Title: The Role of Classroom Input: Processing Instruction, Traditional Instruction, and Implicit Instruction in the Acquisition of the English Simple Past by Cantonese ESL Learners in Hong Kong

Abstract

The purpose of this study was to examine the role of classroom input in achieving the English simple past to unite the insights of SLA theory and L2 pedagogy. As English tense is not realized overtly in Cantonese, it has been causing great difficulty to English as a Second Language (ESL) learners. This study involved Primary 2 students who were divided randomly into 3 groups being taught using 3 different forms of classroom intervention: Processing Instruction Group (PI), Traditional Instruction Group (TI), and Implicit Instruction Group (II). A pre-test and a post-test consisting of interpretation and production tasks were administered to examine if there is any significant difference in the performance after classroom intervention. Findings show that the PI group displayed significant improvement from pre-test to post-test in the interpretation task, and they also obtained the greatest gains. In the production task, both PI and TI groups obtained greatest gains. Pedagogical implications are discussed suggesting what teachers can do to help L2 learners map form and meaning in acquiring English tense and other relevant grammar items in the initial stages of L2 acquisition.

Keywords: classroom intervention; English simple past; Processing Instruction; Traditional Instruction; Implicit Instruction; second language acquisition

1. Introduction

Functional categories (e.g. tense, agreement, articles) have been found to cause difficulty for ESL learners (Eichler & Müller, 2017; Meisel, 2012; Lardiere, 2007; Leung, 2003). This is particularly so when it comes to the acquisition of tense by Cantonese English as a Second Language (ESL) learners, as tense is not realized overtly in Cantonese. Much research has been conducted on the effectiveness of instruction. One of the issues addressed is whether classroom input is more effective than immersion in the target language for learners to acquire the properties of an L2 and relatedly, whether implicit or explicit instruction is better. There seems to be a consensus that second language instruction does make a difference, and that the difference is substantial. In terms of effectiveness, explicit instruction was found to have a clear advantage over implicit types of instruction (e.g. Long, 1991; Norris & Ortega, 2000; Nezakat-Alhossaini, Youhanaee & Moinzadeh, 2014; Gardaoui & Farouk, 2015) for both short-term and long-term effects. Doughty and Long (2003) suggested that research findings about instruction might be biased for a number of reasons, and they argued for an altogether more differentiated and fine-grained approach to examining the effects of L2 instructional treatments. Thus, they consider the enhancement of input processing as the way forward in L2 instruction, suggesting that Processing Instruction (VanPatten, 2002) and focus-on-form (i.e. focusing on both forms and meaning) are emphases which can help learners notice input cues that are relevant but that might otherwise be overlooked.

Processing Instruction (PI) (VanPatten 1991), whose purpose is to shape the ways that learners attend to input and make connections between forms and meaning, was adopted in this study to examine the role of classroom input in the acquisition of the English simple past, together

with 2 other forms of classroom intervention: Traditional Instruction and Implicit Instruction. This follows on the findings of Author (2013), which suggest the presence of functional categories in the initial state, e.g. Tense Phrase (TP), and noting that the major challenge for L2 learners is the mapping between forms and meaning (also see Boser et al., 1992; Wexler, 1998). By suggesting that Cantonese ESL learners possess the underlying knowledge of tense and that it is the mapping problem that we need to address, this study examines the role of classroom intervention to help L2 learners make correct meaning-form connections in the initial state of acquiring the English simple past. The purpose of this study was to examine the role of classroom input in achieving the English simple past to unite the insights of SLA theory and L2 pedagogy.

2. Literature review

This section outlines the studies reporting the challenges Cantonese ESL learners face in acquiring tense and aspect, specifically the English simple past, and how Processing Instruction might be an effective means to help L2 learners make connections between forms and meaning. The significance of this study using three different forms of pedagogical intervention involving Primary 2 Cantonese ESL learners is then explained.

