A dynamic approach to the development of lexicon and syntax in a second language
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Chapter 3

The effects of the enhanced input on learning word associations and collocations

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3.1 Introduction

Vocabulary learning, from a usage-based perspective of second language acquisition, is largely dependent on a substantial amount of input, which provides the learner with more opportunities to encounter words. Hill and Laufer (2003) estimated that an L2 learner can enlarge their vocabulary size by 2000 words for every eight million words of text they read incidentally. However, the number of times a word needs to be encountered in order for it to be retained and recalled by the learner is dependent upon the learners’ English proficiency (Zahar, Cobb, & Spada, 2001). More advanced learners are more likely to acquire new words with fewer encounters whilst less advanced learners may need more encounters to acquire new words. Pellicer-Sanchez and Schmitt (2010) found that seeing a word ten times in different contexts during reading may facilitate recognition of the word the next time learners encounter it in the text. There is some consensus in the literature that about eight to ten encounters whilst reading are needed for learners to acquire receptive knowledge of words (Schmitt, 2008, p.348).

Pigada and Schmitt (2006) explored the acquisition of spelling, meaning, and grammatical characteristics after one-month of extensive reading and found that for about 65% of the target words, at least one of the assessed aspects of vocabulary knowledge was acquired, with a particular gain found for spelling. Al-Homoud and Schmitt (2009) also found similar results from extensive reading of graded readers, where learners increased their vocabulary at the 2000, 3000, and 5000 frequency levels. A study by Brown, Waring and Donkaewbua (2008) found that listening as a supplement to reading was superior to reading-only in acquiring vocabulary; however Al-Homoud (2007) found that listening to news reports for 12 minutes per day for seven days enabled learners to only gain about 5% (2/40) of the target words. Therefore, it could be argued that incidental input, in the form of extensive reading or listening, may have a significant effect on acquiring new words when two forms of input (reading and listening) take place together.

Implicit (incidental) input is less efficient for the acquisition and knowledge of word form and meaning of new words when compared to explicit (intentional) in-class input. Laufer (2005) showed that explicit vocabulary learning led to better retention of word meaning than implicit learning in both immediate and delayed tests. However, incidental input was more effective in enhancing knowledge of words that had already been learnt (Waring & Takaki, 2003). They found that reading graded readers does not always lead to acquisition of new words, but it is effective for developing partially-known vocabulary. In addition, incidental exposure may lead to the development of multiple types of vocabulary knowledge, as it provides “repeated exposures in different contexts” (Schmitt, 2008, p.348).

In addition to incidental in-class input, the effect of incidental input outside the classroom has been investigated in three studies. Xu (2010) studied the language attrition between Chinese and Dutch learners of English at university level and found that Chinese learners, receiving only a small amount of input outside the
structured setting, showed a decline in their vocabulary after their English instruction ceased, whilst Dutch learners, receiving a great amount of input outside the structured setting, managed to maintain their vocabulary. The effect of incidental input outside the classroom has also been explored in terms of English proficiency. De Bot et al (2004) studied the key factors of the English proficiency of 13 to 16 year-old Dutch learners of English. They found that in-class English learning had little effect, and that it was input outside the structured setting such as listening to pop music or watching movies that had a great effect on students’ English proficiency. Naber and Lowie (2012) also found similar results amongst eighth-grade Dutch learners of English. They found that students who had received early in-class English education did not have significantly higher proficiency results than those students who had not begun classes as early. The most predictive factor in determining English proficiency was, in fact, English exposure after school, such as conversations, computer games, and TV, which blurred the effect of the early start of English instruction.

To compare whether the enhanced input has an effect on language learning, we should compare two conditions: one condition with more enhanced input and one condition with less enhanced input. Previous studies have compared the effects of intensive versus less-intensive language instruction (course density), usually with indirect comparison. Two homogeneous groups are compared: one acting as control and the other as experimental (Fiks & Corbina, 1967; Mason, 1971; Solecki, 1971). However, there has been no direct comparison of the two conditions where one group of participants act as both the control group and the experimental group. When the comparison of the two conditions is done within the same group, the sequencing of the experimental treatment becomes another factor which may influence the results: the experimental condition may come before or after the control condition.

The studies mentioned above demonstrate that a large amount of incidental input from outside the classroom leads to higher language proficiency and that incidental in-class input is likely to enhance contextual knowledge. It has not been investigated whether incidental input has an effect on two types of contextual vocabulary knowledge: associations and collocations. In our study, we intend to investigate if enhanced input has an effect on learning associations and collocations and if the sequence of experimental treatments has an effect on learning associations and collocations.

