it into "threw" while proofreading.
> R: Why did you write "thrown" in execution?
> K: I felt I had seen "was thrown" before. Thus, wrote like that without more thinking.

R: Then, in proofreading, you thought more carefully?
K: Yeah. Because it (thrown) is the past participle (retrieval of written CF: errors in the past participle). Should be past tense (retrieval of written CF: differentiation of verb forms).

It should be noted that the written CF retrieved by Kate in all the three phases of writing was a distorted version of the last written CF given to her. However, she remained consistent in holding this distorted version of written CF in the delayed post-test.

In short, Jane's delayed post-test consisted of two phases: planning and execution, while that of Kate consisted of three phases: planning, execution and monitoring. Nonetheless, both students went through all the cognitive processing stages of the two phases that they both experienced. Moreover, both failed to process written CF on the last obligatory occasion of the passive voice in execution. In addition, both students' understanding of written CF was consistent in the delayed post-test.

Despite of the above similarities, differences, too, were found in their cognitive processing of written CF in this session.

6.2.3.2 Differences in their cognitive processing of written CF in the delayed post-test
Like the case of similarities, differences in Jane and Kate's cognitive processing of written CF in the delayed post-test were found in the two phases that they both experienced in writing (i.e. in planning and execution).

6.2.3.2.1 Differences in their cognitive processing of written CF in planning
Although both Jane and Kate went through all the stages of planning when cognitively processed written CF, they differed in their understanding of written CF, which was revealed in their retrieval of written CF. Jane retrieved both components of written CF (i.e. occasion to use the passive voice and the passive structure) (see Section 6.3.1.1 for the relevant excerpts). In contrast, though Kate also retrieved written CF, she failed to retrieve any of the three components of written CF (i.e. overuse of the passive voice with the intransitive verb, and the formation of the past participle for the regular verbs and the irregular verbs). Instead, the written CF she retrieved was "Errors in the past participle I didn't differentiate bare infinitive, past tense and the past participle of verbs". That is, Kate forgot all the content of the last written CF in planning of the delayed post-test although she remembered she had received written CF. Because what they retrieved revealed their understanding of written CF at the time of retrieval, it can be inferred that Jane correctly understood written CF in planning, while Kate did not.

6.2.3.2.2 Differences in their cognitive processing of written CF in execution

First, like the case in planning, although both students went through all the cognitive processing stages of execution, they differed in their understanding of written CF, which was revealed in their retrieval of written CF in execution. Jane kept retrieving both components of written CF, while Kate kept retrieving the same distorted version of written CF she retrieved in planning. Thus, the pattern of understanding of written CF in planning was found in execution again: Jane correctly understood both components of written CF, while Kate understood none.

Secondly, though both students failed to process written CF on the last obligatory occasion of the passive voice in execution, this failure in processing written CF led to a difference in their output in execution. When only the target form in written CF (the passive voice) was concerned, Jane's output was incorrect, while Kate's was correct (see the last two excerpts in Section 6.3.1.2).

It should be noted that Kate's final output of this sentence was incorrect because she processed written CF while she was proofreading this sentence in the monitoring phase. As a result, she modified the output produced in execution according to the written CF she retrieved in monitoring, which was the same distorted version of written CF as in planning (see the only excerpt in Section 6.3.1.3).

Thirdly, although both students processed written CF in execution, they differed in the occasions on which the written CF was processed. Kate only processed written CF on obligatory occasions of the passive voice (i.e. only after she had established the relationship between the meaning to be expressed and the form targeted in written CF). In contrast, Jane processed written CF not only on obligatory occasions of the passive voice, but also on occasions where she was using the active voice consciously. In the latter case, Jane was forming the past continuous tense in the active voice with reference to the passive structure. Her cognitive processing on such occasions was illustrated in the following excerpt:

> R: Then, what were you thinking while writing these words?
> J: These words?
> R: Yeah. "The dog was bite".
> J: I thought I should use the active voice.
> R: Anything else?
> R: Past continuous tense. With past continuous tense.
> R: Thought of the form of the active voice the verb?
> J: Yes. "Auxiliary be" plus present participle.

R: Then, look at what you wrote.

J: "Auxiliary be" plus bare infinitive.

R: Yeah. Why didn't you write what you were thinking?

J: I don't know. I now recall that this (Pointing to "bite") is wrong. I should have added "ing" to form the present participle.

R: At that time, you thought to use the active voice, and to use auxiliary be plus present participle. Then, you should have written accordingly.

J: Probably because of the passive voice: auxiliary be plus the past participle (retrieval of written CF: the passive structure). Then, I thought: to form the past participle, I should add "ed"; hence, for the active voice, to form present participle, I shouldn't add 'ed" (application of written CF retrieved).

R: You'd decided to use the active voice. Why did you thought of the passive voice then?

J: Because in planning, when I was making up the story, I always felt the need to use the passive voice in this writing (identification of the need to use written CF).

An examination of her output confirmed her recall of this application: *The dog was bite.*

Jane's such cognitive processing was illustrated further in her recall of producing another sentence in the same way:

R: While you were writing these words, what were you thinking?

J: I was thinking about the structure of the active voice: "Auxiliary be" plus present participle. But my present participle is in the wrong form.

R: Why? You thought about "auxiliary be plus present participle". But wrote "auxiliary be plus bare infinitive".

J: Disturbed by the structure of the passive voice (retrieval of written CF: the passive structure).

R: Why did you thought about the passive voice while writing this point?

J: Because I thought, for the past participle in the passive voice, I should add "ed". So, for present participle in the active voice, I shouldn't add "ed" (application of written CF retrieved).

R: Let me iterate your cognitive process: you first considered that the honeycomb fell down itself. So you should use the active voice. Then, you thought of the structure of the active voice: "auxiliary be" plus present participle. After that, you thought about the structure of the passive voice: "auxiliary be" plus the past participle And to form the past participle, you should add "ed".

J: Yeah.

R: Then, you inferred the form of present participle from the form of the past participle. The active voice should be different from the passive voice—

J: The opposite.

R: Oh. In the passive voice, "ed" should be added to the verb. So, in the active voice, shouldn't add "ed".

J: Yeah (Laughed gently).

R: When you were thinking that the structure of the active voice was
   "auxiliary be plus present participle", did you think about the form
    of present participle?
J: No, I didn't.
R: That is, before you thought about the structure of present participle,
   you thought about the structure of the passive voice? The active
   voice shouldn't look the same as the passive voice?
J: You said it! (identification of the need to use written CF)

An examination of her output confirmed her recall of this application: *The deer was pick up Tom.*

It was noted from the recalls that, on the occasions where Jane retrieved the passive structure while she was forming the present participle in the active voice, she did not establish the relationship between the meaning to be expressed and the form targeted in written CF. Nor did she retrieve the other component of written CF: occasion to use the passive voice. Absence of the two, especially, absence of the stage of establishment of the relationship between the meaning to be expressed and the form targeted in written CF, made her cognitive processing of written CF on the occasions where she was using the active voice consciously different from that on the obligatory occasions of the passive voice, and may explain why errors occurred on the former occasions.

In short, although both students processed written CF in planning and execution in the delayed post-test, they differed first in their understanding of written CF according to their retrieval of written CF in these two phases of writing. Jane consistently and correctly understood both components of written CF in this session, while Kate consistently misunderstood all the components of written CF in this session. Moreover, although both students failed to process written CF on one obligatory occasion of the passive voice in execution, such a failure led to the difference in their output in execution: incorrect output with Jane, while correct output with Kate. In addition, unlike Kate who processed written CF only when she was trying to express the passive meaning, Jane's processing of written CF was expanded to occasions where she was trying to express the active meaning and was using the active voice consciously. In the latter cases, Jane was trying to use the passive structure in her formation of the present participle for the past continuous tense in sentences in the active voice.

To sum up, both similarities and differences were revealed in Jane and Kate's cognitive processing of written CF in the delayed post-test. On the one hand, both students went through all the cognitive processing stages of the two phases of writing they both

experienced (i.e. planning and execution). Also, both failed to process written CF on the last obligatory occasions of the passive voice in execution. Moreover, their retrieval of written CF revealed both students' understanding of written CF was consistent in the delayed post-test.

On the other hand, the two students differed first in their understanding of written CF in the delayed post-test, which was revealed in what they retrieved about written CF in this session. Jane consistently retrieved both components of written CF (i.e. occasion to use the passive voice and the passive structure), while Kate retrieved none of the three components of written CF: overuse of the passive voice with the intransitive verb and the formation of the past participle for regular and irregular verbs respectively. Instead, Kate consistently retrieved a completely distorted version of written CF: errors in the past participle and differentiation of verb forms. Hence, in the delayed post-test, Jane consistently and correctly understood written CF, while Kate consistently misunderstood written CF. Moreover, though both students failed to process written CF on one obligatory occasion of the passive voice in execution, this failure resulted in an error in Jane's output, but accuracy in Kate's output in execution. In addition, unlike Kate whose cognitive processing of written CF was restricted to obligatory occasions of the passive voice, Jane expanded her cognitive processing of written CF to occasions where she was using the active voice consciously. She retrieved the passive structure and applied this retrieved written CF knowledge in the formation of the present participle for the past continuous tense in sentences in the active voice.

6.2.4 Consistency in their cognitive processing of written CF in the post-tests after the treatment of written CF

Both similarities and differences were found in the two students' consistency in processing written CF in the two post-tests after the treatment of written CF. As Jane reported that she had no time to proofread her text in this session, her delayed post-test consisted of two phases: planning and execution. By comparison, according to Kate's recall, her delayed post-test consisted of three phases: planning, execution and monitoring. Hence, to address the consistency in processing written CF in the two post-tests after the treatment, data from monitoring phase were analysed and used to illustrate findings generated from the data from the phases of planning and execution.

6.2.4.1 Similarities in the consistency in their cognitive processing of written CF in the post-tests after the treatment of written CF

Similarities in the consistency in their cognitive processing of written CF in the post-tests after the treatment of written CF were found in planning and execution (i.e. the phases of writing that both students experienced in both writing sessions).

6.2.4.1.1 Similarities in the consistency in their cognitive processing of written CF in planning

In planning of both pieces of writing, both students attended to meaning and form. Jane's attention to meaning and form in planning was first illustrated in her recall of her focus in planning of the immediate post-test: "(I focused on) the explanation under the pictures… (They) told me what to be emphasized in the picture. Thus helped me to figure out the logic in writing…" (attention to meaning), and her explanation about why she retrieved written CF in planning: "In planning, I retrieved your last written CF to avoid the same error." (attention to form)

Her attention to meaning and form in planning was illustrated again one month later in her recall of her focus in planning of the delayed post-test:

> R: What did you focus on while planning?
> J: To tell the story from the beginning to the end. That is, what was the
>   story about (attention to meaning).
> R: Why focused on it?
> J: To be more logic while writing.
> R: Then?
> J: Focused on what the subject was (attention to form).

Similarly, Kate's attention to both meaning and form in planning was also first illustrated in her recall about her focus in planning of the immediate post-test: "First, I thought about the content of writing, and found out the subject and tense to be used."

One month later, Kate's such attention was revealed again in her recall of her focus in planning of the delayed post-test: "Focused on content, tense and voice."

Hence, both students consistently attended to meaning and form in planning over time.

6.2.4.1.2 Similarities in the consistency in their cognitive processing of written CF in execution

In execution of both post-tests, both students went through all the stages of execution when cognitively processed written CF:

• establishment of the relationship between the meaning to be expressed and the form

targeted in written CF
- identification of the need to use the knowledge newly learnt from written CF
- retrieval of the knowledge newly learnt from written CF
- application of the retrieved written CF knowledge
- output.

Jane's complete cognitive processes in execution was first illustrated in her recalls of writing of the specific sentences in the passive voice as well as her general comment on her cognitive processing in execution of the immediate post-test. Her general comment on her cognitive processing in in execution illustrated how she first established the relationship between the meaning to be expressed and the form targeted in written CF, then identified the need to use written CF and retrieved written CF:

> R: That is, whenever you saw the subject was inanimate (establishment
>   of the relationship between meaning to express and the form
>   targeted in written CF) —
> J: I would think of the passive voice (identification of the need to use
>   written CF + retrieval of written CF).

Jane's recall of writing of a sentence in the passive voice revealed that she established the relationship between the meaning to be expressed and the form targeted in written CF: "What's this? Stones. I thought it was inanimate too. So, the passive voice should be used here."

Her recall of writing of another sentence illustrated her cognitive processing from identification of the need to use written CF to application of the retrieved written CF knowledge:

> J: At the beginning, I wanted to write "It will move to the new site"
>   (the Chinese version of this sentence).
> R: Then?
> J: Then, the passive voice flashed by because I saw "temple" at the
>   beginning of the sentence (identification of the need to use written
>   CF + retrieval of written CF). So, I still wrote in the passive voice,
>   and didn't wrote "will move to" (application of the retrieved written
>   CF).

An examination of her output confirmed this recall of application: *The temple will be moved to Agilkia.*

According to the recalls, Jane went through all the stages of execution when cognitively processed the written CF in the immediate post-test.

Jane's complete cognitive processes in execution was revealed again one month later in her recalls of writing of the specific sentences in the passive voice in the delayed post-test.

Jane's recall of writing the first sentence in the passive voice illustrated how she went through all the stages of execution:

> R: What were you thinking while writing these? (Pointing to "The dog was chased").
> J: I saw, in the picture, the dog was chased by a swarm of bees (Stressed "bei" construction in Chinese) (establishment of the relationship between the meaning to be expressed and the form targeted in written CF + identification of the need to use written CF).
> R: "Bei". So, you used the passive voice.
> J: Yeah.
> R: I mean, what were you thinking and focusing on in implementation?
> J: Should use the passive voice (retrieval of written CF: occasion to use the passive voice).
> R: Then?
> J: Thought about the structure of the passive voice.
> R: Then?
> J: Nothing else.
> R: Nothing else. Then, you added 'ed" naturally while writing?
> J: Also thought about this word. Should add "ed" or change it into other forms.
> R: How did you make the decision?
> J: Decided whether it was regular.
> R: How?
> J: According to my memory, it was regular.
> R: That is, in planning, you thought about "chase", there was "bei" construction. So, you should use the passive voice. Also, you thought about the structure of the passive voice: "auxiliary be" plus the past participle Then, thought about the form of the past participle was related to the distinction between regular and irregular verbs. You thought about it in such details. Then, in implementation, this cognitive process was repeated.
> J: Yes.
> R: Then, because you were going to write this word, you thought further whether "chase" was regular. And this step involved retrieval from your memory.
> J: Yeah.
> R: In your memory, it is a regular verb. So you added—
> J: "d" (application of written CF retrieved).

An examination of her output confirmed this recall of application: *The dog was chased.*

Jane's retrieval and application of written CF were also illustrated in her recall of writing another sentence in the passive voice:

> R: What were you thinking while writing?
> J: Should use the passive voice (retrieval of written CF: occasion to use the passive voice).
> R: Then?
> J: The structure of the passive voice: auxiliary be plus the past participle (retrieval of written CF: the passive structure). Then, started to write (application of written CF retrieved).

An examination of her output confirmed this recall of application: *Tom was picked up.*

These two stages of cognitive processing of written CF were revealed again in her recall of writing a sentence in the passive voice, but with the incorrect past participle form:

> R: What were you thinking in execution?
> J: Execution? Just thought I should use the passive voice. The structure of the passive voice (retrieval of written CF: occasion to use the passive voice the passive structure). Then, added the past participle form (application of written CF retrieved).

An examination of her output revealed that past tense of the main verb, "throw", not the past participle, was used: *The boy was threw down.*

Nonetheless, according to Jane's recall, she figured out the past participle form of "throw" in planning, and considered "threw", not "thrown" as the past participle form at that time:

> J: I was recalling "threw, thrown".
> R: What were you thinking at that time, not now.
> J: Thought to change "o" into "e" at that time.
> R: You thought "e" is the past participle at that time?
> J: Yeah.

As Jane considered "threw" as the past participle form of "throw" at that time, her output, "The boy was threw down", confirmed this recall of application: she was using the passive structure, auxiliary be + the past participle.

Hence, Jane's recalls of both writing sessions revealed that she consistently went through all the cognitive processing stages of execution in both pieces of post-test.

Similarly, Kate's recalls of writing the specific sentences in the passive voice in the immediate post-test illustrated that she went through all the cognitive processing stages

of execution. Her establishment of the relationship between the meaning to be expressed and the form targeted in written CF was illustrated in her recall of writing of the first sentence in the passive voice: "Felt quite self-contradictory. It is an intransitive verb. But in meaning, it is passive, and demands change of the verb form." Her recall of writing the verb illustrated her identification of the need to use written CF and retrieval of written CF: "When I was writing the intransitive verb, I thought about my errors in last writing and the written CF to them." What was retrieved at that moment was revealed in her elaboration of the process of reconciliation: "the passive voice: auxiliary be + the past participle There are regular verbs and irregular verbs. For the regular ones, add 'ed'. Irregular ones are in that table (the table of irregular verbs)," and "But I remember the word 'build' has no passive form. It is an intransitive verb". With the feeling of contradicting herself, she applied the retrieved written CF knowledge: "I felt self-contradictory. Because it was built (stressed 'bei' construction in Chinese). But I remember the word 'build' has no passive form. It is an intransitive verb Thus, I reconciled the two together."

An examination of her output confirmed this recall of application: *The temple of Isis was build with Potolemy II.*

Kate's recall of the third sentence in the passive voice showed more fluently how she went through all the cognitive processing stages of execution as she did not report feeling of contradicting herself while producing this sentence.

> K: Because the stone carvings were inanimate, they were submerged by water. So, I used the passive voice (establishment of the relationship between meaning to express and the form targeted in written CF).
> R: The form of the verb?
> K: Actually, I didn't know this word. For the unknown verbs, I usually consider them as regular (identification of the need to use written CF). Thus, added "ed" (retrieval of written CF + application of the retrieved written CF).

An examination of her output confirmed this recall of application: *The stones carvings of temple were submerged.*

One month later, the same cognitive processing of written CF was revealed again in Kate's recalls of writing the specific sentences in the passive voice in the delayed post-test. Kate's recall of writing the first sentence in the passive voice illustrated how she

went through all the stages of execution when cognitively processed written CF in this piece of writing:

> R: What were you thinking then?
> K: Because in Chinese, it was "the boy was bitten" (stressed "bei" construction in Chinese) (establishment of the relationship between the meaning to be expressed and the form targeted in written CF). I thought about the past participle of "bite" (retrieval of written CF: errors in the past participle).
> R: Please slow down. When you noticed "bei" construction in Chinese, you thought about —
> K: The passive voice (identification of the need to use written CF) and the past participle of "bite" (retrieval of written CF: errors in the past participle).
> R: Then?
> K: Thought about the tense. Past tense.
> R: Then?
> K: The passive voice: auxiliary be + the past participle The past tense of "be" is "was".
> R: What did you attended to next?
> K: The past tense of "bite" (retrieval of written CF: differentiation of verb forms). Then, wrote (application of written CF retrieved).
> R: Not the past participle of "bite" this time?
> K: No. because auxiliary be + past tense. Not the past participle Different forms (retrieval of written CF: differentiation of verb forms).