2.1 Acquisition of tense by L2 learners

There have been two main streams of research into tense which offer insights into the difficulties encountered by L2 learners: meaning-oriented and form-oriented studies (Bardovi-Harlig, 2000). While the former focuses on how L2 learners express temporality using pragmatic, lexical or morphological means, the latter is concerned with how tense and aspect emerge in the interlanguage (i.e. the sequence of acquisition, see Kaplan, 1987; Giacalone-Ramat, 1997; Wiberg, 1996), the role of lexical aspect inherent in verbs (i.e. the Aspect Hypothesis, see Robison, 1995)

and also narrative structure (i.e. the Discourse Hypothesis, see Bardovi-Harlig, 1998). Some previous studies (Collins, 2007; Lim, 2003, 2006, 2007) have also examined issues concerning how learners' first language (L1) has had an influence on students' learning of the second language and some common developmental patterns in the domain of verb tense and aspect. For instance, Collins (2007) compared the acquisition of the English simple past by Japanese and French-speaking learners, while Lim (2003, 2006, 2007) reported on how the learning of the English simple past and the present perfect may be influenced by Malay learners' knowledge of their first language and the target language itself.

A number of studies have been conducted to investigate the problems specifically faced by Cantonese ESL learners in acquiring tense and aspect (e.g. Yu & Atkinson, 1988; Yang & Huang, 2004; Darus & Ching, 2009; Hung, 2012; Rezzonico, Goldberg, Milburn, Belletti & Girolametto, 2017). Different accounts have been proposed to explain the situation, which may be related to the principle of Input Processing (IP), one of which is the Lexical Preference Principle. This concerns the incorrect processing strategy used by L2 learners when they process input: "when content lexical items and a grammatical form both encode the same meaning and when both are present in a sentence/utterance, it is the lexical item that learners attend to (Van Patten, 2002, p.757). Thus, in acquiring the English simple past, learners tend to use lexical items such as *yesterday* or *last week* instead of the grammatical form *ed* when both encode the same past meaning. The use of bare verb forms to refer to past events and the reliance on temporal adverbials to recover the event timing (e.g. I *study* at home yesterday) was reported in a number of studies. In Yu and Atkinson (1988) examining the English compositions produced by 124 Secondary 4 students in Hong Kong, the misuse of the past tense for the present tense formed the largest number of errors in the category of tense/aspect error. In Yang and Huang (2004), it was argued that temporal adverbials were tense

substitutes at Primary 5 and Secondary 1 levels, and there was a slow shift from depending on these devices to using grammatical devices.

Another problem concerns incorrect tense marking; and the Aspect Hypothesis seems to be universal in suggesting that learners first mark tense for those verbs that are lexico-semantically more event-like (i.e. achievement, such as *shut* the door) and accomplishment verbs (e.g. *built* a house), and then mark increasingly less event-like verbs (i.e. activities, such as *slept*; and states, such as I *knew* it) in stages (see for example Andersen, 1989, 1991; Bardovi-Harlig, 1992; Bardovi-Harlig & Reynolds, 1995; Bardovi-Harlig & Bergstrom, 1996). In Tickoo (2001) involving secondary and university students in Hong Kong, the Aspect Hypothesis and the Discourse Hypothesis were both examined. Findings obtained by examining the written narratives of the students revealed that Cantonese ESL learners do not mark tense in the manner that the Aspect Hypothesis predicts (i.e. past-tense marking appearing first in achievements and accomplishments, followed by activities and states). Instead, it was argued that Cantonese ESL learners used the English simple past to present core and new information, while verbs in what was regarded as supplementary information were not marked. Specifically, clauses with verbs marked for the English simple past relate to the key events of the storyline, and those which are unmarked relate to subsidiary and noncentral information. With the increase in students' English proficiency level, there is a gradual increase in the number of students who use target-like marking. Hong (2008) studied the use of the English simple past of 138 secondary students in Hong Kong using a fill-in-the-blanks task, translation task and a picture narrative. Results showed that both lexical aspect and L1 influence affect Cantonese ESL learners' acquisition of the English simple past.

2.2 Processing Instruction and its effectiveness

To address the mapping problem, Processing Instruction (PI), first introduced in VanPatten and Cadierno (1993), may be an effective pedagogical intervention. The main objective of PI is to help learners circumvent the incorrect strategies which they used to process the form and structure in order to derive meaning from input. PI works through helping learners alter the process and strategies of processing input: "a pedagogical intervention to grammar instruction whose main scope is to facilitate the cognitive processes by which language learners connect a linguistic feature in the input to its meaning" (Benati, 2017, p.2). This is in contrast with the traditional type of instruction, which concerns explicit explanation of grammatical items and requires learners to produce the target form.