This chapter begins with elucidating how the vocabulary learning processes- semantization and consolidation- could potentially be enhanced by natural exposure to input, followed by an evaluation of how these two learning processes may be involved in explicit and implicit in-class learning in the Taiwanese context. We argued that in-class explicit learning in Taiwan may not necessarily lead to the acquisition of contextual vocabulary knowledge and that natural exposure to input may enhance the vocabulary learning process, with a specific focus on the knowledge of associations and collocations. To assess the level of achievement of associations and collocations, we made a distinction between receptive and productive
knowledge. We evaluated the effects of enhanced input on contextual vocabulary knowledge in two aspects with two levels: receptive collocation, productive collocation, receptive association, and productive association. Over a period of eight months, two homogeneous groups of beginner learners of English received input in two inverse conditions: group A was exposed to extra enhanced input in the first four months (high input condition) and received no extra enhanced input in the last four months (low input condition) whilst group B was exposed to no extra enhanced input in the first four months and was given extra enhanced input in the last four months. Each group acted as its own control group. We compared the results with tests at three moments in time to see to what extent the learners acquired the four types of vocabulary knowledge, both with and without extra English input and whether the sequence of experimental treatment influenced the acquisition of four types of vocabulary knowledge.

3.2 Theoretical Background

3.2.1 The process of vocabulary acquisition

When it comes to vocabulary learning, two major processes are involved: semantization and consolidation (Beheydt, 1987). In the process of semantization, learners notice the gap between their knowledge and the English input and make efforts to make sense of the word. They try to deduce the meaning of the word and the part of the speech within the context, link the word form and the word meaning, and incorporate the word meaning to their existing semantic network. In terms of the mental lexicon, learners temporarily create a new lemma, attach meaning to the lemma, and include the new lemma and the meaning in the semantic network (de Groot, 1993). The more efficiently the words are incorporated into the semantic network, the more effective the process of semantization will be.

However, during the process of semantization, new words cannot be retained for long. The new words should be retrieved several times before they can be learned. In order to embed the new words in long-term memory, elaborate retrieval paths must be set up. This is achieved through repetition of the target words, sample sentences of the words, images of the words, and encountering words in different contexts. Learners consolidate the words by guessing the word meaning while reading, by intentionally practicing the words frequently, by incidentally being exposed to the words more often in different contexts, and by associating the words with images or some sample sentences. Hulstijn (2000) and Hulstijn and Laufer (2001) argued that learners who processed the words more elaborately would have higher retention rates than those who processed the words less elaborately, and that learners who processed the words with higher levels of involvement with their input would have better retention than those who processed the words with lower levels of involvement with their input. At the consolidation stage, learners are
more likely to retain the words in their mental lexicon when they process and associate the words with various retrieval paths.

Semantization and consolidation take place through both explicit and implicit learning. During the process of semantization, students notice the gap in their understanding in both explicit and implicit learning; however, explicit learning provides a stronger link between the word form and word meaning than implicit learning as learners may not attempt to fill in the gap, or they may incorrectly guess the word meaning in implicit learning. During the process of consolidation, a rich linguistic environment from the incidental learning enables the learners to encounter the words more frequently in different contexts with varied English input, which can only be achieved by very intensive explicit learning. It seems that explicit learning can more efficiently link the word form and word meaning in the process of semantization than implicit learning (as suggested by Laufer (2005)), but implicit learning can provide more varied retrieval paths in the process of consolidation than explicit learning (as suggested by Schmitt (2008)).

However, the generally explicit learning method in Taiwan may not help the students in the process of semantization as much as could be expected, as there is no time allowance in the Taiwanese classrooms for the essential step of deducing the meaning of the new vocabulary. In this setting, students are provided with short readers and an adjacent word list with an accompanying Chinese (L1) translation. The (explicit) teaching methodology centers around basic translation between L1 and L2. In addition, explicit learning in Taiwan has little to do with the process of consolidation, as students encounter the words in only one kind of context due to the limited number of readers in the text book (12 readers per six month period). For example, students only see “present” in one reader in the meaning of “now.” They do not know the use of “at present” and have no exposure to other meanings of “present” such as “gift.”

Therefore, we could argue that explicit learning in Taiwan does not optimally engage learners in the process of obtaining word meanings in different English contexts. Students only associate the words with the L1, making it impossible for them to generate their conceptual representations in English; their understanding of word meaning is only in the form of L1-L2 translation. This L1-L2 link between word meanings does not help students to gain the depth of vocabulary knowledge which is needed for sophisticated use of the language. Students do not know how to use the words in context or how to associate the word with other words. Even if students know how to use the word, their knowledge is most often restricted to a singular context.