An examination of the output confirmed this recall of application: *The boy was bit.*

Kate's identification of the need to use written CF, retrieval of and application of the retrieved written CF (still the distorted version of written CF) were illustrated again and again in her recalls of writing the subsequent sentences in the passive voice:

> R: What were you thinking while writing this sentence?
> K: The passive voice and past tense need to be used (identification of the need to use written CF).
> R: Then?
> K: I wrote "was + past tense" The "ed" form of the verb (retrieval of written CF: differentiation of verb forms + application of written CF retrieved).
>
> <div align="center">And</div>
>
> R: What were you thinking while writing this sentence? Particularly, your processing while writing these two words (pointing to "was frightened")?
> K: The same as above.

An examination of her output confirmed these recalls of application:

The boy was chased (for the former excerpt).
The boy was frightened to fall (for the latter excerpt).

It should be noted that, as in the cases of both "chase" and "frighten", the past tense and the past participle share the same form, both sentences are correct when only the target form (the passive voice) is concerned. Thus, both sentences (i.e. Kate's output here), seem to illustrate her mastery of the target form and the knowledge in written CF. However, her recalls of cognitive processing while writing these two sentences revealed the opposite, for she was consciously using the past tense, not the past participle in these sentences.

Hence, like Jane, Kate also consistently went through all the stages of execution when cognitively processed written CF in both pieces of writing.

In short, both students consistently attended to meaning and form in planning of writing over time, and went through all the stages of execution when cognitively processed written CF in both writing sessions over time.

6.2.4.2 Differences in the consistency in their cognitive processing of written CF in the post-tests after the treatment of written CF

Differences in the consistency in their cognitive processing of written CF in the post-tests after the treatment of written CF were found in the phase of planning and in their understanding of written CF.

6.2.4.2.1 The difference in the consistency in the two students' cognitive processing of written CF in planning

The consistency in the two students' cognitive processing of written CF differed in planning. Jane went through all the stages of planning when cognitively processed written CF in both post-tests (i.e. attention to meaning and form, identification of the need to use the knowledge newly learnt from written CF, and retrieval of the knowledge newly learnt from written CF), while Kate only did so in the delayed post-test.

Jane's complete cognitive processes in planning was first revealed in her recall of her cognitive processing of written CF in planning in the immediate post-test. Besides attention to meaning and form (see Section 6.4.1.1 for relevant quotations from Jane), Jane also identified the need to use written CF in planning. This was revealed in her responses to questions exploring her cognitive processing in planning:

R: Did you plan in Chinese or in English?

J: In Chinese.
R: Then, which voice was used more often in planning?
J: The passive voice. Because your written CF reminded me just now.
    I have memorized that the passive voice should be used when the
    subject of a sentence is an object.

In Chinese, the active voice is used more often than the passive voice. In some cases, even if the meaning is passive, the passive voice is not used (see Section 2.3). Jane's responses in this excerpt revealed that she noticed the issue of voice, and identified the need to use written CF in planning.

How Jane retrieved the written CF in planning was illustrated in her responses to the question in further exploration:

R: You thought about to use the passive voice while planning. Then,
    did you think further about the passive voice in details?
J: I thought if the temple was the subject, I would use the passive voice
    (retrieval of written CF: occasion to use the passive voice).
R: Then, did you think about things such as the structure of the passive
    voice?
J: Yes (retrieval of written CF: the passive structure).
R: During planning or execution?
J: In planning.

Hence, Jane went through all the stages of cognitive processing of written CF in planning of the immediate post-test.

Such cognitive processes were revealed again one month later in Jane's recall of her cognitive processing of written CF in planning in the delayed post-test. Jane's attention to meaning and form, as well as her identification of the need to use written CF, were illustrated in her recall of her focus in planning:

R: What did you focus on while planning?
J: To tell the story from the beginning to the end. That is, what was the
    story about (attention to meaning).
R: Why focused on it?
J: To be more logic while writing.
R: Then?
J: Focused on what the subject was (attention to form). Then, decided
    whether I should use the active voice or the passive voice
    (identification of the need to use written CF).
R: Why focused on subject?
J: According to the task requirement (Pointing to the sheet of task
    requirement). What happened to the boy and the dog.
R: Why focused on the active voice or the passive voice.
J: So that I could know where to use them.

Her retrieval of written CF was illustrated in her recall about what was retrieved in planning:

> R: What did you recall?
> J: On what occasions that the passive voice hould be used. Its structure. Whether the subject is inanimate (retrieval of written CF: occasion to use the passive voice + the passive structure).

Thus, Jane's recalls of her cognitive processing of written CF in planning over time revealed that she consistently went through all the stages of planning when cognitively processed written CF in both pieces of writing.

By comparison, Kate attended to meaning and form in planning of the immediate post-test (see Section 6.4.1.1 for relevant quotation from Kate), but her cognitive processing of written CF was not developed in planning of the immediate post-test: she did not identify the need to use the passive voice, nor retrieved written CF in planning. This was illustrated in the following excerpt:

> R: Then, in planning, after you noticed that "temple" would be the subject recurrently, to what extent did you notice the passive voice would be used recurrently?
> K: No. I only thought about the voice when I was writing about each picture.

The passive voice was targeted in written CF. This excerpt showed that, as Kate did not think about voice in planning, she did not notice the passive voice at all at that time. Thus, she failed to identify the need to use the passive voice and retrieve written CF in planning.

Nonetheless, Kate went through all the stages of cognitive processing of written CF in planning of the delayed post-test. Her attention to meaning and form was illustrated in her recall of her focus in planning: "Focused on content, tense and voice." Her identification of the need to use written CF and retrieval of written CF were illustrated in the following excerpt:

> R: Did you recall my written CF given to you last month?
> K: Yes.
> R: When?
> K: In planning. Because I noticed the voice and tense to be used in this writing (identification of the need to use written CF). I retrieved my errors pointed out by your last written CF (retrieval of written CF).
> R: What were the errors?
> K: Errors in the past participle. I didn't differentiate the bare infinitive,

past tense and past participle of verbs (retrieval of written CF: distorted version).

It should be noted that the written CF Kate retrieved here was a completely distorted version of the last written CF given to her. The last written CF consisted of three components: overuse of the passive voice with the intransitive verb and the formation of the past participle for regular and irregular verbs respectively.

Hence, unlike Jane who consistently went through all the stages of planning when cognitively processed written CF in both pieces of new writing, Kate's processing of written CF in planning was inconsistent in the two writing sessions. Kate only went through all the stages of planning in the delayed post-test, while she did not process written CF in planning of the immediate post-test.

6.2.4.2.2 Differences in the consistency in the two students' understanding of written CF

The two students' consistency in cognitive processing of written CF differed in the consistency in their understanding of written CF, too. This was revealed in their retrievals of written CF in both post-tests.

Jane's understanding of written CF in the immediate post-test was correct except for one occasion in monitoring. Her correct understanding of written CF in this writing session was illustrated in her recalls of her cognitive processing in planning:

> R: You thought about to use the passive voice while planning. Then, did you think further about the passive voice in details?
> J: I thought if the temple was the subject, I would use the passive voice (retrieval of written CF: occasion to use the passive voice).
> R: Then, did you think about things such as the structure of the passive voice?
> J: Yes (retrieval of written CF: the passive structure).
>
> And
>
> R: After that did you think about the structure of the passive voice? That is, while you were writing, did you quickly thought about it?
> J: No. because I had thought about it and settled it in planning.
> R: What's the structure of the passive voice? Can you tell me now?
> J: "Auxiliary be" plus the past participle (retrieval of written CF: the passive structure).

In execution of the immediate post-test, she correctly understood written CF (occasion to use the passive voice) again and again on the obligatory occasions of the passive

voice. This was illustrated in her general comment on her cognitive processing in execution.

> R: That is, whenever you saw the subject was inanimate (establishment of the relationship between meaning to express and the form targeted in written CF) —
> J: I would think of the passive voice (identification of the need to use written CF + retrieval of written CF).

Her correct understanding of this component of written CF (i.e. occasion to use the passive voice), was revealed again and again in her recalls of writing the specific sentences in the passive voice:

> J: "What's this? Stones. I thought it was inanimate too. So, the passive voice should be used here."

> And

> J: "I used 'temple' as the subject. So, the passive voice should be used."

> And

> J: At the beginning, I wanted to write "It will move to the new site" (the Chinese version of this sentence).
> R: Then?
> J: Then, the passive voice flashed by because I saw "temple" at the beginning of the sentence (identification of the need to use written CF + retrieval of written CF). So, I still wrote in the passive voice, and didn't wrote "will move to" (application of the retrieved written CF).

However, when she was proofreading the last sentence in the passive voice in the monitoring phase, an error occurred in her retrieval of one component of written CF — the passive structure:

> J: How to say? I was thinking: it is a verb (identification of the need to use written CF), auxiliary be plus verb (retrieval of written CF). So neglected "ed" (application of retrieved written CF).

As the written CF she retrieved here was a distorted version of the passive structure in the written CF, this indicates that Jane's understanding of written CF at that moment was incorrect.

Nonetheless, Jane's understanding of written CF was always correct in the delayed post-test. There were only two phases in Jane's delayed post-test: planning and execution, for she reported that she had no time to proofread the text. Her correct understanding of one

component of written CF, occasion to use the passive voice, was illustrated in her recall of what she retrieved about written CF in planning:

> R: What did you recall?
> J: On what occasions that the passive voice should be used. Its
>   structure. Whether the subject is inanimate (retrieval of written CF:
>   occasion to use the passive voice + the passive structure).

After that, such correct understanding of this component of written CF was illustrated again and again in her recalls of writing of specific sentences in the passive voice on the obligatory occasions:

> R: What were you thinking while writing?
> J: Should use the passive voice.

Jane's correct understanding of the other component of written CF, the passive structure, was illustrated in her recall of writing one sentence in the passive voice on the obligatory occasion:

> R: What were you thinking while writing?
> J: Should use the passive voice (retrieval of written CF: occasion to
>   use the passive voice).
> R: Then?
> J: The structure of the passive voice: auxiliary be plus the past
>   participle (retrieval of written CF: the passive structure). Then,
>   started to write (application of written CF retrieved).

By comparison, Kate's understanding of written CF was always correct in the immediate post-test. She reported retrieval of written CF four times in this writing session, two in execution, and the other two in monitoring. Kate's correct understanding of written CF (all the three components of written CF: overuse of the passive voice with the intransitive verb and the formation of the past participle for regular and irregular verbs respectively) was first illustrated in her recall of writing the first sentence in the passive voice: "Felt quite self-contradictory. It is an intransitive verb. But in meaning, it is passive, and demands change of the verb form", "the passive voice: auxiliary be + the past participle. There are regular verbs and irregular verbs. For the regular ones, add 'ed'. Irregular ones are in that table (the table of irregular verbs)," and "But I remember the word 'build' has no passive form. It is an intransitive verb".

Later, in her recall of proofreading this sentence in the monitoring phase, Jane's correct understanding of one written CF component, overuse of the passive voice with the intransitive verb, was illustrated again:

> R: Take this word as an example.
> K: Because I remembered it was a vi (identification of the need to use written CF). But felt that the passive voice should be used here. And this verb shouldn't be used in the passive voice (retrieval of written CF).

Her correct understanding of another written CF component, the formation of the past participle for regular verbs, was illustrated again in her recall of writing the second sentence in the passive voice:

> K: Because the stone carvings were inanimate, they were submerged by water. So, I used the passive voice (establishment of the relationship between meaning to express and the form targeted in written CF).
> R: The form of the verb?
> K: Actually, I didn't know this word. For the unknown verbs, I usually consider them as regular (identification of the need to use written CF). Thus, added "ed" (retrieval of written CF + application of the retrieved written CF).

Such a correct understanding of this written CF component was revealed again in Kate's recall of proofreading this sentence:

> R: What were you thinking while proofreading it?
> K: I was thinking whether the form was correct (attention to form). The past participle form (identification of the need to use written CF).
> R: Can you detail it?
> K: I didn't know this verb. Guessed as usual. Considered it as a regular verb. Thus, added "ed" (retrieval of written CF + application of the retrieved written CF).

Hence, in all the phases of the immediate post-test, whenever Kate retrieved written CF, her retrieval revealed her correct understanding of written CF.

However, in the delayed post-test, what she retrieved about written CF was a completely distorted version of written CF. This was first illustrated in her recall of planning:

> R: Did you recall my written CF given to you last month?
> K: Yes.

R: When?

K: In planning. Because I noticed the voice and tense to be used in this Writing (identification of the need to use written CF). I retrieved my errors pointed out by your last written CF (retrieval of written CF).

R: What were the errors?

K: Errors in the past participle I didn't differentiate the bare infinitive, the past tense and the past participle of verbs (retrieval of written CF: distorted version).

Her retrieval of this distorted version of written CF was illustrated again and again in her recalls of writing specific sentences in the passive voice:

R: What were you thinking then? (output: The boy was bit)

K: Because in Chinese, it was "the boy was bitten" (stressed "bei" construction in Chinese) (establishment of the relationship between the meaning to be expressed and the form targeted in written CF). I thought about the past participle of "bite" (retrieval of written CF: errors in past participle).

R: Please slow down. When you noticed "bei" construction in Chinese, you thought about —

K: The passive voice (identification of the need to use written CF) and the past participle of "bite" (retrieval of written CF: errors in past participle).

R: Then?

K: Thought about the tense. Past tense.

R: Then?

K: The passive voice: auxiliary be + the past participle. The past tense of "be" is "was".

R: What did you attended to next?

K: The past tense of "bite" (retrieval of written CF: differentiation of verb forms). Then, wrote (application of written CF retrieved).

R: Not past participle of "bite" this time?

K: No. because auxiliary be + past tense. Not the past participle. Different forms (retrieval of written CF: differentiation of verb forms).

And

R: What were you thinking while writing this sentence? (output: The boy was chased)

K: The passive voice and past tense need to be used (identification of the need to use written CF).

R: Then?

K: I wrote "was + past tense" The "ed" form of the verb. (retrieval of written CF: differentiation of verb forms).

And

R: What were you thinking while writing this sentence? Particularly, your processing while writing these two words (pointing to "was frightened")? (output: The boy was frightened to fall)

K: The same as above.

Finally, in the monitoring phase, this distorted version of written CF was retrieved again. This was illustrated in Kate's recall of proofreading the last sentence in the passive voice:

> K: Actually, I wrote "thrown" in execution. Revised it into "threw" while proofreading.
> R: Why did you write "thrown" in execution?
> K: I felt I had seen "was thrown" before. Thus, wrote like that without more thinking.
> R: Then, in proofreading, you thought more carefully?
> K: Yeah. Because it (thrown) is past participle (retrieval of written CF: errors in past participle). Should be past tense (retrieval of written CF: differentiation of verb forms).

As Kate retrieved none of the three components of written CF, overuse of the passive voice with the intransitive verb and the formation of past participle for regular and irregular verbs respectively, but kept retrieving the distorted version of written CF in the delayed post-test, her understanding of written CF in this session was completely incorrect. Thus, unlike Jane, whose understanding of written CF improved from the immediate post-test to the delayed post-test, Kate's understanding of written CF deteriorated from the immediate post-test to the delayed post-test.

6.2.4.2.3 Differences in the two students' consistency in the occasions where they processed written CF

Moreover, the two students' consistency in processing written CF differed in the kind of occasions where they processed written CF. Kate consistently restricted her cognitive processing of written CF to the obligatory occasions of the passive voice in both post-tests, while Jane expanded her cognitive processing of written CF to the occasions where she was consciously using the active voice in the delayed post-test. The latter was illustrated in her following excerpt:

> R: Then, what were you thinking while writing these words?
> J: These words?
> R: Yeah. "The dog was bite".
> J: I thought I should use the active voice.
> R: Anything else?
> R: Past continuous tense. The active voice with past continuous tense.
> R: Thought of the form of the verb?
> J: Yes. "Auxiliary be" plus present participle.
> R: Then, look at what you wrote.
> J: "Auxiliary be" plus bare infinitive.
> R: Yeah. Why didn't you write what you were thinking?
> J: I don't know. I now recall that this (Pointing to "bite") is wrong. I should have added "ing" to form the present participle.

R: At that time, you thought to use the active voice, and to use
   auxiliary be plus present participle. Then, you should have written
   accordingly.

J: Probably because of the passive voice: auxiliary be plus past
   participle (retrieval of written CF: the passive structure). Then, I
   thought: to form past participle, I should add "ed"; hence, for the
   active voice, to form present participle, I shouldn't add 'ed"
   (application of written CF retrieved).

R: You'd decided to use the active voice. Why did you thought of the
   passive voice then?

J: Because in planning, when I was making up the story, I always felt
   the need to use the passive voice in this writing (identification of the
   need to use written CF).

An examination of her output confirmed her recall of this application: *The dog was bite.*

Jane's such cognitive processing was illustrated further in her recall of producing

another sentence in the same way:

R: While you were writing these words, what were you thinking?

J: I was thinking about the structure of the active voice: "Auxiliary be"
   plus present participle. But my present participle is in the wrong
   form.

R: Why? You thought about "auxiliary be plus present participle". But
   wrote "auxiliary be plus bare infinitive".

J: Disturbed by the structure of the passive voice (retrieval of written
   CF: the passive structure).

R: Why did you thought about the passive voice while writing this
   point?

J: Because I thought, for past participle in the passive voice, I should
   add "ed". So, for present participle in the active voice, I shouldn't
   add "ed" (application of written CF retrieved).

R: Let me iterate your cognitive process: you first considered that the
   honeycomb fell down itself. So you should use the active voice.
   Then, you thought of the structure of the active voice: "auxiliary
   be" plus present participle. After that, you thought about the
   structure of the passive voice: "auxiliary be" plus the past participle
   And to form the past participle, you should add "ed".

J: Yeah.

R: Then, you inferred the form of present participle from the form of
   the past participle. The active voice should be different from the
   passive voice—

J: The opposite.

R: Oh. In the passive voice, "ed" should be added to the verb. So, in
   the active voice, shouldn't add "ed".

J: Yeah (Laughed gently).

R: When you were thinking that the structure of the active voice was
   "auxiliary be plus present participle", did you think about the form
   of present participle?

J: No, I didn't.

R: That is, before you thought about the structure of present participle,

      you thought about the structure of the passive voice? The active
      voice shouldn't look the same as the passive voice?
  J: You said it! (identification of the need to use written CF)

An examination of her output confirmed her recall of this application: *The deer was pick up Tom.*

It was noted from the recalls that, on the occasions where Jane retrieved the passive structure while she was forming present participle in the active voice, she did not establish the relationship between the meaning to be expressed and the form targeted in written CF. Nor did she retrieve the other component of written CF: occasion to use the passive voice. Absence of the two, especially, absence of the stage of establishment of the relationship between the meaning to be expressed and the form targeted in written CF, made her cognitive processing of written CF on the occasions where she was using the active voice consciously different from that on the obligatory occasions of the passive voice, and may explain why error occurred on the former occasions.