PI arose from VanPatten's research on learners' input-processing strategies, with one of the principles concerning learners' attention to words and content lexical items for the meaning instead of grammatical form when both encode the same meaning and exist in a sentence, that is, the Primacy of Meaning Principle. In the case of L2 acquisition of the English simple past, there are time adverbials such as *yesterday, last week,* and *three days ago* that encode past-tense meaning, and thus L2 learners will simply use them instead of grammatical markers of tense. In order to help learners map form and meaning, PI has the following features: (a) explicit information about a particular linguistic form/structure is presented to the learners; (b) explicit information about a particular IP strategy adopted by L2 learners which negatively affects the acquisition of the form or structure is presented to the learners; and (c) structured-input activities are used to help learners attend to both forms and meaning.

The effectiveness of PI has been demonstrated in studies over the past 25 years involving at least 15 structures (e.g. word order, tense marker, aspect markers; copular verbs, subjunctive, causative and passive constructions, and object pronouns), and at least eight languages mainly with college students but also with some high-school and primary-school learners. Findings generally show a significant improvement in the post-test results of the PI group in both form and meaning compared with other forms of classroom intervention such as Traditional Instruction (Buck, 2000; Cheng, 2004; Hashemnezhad & Zangalani, 2012), meaning-based output production (Benati, 2001; Farley, 2001a; VanPatten & Wong, 2004), output-oriented type of instruction (Birjandi, Maftoon & Rahemi, 2011; Morgan-Short & Bowden, 2006), and communicative output or dictogloss (Paulston, 1972; Cadierno, 1995); and it seems to be effective regardless of the participants' L1. Recent studies have included not just sentences in listening comprehension tests, but also complete texts at the level of discourse (Benati, 2001; Cheng, 2004; Benati, Lee & Hikima, 2010). These have examined not just the primary effects of Processing Instruction but also secondary ones, i.e. whether the primary effects can be transferred to another similar structure, such as the simple present (Benati et al., 2008). Most importantly, it is the underlying linguistic representation that PI develops, and its effects were retained in the original study (VanPatten & Cadierno, 1993), for one month, and up to eight months in subsequent studies (VanPatten & Fernández, 2004).

2.3 Focus of study

While the preceding studies may well give some insights into the challenges posed by English tense to Cantonese ESL learners, in equating suppliance and no-suppliance of simple past forms with learners' lack of knowledge, these studies have possibly ignored the underlying representation of tense in the interlanguage grammars of Cantonese ESL learners. As found by Author (2013), Cantonese ESL learners in fact had an underlying knowledge of tense, but had difficulty in mapping forms and meaning, as suggested by the Missing Surface Inflection Hypothesis (e.g. Haznedar & Schwartz, 1997; Prévost & White, 1999). It is thus the mapping between forms and meaning that we should be concerned about to address this. In particular, it is worth examining the role of classroom intervention in addressing this mapping problem, specifically the relative roles played by Processing Instruction, Traditional Instruction, and Implicit Instruction - the latter two being most commonly used in Hong Kong classrooms.

Given the importance of examining the acquisition of the target feature in the initial state and that there is only one study in the processing studies literature conducted close to a decade ago involving a less representative number of participants (Benati & Lee, 2010), this study investigates the role of classroom input in the acquisition of the English simple past by HK Primary school Cantonese ESL learners. Processing Instruction (PI) was used to alter the ways that learners attend to input and make connections between forms and meaning. Its effectiveness was compared with that of Traditional Instruction (TI) and Implicit Instruction (II). Assessment tasks covered listening and reading, sentence-level and discourse level for both interpretation and production tasks to determine their different roles in affecting the production and interpretation of the English simple past by Primary 2 students. The following specific research questions are addressed:

1. What are the relative effects of PI, TI and II on the acquisition of the English simple past as measured on an interpretation task and a production task?

2. What are the relative effects of PI, TI and II on the acquisition of the English simple past as measured on a listening and a reading task?

3. What are the relative effects of PI, TI and II on the acquisition of the English simple past as measured on a sentence-level and a discourse-level task?