Due to the lack of vocabulary processing in the explicit learning environment and the scarcity of implicit learning taking place in classrooms in the Taiwanese context, enhanced input (naturally exposing learners to English input) may take over the role of enhancing the process of vocabulary learning, semantization and consolidation, with larger quantities of input as well as a higher quality of input. It is generally difficult to obtain contextual knowledge such as collocations in the
Taiwanese English classrooms because it is important to have learners read or hear new vocabulary in all types of different contexts in order to learn contextual knowledge. Enhanced input offers a lot of opportunities for repetition of new words in different contexts; learners encounter the lexical items from various meaning-based input sources, which potentially contribute to better contextual vocabulary knowledge.

3.2.2 Vocabulary knowledge

Knowledge of a word conflates a number of different dimensions of vocabulary knowledge. The first of these dimensions is the level of vocabulary knowledge—receptive and productive vocabulary knowledge. Receptive vocabulary knowledge refers to the ability to comprehend or to read the language, that is, the ability to receptively recognize. Productive vocabulary knowledge refers to the capacity of producing word knowledge in forms of speaking or writing.

Several studies found a significant gap between receptive and productive vocabulary knowledge. Laufer and Paribakht (1998) tested learners of English in 11th grade in Israel on passive vocabulary size (matching words based on word meaning), controlled active vocabulary (producing words based on a sample sentence), and free active vocabulary (composing a 300-400 word writing piece). They found that the gain of all three levels of vocabulary knowledge over one academic year indicated the existence of a gap between them. Students significantly gained in their passive vocabulary size and controlled active vocabulary; however the increase of the passive vocabulary size was larger than the controlled active vocabulary. Moreover, a gain in free active vocabulary was not found. This implied an even larger gap between the free active vocabulary and the other two types of vocabulary knowledge. Laufer et al (2004) then explored receptive and productive knowledge at four levels where a more organized structure of vocabulary knowledge was displayed: passive recall, active recall, passive recognition, and active recognition. The gap between passive and active was found again: productive knowledge was found to require more efforts to learn than receptive knowledge as learners should not only maximize the chances of encountering the same lexical items but also elaborate the contexts where these lexical items are accommodated. Caspi and Lowie (2013) investigated four levels of vocabulary knowledge (following Laufer’s study in 2004) in multiple case studies over 36 weeks. They found confirmation of the gap between receptive and productive vocabulary knowledge as a result of the complex interactions between the different levels of vocabulary knowledge.

Studies on the existence of the gap between receptive and productive knowledge also provide information on the necessity of distinguishing of different types of vocabulary knowledge in order to understand to what extent learners comprehend new vocabulary. For instance, passive recall and passive recognition are both aspects of receptive vocabulary knowledge; however, passive recall focuses on retrieving word meaning given the word form whilst passive recognition focuses on
retrieving word form given the word meaning.

Different types of vocabulary knowledge—word form, word meaning, and word use—were suggested by Nation (2001, p.27) in Table 3.1. These three aspects of vocabulary knowledge enable us to investigate how well learners comprehend the words. For example, the word form may be produced correctly while the link between the word form and the meaning is missing. The word meaning may be recognized correctly while the word use may not be right: learners may use the word grammatically or semantically incorrectly. The word use may be precise while the word form is not accurate, i.e. learners may use the word in the right context but spell the word incorrectly. Our study focuses on two types of contextual vocabulary knowledge, one from the category of word meaning and one from the category of word use, at two levels: receptive and productive knowledge. For word meaning, we looked at word associations: how well learners are able to distinguish word meanings among synonyms. For word use, we looked at word collocations: how well learners are able to use words which conventionally occur together, namely, word collocations. In the next section, we will explain the categorization of the knowledge of associations and collocations and discuss some of the studies regarding the acquisition of these two types of knowledge.
<table>
<thead>
<tr>
<th>Word knowledge</th>
<th>Abstract Concepts</th>
<th>Concrete Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word Form</td>
<td>Spoken</td>
<td>Learners should be able to recognize the “spoken form” when hearing the word or say the “spoken form.”</td>
</tr>
<tr>
<td></td>
<td>Written</td>
<td>Learners should be able to recognize the “written form” when reading the word or spell the “written form” when writing.</td>
</tr>
<tr>
<td>Word Part</td>
<td></td>
<td>Learners should be able to recognize “what parts” the word is made of and associate “word parts” with word meaning or construct the word with the right “word parts.”</td>
</tr>
<tr>
<td>Word meaning</td>
<td>Form and Meaning</td>
<td>Learners should know the meaning of the word or be able to produce the word to express the meaning.</td>
</tr>
<tr>
<td></td>
<td>Concept and Referents</td>
<td>Learners should know the meaning of the word when it is used in different contexts or produce the word in different contexts.</td>
</tr>
<tr>
<td></td>
<td>Associations</td>
<td>Learners should know the related words of the target words or produce the synonym or the antonym of the target words.</td>
</tr>
<tr>
<td>Word Use</td>
<td>Grammatical Functions</td>
<td>Learners should be able to recognize whether the word is used correctly or use the word in the sentence that the learners originally learned.</td>
</tr>
<tr>
<td></td>
<td>Collocations</td>
<td>Learners should know the collocated words of the target word or use the collocated words or the target word in the writing.</td>
</tr>
<tr>
<td></td>
<td>Constraints on use</td>
<td>Learners should know the property of the word or use the word in the most suitable situation.</td>
</tr>
</tbody>
</table>