In short, differences in the consistency in the two students' cognitive processing of written CF was first revealed in their planning of writing. Jane consistently processed written CF in planning over time, while Kate only processed written CF in planning of the delayed post-test. Secondly, Jane's understanding of written CF improved from the immediate post-test to the delayed post-test, while that of Kate regressed from the former to the latter. In the immediate post-test, one error occurred in Jane's retrieval of written CF once, while in the delayed post-test, all her retrievals of written CF were error-free. In contrast, all Kate's retrievals of written CF were error-free in the immediate post-test, but erroneous in the delayed post-test, with no components of written CF being retrieved. Thirdly, the consistency in the two students' cognitive processing of written CF differed in the kind of occasions where they processed written CF. Kate only processed written CF on obligatory occasions of the passive voice in both new writing sessions, while Jane did the same in the immediate post-test, but expanded her cognitive processing of written CF to the occasions where she was consciously using the active voice in the delayed post-test.

To sum up, there were both similarities and differences in their consistency in processing written CF in the two writing sessions. On the one hand, they both consistently attended to form and meaning in planning, and went through all the stages of execution when cognitively processed written CF in both post-tests.

On the other hand, their consistency in processing written CF differed in that Jane consistently processed written CF in planning over time, while Kate only did so in the later writing session. Moreover, although neither of them consistently and correctly understood written CF in both new writing sessions, the patterns of change in their understanding of written CF were different. Jane failed to correctly understand written CF on all the occasions where she was retrieving it in the earlier writing session, but succeeded in doing so in the later session. In contrast, Kate correctly understood written CF whenever she was retrieving it in the earlier writing session, but completely misunderstood it whenever she was retrieving it in the later session. In addition, the consistency in their processing of written CF differed in the kind of occasions, where they processed written CF in the two writing sessions. Kate's processing of written CF was consistently restricted to the obligatory occasions of the passive voice over time, while that of Jane was the same in the immediate post-test, but expanded to occasions where she was consciously using the active voice in the delayed post-test.

6.2.5 Evaluation of the treatment effect of the data collection method: the stimulated recall

The possible treatment effect of the data collection method, the stimulated recall, was explored at the end of the stimulated recalls of the delayed post-test. Both students confirmed such an effect of the stimulated recall on their cognitive processing of written CF in the delayed post-test. The treatment effect of the stimulated recall on Jane was illustrated in the following excerpt:

> R: I guided you to recall your cognitive process in writing last time. Do you think that recall played a role in your writing this time? If so, what kind of roles?
> J: After your written CF, that sense grew in me. It is, to think where I should use the passive voice or the active voice.
> R: After written CF or after I guided you to reflect on your cognitive process?
> J: Reflect?
> R: If I didn't talk to you after giving you the written CF, just like what happened in the quasi-experiment, would you think about these intentionally?
> J: If I had only received the written CF, I would still thought about why I made the errors.
> R: Then, there's no difference between written CF with and without interview?
> J: But I couldn't think in such details myself, like you had asked me. Thus, written CF wouldn't have left such strong impression on me.

Hence, stimulated recall following written CF contributed to a stronger impression of written CF on Jane in the delayed post-test. This helps to explain why Jane's cognitive processing of the past continuous tense in the active voice was disturbed by the passive structure in her IL. Consequently, she formed the present participle of the former linguistic feature with reference to the past participle in the latter linguistic feature. Hence, it cannot be inferred from the change in her accuracy score from 86.7 in the immediate post-test to 25 in the delayed post-test that Jane's written CF knowledge regressed during this period.

The treatment effect of the stimulated recall on Kate was illustrated in the following excerpt:

> R: Another question. If I had only given you the written CF without
>   such an interview, like what happened in the quasi-experiment two
>   months ago, would you recall my written CF in this writing?
> K: Probably yes. But I might not use it systematically like this.
> R: Why not?
> K: Because I would have only memorized the specific erroneous
>   points. Difficult to use them.
> R: Why?
> K: Because my processing would remain untouched. Thus, I could
>   only use rote memorization.

Hence, the stimulated recall after written CF in this multi-case study contributed to Kate's more strategic use of written CF in this writing. It was noted that Kate did not process written CF in planning of the immediate post-test. Neither did she recognize the need to use written CF, nor retrieve written CF at that time. In contrast, Kate did so in planning of the delayed post-test. Hence, such a change in Kate's cognitive processing of written CF could be attributed to the treatment effect of the stimulated recall, not that of written CF itself. As a result, in the evaluation of the long-term effect of written CF on the cognitive processing in writing, the different treatment effects of the stimulated recall on each student should be considered.

6.2.6 Summary of the findings

In brief, there were both similarities and differences in the two students' cognitive processing of written CF in the treatment, the immediate post-testand the delayed post-test.

In the treatment, both students showed a general tendency to form/accuracy and written CF. Also, both noticed the gaps pointed out by written CF, understood the written CF

and applied it in revision. Moreover, their modified output revealed both had problems with the formation of the passive structure. However, the recalls showed that written CF triggered Jane's reflection of her cognitive processing in writing the original draft, but not Kate's. Also, while Kate's application of written CF was confined to the marked errors, Jane's was not. Jane actively used what was learnt from written CF to monitor the whole original text. As a result, she detected and "corrected" two "errors" that were "missed out" by the researcher in her eyes. Besides, Kate noticed the gaps pointed out by written CF more frequently than Jane, and Kate's modified output was generally more accurate than Jane's.

In the immediate post-test, both students went through planning, execution and monitoring in writing. They both attended to meaning and form in planning, then went through all the stages of execution and monitoring when cognitively processed written CF. Moreover, both students retrieved all the written CF components in immediate post-test. However, differences in their cognitive processing of written CF were found first in planning. Jane identified the need to use written CF, and consequently retrieved written CF in planning. In contrast, Kate did not go through these two stages in the phase of planning. Secondly, they differed in the consistency in understanding of written CF in the immediate post-test. According to their recalls, Jane misunderstood one component of written CF, the passive structure, once in the phase of monitoring, while Kate's understanding of all the written CF components was correct all the time. Finally, they differed in the stages where they retrieved all the written CF components: Jane did it in planning, while Kate did it in execution.

In the delayed post-test, when cognitively processed written CF, both students went through all the stages of planning and execution, the two phases of writing they both experienced. Also, both failed to process written CF on the last obligatory occasions of the passive voice in execution. Moreover, their retrieval of written CF revealed both students' understanding of written CF was consistent in the delayed post-test.

However, the two students differed first in their understanding of written CF in the delayed post-test, which was revealed in what they retrieved about written CF in this session. Jane consistently retrieved both components of written CF (i.e. occasion to use the passive voice and the passive structure), while Kate retrieved none of the three components of written CF: overuse of the passive voice with the intransitive verb and the formation of the past participle for regular and irregular verbs respectively. Instead,

Kate consistently retrieved a completely distorted version of written CF: errors in the past participle and differentiation of verb forms. Hence, in the delayed post-test, Jane consistently and correctly understood written CF, while Kate consistently misunderstood written CF. Moreover, though both students failed to process written CF written CF on one obligatory occasion of the passive voice in execution, this failure resulted in an error in Jane's output, but accuracy in Kate's output in execution. In addition, unlike Kate whose cognitive processing of written CF was restricted to obligatory occasions of the passive voice, Jane expanded her cognitive processing of written CF to occasions where she was using the active voice consciously. She retrieved the passive structure and applied the retrieved written CF knowledge in the formation of present participle for the past continuous tense in sentences in the active voice.

When the two writing sessions were considered as a whole, both students consistently attended to form and meaning in planning, and went through all the stages of execution when cognitively processed written CF in both new writing sessions. However, their consistency in processing written CF differed in that Jane consistently processed written CF in planning over time, while Kate only did so in the later writing session. Moreover, although neither of them consistently and correctly understood written CF in both new writing sessions, the patterns of change in their understanding of written CF were different. Jane failed to correctly understand written CF on all the occasions where she was retrieving it in the earlier writing session, but succeeded in doing so in the later session. In contrast, Kate correctly understood written CF whenever she was retrieving it in the earlier writing session, but completely misunderstood it whenever she was retrieving it in the later session. In addition, the consistency in their processing of written CF differed in the kind of occasions, where they processed written CF in the two writing sessions. Kate's processing of written CF was consistently restricted to the obligatory occasions of the passive voice in both sessions, while that of Jane was the same in the immediate post-test, but expanded to occasions where she was consciously using the active voice in the delayed post-test.

It should be pointed out that the treatment effect of the stimulated recall on each student needs to be considered in the evaluation of the long-term effect of written CF on the cognitive processing in writing. The stimulated recall contributed to a stronger impression of written CF on Jane, while a more strategic use of written CF in Kate's delayed post-test. Hence, Jane's strong impression of the passive voice in the delayed post-test, which disturbed her processing of the past continuous tense in the active

voice, could be attributed to the treatment effect of the stimulated recall rather than that of written CF itself. Likewise, the change in Kate's processing of written CF from absence of processing written CF in planning in the immediate post-test to processing written CF in planning in the delayed post-test could be a result of the treatment effect of the stimulated recall rather than that of written CF itself.

6.3 Discussion

As RQ 5 explored some possible causes of the difference in two participants' benefits from written CF, the following discussion will only focus on the differences in their cognitive processing of written CF. Both participants of the present multi-case study (i.e. Jane and Kate) participated in the preliminary quasi-experiment. Both of them were Hospitality majors and both scored 0 on both accuracy and the recognition of the need to use the passive voice in the pre-test in the quasi-experiment. However, the development of their accurate use of the passive voice in the quasi-experiment differed greatly. Jane's accuracy score changed from 0 to 71.4 in the immediate post-test, and finally to 75 in the delayed post-test. By comparison, Kate's accuracy score remained at 0 in all the three tests in the quasi-experiment.

6.3.1 Discussion of the two students' different cognitive processing of written CF in the treatment session

In the treatment session, the two students' cognitive processing of written CF differed on four points. First, written CF triggered Jane's reflection on her cognitive processing in writing the original draft, but not Kate's. Secondly, Kate's application of written CF was confined to the marked errors, indicating her reliance on the authority of feedback source in L2 learning. By comparison, Jane actively used what was learnt from written CF to monitor the whole original text, demonstrating her initiation of learning from written CF. Thirdly, Kate noticed written CF more frequently than Jane did. This is because Kate first read silently all the written CF points without processing them further. She did so in order to memorize the written CF points. Fourthly, Kate's modified output was generally more accurate than Jane's. This is because, unlike Kate who only targeted the marked error, Jane applied the written CF knowledge to monitor the whole original text. As a result, Jane detected and "corrected" two "errors" that were "missed out" by the researcher in her eyes. However, this suggested that Kate relied on the authority of feedback source in learning, while Jane did not.

Except for revision, research into the relationship between the effects of written CF and the learning strategies is not available to my knowledge. The differences in the two students' strategy use in their cognitive processing of written CF in the treatment session conformed to L2 learning from the cognitive and DST perspectives. Moreover, some of the differences also conformed to the findings of previous studies on the relationship between L2 learning strategies and L2 proficiency as well as vocabulary size.

First, Jane reflected on her cognitive processing in writing the original draft, but Kate did not. Such a difference in their strategy use, together with the difference in their improvements in writing accuracy, was in line with the DST theory. As introduced in Section 2.7, reflection is a goal-orientated metacognitive strategy under the learner's control. It refers to the mental process involving evaluation of an L2 learning activity by the learner him/herself (Yancey, 1998). Thus, it contributes to the conversion of experience into personal knowledge (Yancey, 1998) (see Section 2.7). In other words, reflection provides a learning opportunity to the learner. From the DST perspective, L2 learning is an iterative process because L2 learning consists of on-going interactions between input and the learner's IL (see Section 2.9). Therefore, with learning opportunities brought about by reflection, a learner who reflects his/her learning behaviours may learn faster. Moreover, as stated in Section 2.7, reflection has the potential to provide the learner with "insights necessary to learn from experience and alter habitual behaviours" (Jones & Shelton, 2006, p. 53). Moreover, Kim and Kim (2014) found that changes in L2 learning behaviours caused by reflection influenced L2 learning outcome (see Section 3.6.2.3). Hence, Jane who reflected on her cognitive processing in writing the original draft improved faster in accurate use of the target feature than Kate who did not use such a strategy in the initial cognitive processing of written CF. Hence, the present finding seems to suggest that reflection facilitates the contribution of written CF to L2 development. However, more empirical studies on the relationship between the two variables are needed to validate this inference.

Second, although both students applied written CF knowledge to correct their marked errors while revising their texts, Jane initiated applications of written CF knowledge to monitor the unmarked points in her original text, while Kate relied on written CF for error identification. Considering the difference in their accuracy improvement, such differences in their use of strategies conformed to both the cognitive and DST theories. As introduced in Section 2.7, both self-initiation and reliance on the expert (such as the

authority of feedback source) are metacognitive strategies. They regulate the cognition via planning the learning activities. A learner with self-initiation is ready and able to identify and utilize the learning opportunities him/herself, while a learner with reliance on the authority of feedback source is not (see Section 2.7). Therefore, a learner with an ability for self-initiation can identify, and utilize more L2 learning opportunities than a learner who relies on the authority of feedback source. From the DST perspective, L2 learning is an iterative process consisting of interactions between input and IL (see Section 2.9). Although both students followed written CF closely in revising their texts, the extra learning opportunities brought about by Jane's self-initiation contributed to her ongoing learning process of written CF. As a result, Jane's writing accuracy improved faster than Kate, because Kate did not take such learning opportunities. From the macro cognitive perspective, written CF leads to explicit knowledge (see Section 2.2.2.2), which is subject to regression (Shintani et al., 2014). The extra learning opportunities brought about by Jane's self-initiation involved repeated retrieval and processing of written CF, which contributed to the elaboration and the refining of the knowledge learnt from written CF (see Section 2.2.2). As a result, Jane's written CF knowledge became consolidated and resistant to regression over time. By comparison, Kate, who relied on the authority of feedback source, did not take such opportunities to consolidate the explicit knowledge learnt from written CF. As a result, her written CF knowledge regressed over time. Such a strategy difference may help to explain why the two students with the same start in using the target feature differed greatly in the improvements in the accurate use of the target feature in the preliminary quasi-experiment. It may also explain why Jane's correct understanding of written CF improved from the immediate post-test to the delayed post-test in the multi-case study, while that of Kate decreased to zero in the same period. Hence, the present finding may suggest the superiority of self-initiation over reliance on the authority in facilitating the contribution of written CF to L2 development. In addition, findings of Gu and Johnson's (1996) and Wong and Nunan's (2011) studies may lend some support to such an inference. Gu and Johnson's questionnaire survey revealed that self-initiation was a significant predictor of both L2 proficiency and vocabulary size, while Wong and Nunan's questionnaire survey revealed that the higher and lower proficiency learners differed significantly in the use of reliance on the teacher, with the latter favouring this strategy (see Section 3.6.2.4). Nonetheless, more research into the relationship between these two strategies and the effect of written CF is needed for the validation of this inference.

It is noted that because Jane used written CF knowledge herself to monitor the unmarked points in her original text, she incorrectly revised two unmarked points. As a result, Jane's score of successful revision was lower than that of Kate who targeted only the marked errors. Considering their cognitive processing of written CF while revising the texts, Kate's higher score of successful revision could not indicate that Kate's knowledge internalization was of a higher quality than Jane's. Instead, in the treatment session, Jane, who completed more processing episodes of written CF, could have achieved a higher quality of knowledge internalization than Kate due to the more elaborated and more refined knowledge resulting from the repeated retrieval and processing of written CF. Hence, Kate's present higher score of successful revision (one opportunity for revision) may lend some support to the conclusion that both successful revision and unsuccessful revision (one opportunity for revision) are insignificant moderators of the contribution of written CF to the development in accuracy in the preliminary quasi-experiment (see the results and discussion of RQ 2 a). Both findings suggest that the revision type adopted at a particular point in time may not represent the quality of internalization of written CF.

Furthermore, Jane's self-initiation to use the written CF knowledge to monitor the unmarked points revealed her active use of the written CF knowledge. Such a strategy use was in line with both the cognitive and DST theories. From the macro cognitive perspective, the active use of written CF knowledge can activate the form-meaning connection in IL, thus contributing to knowledge consolidation (see Section 2.2.2). Hence, the more consolidated written CF knowledge may have contributed to Jane's faster improvement in the accurate use of the target feature. From the DST perspective, L2 learning "is an iterative process … the more it [a linguistic feature] is used, the faster it is learnt" (de Bot et al., 2013, p. 201). Hence, Jane's active use of the written CF knowledge could have facilitated her L2 development. As a result, the present finding seems to suggest that the active use of the written CF knowledge facilitate the contribution of written CF to L2 development. Such an inference found some support in Gu and Johnson's (1996) study. Their questionnaire survey revealed that activation (i.e. active use of the new word) significantly predicted vocabulary size (see Section 3.6.2.4). Nonetheless, more research into the relationship between the active use of written CF and the effect of written CF is needed for clarification.

In addition, in order to facilitate her memory of written CF points, before reading the written CF points for understanding, Kate first read silently all the written CF points

without processing them for understanding. In other words, she adopted visual repetition for memory. Considering Kate's zero improvement in writing accuracy in the preliminary quasi-experiment, and her complete loss of correct understanding of written CF in the delayed post-test in the multi-case study, Kate's strategy use conformed to Gass' (1997) model of micro cognitive processing. From the micro cognitive perspective, the second stage of cognitive processing, understanding, is the prerequisite of knowledge internalization (see Section 2.2.1.1). Since Kate first read silently all the written CF points without processing them further, she only achieved the first stage of micro cognitive processing (i.e. noticing) at that time, not the second stage of cognitive processing, understanding. That is, at that time, Kate did not complete the episode of the cognitive processing of written CF. Thus, she did not learn the written CF knowledge. Therefore, although Kate noticed written CF more frequently than Jane, Jane improved considerably faster than Kate in the accurate use of the target feature. Hence, the present finding seem to suggest that visual repetition has a negative impact on the contribution of written CF to L2 development. Such an inference found some support in Gu and Johnson's (1996) study. Their questionnaire survey revealed that visual repetition was a significant but negative predictor of both L2 proficiency and vocabulary size. Nonetheless, more research into the relationship between visual repetition and the effect of written CF is needed to validate this inference.