3. Methodology

To determine the effectiveness of 3 different forms of pedagogical interventions in helping map forms and meaning in L2 acquisition of the English simple past, 66 Primary 2 students were divided into 3 groups being taught by each of the pedagogical form of intervention: Processing Instruction group (PI), Traditional Instruction group (TI), Implicit Instruction group (II). This section gives details about the participants, procedure of data collection, the pre-test and post-test adopted, and the features of the teaching materials involved.

3.1 Participants

The participants were Primary 2 students aged 7-8 (equivalent to Grade 2 in US system or Year 2 in UK system of education) in their second semester of study at primary schools in Hong Kong. They were all native speakers of Cantonese, and had never been taught either the English simple past inside or outside the classroom. Primary 2 students were selected instead of Primary 1 because they are more able to handle the tasks involved compared with Primary 1 students. Students in both the PI and TI groups were asked to indicate if they were having tutorial lessons outside the classroom on the topic of the English simple past. None of them indicated so before

the lessons started. Students in the II group were asked at the end of the 3-day lessons if they had exposure to the English simple past outside the classroom. Again, none of them had such exposure either formally or informally.

3.2. Overall procedure

This study was a classroom-based experimental study involving students being taught using 3 different forms of pedagogical intervention: Processing Instruction group (PI); Traditional Instruction group (TI); and Implicit Instruction group (II). It followed the design of all other PI studies in using a pre-test/post-test procedure (e.g. Benati, Lee & Houghton, 2008; Larson-Hall, 2015; Modirkhamene, Pouyan & Alavinia, 2018).

As Primary 2 students have not started learning the English simple past, all 66 participants were eligible to attend the lessons after the pre-test. Out of the total score of 82, the mean score was 13.27 and standard deviation was 4.03 in the pre-test. The qualified participants were randomly assigned to one of three groups: the Processing Instruction group (n=21), the Traditional Instruction group (n=24), and the Implicit Instruction group (n=21). Randomization is important because this can lessen the influence possibly played by extraneous variables and promote group comparability. Students were taught for 1.5 hours on each of three days. A post-test was given immediately after the last lesson; because of curriculum constraints, no delayed post-tests were possible.

[Table 1 here]

The participants were taught by three different teachers to avoid the Hawthorne effect (Landsberger, 1958) (i.e. the 'observer effect' which is the modification of behaviour by the students who might be aware of being observed), and they were told that each approach had a high likelihood of success. The teachers all held professional teaching qualifications; they were trained appropriately and were observed in order to make sure that they followed the instructions strictly. Standard input and PPT slides/teaching materials were also prepared for the teachers so that they know clearly what should and should not be said with respect to the features of the three different forms of classroom intervention.

Paired samples *t*-test and one-way ANOVA were conducted to examine if participants in different groups improved significantly from the pre-test to the post-test. A repeated two-way ANOVA on the raw scores was performed, in order to determine the possible effects of Processing Instruction on the way participants interpreted sentences in the interpretation task, and the way they produced sentences using the English simple past. Tukey post-hoc test was also used to examine if there was any significant difference in the test result among each instruction type. The extent of the significance was then measured by effect size, which was classified as small, medium and large influence level with critical thresholds of *d*-values (Cohen, 1988, 1994; Kirk, 2001). The range of a small effect was d=0.0-0.49; a medium effect was d=0.5-0.79; and a large effect was d>0.8. This is therefore an objective judgment about the extent of influence of each instruction type on respective interpretation and production tasks in the post-tests. All statistical analyses were conducted by IBM SPSS Statistics 24.0.

3.3 Pre-test and post-tests

The pre-test and post-tests consisted of five tasks: sentence-level interpretation task, two discourse-level interpretation tasks, a fill-in-the-blanks task and a sentence creation task.

3.3.1 Interpretation tasks

The sentence-level interpretation task required participants to listen to 20 sentences eliciting their knowledge of the English simple past at sentence level. There were 10 sentences in the simple past and another 10 in the simple present as distractors. Temporal adverbs were removed and students had to rely on the verb morphology as the only indicator of when the action takes place. 1 point was given to each correct response and 0 for wrong responses (e.g. when hearing this sentence: *I walk the dog in the morning*, the participant should put a tick in the box to indicate this is 'present').

