Chapter Six

Discussion of Findings and Further Research

6.0 Introduction

In this chapter, we summarize and explain the findings of Chapters Four and Five. The chapter is organized as follows. The research questions of the study are restated in Section 6.1 and the discussion of the findings with relation to the hypotheses are provided in Section 6.2 and Section 6.3 with respect to the dictation task and the picture story task. The comparison of the findings of the two tasks and with earlier studies on the lexical-functional divide in prepositions are discussed in Section 6.4, and the implications of the study are addressed in Section 6.5. In Section 6.6 main claims of the study are discussed and finally in section 6.7, suggestions for further research are addressed.

6.1 Research questions of the study

The present study looked at the acquisition of the four fine-grained categories of preposition proposed by Littlefield in 2006, questioning the broader distinction of lexical and functional categorization of prepositions. Recall that the fine-grained categorization had adverbs [-Lexical, -Functional]; semi-lexical prepositions [-Lexical, +Functional]; particles [-Lexical, -Functional] and functional prepositions [-Lexical, +Functional].
The original data by which Littlefield (2006) empirically verified her categorization was from early first language acquisition (English). The data came from the spontaneous production of 5 children who were studied over a period of time from 1.0 MLU to 4.0+ MLU (Littlefield 2006) and also was compared with the caregivers’ speech. One of the aims of the present study was to garner empirical support for the fine-grained categorization from second language acquisition, here, from Sinhala speakers of English.

The second objective was to see whether the acquisition of these fine-grained categories showed similar trends in different tasks, one where sentences with the categories were to be imitated (written down after an oral presentation) (the dictation task) and an elicited production task (where a story had to be narrated on the basis of pictures which forced learners to use prepositions) (the picture story task). Both these tasks were distinctly different from what Littlefield used (2006) i.e. a spontaneous production task.

To parallel the developmental trends that Littlefield addressed in her study, we used a cross-sectional design with four grades (Grades 4, 6, 8, and 10). This was used to capture the growth in the acquisition of the four preposition categories.

Therefore, the research questions of the study were:

1. Do second language learners respect the fine-grained categorization of prepositions in the dictation and the picture story tasks?

2. Do second language learners show an initial advantage in some categories, which eventually disappear with increasing age and proficiency?
3. Is there a difference between the acquisition patterns in the dictation and the picture story tasks?

4. How does the second language acquisition data compare with first language data reported by Littlefield (2006)?

The results of the dictation task have been reported in Chapter Four, and the picture story task in Chapter Five. Let us first summarize the findings of the two tasks, and then move on to address how the research questions have been adequately answered in the present study.

### 6.2 Results of the dictation task

65 learners each from the four grades (Grades 4, 6, 8, and 10) had to write sentences (with one of the four preposition types) that they had heard orally. It was hypothesized that learners would imitate sentences with different prepositional categories differently (Hypothesis 1).

Given the numerous findings in first language acquisition research that lexical elements are learnt before functional elements, it was hypothesized that [+Lexical] prepositions (i.e. adverbs and semi-lexical prepositions) would show an initial advantage (in Grade 4 and Grade 6) over [-Lexical] prepositions (i.e. particles and functional prepositions). This would translate in the task as follows: Sentences with [-Lexical] prepositions would be imitated better than sentences with [+Lexical] prepositions (Hypothesis 2). The initial advantage would disappear with increasing
age and proficiency, i.e. all categories would be imitated equally well by Grade 10 (Hypothesis 3).

Along with a computation of the accuracy of imitation, errors with respect to each category was also looked into. In language acquisition studies, it has been seen that children tend to omit the functional words and elements, and construct utterances with only lexical words and elements. Therefore, it was hypothesized that Grade 4 and Grade 6 learners would tend to omit prepositions more often than Grade 8 and Grade 10 learners, and the latter would show more substitution and addition errors (Hypothesis 4). Also, the omissions were expected to be more in [+Functional] prepositions than in [+Lexical] prepositions (Hypothesis 5). Moreover, in substitutions, the category criterion would be preserved, i.e. a semi-lexical preposition would be substituted with a semi-lexical preposition and a functional preposition with a functional preposition (Hypothesis 6).