6.3.2 Discussion of the differences in the two students' cognitive processing of written CF in the two post-tests

Three differences were revealed in the two students' cognitive processing of written CF in the two post-tests. First, although neither student consistently and correctly understood written CF in both post-tests, they differed in the pattern of change in their understanding of written CF. The accuracy in Jane's understanding of written CF increased from the immediate post-test to the delayed post-test, while that of Kate decreased during the same period. Secondly, Jane processed written CF in planning in both post-tests, while Kate only in the delayed post-test. Thirdly, Kate's processing of written CF was consistently restricted to the obligatory uses of the passive voice in both sessions, while that of Jane was expanded to occasions where she was consciously using the active voice in the delayed post-test.

As both students indicated that they were preparing for an examination for a paid internship at a five-star hotel downtown, they did not review the grammar of the passive voice (i.e. the target feature) themselves during the period of the multi-case study (see

Appendix G for the interview guide). Hence, what they recalled about the passive voice in the delayed post-test was considered as the results of the effects of multi-case study. As it was found that Jane's expansion of processing of written CF to occasions where she was consciously using the active voice in the delayed post-test and Kate's processing of written CF in planning in the delayed post-test resulted from the treatment effects of stimulated recalls, these two changes in their processing of written CF in post-tests were not attributed to the effects of written CF. As a result, they are excluded from the discussion. Nonetheless, Kate's more strategic use of written CF in the delayed post-test resulting from the effect of the stimulated recall demonstrated that she was able to pick up learning strategies while interacting with the learning context. In addition, Jane had a strong impression about written CF in the delayed post-test, which disturbed her processing of the past continuous tense in the active voice. This phenomenon conformed to the DST theory. According to the DST theory, components of the IL are interrelated and interact with one another. One small change in one component may lead to changes in another or other component(s) (see Section 2.9).

As mentioned previously, research into the relationship between the effects of written CF and the learning strategies other than revision is not available to my knowledge. Nonetheless, the differences in the two students' strategy use in their cognitive processing of written CF in both post-tests were in line with the cognitive and DST theories, just like those in the treatment session. First, from the cognitive perspective, the difference in the pattern of change in their understanding of written CF contributed to the difference in their long-term achievements of learning. The accuracy of Jane's understanding of written CF increased from 85.7% in the immediate post-test to 100% in the delayed post-test in the present multi-case study, while that of Kate decreased from 100% to 0 in the same period. Their understanding of written CF was revealed in what they retrieved about written CF in the post-tests. Because the retrieval and processing of written CF in post-tests contributes to the consolidation of written CF (see Section 2.2.3), what a learner retrieves in the post-tests can greatly influence the quality of consolidation. Hence, with the improvements in the accuracy of Jane's understanding of written CF in post-tests (revealed in her retrieval of written CF in post-tests), Jane's written CF knowledge became more consolidated over time. By comparison, with the decrease of the accuracy of Kate's understanding of written CF in post-tests (revealed in her retrieval of written CF in post-tests), Kate's written CF knowledge regressed in the

same period. As a result, Jane developed accuracy in the use of the passive voice faster than Kate.

Secondly, different from Kate, Jane processed written CF in planning in both post-tests in the present multi-case study. That is, only Jane used written CF knowledge in the planning of the two new writing tasks. From the cognitive perspective, the retrieval and processing of written CF in post-tests contributed to the consolidation of written CF (see Section 2.2.3), because repeated retrieval and processing contributed to knowledge consolidation (see Section 2.2.2.2). From the DST perspective, as L2 learning "is an iterative process", the utilization of a linguistic feature contributes to its development in the learner's IL (de Bot et al., 2013, p. 210). As a result, from both the cognitive and DST perspectives, Jane, who retrieved and processed written CF more frequently in the post-tests in the present multi-case study, consolidated written CF better, and could improve faster than Kate, who retrieved written CF less in the same post-tests. This may also help to explain why Kate's correct understanding of written CF regressed, while that of Jane improved during the one month delay in the present multi-case study, although both students did not study the grammar of the target feature themselves during this period. Jane's more frequent use of written CF in the new writing tasks also conformed to Gu and Johnson's (1996) finding. Their questionnaire survey revealed that activation (i.e. active use of the new word) significantly predicted vocabulary size. Hence, the present finding may suggest again that active use of written CF knowledge facilitate the contribution of written CF to L2 development. However, empirical studies on the relationship between the two variables are needed to validate such an inference.

6.3.3 Summary

To sum up, the present multi-case study revealed that the two students differed in their strategy use while cognitively processing written CF in both the treatment and the subsequent new writing tasks. In the treatment, the student whose writing accuracy improved faster reflected her cognitive processing in the original writing task. She also initiated application of written CF to monitor the unmarked points in her original text. As a result of her active use of the written CF knowledge, she incorrectly revised two unmarked points. Therefore, her score of successful revision in the present multi-case study was lower than the student who relied on the authority of feedback source in learning (i.e. less active use of written CF knowledge) and visually repeated the written CF points to facilitate her memory of them. In the subsequent new writing tasks, only the student whose writing accuracy improved faster processed written CF in planning in

both post-tests, showing again her active use of the written CF knowledge. Moreover, both students' understanding of written CF changed from the immediate post-test to the delayed post-test, but the patterns of change were opposite. The student whose writing accuracy improved faster made improvements in her correct understanding of written CF, while the other student's correct understanding of written CF decreased from 100% to 0 in this period.

From the cognitive and DST perspectives, reflection, self-initiation and active use of the L2 knowledge have the potential to facilitate L2 development, while reliance on an expert (e.g., a teacher) has less L2 learning potential, and visual repetition does not have such potential. These present findings seem to suggest that reflection, self-initiation and active use of the written CF knowledge have more positive impacts on the contribution of written CF to L2 development than reliance on an expert (e.g., the feedback source in the present multi-case study) and visual repetition. Besides the difference in the two students' improvements in writing accuracy in the preliminary quasi-experiment and the difference in the changes of their correct understanding of written CF in the multi-case study, such an inference found some support in two previous studies among EFL learners in China. On the one hand, Gu and Johnson's (1996) survey in mainland China revealed that self-initiation and active use of the new word significantly predicted L2 proficiency and/or vocabulary size, while visual repetition significantly but negatively predicted both learning outcomes. On the other hand, Wong and Nunan's (2011) survey in HK revealed that the higher and lower proficiency learners differed significantly in their use of reliance on the teacher, with the latter favouring this strategy. Nonetheless, more research into the learners' strategy use in their cognitive processing of written CF in both the treatment and the new writing tasks is needed to validate this inference. Particularly, the present multi-case study is an exploratory one, and systematic exploration of the impacts of L2 learning strategies, such as reflection, self-initiation, active use of the written CF knowledge, reliance on an expert (e.g., the teacher or the feedback source in the present study) and visual repetition, on the contribution of written CF to L2 development is needed for a deep insight into the L2 learning potential of written CF.

CHAPTER 7

CONCLUSION

7.1 Introduction

Research into written CF has been increasing in recent years due to the researchability of written CF (Ellis, 2010) and "the significance it [written CF] carries for both SLA theory building and language pedagogy" (Sheen, 2010, p. 177). As a part of the recent written CF research, this project was (a) driven by my pedagogical needs, (b) guided by L2 learning theories (i.e. the cognitive and DST theories) and (c) built on the previous written CF research. Conducted in both the cognitive and DST frameworks, the study sought to extrapolate the empirical findings to the implications for theoretical development, methodological improvement and pedagogy. Hence, this chapter will first review briefly the aims and methodology of the study before summarising the key findings. Then, the theoretical, empirical, methodological and pedagogical contributions of the study will be discussed. Next, the limitations of this project will be identified and directions for future research will be recommended. Final remarks will be offered at the end of this chapter.

7.2 Aims and methodological approach

The main purpose of the study was to explore the L2 learning potential of written CF with the enhancement of revision. It also aimed to investigate the possible moderations of written CF type, revision type and L2 motivation on the contribution of written CF to L2 development. In addition, it attempted to explore some of the reasons why one student may benefit from written CF while another may appear to not benefit from it.

To achieve these aims, the study adopted a mixed-method research design. It consisted of two phases: first the quantitative phase, then the qualitative phase. The quantitative phase was a quasi-experiment, embedded with an L2 motivation questionnaire survey. It was conducted among the second-year EFL learners in a vocational college in China. Consisting of the pre-test, the treatment (revision required for the feedback groups), the immediate post-test and the delayed post-test (four weeks later), the quasi-experiment aimed to explore the contribution of written CF (i.e. direct feedback and metalinguistic explanation) to the development of a little explored syntactic feature: the English passive voice. It also aimed to explore the possible moderating effects of written CF type, revision type and L2 motivation on the efficacy of written CF as well as the

possible moderating effect of L2 motivation on the revision type adopted by the learners. For a clearer picture of the L2 learning potential of written CF, both the accurate development of the target feature (i.e. the English passive voice) and the partial development of this feature (i.e. a recognition of the need to use the English passive voice) were considered in the quasi-experiment.

Informed by the results of the quantitative phase, a multi-case study was conducted, aiming to explore some of the reasons why one student may benefit from written CF while another may appear to not benefit from it. The two participants of the multi-case study (i.e. the qualitative phase of this project) had participated in the quasi-experiment, in which they differed greatly in the amount of benefit they obtained from written CF. The multi-case study consisted of the pre-test, the treatment (revision required), the immediate post-test and the delayed post-test. The immediate post-test was followed by the stimulated recall interviews focusing on each student's cognitive processing in the treatment session (including revision) and the immediate post-test respectively. The delayed post-test was followed by the stimulated recall interview, focusing on each student's cognitive processing in this session.

Hence, triangulation in time as well as triangulation of data collection and analyses methods were achieved in the study. It should be noted that although only quantitative data were collected during the quantitative phase, the data generated by the writing tests and the revision tasks in the quasi-experiment were triangulated with two students' recall of their cognitive processing in the treatment session and the two post-tests in the multi-case study. Findings of this project (both the quantitative phase and the qualitative phase) are summarized as follows, according to the issues being explored:

7.3 Summary of key findings

7.3.1 The L2 learning potential of written CF

On the one hand, this project revealed that written CF, enhanced by revision, did not significantly differ from writing practice regarding their contributions to the accurate development of the passive voice over time. On the other hand, it revealed that written CF significantly outperformed writing practice as it helped the learner to recognize the need to use the passive voice over time (i.e. the partial development of the target feature). Regarding the latter issue, the study also revealed that although the effects of two written CF types did not differ significantly, metalinguistic explanation was significantly more helpful than writing practice, while direct feedback was less so. As a

result, even when the effect of written CF on accurate development of the target feature was not significant, the study detected the L2 learning potential of metalinguistic explanation, the most informative written CF type.

7.3.2 The moderating effect of revision type on the efficacy of written CF

Learners have been found to adopt four types of revision in responding to written CF: successful revision, unsuccessful revision, deletion of the text with the marked error and no response. Among the four types of revision, successful revision may contribute most to L2 development, because only it may manifest the internalization of the correct form (i.e. the correct modification). However, this project revealed that neither successful revision nor unsuccessful revision significantly moderated the effects of direct feedback and metalinguistic explanation on accuracy over time. Nor did either revision type significantly moderate the effects of the two written CF types on a recognition of the need to use the English passive voice over time. Hence, this project found that the revision type adopted by the learners during a single opportunity to revise the text did not significantly moderate the L2 learning potential of written CF.

7.3.3 The moderating effect of L2 motivation on revision type

L2 motivation, the effort that the learner puts in L2 learning due to the desire to learn, can impact learners' utilization of the L2 learning opportunities brought about by written CF, including revisions (Kormos, 2012). However, this project revealed that L2 motivation, including each of the L2 motivation variables (i.e. Ideal L2 self, L2 learning experience, Ought-to L2 self, and the discrepancy between Ought-to L2 self and the actual L2 self perceived by the learner), did not significantly affect any of the revision types adopted by the feedback groups (i.e. successful revision, unsuccessful revision, and no response). Hence, this project revealed that L2 motivation did not significantly impact the revision type adopted in the single revision.

7.3.4 The moderating effect of L2 motivation on the efficacy of written CF

As L2 motivation can play a role in the learner's utilization of the L2 learning opportunities provided by written CF, it has the potential to have an impact on the efficacy of written CF (Kormos, 2012). The study revealed that one L2 motivational variable, Ideal L2 self (i.e. the kind of person the L2 learner would like to become) (Dörnyei, 2009), significantly moderated the effects of direct feedback and metalinguistic explanation on the accurate use of the passive voice over time. It also found that only the effect of direct feedback was significantly moderated by Ideal L2

self. Hence, the study not only revealed that the dynamic dimension of L2 motivation significantly moderated the efficacy of written CF, but it also revealed that the dynamic L2 motivation had a higher moderating influence on the effect of direct feedback, than on metalinguistic explanation. In order to locate where in the cognitive processing the significant moderating effect of Ideal L2 self on direct feedback occurred, the direct feedback group (n = 29) was separated into two sub-groups according to the scores of the members in this group on Ideal L2 self. However, due to the small sample size in the two sub-groups, the study could not locate where this significant moderating effect occurred. Considering the reasonably high correlation revealed in the regression analysis of the data in the delayed post-test, a larger sample size in the future research may help to reveal the moderating pattern. Nonetheless, within the direct feedback group, this project found that learners with low Ideal L2 self improved more in accurately using the target feature than their peers with high Ideal L2 self, and the prediction of Ideal L2 self on the accuracy scores in the delayed post-test was marginally non-significant and negative. Because learners are motivated to learn an L2 by their desire to reduce the discrepancy between their actual and ideal selves (Dörnyei, 2009), this finding may suggest that the discrepancy between the actual and ideal selves, not necessarily Ideal L2 self, positively related to the effect of direct feedback. However, further research which addresses such a discrepancy would be needed to validate this inference.

In addition, this project revealed that L2 motivation, including each of the L2 motivational variables, did not significantly moderate the effects of direct feedback and metalinguistic explanation on the partial development of the target feature (i.e. a recognition of the need to use the passive voice) over time. A recognition of the need to use the passive voice is meaning-related, and meaning is universal. Thus, the development of the meaning-related component of the target feature demands less effort than the development of the form-related component of the same feature. Hence, this project revealed that L2 motivation did not significantly moderate the effects of written CF on the development of the meaning-related component of the target feature, but it did on that of the form-related component (i.e. the accurate use of the target feature).

7.3.5 The impact of strategy use in the cognitive processing of written CF

In the exploration of the possible causes of the different extents to which the two students benefited from written CF, this project revealed that they differed in their strategy use while they cognitively processed written CF in both the treatment session

and the subsequent new writing tasks. In the treatment session, the student whose writing accuracy improved faster reflected her cognitive processing in the pre-test. She also initiated application of written CF to monitor the unmarked points in her original text while revising the text. The latter strategy (i.e. self-initiation) also reflected her active use of written CF in the treatment session. By comparison, the student whose writing accuracy did not improve in the quasi-experiment visually repeated (i.e. read silently) the written CF points to facilitate her memory of them. She also paid attention only to the marked errors while revising her text, showing her reliance on the authority of the feedback source in error identification. Hence, compared with the former student, the latter used written CF less actively in the treatment session. Moreover, in the two post-tests, the student whose writing accuracy improved more kept using written CF knowledge more actively than the other student. Hence, this project may suggest that reflection, self-initiation and active use of written CF are more positive and impactful strategies than reliance on the authority of the feedback source and visual repetition on the L2 learning potential of written CF. However, further research into learners' strategy use in the cognitive processing of written CF in both the treatment session and the subsequent new writing tasks is needed for confirmation.

7.4 Contributions of this project

The above findings contributed to the extant empirical knowledge about written CF, and have theoretical implications about the L2 learning potential of written CF as well as the extent of potential moderating factors in this process. They also have methodological implications for written CF research and pedagogical implications for the application of written CF in L2 teaching. These contributions will be discussed as follows:

7.4.1 The empirical and theoretical contributions

The findings of this project contributed to new empirical knowledge about written CF, which carries theoretical implications regarding the following aspects:

• the L2 learning potential of written CF (see Section 7.4.1.1)
• the informativeness of written CF (see Section 7.4.1.2)
• the significance of a complete cognitive processing episode and knowledge
  consolidation in L2 development resulting from written CF (see Section 7.4.1.3)
• the impact of dynamic L2 motivation on the efficacy of written CF and the need to
  develop the dynamic L2 motivation model (see Section 7.4.1.4)
• the impact of strategy use in the cognitive processing of written CF (see Section
  7.4.1.5)

These theoretical implications together with the relevant empirical contributions are discussed as follows:

7.4.1.1 The L2 learning potential of written CF

As introduced in Chapter 2, the L2 learning potential of written CF has been a theoretically controversial issue. On the one hand, both cognitive and DST theories consider that written CF can facilitate L2 development. From the micro cognitive perspective, written CF can facilitate noticing and output; from the macro cognitive perspective, written CF can function at the stages of knowledge modification and knowledge consolidation. From the DST perspective, as a kind of input, written CF can trigger the interactions between L2 input and IL, then interact with IL for L2 development. Hence, from both the cognitive and DST perspectives, written CF can contribute to the on-going development of the L2. On the other hand, drawing on Krashen's (1985) Monitor model, Truscott (1996) holds that explicit knowledge cannot be converted into implicit knowledge, thereby claiming that written CF cannot affect the IL, and that it can only lead to pseudo-learning at best. Moreover, he considers (1996, 2004) that writing practice is a more effective learning activity than written CF, and so concludes that written CF harms L2 development by taking the time and effort away from the more productive activity: writing practice.

Focusing on an improvement in writing accuracy, previous empirical studies, testing the L2 learning potential of written CF, have generated somewhat mixed results. On the one hand, written CF, either focused or unfocused written CF, was found to have contributed to the long-term development in writing accuracy (Bitchener, 2008; Bitchener & Knoch, 2008; Sheen, 2007; Shintani et al., 2014; Van Beuningen et al., 2012). On the other hand, both Truscott and Hsu's (2008) unfocused study and Shintani and Ellis' (2013) focused study revealed that written CF did not result in long-term development in writing accuracy. Hence, the former findings support the L2 learning potential of written CF, while the latter suggest the opposite. However, as discussed in Section 3.2, the latter findings need to be treated with caution due to the methodological limitations in the two studies. In Truscott and Hsu's study, the function of the comparison treatment overlapped with a function of written CF (see Section 3.2.1). In Shintani and Ellis' study, metalinguistic explanation was provided without error indication (see Section 3.2.2). Strictly speaking, the metalinguistic explanation in the latter study was not written CF, because written CF refers to a written response to a

linguistic error in learners' texts (Bitchener & Storch, 2016) Therefore, more research with improved methodology is needed for clarification.