Table 3.1: Different aspects of vocabulary knowledge (Nation, 2001, p.27)
3.2.3 Word associations

Fitzpatrick and Izura (2011, p.384) categorized six types of word associations (Table 3.2): the associations between form and meaning (newsagent and newspaper), associations between meaning and collocations (brother and sister), collocations (goose and bump), associations between forms (assess and asset), associations between words of equivalent meaning such as synonyms (sofa and couch), and associations between associated words of non-equivalent meaning (celebrate and party).

Schmitt and Meara (1997) investigated 95 secondary and post-secondary Japanese English learners and assessed them at the beginning and the end of the semester on their acquisition of receptive and productive verb associations. When further analyzing the results in the productive associations, they found that among the words these participants knew the meaning of, only fifty percent were being correctly connected to their verb associations. They argued that one possible reason why there was so little gain in verb associations was that these learners only knew the translated meaning in their L1 of the words, which prevented the mastering

<table>
<thead>
<tr>
<th>Category Name</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form and Meaning</td>
<td>Associative responses related to the cue word in both their form and general meaning.</td>
<td>newsagent&amp;newspaper</td>
</tr>
<tr>
<td>Meaning and Collocations</td>
<td>Associative responses related to the cue word in both general meaning and in their tendency to co-occur in the language.</td>
<td>rubbish&amp;bin</td>
</tr>
<tr>
<td>Collocation</td>
<td>Associative responses whose only relation to the cue word is their tendency to co-occur in language</td>
<td>batman,goose bump</td>
</tr>
<tr>
<td>Form</td>
<td>Associative responses related to the cue word only in their form.</td>
<td>mustard&amp;mustang</td>
</tr>
<tr>
<td>Equivalent meaning</td>
<td>Associative responses whose meaning is equivalent to the cue word</td>
<td>sofa&amp;couch</td>
</tr>
<tr>
<td>Non-equivalent meaning</td>
<td>Associative responses whose meaning is related but not equivalent to the cue word.</td>
<td>party&amp;celebrate</td>
</tr>
</tbody>
</table>

Table 3.2: Categories of associations (Fitzpatrick and Izura, 2011, p.384)
of knowledge of associations.

### 3.2.4 Word collocations

The definition of collocations in Fitzpatrick and Izura’s association framework focuses on the tendency of the collocations related to the cue word in meaning to co-occur. We applied a more complete classification of collocations, suggested by Granger and Paquot (2008, 43-44), to refine the definitions. Classifications of the collocations are assigned to one of the three major categories: referential phrasemes, textual phrasemes, and communicative phrasemes. Referential phrasemes refer to objects, phenomenon, or real-life facts (heavy rain, sort out). Textual phrasemes are used to structure the content (as soon as). Communicative phrasemes are used to express feelings (how are you doing?).

There are different types of referential phrasemes: compounds, lexical collocations, grammatical collocations, and phrasal verbs. Compounds are combinations of words where each of the constituent parts of the compound can stand on its own but carry one meaning as a whole collocation (birthday calendar). Lexical collocations are usage-based relations between two lexemes (heavy rain). The second word (rain) is semantically dependent on the base word (heavy), while both words each have their semantic contribution to the combination (heavy rain). Grammatical collocations (cope with) are combinations of a lexical word (cope) and a grammatical word (with). Phrasal verbs (blow up, make out) are combinations of a verb (blow) and an adverb (up).

Durrant & Schmitt (2010) tested 84 proficient English learners in the UK on their retention of collocations based on different training conditions: (1) single exposure, 40 sentences for 40 target collocations shown once, (2) verbatim repetition, 40 sentences for 40 target collocations shown twice, and (3) varied repetition, 80 sentences for 40 target collocations shown once. Both verbatim repetition and varied repetition demonstrated better retention performances than single exposure; and verbatim repetition showed slightly better retention performances than varied repetition. We could argue that the acquisition of collocations could be enhanced by the number of repetitions (exposure) and by the various retrieval paths.