In the second discourse-level interpretation task, the participants were required to listen to a dialogue in which 10 test items with the simple past and 10 distractors with simple present were embedded. The recorded dialogue was spoken by a native English speaker at a normal conversational speed. There was no repetition in order to measure real-time comprehension. There was no temporal adverb throughout the dialogue, and the participants needed to decide whether each verb refers to present events or past events. The maximum number of points was 20 and the minimum 0. Both discourse-level interpretation tasks were designed in the same manner, except it was reading for the first one and listening in the second one.

3.3.2 Production tasks

A written completion task (i.e. fill-in-the-blanks) and a sentence writing task were also included to determine the participants' ability to produce the target form using the English simple past. In the former task, students were asked to read a story about what a person did last weekend and then fill in the blanks with an appropriate form of the verbs. In the sentence writing task, there were pictures for participants to look at and produce sentences using the given words (e.g. 'Mary', 'paint', 'picture'). Necessary translations were given to students before the tasks. The raw scores of the production task were calculated as follows: (a) correct use of English simple past (1 point); incorrect (0 point).

3.4. Description of teaching materials for classroom intervention

Fifteen activities were developed for the three different forms of pedagogical intervention, with five used in each lesson. They were balanced and comparable in terms of the number of verb tokens and vocabulary difficulty (See Table 1).

[Table 1 here]

3.4.1 Processing Instruction

Processing Instruction consists of grammatical explanation of the English simple past and structured input activities. Explicit instruction was given to remind learners not to rely on temporal adverbials to determine when the activities take place but to pay attention to the endings of verbs. The structured input activities used in this study included both referential and affective activities. Referential activities have a standard answer and participants have to rely on the target form to access the meaning. Following referential activities, learners were engaged in affective activities

where they could express opinions or beliefs with no standard answer. This was mainly to allow learners to see or hear the form in a meaningful context. Appendix 1 shows an example of discourse-level affective activity in which learners receive both aural and written input. During the treatment, teachers could only tell learners if their answers are correct or not. Any other feedback or explanation of how the English simple past is formed is not allowed (see Sanz, 2004).

3.4.2 Traditional Instruction

In the TI group, the students received grammatical explanation of the English simple past and had to work on a set of form-focused activities. They were given explicit information about the simple past focusing on the forms: mechanical drills, meaningful drills and communicative drills (See Appendix 2). In mechanical drills, leaners were required to attend to meaning and there is only one correct response. They are mainly exemplified as repetition; substitution, and transformation activities. To complete meaningful drills successfully, the learner had to process the meaning of both the stimulus and his/her own answer, but there is still one right answer, and it is already known to the participants. Communicative drills required learners to pay attention to meaning, and the information given by the learners is new and unknown to the person asking the question. Thus, the answer cannot be regarded as right or wrong.

3.4.3 Implicit Instruction

In Implicit Instruction, learners did not receive any explicit explanation of grammatical rules about the English simple past (see Ellis, 2009). They were exposed to different passages with the use of the English simple past. They first listened to the passages, read them and were then

required to answer questions to check their understanding of the passages (See Appendix 3).

3.5 Ethical considerations

Human subjects' ethic approval was granted by The Hong Kong Polytechnic University and consent was given by the parents whose children were involved in this study. Participation was voluntary and students had the right to withdraw at any time. Participants' information was also stored securely and treated in the strictest confidence.

4. Results

This section reports findings which address the relative effects of PI, TI and II on the acquisition of the English simple past as measured on a number of tasks, including (a) an interpretation task (listening/reading and sentence-level/discourse-level); and (b) a production task. It was important to ensure that there were no pre-existing differences between the three groups so that we could attribute any post-intervention differences to the effects of instruction, Table 2 lists their scores in the pre-test and the mean values for each group. There was no significant difference between the three pre-test scores of the three groups (F (2, 66)= 0.20, p=0.82).

[Table 2 here]

4.1. Results of the interpretation task

Paired samples *t*-test conducted on the interpretation task showed that the PI group obtained the greatest gains from pre-test to post-test (29.4%) whereas TI and II only displayed a slight improvement: about 8.0% increase for the TI group and a 9.3% increase for the II group (See Table 3). Paired samples t-test (*p*-value) and the effect size analysis (*d*-value) reveal that: first, the PI group improved significantly from pre-test to post-test ($p=0.0<0.05$, large effect $d=1.18>0.8$); secondly, the TI group did not improve significantly from pre-test to post-test ($p=0.18>0.05$, small effect $d=0.2<0.5$); thirdly, the II group did not improve significantly from pre-test to post-test ($p=0.06>0.05$, small effect $d=0.35<0.5$).