Like the previous research, this project focused on the development of writing accuracy. It revealed that written CF did not differ significantly from writing practice regarding its contribution to the accurate development of the passive voice over time. Such a finding was in line with Shintani and Ellis' (2013) and Truscott and Hsu's (2008) findings. Different from the previous written CF research, this project also focused on the partial development of the target feature. It revealed that, regarding the contribution to a recognition of the need to use the passive voice over time (i.e. the partial development of the target feature), written CF significantly outperformed writing practice. That is, this project contributed to empirical knowledge in that written CF can significantly outperform writing practice in its contribution to the long-term partial development of a linguistic feature even when its contribution to accurate development does not differ significantly from writing practice. As a result, the present findings may suggest that, in the previous studies where written CF did not significantly contribute to accurate development, there was a possibility that written CF contributed significantly to the partial development of the target feature. Hence, under the condition that accurate development was not achieved, this project lent some support to the L2 learning potential of written CF revealed in L2 learning theories.

7.4.1.2 The informativeness of written CF

As introduced in Section 2.4, direct feedback is the most explicit written CF type, while metalinguistic explanation the most informative type. Theoretically, feedback with differences in explicitness and informativeness may have different effects on comprehension, the second stage of cognitive processing of input. Hence, the effects of feedback types may differ. As direct feedback provides correct forms, the merit of direct feedback lies in its ability to enable the learner to internalize the correct form immediately (Chandler, 2003). By comparison, metalinguistic explanation provides rules about the errors with illustration, but not correct forms. The learner has to use the metalinguistic explanation to work out the correct forms themselves. In this process, the learner practises the mapping between explicit knowledge in metalinguistic explanation and the context in which to use the knowledge. Hence, the merit of metalinguistic explanation lies in its contribution to the procedualization of explicit knowledge (Shintani, Ellis, & Suzuki, 2014). Thus, theoretically, if the influences of degree of explicitness and informativeness on the efficacy of written CF are confirmed, L2

learning theories need to incorporate these differences "as conditions of L2 learning" (Bitchener, 2012, p. 354).

Both focused and unfocused research have compared the efficacy of different written CF types with respect to their degrees of explicitness and informativeness. The unfocused research revealed that the effects of error code, error location and direct feedback did not differ significantly (Lalande, 1982; Rob et al., 1986; Semke, 1984; Van Beuningen et al. 2012; Vyatkina, 2010). A number of focused studies compared the efficacy of direct feedback alone with that of direct feedback plus written and/or oral metalinguistic explanation (Bitchener, 2008; Bitchener & Knoch, 2008; Sheen, 2007). They revealed no significant difference between the effects of the written CF types under investigation, suggesting that metalinguistic explanation does not significantly influence the effect of direct feedback. To my knowledge, only two previous focused studies compared the effects of direct feedback and metalinguistic explanation directly (Shintani & Ellis, 2013; Shintani et al., 2014). They revealed that the effects of the two written CF types did not differ significantly. Such findings seemed to suggest that the degrees of explicitness and informativeness do not significantly influence the efficacy of written CF. However, these findings need to be interpreted with caution because errors were located for the direct feedback group, but not for the metalinguistic explanation group in each study (see Section 3.2.2). Hence, more research into this issue with improved methodology is needed.

Targeting accurate development, this project confirmed Shintani and Ellis' (2013) and Shintani et al.'s (2014) findings. Targeting the partial development of the target feature (i.e. a recognition of the need to use the passive voice), this project revealed that direct feedback and metalinguistic explanation did not differ significantly in their contributions to the L2 development, either. Although partial development of a linguistic feature has not been addressed systematically in the previous written CF research to my knowledge, the present findings seem to further suggest that the degrees of explicitness and informativeness do not significantly influence the efficacy of written CF. However, L2 learning does not take place in a vacuum. Due to the learner's interaction with the learning context, a variety of learner factors, both internal and external factors, can play a role in the learning process. Thus, they may moderate the effects of written CF (see Section2.5 – 2.7 and Section 3.5 and 3.6). Among the learner factors, this project systematically addressed the possible moderating effects of revision type and L2 motivation. It was found that revision type did not significantly moderate

the effects of direct feedback and metalinguistic explanation on both accurate development and partial development of the target feature. Neither L2 motivation nor a single L2 motivation variable, significantly moderated the effects of both written CF types on partial development. However, an L2 motivation variable, Ideal L2 self, significantly moderated the effect of direct feedback, but not metalinguistic explanation, on accurate development. Thus, the present findings relevant to the influence of explicitness and informativeness degrees on the efficacy of written CF cannot be taken definitive. The different moderating effects of L2 motivation on the degree of explicitness and informativeness of written CF need to be considered.

7.4.1.3 The significance of complete cognitive processing episodes and knowledge consolidation in L2 development resulting from written CF

As introduced in Section 2.2.1, L2 learning from the micro cognitive perspective consists of five stages: noticing, understanding, intake, integration and output. They form a complete cognitive processing episode. The last stage, output, manifests the L2 knowledge that has been internalized. Hence, L2 input, including written CF, needs to go through all the stages of cognitive processing in order for the learning process to begin. As introduced in Section 3.8, the previous empirical studies on the cognitive processing of written CF focused on the initial cognitive processing episodes (i.e. those in the written CF treatment session). They all revealed that noticing did not guarantee understanding (Shintani & Ellis, 2013; Stefanou, 2014; Suzuki, 2012). With the same learner's cognitive processing of written CF in both the treatment session and the subsequent new writing tasks unexplored to my knowledge, little attention has been given to the relationship between the cognitive processing of written CF in a single episode and the L2 development resulting from written CF.

This project explored the same pair of learners' cognitive processing of written CF in both the treatment session and the subsequent new writing tasks. It revealed that past tense, instead of past participle, was memorized as a component of passive structure one month after the treatment by the learner who noticed written CF more frequently in the treatment session. However, nearly half of her cognitive processing episodes in the treatment session only consisted of noticing. By comparison, the student who noticed written CF less frequently completed more cognitive processing episodes in the treatment session. She completely memorized the correct written CF knowledge one month after the treatment. Hence, this project suggested a positive link between the completeness of cognitive processing episodes and the L2 development resulting from

written CF. Such new empirical knowledge of the value of complete cognitive processing episodes to the retention of written CF suggests the significance of complete cognitive processing episodes in L2 development.

In addition, as introduced in Section 2.2.2, L2 learning from the macro cognitive perspective consists of three processes: knowledge internalization, knowledge modification and knowledge consolidation (Housen & Pierrard, 2005). Written CF leads to explicit knowledge, and explicit knowledge is subject to regression (Shintani, et al., 2014). After the establishment of the initial form-meaning connections in the IL, such a connection needs to be enhanced via repeated retrievals and deeper processing in use (Williams, 2012). To my knowledge, empirical written CF studies have yet to address the function of knowledge consolidation directly from the cognitive processing episodes. The present multi-case study revealed that the student who used written CF knowledge more often in revision (i.e. part of the treatment session) and the immediate post-test improved in her correct understanding of written CF from the immediate post-test to the delayed post-test. A different pattern of change in the understanding of written CF was found with the student who used written CF knowledge less in revision and the immediate post-test. Her correct understanding of written CF regressed from the immediate post-test to the delayed post-test. Hence, such new empirical knowledge of the value of repeated retrieval and processing of written CF to the retention of written CF suggests the significance of knowledge consolidation in the L2 development.

7.4.1.4 The impact of L2 motivation on the efficacy of written CF and the need to adapt the L2 Motivational Self System, the dynamic L2 motivation model

As introduced in Section 2.6, L2 motivation (i.e. the effort put into in L2 learning resulting from the desire to learn) can impact on the efficacy of written CF via its impact on the learners' utilization of the L2 learning opportunities brought about by the written CF (KorFmos, 2012). Because learners are social beings, they interact with their learning context. Due to such interactions, L2 motivation has a dynamic dimension. The L2 Motivational Self System is a macro model of language-specific motivation, which manifests the interaction between the learner and the learning context (Dörnyei, 2009). It consists of three components: Ideal L2 self, Ought-to L2 self and L2 learning experience (Dörnyei, 2009). Theoretically, Ideal L2 self is strong in motivating L2 learning because people always try to reduce the discrepancy between their actual and ideal selves (Dörnyei, 2009).

Empirical research on the relationship of L2 learning style, Ideal L2 self, motivated learning behaviour and learning outcome revealed that Ideal L2 self was the most substantial predictor of L2 proficiency (i.e. learning outcome) (Kim & Kim, 2014). Empirical written CF research addressing the impact of dynamic L2 motivation on the efficacy of written CF is not available to my knowledge. By systematically addressing this issue, this project revealed that Ideal L2 self significantly moderated the effect of direct feedback on the accurate development of the target feature. This new empirical knowledge of written CF, together with the significant prediction of Ideal L2 self on L2 proficiency revealed in Kim and Kim's study, lent some support to the influence of Ideal L2 self proposed in the L2 motivation theory (i.e. the L2 Motivational Self System). However, due to the small sample size, this project failed to reveal a moderating pattern. Nonetheless, it revealed that, within the direct feedback group, learners with low Ideal L2 self improved more in their accurate use of the target feature than their peers with high Ideal L2 self. Moreover, the prediction of Ideal L2 self on the accuracy scores in the delayed post-test was marginally non-significant and negative. Because learners are motivated to learn an L2 as a result of a desire to reduce the discrepancy between their actual and ideal selves (Dörnyei, 2009), this new empirical knowledge may suggest that the discrepancy between the actual and ideal selves, not necessarily Ideal L2 self, is positively related to the effect of direct feedback. Hence, the L2 Motivational Self System may need to be extended to include this discrepancy as a component. Besides, the extended the L2 Motivational Self System needs to be tested empirically.

7.4.1.5 The impact of strategy use in cognitive processing of written CF

As introduced in Chapter 2, learning strategies are adopted by the learner to solve specific problems in a learning task. Thus, strategies used in the learner's response to written CF can impact the efficacy of written CF (Kormos, 2012). Among the strategies, metacognitive strategies regulate cognition via planning, monitoring and evaluating the L2 learning actions. Reflection is a metacognitive strategy involving an evaluation of an L2 learning activity by the learner him/herself (Yancey, 1998). It contributes to the conversion of experience into personal knowledge (Yancey, 1998) (see Section 2.8). Because reflection provides a learning opportunity for the learner, it has the potential to facilitate L2 learning. Self-initiation and reliance on an expert are metacognitive strategies, too. The former is embedded in learning initiated by the learner him/herself. The latter is embedded in the phenomenon that the learner is pushed to study by the

teacher or an expert such as the feedback source in the present study. Both self-initiation and reliance on an expert regulate cognition via planning the learning activity. Compared with a learner who relies on the authority, a learner with self-initiation is ready and able to identify and utilize the learning opportunities him/herself (see Section 2.7). Hence, self-initiation can be more effective in aiding L2 learning than reliance on the authority.

Among the strategies, cognitive strategies function directly in the information processing of L2 input to facilitate learning. Both an active use of L2 knowledge and visual repetition (i.e. read silently) are cognitive strategies. Active use of L2 knowledge can activate the form-meaning connection in the IL. Thus, it facilitates L2 learning by contributing to knowledge consolidation (see Section 2.2.2). By comparison, visual repetition indicates that the learner read the L2 input silently without actually thinking about it. That is, the learner only notices the L2 input. From the micro cognitive perspective, noticing is the first stage of cognitive processing. It does not guarantee the second stage, understanding, which is the prerequisite for knowledge internalization (see Section 2.2.1.1). As a result, the learner cannot learn the L2 input while using visual repetition.

Empirical research into the influence of strategy use on L2 learning outcomes revealed that self-initiation and an active use of the L2 knowledge are effective for L2 development (Gu & Johnson, 1996), while visual repetition and reliance on the authority of L2 knowledge are not (Gu & Johnson, 1996; Wong & Nunan, 2011). Regarding the impact of learning strategies on the efficacy of written CF, revision and types of revision have been the foci in research (Chandler, 2003; Ferri, et al., 2013; Hyland, 2003; Shintani et al., 2014). To my knowledge, the impact of other strategies on the efficacy of written CF have not been explored. Neither were the strategies used in the learners' cognitive processing of written CF. Based on two students' stimulated recall of their cognitive processing of written CF in both the treatment session and the new writing tasks, this project revealed that these two students differed greatly not only in the amount of benefit they obtained from written CF but also in strategy use while they cognitively processed written CF. The student whose accurate development was considerably greater adopted three strategies: reflection, self-initiation and active use of written CF knowledge. By comparison, the student, whose accurate development was zero, adopted two strategies: reliance on the authority of feedback source and visual repetition. Hence, regarding the impact of strategy use in cognitive processing of written

CF, the superiority of reflection, self-initiation and active use of written CF knowledge over reliance on the authority of feedback source and visual repetition in facilitating L2 learning from the theoretical perspective are detected in the field of written CF. In other words, the former three strategies may impact more positively on the contribution of written CF to L2 development than the latter two strategies.

7.4.2 The methodological contributions

This project was built on previous written CF research with improved methodology. As a result, its findings contribute to the methodological development of written CF research in the following aspects:

- introducing the DST perspective and a pathway to do quantitative written CF research in the DST framework (see Section 7.4.2.1)
- the significance of examining the same set of data from different perspectives (see Section 7.4.2.2)
- applicability of Bitchener's (2016) cognitive processing model of written CF (see Section 7.4.2.3)
- the need to explore cognitive processing of written CF in both the treatment session and subsequent new writing tasks (see Section 7.4.2.4)
- the significance of exploring new moderating factors (see Section 7.4.2.5)

These contributions will be discussed hereafter:

7.4.2.1 Introduction of the DST perspective and a pathway to do quantitative written CF research in the DST framework

As introduced in Chapter 1 and detailed in Chapter 3, written CF research has been dominated by quasi-experiments in the cognitive framework. In these quasi-experiments, L2 development after the written CF treatment(s) is inferred from the accurate development in the texts (Bitchener, 2008; Sheen, 2007; Shintani & Ellis, 2013; Truscott & Hsu, 2008; Van Beuningen et al., 2012). In other words, the ultimate goal, rather than the process, of L2 learning was examined in these studies. Because the micro cognitive process of L2 learning snowballs into the macro cognitive process of L2 learning, L2 learning is an on-going process (see Section 2.2). Hence, in the exploration of L2 development after the written CF treatment(s), the on-going process of L2 development also deserves attention.

DST "is a theory of change that takes time as a core issue" (de Bot et al., 2013, p. 201). In other words, DST focuses on the process of L2 development, rather than its endpoint. In addition to the longitudinal and qualitative research methods which fit the DST account of L2 learning, Larsen-Freeman and Cameron (2008) also support large scale

research which covers a short period of time being conducted in the DST framework. This is a micro-development approach. According to them, "we need not only longitudinal corpora, but also dense corpora that involve highly intensive sampling over short periods of time" in order to study the process of L2 development (p. 208). A micro-development approach allows collection of dense data from a large sample over a short time scale. In this way, it helps to make the subtle changes in the IL, which are difficult to perceive from the outside (see Section 2.9.1), more transparent (Thelen & Corbetta, 2002).

This project introduced the DST perspective in written CF research and adopted a micro-development approach. By focusing on the partial development of the target feature, the present quasi-experiment observed a subtle change in the IL (i.e. the development of the meaning-related component of the target feature), which became transparent within the micro-development research design. Thus, the present quasi-experiment captured the process of L2 development when the ultimate aim of L2 learning (i.e. the accurate use of the L2) was not achieved, and found a pathway to do quantitative written CF research in the DST framework.

7.4.2.2 The significance of examining the same set of data from different perspectives

The L2 learning potential of written CF is the key issue explored in this project. To my knowledge, previous quasi-experiments on this issue adopted accurate development as the measurement and inferred the L2 learning potential of written CF from the significant differences in the accurate development among groups. As mentioned in Section 7.4.2.1, the on-going process of L2 learning after the written CF treatment(s) has yet to be investigated. Besides adopting accurate development as the measurement, the present quasi-experiment also identified partial development as a measurement to analyse the same texts. On the one hand, the present quasi-experiment revealed that one written CF treatment was not significantly more effective than the comparison treatment, writing practice, for the accurate development of the target feature. On the other hand, it revealed that one written CF treatment was significantly more effective than writing practice for the partial development of the target feature. As a result, this project captured the process of L2 development after the written CF treatment. Hence, more comprehensive knowledge about the L2 learning potential of written CF generated by the present quasi-experiment points to the significance of examining the same set of data from different perspectives.

7.4.2.3 The applicability of Bitchener's (2016) cognitive processing model of written CF

In exploring the cognitive processing of written CF, previous studies (Shintani & Ellis, 2013; Stefanou, 2014; Susuki, 2012) targeted the initial processing episodes and adopted Gass' (1997) processing model of L2 input in general (see Section 3.8). They all confirmed the existence of two stages, noticing and understanding, in the initial cognitive processing of written CF.

Gass' model is about processing of new L2 input. As the initial processing of one piece of information is different from processing it after it has been taken in, Gass' model is not suitable for the analyses of a subsequent processing episode. Bitchener (2016, December) developed a model addressing the cognitive processing of written CF in the subsequent new writing tasks. Six stages are identified in a subsequent processing episode:

• orientation to form and meaning;
• identification of the need to use written CF knowledge;
• recognition of the relationship between the knowledge learnt from written CF and the meaning to be expressed;
• retrieval of written CF;
• hypothesis formation and testing; and
• output

To my knowledge, the present multi-case study was the first one to adopt this processing model in written CF research. The two multi-case study participants' stimulated recall of new writing tasks was analysed with reference to this model. Except for "hypothesis formation and testing", findings of the present multi-case study confirmed the existence of all the stages in Bitchener's (2016, December) subsequent processing model of written CF (see Section 6.2 and 6.3). As "hypothesis formation and testing" demands online collection methods for it to be revealed, not a retrospective method such as stimulated recalls, it was beyond the scope of the present multi-case study. Hence, this project confirms that Bitchener's (2016, December) subsequent processing model of written CF is applicable in empirical written CF research.

7.4.2.4 The need of exploring cognitive processing of written CF in both the treatment session and new writing tasks

To my knowledge, previous studies on the cognitive processing of written CF only focused on the initial processing (i.e. in the treatment session) (see Section 3.8). The present multi-case study explored the cognitive processing of written CF in both the

treatment session and subsequent new writing tasks. It revealed that the two participants differed in strategy use in their initial cognitive processing of written CF. They also differed considerably in their retention of written CF in the new writing tasks. Such findings suggest that strategy use in the initial processing of written CF can impact the efficacy of written CF. Thus, a potential moderator of written CF is identified in the present multi-case study, pointing to the significance of exploring cognitive processing of written CF in both the treatment session and new writing tasks. Moreover, analyses of one participant's stimulated recall in the delayed post-test revealed that her retention of written CF regressed completely one month after the treatment. This is because she kept retrieving written CF in the delayed post-test as "Passive voice: auxiliary be + past tense". However, her output was correct on two occasions:

> *The boy was chased.*
> *The boy was frightened to fall* (see Section 6.3.1.2).