Fitzpatrick and Izura (2011) tested 24 Spanish learners of English on their productive response time of associations and collocations in L2. They found that learners responded significantly faster on collocations than on associations (non-equivalent meaning). This study seems to show that L2 learners cognitively take more time to process associations than collocations.
3.2.5 The effect of course density

There is little research on the impact of course density (degree of input provided, for instance, intensive vs. less intensive input) on development, and most of the research is dated and does not conform to present day standards. Fiks and Corbino (1967) looked at the relation between course density, course duration, and vocabulary size. The data consisted of interviews with staff members from nine schools. Therefore, no hard data on either vocabulary size or course density is available. Solecki (1971) reports on the set-up of a very intensive course of Russian which leads to good learning results, but no control group was included in the research, so the specific impact of course density could not be shown. Mason (1971) compared groups of EFL students in an experimental intensive course with a control group taking regular classes. No differences between the experimental and control groups were found, but numbers of participants were low (15 in the experimental group, 9 in the control group). He concluded that “intensive EFL work may be a waste of time” (p.179).

Oxford & Ehrman (1995) studied the use of language learning strategies in intensive adult learning language courses in the US Defense Language Institute. Since there was no comparison with strategy use in similar learners in non-intensive courses, there was no way to assess the specificity of strategy use for the intensive learners. Weissberg & Stuve (1979) showed that not all learners profited equally from intensive language instruction. In their project, the students who started with more advanced levels of proficiency gained less than the students with less advanced proficiency.

It turns out that there are very few studies that make a direct comparison between intensive and less intensive language courses by using the same group of participants in both intensive and less intensive conditions. In our study, same students went through an intensive and a less intensive stage with half of the group starting with the intensive part and the other half starting with the less intensive part. No clear conclusions can be drawn on the basis of the literature with respect to the effectiveness of intensive versus less intensive courses. However, as Oxford and Ehrman (1995) points out, course density is only one of many variables that may impact on success in language learning.

3.2.6 The aims of the current study

Enhanced input could potentially address one of the problems of in-class English learning in the Taiwanese context- namely, the quantity of input and the quality of processing vocabulary learning. Firstly, the frequency of encountering the same lexical item is increased, thus quantity of input is enlarged. Secondly, the possibility of encountering the same lexical item in different contexts (various consolidation paths) is increased; these different contexts make learners construct the conceptual representation of the word meaning in L2 instead of L1 translation, and
they shape the network of associations in L2. These two factors in turn facilitate the acquisition of associations and collocations through natural exposure to input. In our study, we investigate whether enhanced input influences the learning of associations and collocations. Through the direct comparison of high and low input conditions within the same learners, we also investigate whether the sequence of input conditions influences the learning of associations and collocations.

Additionally, to productively use the words takes more effort than to receptively recognize the use of the words (the receptive-productive gap) (Laufer & Paribakht, 1998). We assume that the receptive knowledge is more advanced than the productive knowledge in both collocations and associations.

Finally, L2 learners showed longer response times when responding to associations than to collocations (Fitzpatrick & Izura, 2011). We therefore assume that the knowledge of associations is less advanced than the knowledge of collocations.

Our study intends to investigate the following questions:
1. Does the input condition (high and low) affect the number of associations and collocations beginner learners of English in the Taiwanese context are able to learn?
2. Does the sequence of input conditions (high to low vs. low to high) affect the number of associations and collocations beginner learners of English in the Taiwanese context are able to learn?
3. For beginner learners of English in the Taiwanese context, is receptive knowledge more advanced than productive knowledge?
4. For beginner learners of English in the Taiwanese context, is knowledge of associations less advanced than knowledge of collocations?

3.3 Method

3.3.1 Design

Two groups (A and B) received the inverse sequence of input conditions (high to low or low to high input conditions) over eight months and acted as their own control groups. In both input conditions, the two groups received in-class English lessons as usual. As demonstrated in Figure 3.1, Group A had one extra five-hour input session per week from movies and reading together in the first four months, but did not receive any extra input in the second four months. In contrast, Group B had an inverse condition: no additional input in the first four months but with extra five-hour input sessions in the second four months. The two groups were tested three times. Test 1 of group A and test 2 of group B were defined as the first measurement of high input (H1); test 2 of group A and test 3 of group B were defined as the second measurement of high input (H2). Test 2 of group A
and test 1 of group B were defined as the first measurement of low input (L1); test 3 of group A and test 2 of group B were defined as the second measurement of low input (L2). The time between each assessment was approximately four months. The two groups were asked to fill in the questionnaire regarding their input exposure outside the classroom three times: in October 2011, before the experiment began, in February 2012, four months after the experiment, and in June 2012, eight months after the experiment.