As expected, the ability to hear and imitate sentences with different preposition categories showed a steady and consistent increase from Grade 4 to Grade 10. Second language learners showed differences in their imitation of sentences with different prepositions. Recall that the sentence length, number of syllables, familiarity of words, syntactic structure, complexity of ideas presented were strictly controlled. the sentences differed only in the nature of prepositions used in them. Grade 4 and Grade 6 showed that there was significant difference in the way sentences with different prepositions were imitated [in Grade 4: between adverbs and particles \( t(15) = 2.462, p < .04 \)], between adverbs and functional prepositions \( t(15) = 2.52, p < .027 \) in
Grade 6 between adverbs and particles \[ t(15) = 2.708, p < .01 \] and between adverbs and functional prepositions \[ t(15) = 3.62, p < .00 \]. However, the difference was not significant in Grade 10. Therefore, this fact fully confirmed Hypothesis 1.

Looking at the differences in sentence imitation, we found that adverbs and semi-lexical prepositions were imitated more accurately than particles and functional prepositions, thus supporting an initial advantage for [+Lexical] features over [-Lexical] i.e. in Grade 4, and in Grade 6. However, adverbs showed a higher imitation accuracy than particles and functional prepositions but not semi-lexical prepositions. Semi-lexical prepositions were better imitated than particles and functional prepositions in initial grades but the difference was not significant. This supports Hypothesis 2, where we posited that in the dictation task prepositions with [+Lexical] features would be imitated better than prepositions with [-Lexical] features. By Grade 10, the difference in imitation that we showed between [+Lexicals] and [-Lexical] categories also disappeared, thereby confirming Hypothesis 3.

The percentage of omission errors showed a decrease with increasing grades, though they formed the major proportion of errors even in Grade 10 (67%) (compare with 86% in Grade 4). The percentage of the substitution errors increased from Grade 4 (13%) to Grade 10 (28%). The percentage of addition errors accounted for less than 5% in the data set. Though omission errors decreased with grade, the decrease was not substantial and did not get replaced by substitution errors as expected. The finding loosely proved Hypothesis 4. Looking at which categories lend themselves to more omission errors, we found that all categories of prepositions had comparable omission errors across grades and the omission errors in adverbs were the least in all grades.
thus invalidating Hypothesis 5 that [+Functional] prepositions (semi-lexical and functional prepositions) are omitted more often than [+Lexical] prepositions (adverbs and semi-lexical prepositions). Semi-lexical prepositions [+Lexical, +Functional] showed a higher proportion of omission errors (20-24%), not very different from particles [-Lexical, -Functional], (15-22%), and functional prepositions [-Lexical, +Functional] (19-24%). The omission errors did not really reflect the dichotomous lexical-functional divide, against which Littlefield had proposed the fine-grained analysis in 2006. Therefore, Hypothesis 5 stands questioned. However, this finding also refutes the lexical-functional categorization that Littlefield was up against.

When substitution errors were analyzed, it was found that in all categories, substitutions were predominantly made by the same category prepositions: for example, an adverb was substituted by an adverb, so on. This was true of all grades. The implication is that second language learners had an intuitive knowledge of what category of preposition each sentence contained, and therefore, found another preposition of the same category when they could not listen to or attend to the right preposition in the sentence. Substitutions were rarely cross-category, though some instances of functional prepositions being substituted with semi-lexical prepositions. In general, Hypothesis 6 was confirmed.

### 6.3 Findings of the picture story task

In the picture story narration task, 40 learners from each of the four grades wrote a story on the basis of 27 pictures and the written stories were analyzed for the text length (in words), the MLU count, use of different categories of prepositions, correct
use of prepositions and types of errors (omissions, substitutions, and additions) category-wise. The mean length of utterance and the length of the story showed a consistent increase from Grade 4 to Grade 10, though the difference between Grade 4 and Grade 6 was not significant in the MLU count. The MLU count was used in the study only to highlight the proficiency differences of learners, and served no other purpose.

Out of a total of 4462 sentence contexts in the data of 160 learners, 2127 had overt prepositions that formed approximately 48% of the sentences in the stories. The use of sentences with prepositions consistently increased from Grade 4 to Grade 10 as expected. The aim was to find out which category of preposition was frequently used, and which was used more accurately. This distinction between frequency and accuracy is important here, because category that was frequently used may not be the category that was most accurately used.

The results of the picture story writing task showed that learners had shown differences in the way the four categories of prepositions were used, therefore supporting Hypothesis 1.

To look at the frequency of use, we calculated the proportion use of each category of preposition separately for each grade. Of all the prepositions used in the story, 65-72% were semi-lexical prepositions in all grades, followed by adverbs (15-26%), functional prepositions (3-10%) and finally by particles (0.3-4%). In this regard, the age and proficiency of the learners made no difference to which preposition was most frequently and least frequently used. Here, [+Lexical] prepositions (semi-lexical
prepositions and adverbs) had an advantage over the [-Lexical] prepositions (functional prepositions and particles).