As mentioned in Section 7.4.2.1, in the quasi-experiments which have dominated written CF research, L2 development has been inferred from evidence of accurate development in the written output. From this viewpoint, the above correct written output can be considered as evidence to infer L2 development after the written CF treatment. However, such an inference contradicts this participant's cognitive processing revealed in the stimulated recall. Such a mismatch between her cognitive processing of written CF and correct output on each of the two occasions resulted from the characteristics of the main verb in each sentence: their past tense and the past participle share the same form. Hence, this project revealed that the inference of the cognitive processing of written CF from the written output is not always reliable. Thus, this project suggests a need to explore the cognitive processing of written CF in new writing tasks after written CF treatments.

7.4.2.5 The significance of exploring new moderating factors

This project revealed that direct feedback (the most explicit written CF type) and metalinguistic explanation (the most informative written CF type) did not differ significantly regarding their contributions to accurate development. Such a finding seems to suggest that the degrees of explicitness and informativeness do not significantly influence the effects of written CF. However, this project also revealed that an L2 motivation variable, Ideal L2 self, significantly moderated the effect of direct feedback, but not that of metalinguistic explanation, on accurate development. Thus, as pointed out in Section 7.4.1.2, the former finding about the influence of explicitness and

informativeness on the efficacy of written CF cannot be assumed. The different moderating effects of L2 motivation on the explicitness and informativeness of written CF need to be considered. Therefore, this project, together with previous studies which explored the moderating effects of learner factors (see Section 3.5), indicates that the efficacy of written CF may be moderated by a range of learner factors. As a result, in the exploration of the L2 learning potential of written CF, the potential moderators need to be explored and their moderation needs to be considered for a more comprehensive understanding of the role of written CF in L2 development.

7.4.3 Pedagogical contributions

This project was initiated by my EFL teaching experience. As a result, its findings have a number of pedagogical implications:

- the value of focused written CF in the EFL context (see Section 7.4.3.1)
- the value of teachers' understanding of moderators in the cognitive processing of written CF (see Section 7.4.3.2)
- the need of strategy training in the cognitive processing of written CF (see Section 7.4.3.3)

These pedagogical implications will be discussed hereafter:

7.4.3.1 The value of focused written CF in the EFL context

As introduced in Section 1.1, unfocused written CF is a general practice in EFL teaching in China, and how to provide written CF more effectively seems to be a common issue in tertiary education. Before looking for a more effective way to provide written CF, one needs to know whether it is worthwhile providing written CF (i.e. whether written CF has the potential to contribute to L2 development) in this context.

Passive voice is a complex syntactic feature and is a difficult feature for Chinese learners of English (see Section 2.3). Adopting a focused approach, this project investigated the development of passive voice among a group of vocational college students in China. It revealed that focused written CF did not significantly differ from writing practice for accurate development of the passive voice over time. However, it also revealed that focused written CF was significantly more effective than writing practice for the development of a recognition of the need to use the passive voice over time (i.e. the partial development of the target feature). Hence, the contribution of focused written CF to L2 development in the EFL teaching in the higher vocational education in China is suggested. Therefore, it is useful for teachers in this context to provide focused written CF.

It is noted that, on the one hand, focused written CF can only treat one or a few linguistic features at a time. On the other hand, teachers provide written CF with the hope of improving the overall accuracy of their students' writing, not just the accuracy of the target features (Liu & Brown, 2015). The former improvement results from a development of the whole IL, while the latter results from a development of the target features only. Regarding this issue, Bitchener (2009) pointed out that after the target feature has been modified by and consolidated with written CF for a period of time, focused written CF can target other erroneous features in the next period. In this way, focused written CF can treat a wide range of linguistic features over time, and meet the teachers' demands to facilitate the development of the whole IL.

7.4.3.2 The value of teachers' understanding of moderators in the cognitive processing of written CF

Learners benefit from written CF via their cognitive processing of it. This project revealed that L2 motivation significantly moderated the efficacy of written CF. It also revealed that learning strategies also played a role in the learners' cognitive processing of written CF. Hence, this project, together with the previous studies on the moderating effects of learner variables (see Section 3.6), revealed that the learners' cognitive processing of written CF is moderated by a range of learner variables. If a teacher understands that the cognitive processing of written CF can be moderated by learner variables, while providing written CF, he/she may intentionally cater to the learner differences where possible. As a result, the individual learners may benefit more from written CF than previously. In addition, when the teacher encounters instances that written CF is not as effective as expected, he/she may reflect on his/her written CF practice, and explore ways to improve the efficacy of written CF for the specific learners.

7.4.3.3 The need for strategy training in the cognitive processing of written CF

Learners can be trained to learn new learning strategies (Dörnyei & Skehan, 2003). The present multi-case study among two learners revealed a link between the considerably different extents to which they benefited from written CF and their differences in strategy use while they were cognitively processing written CF. If such a link is confirmed in future research, teachers could train their students to use the more effective strategies while they are cognitively processing written CF. In the present multi-case study, the data collection method (i.e. stimulated recall) had a treatment effect. As a result, the learner whose retention of written CF decreased to zero one month after the

treatment realized that she could process written CF in the planning of a new writing task in the first stimulated recall interview, and did so in the delayed post-test. Such a change in her learning behaviour indicated that learners can pick up new strategies while they are interacting with the learning context. Therefore, the practice of strategy training suggested here is not expected to be difficult. Learning strategies are used by learners to solve the specific problems they encounter in a specific learning task (Ellis, 2008). With a broader strategy repertoire resulting from the strategy training, learners could solve problems in their cognitive processing of written CF more effectively. Consequently, the extent to which a learner can benefit from written CF could be improved.

7.5 Limitations and implications for future research

This project generated new empirical knowledge about written CF which has theoretical, methodological and pedagogical implications. Nonetheless, there are methodological limitations (see Section7.5.1) and scope limitations (see Section7.5.2) in this project, which demand further exploration in future written CF research. In addition, the present finding about the moderating effect of L2 motivation suggests the need for more research into moderating factors while exploring the impact of explicitness and informativeness on the efficacy of written CF (see Section 7.5.3).

7.5.1 Methodological limitations and implications for future research

There are three methodological limitations of this project:

• the systematic but cross-sectional style in the exploration of revision types (see Section 7.5.1.1)
• the failure to consider the discrepancy between the actual and ideal selves in the L2 motivation concept (see Section 7.5.1.2)
• the comparatively small sample size in exploring the moderating pattern of L2 motivation (see Section 7.5.1.3)

They will be detailed hereafter, together with their respective implications, for future research:

7.5.1.1 The systematic but cross-sectional style in the exploration of revision types

Learners have been found to adopt four types of revision in responding to written CF: successful revision, unsuccessful revision, deletion of the text with the marked error and no response (Ellis, 2008). Theoretically, among the four types of revision, successful revision may contribute most to L2 development, because only it may manifest the internalization of the correct form (see Section 2.5). To explore the possible moderating

effect of revision type was a key aim of this project. To achieve this aim, a systematic but cross-sectional approach was adopted. As a result, only one written CF treatment together with one opportunity for revision was provided in the present quasi-experiment. The results showed that both feedback groups adopted two revision types: successful revision and unsuccessful revision. Moreover, neither revision type significantly moderated the effect of either written CF type on accurate development. Hence, this present finding seemed to suggest that revision type may not necessarily have a moderating effect.

However, as L2 learning is an iterative process from both the cognitive and DST perspectives (see Section 2.2 and 2.9), in a naturalistic instruction setting, learners usually receive written CF more than once, and revise their texts more than once. It is unlikely that the learner adopts the same revision type every time while revising his/her text due to the learner's interaction with the learning context. Hence, the revision type revealed in the present quasi-experiment with only one opportunity for revision may not represent the pattern of revision type adopted by a learner over a period of time. Consequently, the present quasi-experiment could not test the theoretical assumption about the difference in the contribution of revision types to the on-going L2 development. As a result, there is a need to imitate the iteration of the L2 learning process in order to address this issue. Therefore, quasi-experiments with multiple treatment occasions, each followed by an opportunity for revision, are needed to explore the possible moderating effect of revision type.

Similarly, from a theoretical perspective, L2 motivation can impact learners' utilization of L2 learning opportunities brought about by written CF, including revisions (Kormos, 2012) (see Section2.6). However, due to the cross-sectional feature in the exploration of revision types, the present quasi-experiment was not able to reveal the long-term relationship between L2 motivation and revision types (see the discussion of RQ 3). As a result, quasi-experiments with more than one treatment occasions and multiple opportunities for revision are needed to address this issue.

7.5.1.2 The failure to consider the discrepancy between the actual and ideal selves in the L2 motivation concept

Theoretically, because L2 motivation can impact learners' utilization of L2 learning opportunities brought about by written CF, it can impact the efficacy of written CF (Kormos, 2012) (see Section 2.6). One L2 motivational variable, Ideal L2 self "is a powerful motivator to learn the L2 because of the desire to reduce the discrepancy

between our actual and ideal selves" (Dörnyei, 2009, p.217). The present quasi-experiment, together with the L2 motivation survey, aimed to explore the possible moderating effect of L2 motivation on the efficacy of written CF. It revealed that Ideal L2 self significantly moderated the efficacy of one written CF type, direct feedback. Due to the small sample size of the direct feedback group, a moderating pattern was not revealed. Nonetheless, within the direct feedback group, this project found that learners with low Ideal L2 self improved more regarding the accuracy of the target feature than their peers with high Ideal L2 self, and the prediction of Ideal L2 self on the accuracy scores in the delayed post-test was marginally non-significant and negative. Such findings seemed to contradict the function of Ideal L2 self revealed in the L2 motivation theory. According to the L2 motivation theory, the power of Ideal L2 self comes from "the [learners'] desire to reduce the discrepancy between our actual and ideal selves" (Dörnyei, 2009, p.217). However, such a discrepancy was not considered in this project. Thus, the present findings may suggest that the discrepancy between the actual and ideal selves, not necessarily Ideal L2 self, positively related to the effect of direct feedback. Hence, further research into this issue which addresses such a discrepancy is needed for clarification.

7.5.1.3 The comparatively small sample size in exploring the moderating pattern of L2 motivation

The present quasi-experiment, together with the L2 motivation survey, revealed that one L2 motivational variable, Ideal L2 self, significantly moderated the efficacy of one written CF type, direct feedback. However, further analyses were not able to locate where the significant moderating effect of Ideal L2 self on direct feedback occurred due to the comparatively small sample size of the direct feedback group for exploring this issue (see Section 7.3.4). Hence, further research with a larger sample size is needed to explore the moderating pattern of L2 motivation.

7.5.2 Scope limitations

Besides the above methodological limitations, which demand further research with improved methodology, three scope limitations are identified:

• the L1 background (see Section7 .5.2.1)
• the instructional context (see Section 7.5.2.2)
• the exploratory nature of the investigation of the impact of strategy use in cognitive processing of written CF (see Section 7.5.2.3)

They limit the extent to which the present findings can be generalized and this situation demands further exploration of each relevant issue with a broadened scope.

7.5.2.1 The L1 background

All the participants in the study had the same L1: Chinese. As introduced in Section 2.3, Chinese is a topic-prominent language without verb inflections. Due to these features, for Chinese speakers, learning the English passive voice involves both learning the syntactic processing required in the English language and the language form. The former is meaning-related, and refers to the recognition of the need to use the passive voice; while the latter is form-related, and refers to the formation of the correct passive form (see Section 2.3). This project revealed that compared with writing practice, the contribution of one written CF treatment to the accurate development of passive voice was not significant; but the contribution of one written CF treatment to the partial development (i.e. the recognition of the need to use the passive voice) was. As a result, the L2 learning potential of written CF was suggested among Chinese learners of English even when the learners could not form the correct English passive form. Due to differences between Chinese and English, the present findings about the L2 learning potential of written CF cannot to be generalized to the learners of English with other L1 backgrounds at this time. Hence, it is worthwhile to conduct replicative studies among learners with other L1s in order to test the generalizability of the L2 learning potential of written CF found in this project.

7.5.2.2 The instructional context

The instructional context of this project also resulted in scope limitation. The present quasi-experiment was conducted in the English classes. They are L2 classes, because L2 (i.e. English) is the medium of teaching and learning, and L2 development is the focus and ultimate goal of these classes. By comparison, in a context-based class where L2 is the medium of teaching and learning, such as "Business English Correspondence", the focus and ultimate goal is not L2 development, but the development of knowledge of the subject,. Hence, although context-based classes may adopt "a language [L2] sensitive approach", their instructional context differs from that of L2 classes in nature (Van Beuningen, 2011, p. 148). Therefore, the present findings, which were derived from L2 classes are not ready to be transferred to the L2 sensitive but context-based classes. Hence, replicative studies in the context-based and L2 sensitive classes are needed to check the generalizability of the present findings about written CF.

7.5.2.3 The exploratory nature of the investigation of the impact of strategy use in cognitive processing of written CF

This project also aimed to explore some of the reasons why one student may benefit from written CF while another may appear to not benefit from it. Because learners benefit from written CF via their cognitive processing of it, to achieve this research aim, this project tried to (1) connect the learners' cognitive processing episodes of written CF in the treatment with those in the subsequent new writing tasks; and (2) find out if there were any differences in the learners' cognitive processing of written CF; and if yes, what they were.

Due to the exploratory nature of this investigation, a multi-case study was conducted which targeted two learners' cognitive processing episodes of written CF in both the treatment session and the subsequent new writing tasks. It revealed a link between strategy use in the cognitive processing of written CF and the retention of written CF one month after the treatment. However, due to the small sample size, which resulted from the exploratory nature of this project on this issue (i.e. the possible causes of the different extents to which learners benefited from written CF), such a link cannot be generalized. Hence, systematic investigations, such as a questionnaire survey on the strategy used in the cognitive processing of written CF built in a quasi-experiment, are needed to find out whether the link found in this project commonly exists.

7.5.3 Further research into the influence of the explicitness and informativeness on the efficacy of written CF

As discussed in Section 7.4.1.2 and Section 7.4.2.5, this project revealed that, regarding the contribution to accurate development, direct feedback and metalinguistic explanation (the most explicit vs. the most informative written CF type) did not differ significantly. However, this project also revealed that an L2 motivation variable, Ideal L2 self, significantly moderated the effect of direct feedback, but not metalinguistic explanation, on accurate development. Thus, the former finding about the influence of explicitness and informativeness on the efficacy of written CF cannot be assumed. The different moderating effects of L2 motivation on the explicitness and informativeness of written CF need to be considered. Moreover, considering the significant moderating effects of other learner factors revealed in the empirical written CF research (see Section 3.5), it is possible that the explicitness and informativeness of written CF are moderated by more than one learner variable. Hence, while exploring the possible influence of explicitness and informativeness on the efficacy of written CF revealed in

L2 learning theories, the moderating effects of learner factors (including L2 motivation revealed in this project) need simultaneous exploration in future research.

7.6 Final remarks

This project introduced the DST perspective and the micro-development approach into the written CF research. Targeting Chinese learners of English, it revealed that focused written CF was not significantly more effective than writing practice for accurate development of the English passive voice, but was so for partial development of the target feature. Hence, the L2 learning potential of written CF was evidenced in the EFL context in China even when the learners could not work out the correct form of the target feature. Hence, this project cast new light on our understanding of the function of written CF in L2 development, and refuted Truscott's (1996, 2004) two claims against written CF (see Section 2.4). This project also revealed that L2 motivation significantly moderated the effect of written CF. Moreover, a link between strategy use in the cognitive processing of written CF and the efficacy of written CF was also found.

Hence, it can be inferred from the present findings that written CF can facilitate the L2 development of EFL learners in China, and its efficacy is moderated by learner variables. As such, it is useful for Chinese teachers of English to provide written CF and cater where possible to learner differences simultaneously. In addition, because the present findings about the L2 learning potential of written CF are closely related to differences between the participants' L1 (i.e. Chinese) and their target language (i.e. English), replicative studies (i.e. focusing on both the accurate development and the partial development of the target features) among learners with other L1s are suggested for the generalizability of the present findings in other contexts.

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APPENDICES

Appendix A: Ethics Approval

AUT
UNIVERSITY
TE WĀNANGA ARONUI O TAMAKI MAKAU RAU

AUTEC
SECRETARIAT

5 June 2015

John Bitchener
Faculty of Culture and Society

Dear John

Re Ethics Application: **15/152 L2 motivation, types of revision and the efficacy of written corrective feedback.**

Thank you for providing evidence as requested, which satisfies the points raised by the Auckland University of Technology Ethics Committee (AUTEC).

Your ethics application has been approved for three years until 4 June 2018.

As part of the ethics approval process, you are required to submit the following to AUTEC:

- A brief annual progress report using form EA2, which is available online through http://www.aut.ac.nz/researchethics. When necessary this form may also be used to request an extension of the approval at least one month prior to its expiry on 4 June 2018;

- A brief report on the status of the project using form EA3, which is available online through http://www.aut.ac.nz/researchethics. This report is to be submitted either when the approval expires on 4 June 2018 or on completion of the project.

It is a condition of approval that AUTEC is notified of any adverse events or if the research does not commence. AUTEC approval needs to be sought for any alteration to the research, including any alteration of or addition to any documents that are provided to participants. You are responsible for ensuring that research undertaken under this approval occurs within the parameters outlined in the approved application.

AUTEC grants ethical approval only. If you require management approval from an institution or organisation for your research, then you will need to obtain this. If your research is undertaken within a jurisdiction outside New Zealand, you will need to make the arrangements necessary to meet the legal and ethical requirements that apply there.

To enable us to provide you with efficient service, please use the application number and study title in all correspondence with us. If you have any enquiries about this application, or anything else, please do contact us at ethics@aut.ac.nz.

All the very best with your research,

Kate O'Connor
Executive Secretary
Auckland University of Technology Ethics Committee

Cc: Su Li dds3236@aut.ac.nz

Appendix B: Letter of consultation

25 March 2013

AUT
UNIVERSITY
TE WĀNANGA ARONUI O TAMAKI MAKAU RAU

page 1 of 1

Letter of Consultation

Sichuan Business Vocational College
Address: 288 Xingyi Avenue, Wenjiang district, Chengdu, Sichuan Province, P.R. China
E-mail: sunyila@foxmail.com
Date: March 23, 2015

To whom it may concern:

This is to confirm that Miss Su Li, a PhD student in Applied Language Studies at School of Language and Society, AUT University, New Zealand has already undertaken consultation with me about the suitability and usefulness of her research design, data collection procedure and instruments.

After intensified discussions, Professor Danya Xu (the Associate President in charge of teaching research) and I consent that Su Li's research project will not only benefit the students but also the English teaching and research at out college.

Therefore, on behalf of Sichuan Business Vocational College, I am willing to permit her to collect data with the students at our college for her research project on providing written corrective feedback to English writing.

Should you need further information concerning her issues, please do not hesitate to contact me at the address above.