![Figure 3.1: Research Design of groups A and B in low and high input with three tests (T1, T2, and T3) and measurements (H1, H2, L1, and L2)](image)

### 3.3.2 Participants

60 beginner learners of English, aged from 14 to 15, participated in the study. There were 30 students for each group. Two groups were evaluated based on their mid-term exams and were found to be homogenous in terms of their English proficiency at school. All of them had learned English at the same junior high school for one year: they were supposed to know 1000 English words by the time the experiment began, but their ability to speak or write in English was extremely limited. Based on the questionnaire, these participants had been limitedly exposed to English-speaking contexts (1 to 1.5 hours per week), movies or reading in their daily life. They merely received eight-hour English classes per week as their exposure to English. Seven participants in each group were excluded from our study, as their contributions to the experiment were not valid (not paying attention to either the input or the tests). Therefore, only the contributions of 23 students in each group were included in the analysis.

### 3.3.3 Sources of input outside the classroom

Previous research on incidental learning has shown that the combination of reading and listening input is superior to reading-only input (Brown, Waring, & Donkaew-
bua, 2008). Our participants received 5-hour extra input sessions in two forms: graded readers and movies. The graded readers were from the book “Speed Reading: A course for learners of English” (Quinn & Nation, 2007). This reader was written for English foreign learners who have a vocabulary size of approximately 1000 words. Each reading consisted of 550 words with ten comprehension questions. Movies selected by the participants were all American animated movies such as Mega Mind and Toy Story 3 (see Appendix A).

3.3.4 Experiment procedure

Participants were told that they were in a program aimed at promoting their English proficiency and that their attitudes towards involvement in the program would be counted as a part of their overall English grade (5%). They filled in the online questionnaire three times in class before each assessment. In the low input condition, the two groups only received eight hours of English classes per week, with most of the instructions in Chinese. There was very little chance for these learners to actively make use of resources outside the classroom based on the questionnaire. It was found that on average less than 1.5 hours of English input was experienced when not in class. In the high input condition, two groups received a graded reader and watched movies in as natural a fashion as possible. No intentional teaching instructions and no note-taking were involved; the students were invited to watch the movies just for pleasure. They read one to two graded readers per week under the supervision of their English instructor after class (16:00-17:00). They read the graded readers with no time limit (on average, they finished each reader in 45 minutes), answered ten comprehension questions about the reader as part of the text input, and were not given the answers to these questions in order to eliminate any task-related pressure. They watched two to three movies per week with Chinese subtitles during lunchtime almost every day and were asked to write two sentences in English about the movie to ensure their focus on the content of the movie.

3.3.5 Assessment of collocations and associations

In each assessment, there were forty items. The word meanings of the forty items were not known to the participants before the experiment began as these words did not appear in their only English source, the English text book from which they were taught. Many of the word meanings of these 120 items were explicitly taught by the English teacher during the experiment with a translation vocabulary list. The forty items in each assessment consisted of 10 receptive collocation questions, 10 productive collocation questions, 10 receptive association questions, and 10 productive association questions. Among the 10 items in each of these categories, four words were from frequency band 1 to 1000, another four words were from frequency band 1001 to 2000, and two words were from frequency band 2001 to
3000 (based on the corpus of contemporary American English (COCA)). We chose COCA as our target corpus database because it is a frequently updated corpus based on American English, especially from the media; and the English input our participants was exposed to was mainly American English via the media.

The assessments of the word associations evaluated the ability to associate words of equivalent meaning and to associate the associated words of non-equivalent meaning. For receptive associations, learners were required to choose the word that had a different meaning from three other words, and write down the Chinese meaning of the assigned word randomly selected from the four options to avoid guessing; for productive associations, learners were required to produce one synonym of the target word given the part of the speech.

The assessment of collocations examined the learners’ capacity to choose and produce the four major lexicon-related categories of referential phrasemes: compounds (high-speed train), lexical collocations (heavy rain), grammatical collocations (good for), and phrasal verbs (blow up) as they frequently occur in the movies and the reader. For receptive collocations, learners were required to choose the collocated words from four multiple choice items. As the receptive assessments only require learners to choose instead of producing the answer, we asked the learners to write down the translation of the meaning of the collocations in Chinese to avoid guessing; for productive collocations, learners were required to produce the prepositions of the grammatical collocations and the phrasal verbs, a task which was deemed appropriate in difficulty considering the low level of English proficiency of the students. Words which may have been beyond the learners’ vocabulary knowledge had the Chinese meaning included in the sentence. Only when the translation and the answer were correct could that item be calculated as one correct item in the receptive tests of associations and collocations. Below are some examples of questions of receptive associations, productive associations, receptive collocations, and productive collocations. Full version of three assessments can be found in Appendix B.