In Littlefield’s study (2006), the adult and child data showed similar distribution, though initially at lower MLU counts of 1.5-2.0 in the child data, adverbs far exceeded the semi-lexical prepositions. In our dataset, the youngest learners (Grade 4) had an MLU count of 5.53. At this corresponding MLU count in Littlefield’s study, the children’s distribution of use was identical with the adults: semi-lexical prepositions more than adverbs, which was more than functional prepositions, with particles showing very infrequent use. Let us look at these findings in the light of Hypothesis 2 where we claimed that [+Lexical] prepositions would show an advantage over the [-Lexical] prepositions. Since both semi-lexical prepositions and adverbs are [+Lexical] and functional prepositions and particles are [-Lexical], Hypothesis 2 was confirmed in the picture story task when proportion of use was looked at. However, this distributional difference we saw in Grade 4 seemed to even out in Grade 10. Therefore, the results did not confirm Hypothesis 3.

When accuracy of use was taken into consideration, the picture completely changed. Particles and adverbs were used with an average of 90% accuracy, followed by semi-lexical (61-76%) and functional prepositions (50-83%). This means that [-Functional] prepositions were more accurately used than [-Functional] prepositions, therefore making Hypothesis 2 irrelevant for accuracy of production. The accuracy levels were similar across grades, thus once again disproving Hypothesis 3 in the picture story task. In brief, what we have shown is that proportion of use and accuracy show asymmetrical results for Hypothesis 2.
All learners made more errors with semi-lexical prepositions than any other category (87-91%). This was understandable since the frequency of use in semi-lexical prepositions far outweighed other categories in all the grades. Particles were used in 0.3-4% cases across grades and the error rate was less than 5%. Adverbs which were used 15-26% across the four grades had errors less than 4% whereas functional prepositions which were used 3-10% had considerably more errors (4-9%). Therefore, looking at errors without taking into consideration the proportion of use would be problematic. From this analysis, it looks like [-Functional] prepositions (i.e. adverbs and particles) showed fewer errors than [+Functional] prepositions (semi-lexical and functional prepositions), which is what Littlefield (2006) only found.

Omission errors showed a clear decrease from Grade 4 to Grade 10 (30% to 7%). Meanwhile substitution errors increased from Grade 4 to Grade 10 (51% -65%). However, the increase was not as sharp as expected. Therefore, this data provided partial proof for Hypothesis 4. Omissions were more frequent for semi-lexical prepositions (28-6%) with compared to other categories which shows (0-5%). Here the functional prepositions showed (0-3%) omission errors. Therefore, our hypothesis that [+Functional] prepositions (semi-lexical and functional prepositions) are mostly omitted than [+Lexical] prepositions (adverbs and semi-lexicals): Hypothesis 5 stands questioned in the picture story task.

Only semi-lexical prepositions and functional prepositions showed noticeable substitution errors. Like in the dictation task, learners generally respected the category rule in their substitutions: semi-lexicals were substituted by semi-lexicals, supporting
Hypothesis 6. A few functional prepositions were substituted by semi-lexical prepositions, and vice versa.

6.3.1 Testing of hypotheses in the two tasks

Table 6.1 compares the status of the hypotheses on the two tasks with Littlefield (2006) study.

<table>
<thead>
<tr>
<th>Hypothesis 1</th>
<th>Dictation task</th>
<th>Picture Story Task</th>
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<td>✓</td>
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<td>✓</td>
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<th>Picture Story Task</th>
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<td>✓</td>
</tr>
<tr>
<td>Accuracy</td>
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<td>×</td>
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<th>Dictation task</th>
<th>Picture Story Task</th>
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</tr>
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<tbody>
<tr>
<td></td>
<td>✓</td>
<td>×</td>
<td>No data to prove or disprove the hypotheses (children aged 1:2 to 2:3)</td>
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<td>✓</td>
<td>No data</td>
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Table 6.1: Comparison of the findings on the hypotheses on two tasks and with Littlefield (2006)

Table 6.1 shows that Hypothesis 1 was proved in all the three studies. The results of the rest of the hypotheses differed on the basis of the method of data collection.
6.4 **Comparison of the two tasks**

(a) As discussed in Section 5.6, a comparison between the dictation task and the picture story task showed that initially learners found more difficult to imitate the four categories of prepositions than to produce them. However, with growing age/proficiency, the learners showed comparable performance in both tasks.