[Table 3 here]

A repeated two-way ANOVA was conducted on the raw scores of the interpretation task. Instruction was the between-subjects factor, whereas Test (pre-test, post-test) was the within-subjects factor. The results revealed a significant effect for Test (F (5.9)=120.7, $p=0.0<0.05$) and a significant effect for Instruction ($F(9.0)=183.3$, $p=0.0<0.05$), but no significant interaction between Instruction and Test (F 2.3)=47.0, $p=0.1>0.05$). The Tukey's post hoc analysis showed that: first, the scores for PI were statistically different from those of TI and II ($p=0.0>0.05$); secondly, but the scores for TI and II were not statistically different from each other ($p=1.0>0.05$; $p=0.1>0.05$). The results of the interpretation task indicate that Processing Instruction seems to be most effective in helping L2 learners interpret the simple past since the PI group improved significantly from pre-test to post-test and performed significantly better than the other 2 groups. TI and II groups obtained a slight but not a significant improvement from pre-test to post-test and

they gained almost equally from the instruction, which seems to show that Traditional and Implicit Instruction have limited effect on the interpretation of the simple past.

4.2 Production task

A paired samples *t*-test was carried out in the production task scores of the experimental groups to examine whether there is any improvement from pre-test to post-test. One-way ANOVA was used to determine whether the improvement was significant between the two tests in the production task (i.e. fill-in-the-blanks and sentence creation tasks). Table 4 shows that PI and TI groups obtained the greatest gains from pre-test to post-test: about 88% increase for the PI group and about 93.8% increase for the TI group. The II group gained slightly from pre-test to post-test: about 16.7% increase for the II group (p=0.8>0.05, small effect d=0.05<0.5). The statistical analysis of paired samples *t*-test further revealed that, first, the PI group improved significantly from pre-test to post-test (p=0.0003<0.05, large effect d=1.32>0.8); and secondly, the TI group improved significantly from pre-test to post-test (p=0.0001<0.05, large effect d=2.66>0.8).

[Table 4 here]

A repeated two-way ANOVA was conducted on the raw scores of the production task. Instruction was the between-subjects factor, whereas Test was the within-subjects factor. The results from the statistical analysis revealed a significant effect for Test (F (36.7) = 710.8, p=0.0<0.05); a significant effect for Instruction (F (16.3)= 315.0, p=0.0<0.05); and a significant interaction between Instruction and Test (F 16.4)= 317.9, p=0.0<0.05). The Tukey's post hoc analysis showed that, first, the scores for PI and TI were not statistically different from each other (p=0.1>0.05); secondly, the scores for PI and II were statistically different from each other (p=0.0<0.05); and thirdly the scores for TI and II were statistically different from each other

(p=0.0<0.05). Results show that both Processing Instruction and Traditional Instruction tend to have an equal effect in helping learners produce the simple past.

4.3 Listening and reading interpretation tasks

The interpretation task consisted of three tasks, two listening tasks and one reading task. Table 5 shows that changes in the scores for both listening and reading tasks were similar. The mean difference in the scores for listening and reading tasks was insignificant in both pre-test (p=0.053>0.05) and post-test (p=0.07>0.05). Students improved 13.7% in the listening tasks and 23.5% in the reading task. The effect size analysis shows that the effect is small in listening (d=0.29<0.5) and more or less medium in reading (d=0.58>0.5). It seems that the listening task posed little difficulty to the primary students.

[Table 5 here]

Table 6 shows the performance of the three groups in both listening and reading tasks in both pre-test and post-test. Their improvement in the reading tasks was generally better than in the listening task. In the post-test, the PI group improved significantly in both the listening interpretation task (25.8%: p=0.00<0.05) and the reading task (35.8%: p=0.01<0.05), and the effect is large (i.e. d=0.95>0.8 for listening; d=0.82>0.8 for reading). The TI group did not show a significant improvement in either the listening task (4.5%: p=0.6>0.05) or the reading task (12.2%: p=0.18>0.05), and the effect is small (i.e. d=0.10<0.5 for listening; d=0.30<0.5 for reading). The II group did not show a significant improvement in either the listening task (2.3% with p=0.8>0.05 & d=0.06<0.2) or the reading task (23.1% with p=0.06>0.05 & d=0.67>0.5). However, it should be noted that though the improvement of 23.1% is insignificant, the effect size is medium in the reading interpretation task for the II group.