Yours sincerely,

Yi Sun

Yi Sun

Associate Professor of English
Dean of Foreign Affairs Office of Sichuan Business Vocational College

This version was last edited on 8 November 2013

Appendix C: Participant Information Sheet

Participant Information Sheet

AUT UNIVERSITY
TE WĀNANGA ARONUI O TAMAKI MAKAU RAU

Date Information Sheet Produced:

05/06/2015

Project Title

Second language learning motivation, types of revision and the effectiveness of written corrective feedback

An Invitation

I am Su Li, a PhD student at AUT in the School of Language and Culture, New Zealand. To complete my PhD qualification, I am doing a research project into the effectiveness of written corrective feedback (in comparison with writing practice) and the mediation of second language learning motivation. You are invited to participate in this project. Your participation is voluntary and you may withdraw at any time prior to the completion of data collection without any effect on you. Once you withdraw, all relevant information including papers, recordings and transcripts, or parts thereof, will be destroyed.

What is the purpose of this research?

This research is not part of your English course evaluation, and your writing in the study will bear no scores. Your English teacher will not be present during data collection, nor have access to any data/information you provide in this research.

The purpose of this research is to explore the effectiveness of written corrective feedback (in comparison with writing practice) and the mediation of second language learning motivation in order to inform and help second language teaching and learning. Hence, reports, papers and articles based on the PhD thesis may be presented and/or published in the future.

How was I identified and why am I being invited to participate in this research?

With the permission of your college, I have approached your class. After I introduced the study to your class in the absence of your teacher, you have shown preliminary interest and willingness to participate in the study. As you are majoring in International Business and Economics in the only vocational college that specializes in business in Sichuan, China, and English is a working language in the day-to-day activities of International Business and Economics nowadays, you probably wish to improve the efficiency of your English learning. Hence, you are invited to be a participant of the research.

What will happen in this research?

This research will compare two approaches in second language writing pedagogy (written corrective feedback and writing practice). Participants will be divided into three groups at random: two groups treated respectively with two different types of written corrective feedback (direct corrective feedback, i.e. providing the correct forms and metalinguistic explanation, i.e. providing rules and examples but not the correct forms) and one group treated with writing practice.

This research will consist of two phases: a quasi-experiment and a subsequent multi-case study. The quasi-experiment will comprise three in-class writing sessions, an independent in-class revision (feedback groups) and a questionnaire on your English learning motivation.

After the quasi-experiment, several students will be invited to participate in the subsequent multi-case study. The multi-case study will comprise three timed writing sessions, a revision (independent revision with the help of the written corrective feedback) session and two interviews about your writing and revision processes. The interviews will be audio-recorded. In the interviews, the researcher will also take notes. The recordings will be transcribed by the researcher.

To balance the different treatment of the feedback and writing practice groups in the study, after completion of data collection, students treated with writing practice will receive written corrective feedback to their writing 1 (like the students in the feedback groups in the study) so that they can revise accordingly if they wish. They will be divided into two equal groups at random: half of them will receive direct corrective feedback, the other half will receive metalinguistic explanation.

What are the discomforts and risks?

There will be no risk at all and I do not expect that you will feel any form of discomfort. If you do, please feel free to discuss any issue with me. You can also turn to the College Clinic (the one-story building to the left of the front gate of the college) or the Mental Health Counselling Office (Room 3103, Teaching Building No. 3) for help.

How will these discomforts and risks be alleviated?

If your feel uncomfortable during answering the questionnaire, you are free to quit it at any time or skip any question without answering it, and you will not be disadvantaged in any way.

If your feel uncomfortable during the writing and revision, you are free to quit it at any time without being disadvantaged in any way.

If your feel uncomfortable about the recording or interview, any question will be skipped without being answered, or the recording and/or interview will be stopped at any time when you say so to the interviewer (i.e., the researcher), and you will not be disadvantaged in any way.

What are the benefits?

Written corrective feedback is a common practice in second language teaching despite the uncertainty about the extent to which it facilitates second language acquisition, especially when compared with writing practice. This research will explore the effectiveness of written corrective feedback in comparison with writing practice and the mediation of second language learning motivation, which is closely related to the written corrective feedback work of Chinese teachers of English, who have to give feedback to compositions by several large classes concurrently. Hence, findings in this research may be informative to second language pedagogy, especially that in China.

In particular, participating in the research (writing and revision, questionnaire and interviews) would help you to reflect your English learning process in writing, and you will have a better understanding of your own English learning. Thus, it is expected that you will be able to make adjustments accordingly to facilitate your English learning.

How will my privacy be protected?

Your name will be used in data collection. However, any data/information provided by you will be kept strictly confidential by the researcher and the supervisor, who have access to the data/information. The recording will be transcribed by the researcher. You will not be identified individually in any way as pseudonyms will be used in reports of the completed study. Neither will the name of the college appear in reports of the completed study.

What are the costs of participating in this research?

The quasi-experiment will last about a month and a half. The questionnaire will take about 10 minutes to complete, each writing session about 35 minutes, and revision (feedback groups) about 20 minutes.

The multi-case study will last about five weeks. Each writing practice will take about 35 minutes, revision about 20 minutes, and each interview about 30 minutes.

What opportunity do I have to consider this invitation?

You will have 2 days to think it over from now. If you decide not to take part, it will have no effect on you. Participating in this research project is purely voluntary.

How do I agree to participate in this research?

There is a Consent Form available from the researcher. You need to complete the Consent Form, have it signed and returned before you participate.

Will I receive feedback on the results of this research?

Yes. If you wish, please tick the relevant item on the Consent Form, and you will receive a copy of report on the research when it is completed.

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Prof. John Bitchener, *john.bitchener@aut.ac.nz*, +64 9 921 9978.

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEC, Kate O'Connor, *ethics@aut.ac.nz*, +64 9 921 9999 ext 6038.

Whom do I contact for further information about this research?

Researcher Contact Details:

Su Li, dds3236@aut.ac.nz; lisuanna@126.com, +86 28 87774726.

Project Supervisor Contact Details:

Prof. John Bitchener, john.bitchener@aut.ac.nz, +64 921 9978.

Approved by the Auckland University of Technology Ethics Committee on June 5, 2015, AUTEC Reference number: 15/152.

参与者须知

制作日期:

2015 年 6 月 5 日

课题名称：英语学习动机、修改方式类型及教师书面纠错性反馈的有效性

邀请：

我是一名奥克兰理工大学语言与社会系应用语言研究专业的博士生。我的博士毕业论文的题目是《英语学习动机、修改方式类型及教师书面纠错性反馈的有效性》。现邀你参与此课题研究。你的参与将基于自愿原则。在数据采集结束前的任何阶段，你都可以随时退出，退出后不会对你产生任何影响。一旦退出此研究，所有相关信息，包括录音、访谈记录或相关部分，都将被销毁。

此课题研究的目的是什么？

此课题研究不属于你的英语学绩评估，对你的英语写作也不进行评分。你的英语老师不会接触到你为此课题研究提供的任何资料/信息。在你参加此课题研究的数据采集时，你的英语老师也不会在场。此课题旨在探索英语教师书面纠错性反馈的有效性（与写作练习相较）及英语学习动机在其中的作用，以促进英语教学效果。因此，以此学位论文为基础的报告、论文或文章将来可能会发表或在会议上作演示说明。

为何邀请我参与此课题研究？

经贵学院许可，我与你班接洽，并且，在你们老师不在场的情况下，向全班同学介绍了此课题。此后，你对该课题表示了初步兴趣和参与意向。英语是中国外经贸日常常用工作语言。考虑到贵学院是中国四川省唯一一所集内外贸为一体的职业学院，而你是外经贸专业的学生，据此推测，你很可能希望提高英语学习效率。因而向你发出邀请，参与此课题研究。

研究将以什么方式进行？

研究将比较两种二语写作教学方法（书面纠错性反馈和写作练习）的教学效果。参与者将随机被分成三组：两组分别接受两种不同的反馈方式（直接纠错性反馈和错误性质解释及示例），一组进行写作练习。

研究将分为教学实验和个案研究两个阶段。教学实验将包括 3 次课堂作文，1 次独立完成的课堂修改练习（反馈组），和 1 次英语学习动机问卷调查。其后，个别同学将被邀请参加个案研究。个案研究包括 3 次限时作文，1 次限时修改练习（收到反馈后独立修改）和 2 次个人访谈。问卷调查将询问一些关于你英语学习动机的问题。个人访谈将询问你在修改和写作时所思考的问题。个人访谈将录音。个人访谈时，研究者还将做笔录。录音将由研究者转录成文字。

为平衡参与者所接受的教学方法，数据采集结束后，写作练习组的同学将获得对其作文 1 的书面纠错性反馈 （同反馈组的一样）以满足其中希望根据反馈进行修改的同学的需要。他们将随机被分为两组，一半获得直接纠错性反馈，另一半获得错误性质解释及示例。

会有什么不适或危险吗？

此研究不会带来任何危险。你也不会有任何形式的不适感。如果你有任何类似感觉，请随时与我联系。也可前往学院医务所（学院正校门左边的平房）或大学生心理健康咨询室（第3教学楼3103室）寻求帮助。

有何措施减轻不适或危险？

如果你在回答调查问卷的过程中感觉不适，可随时中止答题或跳过不答该问题。任何一种情形都不会对你产生任何负面影响。

如果你在写作或修改练习的过程中感觉不适，可随时中止写作或修改，且不会对你产生任何负面影响。

如果你在与研究者的访谈或其录音的过程中感觉不适，可随时告知研究者，该问题可跳过不答或者录音或访谈立即中止。任何一种情形都不会对你产生任何负面影响。

参与此课题研究我有何受益？

尽管教师书面纠错性反馈被普遍用于外语教学，但其对外语学习的促进作用几何，特别是与写作练习相比有效性如何，尚不明确。此课题旨在探索英语教师书面纠错性反馈的有效性（与写作练习相比）及英语学习动机在其中的作用。这与中国大班教学条件下的英语教师作文批改工作密切相关。研究结果有望为英语教学和学习提供有价值的信息。尤其是作为参与此课题的学生，写作及修改练习、问卷调查和个人访谈可以帮助你反思你在写作中的英语学习过程，你将更了解自己的英语学习，从而有望更有效地学好英语。

将如何保护我的隐私权？

数据采集过程中将使用你的姓名。研究者及其导师会接触到你提供的数据/信息。但是，他们将把你提供的所有数据/信息作为机密资料保管。录音将由研究者转录成文字。研究结束后，任何报告都不会识别你的个人身份，因为报告中都只使用假名。任何报告中也都不会出现学院名称。

参与此课题研究我将有何付出？

教学实验将持续约1个半月。问卷调查需要约10分钟，写作每次约35分钟，修改练习（反馈组）约20分钟，个案研究将持续约5周。写作每次约35分钟，修改练习约20分钟，个人访谈每次约30分钟。

我有何机会考虑此邀请？

从现在起你有2天时间仔细考虑。若你决定不参与，对你不会产生任何负面影响。参与此课题研究纯属自愿。

怎样表示我同意参与此课题研究？

参与此课题前，你须从研究者那里领取一份同意书，填完并签名后交还给研究者。

我会得到此研究的反馈吗？

是的。若你有此意图，请在同意书上的相关项目旁打勾。据此，在研究结束后，你将得到一份研究报告的副本。

我将如何处理与此研究相关的事宜？

任何与此研究性质相关的事宜请首先与此课题的导师联系，John Bitchener 教授，*john.bitchener@aut.ac.nz, +64 9 921 9978.*

与此研究操作原则相关的事宜请与奥克兰理工大学伦理委员会执行秘书联系，Kate O'Connor, ethics@aut.ac.nz , +64 9 921 9999 ext 6038.

更多关于此研究的信息与谁联系？

请与研究者及其导师联系。

研究者的联系方式:

Su Li, dds3236@aut.ac.nz; lisuanna@126.com

研究者导师的联系方式:

John Bitchener 教授, john.bitchener@aut.ac.nz , +64 9 921 9978.

于 2015 年 6 月 5 日 由奥克兰理工大学伦理委员会通过。参考文号：15/152.

Appendix D: Consent form

Consent form

Project title: L2 motivation, types of revision and the efficacy of written corrective feedback

Project Supervisor: Prof. John Bitchener

Researcher: Su Li

○   I have read and understood the information provided about this research project in the Information Sheet dated 05/06/2015.

○   I have had an opportunity to ask questions and to have them answered.

○   I understand that notes will be taken by the researcher during the interviews and both the pair discussion and the interviews will be audio-recorded and transcribed. Only the researcher and the supervisor will have access to the recording. The transcription will be done by the researcher.

○   I understand that this project is not a part of my English course evaluation and I may withdraw myself or any information that I have provided for this project at any time prior to completion of data collection, without being disadvantaged in any way.

○   If I withdraw, I understand that all relevant information including recordings and transcripts, or parts thereof, will be destroyed.

○   I agree to take part in this research (please tick the phase(s) you agree to participate):

         ○ the quasi-experiment

         ○ the multi-case study

    and allow the data I provide, including what I say and the information I provide in it to be used for the second/foreign language teaching and learning study.

○   I understand all the data/information I provide to this project will always be kept strictly confidential, and my name will not appear in any reports of the completed study.

○   I wish to receive a copy of the report from the research (please tick one): Yes○ No○

Participant's signature:

....
……………

Participant's name:

....
……………

Participant's Contact Details (if appropriate):

……………………………………………………………………………………..

Date:

***Approved by the Auckland University of Technology Ethics Committee on** June 5, 2015. **AUTEC Reference number:** 15/152.*

Note: The Participant should retain a copy of this form.

同意书

课题名称：*英语学习动机、修改方式类型及教师书面纠错性反馈的有效性*
　　导师：*John Bitchener 教授*
研究者：　*Su Li*

○　　我已阅读并理解 2015 年 6 月 5 日的课题参与须知上关于此课题研究的介绍。

○　　我已有机会提出质疑并得到解答。

○　　我知道个人访谈时研究者将做笔记。我还知道同伴讨论和个人访谈时都将录音。只有研究者及其导师能接触到录音。录音将由研究者转录成文字。

○　　我知道此课题不属于我的英语学绩评估。在数据采集结束前的任何时段，我都可以退出研究，或收回我为此课题提供的任何信息。此举不会对我产生任何负面影响。

○　　我知道一旦我退出此研究，所有相关信息，包括录音、访谈记录或其中的相关部分，都将被销毁。

○　　我同意参加此课题研究，（请在你同意参加的研究阶段前的圈内打勾）：

　　　　　　　　○ 教学实验

　　　　　　　　○ 多个案研究

　　并允许我提供的数据，包括我的言谈及其所包含的信息用于关于二/外语教学和学习的研究。

○　　我知道我为此课题提供的任何数据/信息都将作为机密资料保管。研究结束后，任何报告都不会出现我的姓名。

○　　我希望得到一份这次研究报告的副本（请打勾）　是○　否○

参与者签字：

……………………………………………………………………………………………………

参与者姓名：

……………………………………………………………………………………………………
参与者的联系方式（如果方便话）：
………………………………………………………………………………………………..
………………………………………………………………………………………………..
日期：

于 2015 年 6 月 5 日 由奥克兰理工大学伦理委员会通过。参考文号：15/152。

注: 参加者应持有一份此同意书的副本。

Appendix E: L2 Motivation Questionnaire

L2 Motivation Questionnaire
(Please use the answer sheet)

Dear participant:

Thank you for your kind participation. The purpose of the questionnaire is to explore the English learning motivation of English learners in P.R. China. Please fill out the questionnaire according to your situation. This is *not* a test, there is no right or wrong answer. Do not spend too much time on a question. Usually, your first reaction is the best.

Thanks for your cooperation.

Please weigh the following statements by circling an appropriate number.

1 = not true of me at all, 2 = seldom true of me, 3 = sometimes true of me, 4 = often true of me, 5 = always true of me

e.g. I like to read in bed.   1 2 3 4 5

If you choose 4, it indicates you often read in bed.

Ideal L2 self:

1. I can imagine a situation where I am speaking English with foreigners.

                                                               1 2 3 4 5

2. I cannot imagine myself speaking English with international friends or colleagues.
                                                               1 2 3 4 5

3. I can imagine myself speaking English as if I were a native speaker of English.
                                                               1 2 3 4 5

4. Whenever I think of my future career, I cannot imagine myself using English.
                                                               1 2 3 4 5

5. The things I want to do in the future require me to use English.   1 2 3 4 5

Ought-to L2 self:

1. Studying English is important to me in order to attain a higher social respect.
                                                               1 2 3 4 5

2. It will have a negative impact on my life if I don't learn English.   1 2 3 4 5

3. Studying English is important to me in order to gain the approval of people surrounding me.
                                                               1 2 3 4 5

4. Studying English is important to me in order to achieve a special goal (e.g. to get a decent job or study abroad).
                                                               1 2 3 4 5

5. Studying English is important to me because an educated person is supposed to be able to speak English.

                                                               1 2 3 4 5

L2 learning experience:

1. I like the atmosphere of my English classes.	1 2 3 4 5
2. I find learning English really interesting.	1 2 3 4 5
3. I really enjoy learning English.	1 2 3 4 5
4. I'd like to have less English lessons at school.	1 2 3 4 5
5. I feel time passes slowly while studying English.	1 2 3 4 5

Discrepancy between Ought-to L2 self and actual L2 self perceived by the learner

1. My English is so poor that I am very unlikely to pass the English course no matter how hard I study.

                                                              1 2 3 4 5

2. I cannot pass CET unless I keep studying English very hard, because my English proficiency is considerably lower than the requirements of CET.

                                                              1 2 3 4 5

3. To pass CET, I have to put a lot of effort in English study for a long time because the gap between my English proficiency and the requirements of CET is large.

                                                              1 2 3 4 5

4. Passing CET challenges my effort and capability as there is a large gap between my English proficiency and the requirements of CET.

                                                              1 2 3 4 5

5. It challenges my capability to pass the English course as my English proficiency is very low.

                                                              1 2 3 4 5

6. Since my English proficiency is very close to the requirements of CET, it is possible that even if I stop studying English, I can still pass CET if I am lucky.

                                                              1 2 3 4 5

(Adapted from Taguchi et al., 2009).