(b) As adverbs are purely lexical, they were more accurately imitated in the dictation task showing a ‘lexical’ bias initially. However, this bias disappeared with the growing age/proficiency. In the picture story task, this bias was seen when proportion of use was computed and not when accuracy was looked at.

(c) In the picture story task, adverb and particle accuracy were at ceiling though in the dictation task, particles showed the lowest accuracy.

(d) These findings show that acquisition patterns in tasks measuring production frequency, production accuracy, and imitation accuracy may be different. The nature of tasks therefore may have a significant effect on acquisition order of the prepositions.

Recall that on a processing task (Thomann 2013) which measured reaction time, had showed that [-Functional] categories were processed more quickly than [-Functional] categories, i.e. adverbs and particles were processed faster than semi-lexical prepositions and functional prepositions. In [+Functional] the preposition assigns case to the Noun it attaches with, and the preposition in this task was shown on a separate screen, and the Noun on an earlier screen. This could have complicated the processing of the preposition, thereby resulting in time latency in [+Functional] categories.
However, our production results were similar though the cognitive process involved in the task was quite different from Thomann's study. This suggests that the time differences in [-Functional] and [+Functional] processing may not be task-based but might be linguistic.

6.5 Implications

6.5.1 Learning functional prepositions in second language

In the dictation task [+Lexical] prepositions (adverbs, semi-lexical prepositions) were acquired earlier than [-Lexical] prepositions (particles, functional prepositions) in the second language. Here the [+Lexical] categories ranked higher than the [-Lexical] prepositions. In the production task [-Functional] prepositions (adverbs, particles) were acquired earlier than the [+Functional] prepositions (semi-lexical prepositions, functional prepositions). Here the [-Functional] categories ranked higher than the [+Functional] categories. Therefore, pure functional prepositions are the most difficult category to acquire, irrespective of the tasks learners are involved in.

6.5.2 Particles in second language learning

In the ESL contexts, accuracy of particle use depended on the task learners were involved in. Particles were more accurately produced in production than comprehension. In production, second language learners used the least number of particles with compared to other three categories of prepositions; however, particles were most accurately produced. Learners tend to use particles, only what they were
confident in using them, they did not experiment with particles whereas they did so with semi-lexical prepositions that showed a higher rate of errors.

6.5.3 Production/comprehension asymmetries in language acquisition

It is widely assumed that there is more or less perfect symmetry between a first language user's competence in production and his or her competence in comprehension i.e., a user is able to understand whatever he can produce, and he is able to produce whatever he can understand. This may or may not be true of second language though.

Common wisdom and research data makes us assume that comprehension precedes production. "How else can speakers know which words to use to convey a particular meaning? They must already have mapped the relevant meanings onto specific forms, and have these units represented in memory, to be accessed on subsequent occasions whenever they hear the relevant forms from others." (Clark 1993: 246). This assumption has been also imported in second language acquisition research, after Stephen Krashen’s (1981) work.

In our study we show that an inverse pattern—production precedes comprehension—is also possible. This pattern has been commonly observed in the acquisition of Principle B of Binding Theory (Bloom et al. 1994) where 2 years old could use reflexives and pronouns in natural speech, while 5-6 years old showed no mastery of the principle in comprehension experiments. Similar asymmetries have been found in prosody, syntactic attachment of prepositional phrases, and noun phrase interpretation.
The asymmetry between comprehension and production of prepositional categories in the study could have been caused by particular properties of the experimental tasks used. The dictation task was indirect and cross-modal, where learners had to listen to sentences and write them down. It was in some way an artificial situation, which could have caused learners to make errors that they would not make in a more natural situation. Therefore, it is conceivable that learner errors in the task were a product of the task demands that obscured the learners' actual knowledge of preposition categories.

6.5.4 Frequency/accuracy measure in tracking acquisition order

Researchers and practitioners (like speech clinicians) have felt to divide the process of language acquisition into different stages or phases so that the linguistic behavior of learners can be investigated to chart out the path of acquisition of a particular linguistic phenomenon or in order to characterize the language development of a child as 'normal', 'deviant' or 'delayed' with relation to the child's chronological age. To understand which structural item of a set is acquired earlier, researchers have used three measures: (a) age of emergence; (b) accuracy of use; and (c) frequency of use. However, the results we obtain from the three measures may or may not coincide.