[Table 6 here]

4.4 Sentence-level and discourse-level tasks

There was one sentence-level task and two discourse level tasks in the pre-test and post-test. Table 7 shows that learners did not show a significant improvement in the discourse-level interpretation task (7.8%: p=0.09>0.05; small effect d=0.17<0.2), but they did improve significantly in the sentence level task (32.7%: p=0.0<0.05; medium effect d=0.79>0.5) in the post-test. While comparing the two discourse-level tasks in the post-test, there was no significant difference in the scores (p=1.00>0.05).

[Table 7 here]

Table 8 shows that the PI group outperformed the other groups in the post-test. In the sentence-level interpretation post-test, the PI group improved with large effect (p=0.00<0.05, d=1.52>0.8), whereas the other two groups did not (medium effect for both TI: p=0.04<0.05, d=0.59>0.5 and II: p=0.15>0.05, d=0.51>0.5). In the discourse-level interpretation tasks, the PI group increased by 20.3% from pre-test to post-test, with the PI group showing the greatest gains (p=0.01<0.05, d=0.68>0.5: medium effect). A one-way ANOVA conducted on the discourse-level interpretation data demonstrated that the PI group obtained larger gains than both TI and II groups but Tukey's post hoc test showed that the improvement was not statistically significant (p=0.5>0.05 for PI vs TI and p=1.0>0.05 for PI vs II).

[Table 8 here]

It therefore seemed that discourse-level tasks posed challenges to the participants when compared with the sentence-level one.

5. Discussion

This study has examined the role of classroom input in L2 acquisition of the English simple past by Cantonese ESL learners in the initial state, specifically the relative effects of PI, TI and II on the interpretation and production of the English simple past. While showing the superior effects of Processing Instruction in helping map form and meaning as in the literature (see VanPatten & Cadierno, 1993; VanPatten & Wong, 2004 among many others), by involving a more representative number of Primary students, this study not just demonstrates the effectiveness of Processing Instruction, but that Processing Instruction can benefit even primary-school-aged students who can 'process' the target feature in not just a listening task, but a reading task; not just a sentence-level task but a discourse-level one. The pioneering use of the effect size analysis in PI studies reveals specifically and more saliently the relative impact of the pedagogical intervention adopted.

A comparison of Processing Instruction, Traditional Instruction and Implicit Instruction offers much insight into the role of each in helping L2 learners make form-meaning mapping, specifically those in the initial state of acquiring the English simple past. Statistical results clearly show that only the PI group had significant improvement from pre-test to post-test in the interpretation task. The TI and II groups did not improve significantly, suggesting that Traditional Instruction and Implicit Instruction are not as effective in helping L2 learners interpret the simple past. In the production task, the findings are consistent with most previous studies (e.g. Benati, 2005; Benati, Lee & Houghton, 2008; Lee & Benati, 2009; Benati, 2010), in as much as both PI

and TI groups made the greatest gains from pre-test to post-test. In other words, Processing Instruction is as effective as Traditional Instruction in helping L2 learners produce simple past forms in the initial state of acquiring the English simple past. Having said that, TI was found to be quite useful in helping the TI group realize the form in the production task. The effect size analysis conducted shows that the effect of TI is large in helping the TI group realize the form and its effect is small in terms of interpretation. This study suggests, therefore, that Traditional Instruction should not be condemned outright as in the literature (e.g. Farley, 2001b; Cheng, 2002; VanPatten, Farmer, & Clardy, 2009; Benati & Angelovska, 2015; Bayrak & Soruç, 2017), as it can be used as reinforcement together with Processing Instruction as classroom intervention to help L2 learners realize the target form in acquiring the English simple past. Though the Implicit Instruction group's improvement in the reading interpretation task was not significant, the effect size analysis shows that the effect was medium, which seems to indicate that Implicit Instruction which exposes participants to the target form through reading passages might work. This is the first study which has also examined the role of listening/reading task in addition to that of sentence/discourse-level one in the interpretation of the simple past by L2 learners, within one single study. While findings in the PI literature have unanimously reported the effectiveness of PI in enhancing learners' ability to interpret a target form in listening, reading, sentence-level and even discourse-level tasks (e.g. Benati & Lee, 2010; Benati & Batziou, 2017), they did not attempt to determine the distinctive task effect and account for it, as has been done in this study. Regarding listening/reading tasks, though the three groups (i.e. PI, TI, II) did not display significantly different performance in either the listening or reading tasks in the post-test, the effect size analysis shows that learners performed slightly better in the reading interpretation tasks (small effect in listening/more or less medium effect in reading). Concerning sentence and discourse-level interpretation tasks, statistical analyses