One example of receptive associations:
Please choose the word which has a different meaning from the rest.
(1) fear
(2) certain
(3) sure
(4) clear
Write down the Chinese meaning of "clear."

One example of productive associations:
Please write the Chinese meaning of the word and one synonym of the word.
(1) To start

One example of receptive collocations: The Olympic games (奧運)
place in Beijing in 2008. They will be held in London in 2012.

(1) held
(2) made
(3) found
(4) took

One example of productive collocations:
She got the first prize in the first exam. She was so proud ______ (preposition) herself.

The difficulty of the tests was evaluated before the start of the experiment: forty students, who studied in the same grade and in the same junior high school as our participants, completed the three assessments in a week. We carried out a Kruskal test (non-parametric test) on four subparts of vocabulary knowledge in three assessments. It was found that each assessment had equal level of difficulty (mean of Test 1 is 11.2, mean of Test 2 is 8.1, mean of Test 3 is 8.9), as the scores on all three assessments were not significantly different.

3.3.6 Analysis procedure

Due to the complexity of the research design, we first defined each test at three time periods with all features and display in Figure 3.1 together with the experiment design as described in 3.3.1. In addition, the knowledge level (receptive and productive) and the knowledge type (associations and collocations) were also defined. The two groups represent two different sequences of input conditions: group A was exposed to a period of high enhanced input first, and then was exposed to low enhanced input. Group B was exposed to these conditions in the reverse order.

3.4 Results

We carried out a MANOVA with the following independent variables: input condition (high and low input conditions), sequence of input conditions (from high to low or from low to high input conditions), knowledge level (receptive and productive), knowledge type (collocations and associations), and time of measurement (measurement timing 1 and measurement timing 2). In Figure 3.2, we plotted the mean of each test at all three time periods for both groups; in Table 3.3, we displayed the mean and the standard deviation of each test. In the beginning of the experiment (test 1), the two groups did not show any significant differences in the four types of vocabulary knowledge ($F(1, 44) = 1.608, p=0.211$).
Figure 3.2: Developments of four dimensions of vocabulary knowledge in three tests in two groups (T1, T2, and T3).

Table 3.3: Mean score of four types of vocabulary knowledge of group A and B at three timings.

<table>
<thead>
<tr>
<th></th>
<th>A-test1</th>
<th>A-test2</th>
<th>A-test3</th>
<th>B-test1</th>
<th>B-test2</th>
<th>B-test3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receptive</td>
<td>Mean</td>
<td>1.87</td>
<td>2.26</td>
<td>2.30</td>
<td>2.65</td>
<td>2.83</td>
</tr>
<tr>
<td>Collocations</td>
<td>SD</td>
<td>2.30</td>
<td>2.47</td>
<td>2.25</td>
<td>3.23</td>
<td>2.82</td>
</tr>
<tr>
<td>Productive</td>
<td>Mean</td>
<td>1.09</td>
<td>0.78</td>
<td>2.04</td>
<td>1.35</td>
<td>1.66</td>
</tr>
<tr>
<td>Collocations</td>
<td>SD</td>
<td>1.86</td>
<td>1.20</td>
<td>1.99</td>
<td>2.01</td>
<td>1.99</td>
</tr>
<tr>
<td>Receptive</td>
<td>Mean</td>
<td>2.65</td>
<td>1.52</td>
<td>2.74</td>
<td>2.09</td>
<td>1.74</td>
</tr>
<tr>
<td>Associations</td>
<td>SD</td>
<td>2.08</td>
<td>1.47</td>
<td>2.01</td>
<td>2.47</td>
<td>1.57</td>
</tr>
<tr>
<td>Productive</td>
<td>Mean</td>
<td>1.00</td>
<td>1.13</td>
<td>1.78</td>
<td>1.43</td>
<td>1.39</td>
</tr>
<tr>
<td>Associations</td>
<td>SD</td>
<td>2.07</td>
<td>1.46</td>
<td>1.70</td>
<td>2.21</td>
<td>1.37</td>
</tr>
</tbody>
</table>