英语学习动机调查问卷
(答案请写在答题纸上）

AUT UNIVERSITY

同学：

你好！本调查问卷的目的是了解中国学生的英语学习动机。请你根据自己的情况如实填写。 这不是考试，答案不分正误。不要花太多时间在一个问题上。你的第一个反应通常是最好的。

谢谢合作！

请在下面的各题中选一个合适的数字，表明你对该陈述的认可度。

1 = "很不符合我的情况"，2 = "不符合我的情况"，3 = "基本符合我的情况"，4 = "符合我的情况"，5 = "很符合我的情况"

例如：我喜欢躺在床上看书。   1 2 3 4 5
如果你选择 4，意味着你经常躺在床上看书。

1. 我能想象出我用英语与外国人交谈的场景。   1 2 3 4 5

2. 我希望学校的英语课再少些。   1 2 3 4 5

3. 学英语对我很重要因为我想得到更多的社会尊重。   1 2 3 4 5

4. 我觉得学英语真的很有趣。   1 2 3 4 5

5. 如果我不学英语，会对我的生活产生负面影响。   1 2 3 4 5

6. 我无法想象出自己用英语与外国朋友或同事交谈的样子。   1 2 3 4 5

7. 我喜欢我们英语课上的学习氛围。   1 2 3 4 5

8. 学习英语对我很重要因为这能使我获得我周围的人的认可。 1 2 3 4 5

9. 我现有英语水平与 CET 的要求相差太大了，不管我怎么努力学习，也很难通过 CET 考试。

     1 2 3 4 5

10. 我能想象出我说英语流利得如同说母语的样子。   1 2 3 4 5

11. 我觉得学英语时时间过得慢。   1 2 3 4 5

12. 我将来想做的事要求我能使用英语。   1 2 3 4 5

13. 与 CET 的要求相比，我现有英语水平相当差。因此，我无法通过 CET 考试除非我坚持努力学习英语。

     1 2 3 4 5

14. 学英语对我很重要因为我有一些特别的目标（如有一份体面的工作或出国留学）。

                                       1   2   3   4   5

15. 因为我现有英语水平与 CET 的要求差距大，我得长期坚持努力学习英语才能通过 CET 考试。

                                         1   2   3   4   5

16. 我真的喜欢学英语。   1   2   3   4   5

17. 因为我现有英语水平与 CET 的要求差距大，通过 CET 考试是对我的努力和能力的双重挑战。

                                         1   2   3   4   5

18. 学英语对我很重要因为受过教育的人应该会说英语。   1   2   3   4   5

19. 因为我现有英语水平差，通过英语课程考试是挑战我的能力。

                                         1   2   3   4   5

20. 我觉得，无论自己未来从事什么职业，不会用到英语。   1   2   3   4   5

21. 鉴于我现有英语水平已经很接近 CET 的要求了，我即使现在开始停止学习英语也有可能仅凭运气就能通过 CET 考试。

                                         1   2   3   4   5

（改编自 Taguchi et al. , 2009）。

英语学习动机调查问卷答题纸
（Answer sheet for questionnaire）

学号：　　　　　姓名：　　　专业：　　　班级：　　　年龄：

性别：

同学：

你好！本调查问卷的目的是了解中国学生的英语学习动机。请你根据自己的情况如实填写。这不是考试，答案不分正误。不要花太多时间在一个问题上。你的第一个反应通常是最好的。

谢谢合作！

请在下面的各题中选一个合适的数字，表明你对该陈述的认可度。

1＝"很不符合我的情况"，2＝"不符合我的情况"，3＝"基本符合我的情况"，4＝"符合我的情况"，5＝"很符合我的情况"

1. _____ 2. _____ 3. _____ 4. _____ 5. _____

6. _____ 7. _____ 8. _____ 9. _____ 10. _____

11. _____ 12. _____ 13. _____ 14. _____ 15. _____

16. _____ 17 _____ 18. _____ 19. _____ 20. _____

21. _____

Appendix F: Stimulated recall interviews guide for revision

Stimulated recall interviews guide for revision

I. General question

1. While you were revising the text, did you just copy the corrections that resulted from the pair discussion or pause to think whether the correction was O.K. and/or why it is O.K.? And why did you do this?

2. Is there anything you learned from revising the text that you will remember and use in the future? And why?

II. Stimulated-recall part

Instructions:

What we are going to do now is to read your revised text. You read it aloud. I am interested in what you were thinking at the time you were revising. What I would like you to do is tell me what you were thinking, what was on your mind at the time.

You can stop reading any time you want. If you want to tell me something about what you were thinking, you can stop reading. If I have a question, I'll stop you and ask you to talk about that part of the text.

Stimulated-recall questions:

1. Here. [The researcher will indicate the student to stop reading, and point to certain words in the text] You didn't make any changes to the marked error. What were you thinking at that point? What was your focus then? And why? Do you think there is still a problem with the text?

2. Here. [The researcher will indicate the student to stop reading, and point to certain words in the text] You deleted the text with the marked error/ changed the language form. What were you thinking at that point? What was your focus then? And why?

Probing questions

I'm just curious. I noticed when you were talking, you mentioned …several times. Is that what you were most concerned about when you were speaking with me? Can you say a bit more about this?

刺激回忆修改过程访谈提纲

一、一般性问题

1. 你在修改时只是照抄同伴讨论出的修改方式，还是停下来想一想这个修改方式是否正确、为什么正确？你为什么这么做？

2. 你在修改时学到的东西中，有没有什么你认为应该记住、以后会用得到的吗？

二、刺激回忆部分

说明：

现在想让你读你的修改后的作文。请你把它大声读出来。我想知道你在修改时在想什么。请告诉我你当时脑子里出现的念头。

你可随时停下不读。如果你想告诉我你当时在想什么，可以随时停下不读。如果我有问题，我会打断你朗读，问你关于那一部分文字的情况。

刺激回忆问题

1. 这里。[研究者示意学生停止朗读，指着一部分文字] 你没有对错误做任何修改，你当时在想什么？在关注什么？为什么关注它们？

2. 这里。[研究者示意学生停止朗读，指着一部分文字] 你删除了含有错误的文字/对错误进行了修改。你当时在想什么？在关注什么？为什么关注它们？

三、探索性问题

我只是好奇。我注意到刚才在谈论时，你几次提到……那是你当时跟我说话时所关注的吗？关于这一点能否再说点什么？

Appendix G: Stimulated recall interview guide for post-tests

Stimulated recall interview guide for
post-tests

I. General question

1. Did you plan before you wrote the text? If so, what was your focus in planning? And why?

2. What was your focus when you were writing the text? And why?

3. Did you proofread after you finished writing the text? If so, what was your focus when you were proofreading? And why?

II. Stimulated-recall part

Instructions:

What we are going to do now is to read your text. You read it aloud. I am interested in what you were thinking at the time you were planning / writing /proofreading. What I would like you to do is tell me what you were thinking, what was on your mind at the time.

You can stop reading any time you want. If you want to tell me something about what you were thinking, you can stop reading. If I have a question, I'll stop you and ask you to talk about that part of the text.

Stimulated-recall questions:

1. Here. [The researcher will indicate the student to stop reading, and point to certain words in the text] You used the language form correctly.

(1) Did you consider it earlier when you were planning the text? What were you thinking then? And why? If not, what was your focus then? And why?

 (2) What were you thinking when you wrote it (the correct form) down? Did you notice it at that point? What was your focus then? And why?

(3) Did you notice it later when you proofread the text? What were you thinking when you encountered it in proofreading? And why? If not, what was your focus then? And why?

2. Here. [The researcher will indicate the student to stop reading, and point to certain words in the text] You used an incorrect language form.

(1) Did you consider it earlier when you were planning the text? What were you thinking then? And why? If not, what was your focus then? And why?

(2) What were you thinking when you wrote it (the incorrect form) down? Did you notice it at that point? What was your focus then? And why?

(3) Did you notice it later when you proofread the text? What were you thinking when you encountered it in proofreading? And why? If not, what was your focus then? And why?

Probing questions

I'm just curious. I noticed when you were talking, you mentioned …several times. Was that what you were most concerned about when you were speaking with me? Can you say a bit more about this?

A month has passed since our last meeting. Did you study the English passive voice yourself during last month? e.g., asking your English teacher about it or consult a grammar book. Why / why not?

刺激回忆后测写作过程访谈提纲

一、一般性问题

1. 你写作前先构思吗？构思时你关注什么？为什么关注它们？

2. 你在写作中关注什么？为什么关注它们？

3. 你写完后自己检查作文吗？你在自查中关注什么？为什么关注它们？

二、刺激回忆部分

说明：

现在想让你读自己的作文。你把它大声读出来。我想知道你在构思/写作/自查时在想什么。请告诉我你当时脑子里出现的念头。

你可随时停下不读。如果你想告诉我你当时在想什么，你可随时停下不读。如果我有问题，我会打断你朗读，问你关于那一部分文字的情况。

刺激回忆问题

1. 这里。你写对了。

（1）你在构思时考虑到了这个语法点了吗？你当时在想什么？为什么会那么想？如果没有考虑到了这个语法点，你当时在关注什么？为什么关注它们？

（2）你在写这几个字时，当时在想什么？你在写它们时，注意到这个语法点了吗？你当时在关注什么？为什么关注它们？

（3）你在自查时，注意到这个语法点了吗？当你自查遇到它时，你在想什么？为什么会那么想？如果你没有注意到它，你当时在关注什么？为什么关注它们？

2. 这里。你写错了。

（1）你在构思时考虑到了这个语法点了吗？你当时在想什么？为什么会那么想？如果没有考虑到了这个语法点，你当时在关注什么？为什么关注它们？

（2）你在写这几个字时，当时在想什么？你在写它们时，注意到这个语法点了吗？你当时在关注什么？为什么关注它们？

（3）你在自查时，注意到这个语法点了吗？当你自查遇到它时，你在想什么？为什么会那么想？如果你没有注意到它，你当时在关注什么？为什么关注它们？

三、探索性问题

我只是好奇。我注意到刚才在谈论时，你几次提到……那是你当时跟我说话时所关注的吗？关于这一点能否再说点什么？

我们上次面谈和这次面谈相距一个月。在这一个月内，你自己学习过英语被动语态吗？比如说，问你的英语老师或查看语法书。为什么学/不学？

Appendix H: Dimensions and variables of L2 motivation

Dimensions	Variables	No. of items	Items	Reliability
Ideal L2 self	Ideal L2 self	5	1, 6 , 10, 12, 20	a = .60
Ought-to L2 self	Ought-to L2 self	5	3, 5, 8, 14, 18	a = .74
L2 learning experience	L2 learning experience	5	2 , 4, 7, 11 , 16	a = .73
Discrepancy between Ought-to L2 self & actual L2 self perceived by the learner	Discrepancy between Ought-to L2 self & actual L2 self	6	9, 13, 15, 17, 19, 21	a = .76

Note: The coding of the outer bordered items is reversed because of the reversed direction of the wording of these items. For example, if a participant scored "5" on item 2, it would be coded as "1" rather than "5" since this is a five-point responses scale questionnaire.

Appendix I: A sample of writing

Dear Chris,

Long time no see, haha! You'll ~~never~~ never know ~~where~~ *which place* I visited last month, ~~which exists~~ which is ~~just our favorite~~ *the source of* our favorite snacks, the chocolates. Yeah, I ~~guess~~ guess you might have known it, the food plant producing chocolates.

It is incredible to watch the entire process producing chocolate in which I learned a lot about ~~the~~ *how* one normal / bar of chocolate *is* produced and delivered to our hands. Of course not as easy as we think.

~~So, let's to start.~~

The fundamental ingredients of chocolates are cocao beans usually growing on the cacao trees in South America Indonesia.

After picking the ~~beans~~ pods comes the beans in them. A period time later, when the beans turn brown in boxes. They ~~~~ are spread and ~~dry in sun~~ made dry in sun. Then the lorries carry sacks of chocolates into the factory. And there, continuing the next step— baking them on the oven then machines crush them and outers shell of them.

At last. They are squeezed transferring into liquid chocolate

Yours,

Lee

5 obligatory occasions;
3 PV, all correct in form → accuracy: 3/5 = 60
2 AV. → recognition of the need to use
PV: 3/5 = 60

2015. 9. 1/

Appendix J: An excerpt about the cognitive processing of written CF

Jane's cognitive processing in the treatment (including revision) session

Jane was the student who improved most in the quasi-experiment in the metalinguistic explanation group. Words in italics indicates they were stressed in the conversation. The corresponding structure of the passive voice in Chinese is the "bei" construction. The excerpt about her cognitive processing of written CF in the treatment (including revision) session is presented as follows with the original Chinese version. Before that, the abbreviations used in the excerpt is presented in the following box.

Abbreviations:

R: the researcher   J: Jane   PV: the passive voice   AV: the active voice   pp: past participle   auxiliary: aux.

R: Jane, is there anything you learned from revising the text that you will remember and use in the future?

你在修改时是否觉得我学到了什么东西，以后用得着，要把它记住？

J: That is PV. I memorized that there is something that is inanimate. When such an object becomes the subject of a sentence, PV should be used.

就是学会要用被动语态。记住有些东西，没生命的物体作主语，要用被动语态。

R: What is structure of PV. Still remember？

被动语态的结构是什么，还记得吗？

J: "Aux. be" plus pp.

be 动词加动词的过去分词。

R: Now, let's review your revision. Is there anything you want to tell me what you were thinking while revising? What was your focus then?

现在看你的修改稿。是否有什么你想主动跟我说的？Put, put, put?

J: I focused on the topic of the composition.

关注的是文章的主体。

R: What is the topic?

主体是什么？

J: The glass bottle. It has always been re-created by people (Here, she used and stressed the "bei" construction in Chinese). I have always been remembering to use PV.

是玻璃瓶。它都是被（重音）人们改造。我就一直记住要用被动语态。

R: Let's look at this point. I gave you a "tick". Why you revised it during the revision session? You changed it into "putted'. Why? What were you thinking and focusing on then?

一起来看这里。这里我给你一个"勾"。你在修改时为什么把它改了？改成了"putted"。为什么？你当时在想什么？在关注什么？

J: It is *"bei".*

它是"被"（重音）。

R: Yes, PV. In your draft 1, there was an "Aux. be" here, too. Why you revised this point? I didn't indicate you were wrong here. Instead, I gave you a "tick", indicating you were correct here. What were you thinking while revising it?

对。被动。你原先在"put"前也有 be 动词的。为什么要改？我没有指出错误，而且给了你一个"勾"，指明你这里是对的。你在修改时是怎么想的？

J: PV should be used here. "Aux. be" plus pp.

这里要用被动语态。be 动词加动词的过去分词。

R: Then?

下一步呢？

J: I was retrieving pp of "put". Thought should add "ed".

我就背"put"的过去分词。就想到了加"ed"。

R: That is to say, you thought when you were writing draft 1, you missed out the suffix of pp.

就是说，你认为你原先在写的时候是写掉了一个过去分词的后缀"ed"。

J: Yes.

对。

R: Actually, pp of the word is in the same form as its bare infinitive.

其实这个词的过去分词是不变形的。

J: Put, put, put?

Put, put, put?

R: Correct. Now, this point (Pointing to "bottles will put in the furnace"). What were you thinking and focusing on then?

对。看这里。你当时在想什么？在关注什么？

J: When I was writing, I just focused on that after the modal verb, the bare infinitive should be used.

写原稿时，就想情态动词后面要用动词原形。

R: But I gave you a "cross". You corrected it accordingly during the revision session. What were you thinking when you were revising it?

但我给了你一把"叉"。你在修改时也改过了。你当时，修改时，怎么想的？

J: When I was writing this point, I didn't think about PV. I just used it as the subject and translated the sentence word for word from Chinese. Because there was no "bei" construction in its Chinese version.

当时写这里时，没有想到被动语态。直接用它作主语。就是根据中文翻译的。因为没有"被"字。

R: When you were writing each sentence, you thought what to write in Chinese, then translated it into English?

你在写每一句时，你用中文想写什么，再翻译成英文？

J: Yes.

是啊。

R: Oh, this is what you were thinking while writing draft 1. Then, what were you thinking while revising it?

噢，这是你写原稿时的思维。那么，你在修改时，你在想什么？

J: Then, I remembered to use PV. "Aux. be" plus pp.

然后，就是记住要用被动语态。be 动词加动词的过去分词。

R: "Aux. be" plus pp. To you, pp is—

be 动词加动词的过去分词。过去分词的形态，对你来说就是—

J: To add "ed".

加"ed"。

R: Then, "Aux. be". You crossed out "will", and wrote "are" instead.

然后，be 动词，你认为应该是，你把 will 划掉了，改成了 are。

J: Yeah.

嗯。

R: Now, look at this point. Your originally used AV.

下面看这里。你原来用的是主动式。

J: Literally translated from Chinese.

从中文直译的。

R: What were you thinking while revising it?

修改时你怎么想？

J: Still, needed to use PV.

还是要用被动语态。

R; It sounds you had a strong sense to use PV in revision.

好像修改时，你脑子里有很强的这种意识。"要用被动语态"？

J: Yeah.

嗯。

R: Then, the structure of PV came out: "Aux. be" plus pp?

然后，被动语态的结构就出来了：be 动词加动词的过去分词？

J: Yeah.

嗯。

R: But it's not true with this word as it is an intransitive verb. In transitive verbs should not be used in PV. They don't have such a form. Hence, AV should be used with it. It (refers to the glass liquid) flows itself, not "be flowed".

但这个词不行。因为它是一个不及物动词。不及物动词不用于被动语态。统统没有被动式。所以说，它就得用主动式。它是自己在流，而不是被流。

J: Aya (exclaimed) ！

啊呀！

R: If you say in Chinese: The liquid is flowed. It doesn't sound logic, does it?

你说中文：液体被流动。不通吧？

J: The liquid is flowed. Haha! (Laughed)

液体被流动。哈哈！

R: That's why I didn't give you a "cross" when AV was used in your draft 1. You have a strong sense to use PV now.

所以，原来你用主动式，我没有给你打叉。你现在有很强的意识：要用被动语态"。

J: Yes. Because the subject of the sentence is an object.

对。因为它是物作主语。

R: That's a difficult point. It's not OK to use PV whenever the subject of the sentence is an object. You need to differentiate the part of speech: transitive verb or intransitive verb.

难就难在这里。不是所有物作主语就用被动语态。要分词性。动词要分及物和不及物。

Just now, you mentioned PV several times. Is it what you were focusing on while revising the text?

你刚才几次提到被动语态。它是你在修改时所关注的吗？

J: Yes.

是啊。

R: Why? Why were you focusing on it? Can you say something more about it?

为什么？为什么会关注它？能不能多说一点？

J; That is. It is an object, it has always been made use of and re-created by people. It can't do anything itself.

就是它是一个物体，它都是被人们所利用，被改造，它不会自己怎样。

R: Yes. But in your draft 1, you didn't indicate it *is* bla bla bla. Instead, you wrote it bla bla bla.

对呀。但是你在写原稿时，你并未表达它被怎样，而是它怎样。

J: Because you pointed out to me (in the written CF).

因为你给我指出来了。

R: Oh, I wrote about on what occasions PV should be used.

哦。就是写了何时用被动语态。

J: Yes.

对。

R: Yeah. In your draft 1, AV was used on the occasion where PV should be used.

哦，对。因为原先是该用被动语态时，用了主动语态。

J: Also, when I was writing draft 1, I didn't have that sense.

并且，因为自己写原稿时就没有那个意识。

R: What sense?

什么意识？

J: Voice. I used AV on the occasion where PV should be used. It was easy for me to translate literally from Chinese.

就是语态啊。该用被动语态时，用了主动语态。很容易根据中文直译过来。

R: Because in Chinese, there was no "bei" construction in many cases, including where an object functions as the subject of the sentence.

因为中文很多时候，包括物作主语，也无"被"字。