show that improvement in the sentence-level task is much more significant than in the discourse-level task. Given that listening tasks measure more real-time comprehension compared with reading tasks, and that discourse-level tasks require a more thorough interpretation of a target form, we may want to see if and how PI can demonstrate a more significant role in both listening tasks and discourse-level tasks.

6. Conclusion

While the simple past poses universal challenges to L2 learners whose L1 does not have overt tense realization, findings of this study lend support to the Target Language Hypothesis and the Age Hypothesis (Benati & Lee, 2010) that PI, in helping L2 learners steer away from the non-optimal processing strategies and make correct form-meaning connections, is also effective in helping primary children with an Asian language as L1. Unfortunately, English teachers in primary and secondary schools in Hong Kong do not seem to have heard of Processing Instruction, and the dominant teaching approaches adopted still tend to be form-focused (Author, 2016).

Processing Instruction is a pedagogical intervention that uses structured input to push learners away from non-optimal strategies so that they can make correct form-meaning connections, and develop the underlying linguistic representation accordingly. Specifically regarding the L2 acquisition of the English simple past, teachers would need to understand that Processing Instruction is predicated on the Input Processing Theory (VanPatten, 2004) which attempts to explain why L2 learners process certain components in the input but not others when being exposed to certain linguistic features, for example, the Primacy of Meaning Principle (i.e. the preference of using meaningful temporal markers such as *yesterday* instead of grammatical inflection *ed*). Once aware of what the processing problem is, they would then be able to develop

effective structured input activities to push students to circumvent that ineffective processing strategy. There are guidelines suggested by VanPatten and Sanz (1995) that teachers can refer to in order to design purposefully intervention that can move learners away from inappropriate processing: (a) presenting one thing at a time so that learners can map one form to one meaning more effectively; (b) keeping meaning in focus so that learners can extract meaning from the target form or structure in the structured input activities to facilitate form-meaning mapping; (c) moving from sentences to connected discourse; (d) using both oral and written input; (e) requiring the learner to do something with the input such as agreeing/disagreeing; indicating true or false; likely or unlikely before making effective form-meaning connections; and (f) keeping the learner's processing strategies in mind so as to help learners avoid using an ineffective processing strategy. In addition to the English simple past, these strategies can be adapted to the pedagogy of other grammar items which aim to push L2 learners away from non-optimal processing strategies used such as The Lexical Preference Principle or The First Noun Principle (Van Patten, 2015a, b; Benati, 2016). The former strategy is used by L2 learners to first process lexical items before grammatical ones when both encode the same meaning (e.g. *yesterday* vs past tense marker *ed*), and the second strategy is to assign the subject role to the first noun found in a sentence (e.g. passive constructions).

Building upon the contributions of this study, future studies could consider using eye-tracking experiments to determine what aspects of the structure learners focus their attention on during input processing. Treatment of a longer duration can also be arranged to examine if this may allow even more significant improvement in both learners' interpretation and production of the target structure. In addition to interpretation and production tasks as are regularly used in the literature (e.g. Van Patten, 2002; Benati, 2005; Farley, 2001a; Benati & Schwieter, 2017; Soruç, Qin & Kim, 2018), interview data could also be crucial in revealing how learners perceive the different forms

of classroom intervention and their effectiveness. More importantly, the potential of Processing Instruction is not limited to morpho-grammatical items. It could well be applied to different grammatical and lexical target structures so long as L2 learners use those underlying principles during acquisition (e.g. the first noun principle; the Lexical Preference Principle) that negatively affect their picking up certain grammatical or lexical items. With heightened awareness, future collaborations between researchers and teachers should be encouraged to develop the potential of Processing Instruction in mapping forms and meaning in second language acquisition.

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