In the present study, we find particles being used with extremely low frequency by ESL learners, but when they are used, they are used with high levels of accuracy. On the contrary, semi-lexical prepositions are used with highest frequency and also with least accuracy. What does this imply and how does one account for such differences. One of the reasons, as we have stated in 6.5.2, is that particles are lower in input
frequency. and therefore, learners have little exposure to particle use. However, the
categorical distinctions and their co-occurrence with nouns and adjectives have been
noted by learners, and therefore, when they use particles, they use them correctly. In
tracking acquisition order, both frequency and accuracy measures need to be taken
into account since reliance on one of these measures might skew the research findings
in one direction.

6.6 Main claims of the study

The main claims of the study were as follows:

(i) In the mental representation of second language learners, there exists a fine­
grained categorization of prepositions, supporting Littlefield's (2006)
thorization. Reflection of this representation of prepositions can be
empirically observed in imitation and production.

(ii) Initially, as in first language acquisition, in second language learning
prepositions that are with [+Lexical] features have an advantage in perception
tasks, i.e. they are detected in language input more easily than those which are
[-Lexical]. With growing proficiency other [-Lexical] and [+Functional] are
noticed in continuous speech. Those which are [-Lexical] as well as
 [+Functional] show significant delays.

(iii) However, in production, semi-lexical prepositions are most frequently used,
since they communicate lexical meaning and are required for the syntactic
use of prepositions which have specific semantic content but serve purely syntactic functional prepositions (i.e. [+Functional] prepositions are least used).

(iv) Since semi-lexicals convey meaning, which is dependent on the way a spatial scene is construed, errors are significantly more in these prepositions. [-Functional] categories (adverbs, particles) are produced with greater accuracy than [+Functional] categories (semi-lexical prepositions, functional prepositions) though they may not used frequently. This phenomenon shows no age effect.

(v) There is a difference in production and imitation results, and this difference narrows down with age or proficiency.

6.7 Suggestions for further research

The findings of the study suggest many possibilities for further research particularly in the field of language acquisition.

Examining the languages, having post positions and suffixes: If the fine-grained categorization for prepositions is universal, then it should be visible in languages that have postpositions and suffixes instead of prepositions, as well. For example, Sinhala has postpositions and suffixes, but it is worth researching whether these postpositions and prefixes can have a combination of lexical and functional features.
Cross-modal methodology: The present study can be repeated by using a cross-modal data collection method. Either the same tools of the present study or some other compatible forty sentences can be used in order to find out whether Littlefield’s (2006) fine grained approach is validated or not in the dictation task when the data collection method is changed.

Recall that we had not given marks when the spellings of the preposition were inaccurate in the study. In the dictation task, two marks were awarded for the complete accurate sentence and one mark was awarded for a sentence if the preposition was correctly spelt, irrespective of the inaccuracy of the grammar and spellings of the other parts of the sentence. In this suggested study on cross-modal methodology, ‘2’ marks will be awarded for a complete sentence, and ‘1’ mark will be awarded if the spellings of the preposition is inaccurate, but phonetically more or less equal to the target preposition. For example, *akros* instead of *across* was accepted. The accuracy of spellings and the grammar of the other parts of the sentence would be irrelevant here. By following this method, it can be investigated whether the fine-grained approach is validated when the method of data collection and the scoring are changed. The rest of the hypotheses of the present study also can be tested with the findings of this suggested study.

Processing Experiment -- Examining the response time: Recall the processing experiment on Littlefield’s fine grained approach, conducted by the Thomann (2013). The present study can be repeated by examining the response time using DMDX software (Forster and Forster 2003, etc.). Learners should be asked to push the button on the system, soon after they grasp the meaning of the sentence in order to find the
response time. Here the forty sentences used in the dictation task can be used, and the frequency of the responses for sentences of each category should be recorded separately (i.e. how many responses for adverbs and so on). Here again, we test all the hypotheses of the present study and see whether there are any changes in the results due to the change in the data collection methods.

Learners with language disorders: Aphasic second language learners of English either speakers of Sinhala or speakers of other languages can be used to examine whether they show an asymmetry in the use of [±Lexical] and [±Functional] categories of prepositions in English language.

The tools of the present study in dictation can be dictated for these aphasics and they can be asked to repeat them orally. If there is an asymmetry in the accuracy of use of each category of preposition, it would further validate Littlefield’s (2006) fine-grained categorization of prepositions.