The interaction between time of measurement and input condition was not significant (F (0.409, 1) = 0.991, p=0.526). High and low input conditions did not show any difference in all word knowledge types, knowledge levels, and time of measurements. The interaction between input condition and sequence of input conditions (the difference between the two groups) turned out to be significant (F (20.13, 1) = 0.69, p < 0.01): group B showed an increase between low and high input conditions whilst group A showed a decrease (Figure 3.3). The two groups showed opposite patterns of development. The main effect of knowledge
level (receptive and productive) turned out to be significant (F (0.581, 1) = 31.77, p < 0.001), but the main effect of knowledge type (collocations and associations) was not significant (F (0.981, 1) = 0.86, p=0.358). The receptive and the productive knowledge showed a difference in all knowledge types, input conditions, and time of measurement. The knowledge of collocations and the knowledge of associations did not show any difference in all knowledge levels, input conditions, and time of measurement.

To further comprehend how the enhanced input influenced the learning of collocations and associations we looked into the frequency of encountering the same collocations and associations, which were answered correctly by at least 33 participants out of 46 (70% of the participants). We counted the number of occurrences of two lexical items of collocations: “interested in” as the receptive collocation and “no longer” as the productive collocation. “Interested in” appeared in the reading texts 17 times and 6 times in the movies. “No longer” appeared in the reading texts 5 times and 24 times in the movies. We also counted the number of occurrences of two lexical items of associations: “little and small” as the receptive association, and “start and begin” as the productive association. “Little” and “Small” appear in the reading texts 8 and 18 times but 212 times and 161 times in the movie. “Start” and “Begin” appear in the reading texts 25 and 9 times, but 320 times and 291 times in the movies.

The first question addressed in this study is whether the input condition has an effect on the learning of collocations and associations for beginner learners of English in the Taiwanese context, regardless of the groups. The interaction between time of measurement (learning gain from the first to the second measurement) and input condition turned out to be not significant. The input condition, high or low, therefore had no effect on the learning of collocations and associations.

The second question addressed in this study is whether the sequence of input conditions has an effect on the learning of collocations and associations for beginner
learners of English in Taiwanese context. The interaction between input condition and sequence of input conditions turned out to be significant. Group A showed an increase in the low input condition and a decrease in the high input condition whilst Group B showed no increase in the low input condition but had an increase in the high input condition (Figure 3.3). The two groups therefore demonstrated opposite patterns of development. The sequence of input, from low to high input (Group B) or from high to low input (Group A), can be seen to have had an effect on the learning of collocations and associations. Therefore, what seems to be more influential on these beginner learners of English is the sequence of input given rather than whether they are in a high or low input condition.

The third research question asked whether the receptive knowledge was more advanced than the productive knowledge. The analyses showed that there was a significant difference between the two knowledge levels, receptive and productive knowledge in all knowledge types, input conditions, and times of measurement. Receptive knowledge was more advanced than productive knowledge. Therefore, the beginner learners of English showed more mastery of receptive knowledge than productive knowledge.

The fourth research question intended to investigate whether beginner learners of English learned more collocations or associations. The analyses showed that there was no significant difference between the two knowledge types, collocations and associations (F (0.981, 1) = 0.864, p=0.358) in all knowledge levels, input conditions, and time of measurements. These beginner learners of English did not perform differently in collocations and associations. Therefore, regardless of whether learners were in high or in low input periods, their receptive knowledge was generally more advanced than their productive knowledge, and their knowledge of collocations was equal to their knowledge of associations.

3.5 Discussion

Natural exposure to English input using a combination of readings and movies appeared to enhance the acquisition of two types of contextual vocabulary knowledge: associations and collocations. However, this only takes place when the high input condition is presented after the low input condition. It should be noted that natural exposure to English input did not change the nature of the difficulty of receptive and productive knowledge, where the receptive knowledge of associations and collocations was found to be significantly larger than the productive knowledge of associations and collocations.

Natural exposure to English input can be expected to enhance the acquisition of associations and collocations, as the frequency at which learners encounter the same lexical item is increased (Durrant & Schmitt, 2010). The frequency of occurrence of these lexical items in our assessments as shown in the qualitative investigation
of the distribution of collocations and associations largely exceeded the required numbers (8-10) of encountering the words in order to acquire the word meaning (Zahar, Cobb, & Spada, 2001), and therefore these frequency levels subsequently can be seen to have led to the acquisition of contextual vocabulary knowledge among beginner learners.

However, we found striking differences in the frequency of encountering the same lexical items in associations and collocations: the number of occurrences of collocations was much smaller than the number of occurrences of associations, but the acquisition of associations was equally difficult as to the acquisition of collocations, as shown in the results where there was no significant difference between the two. A reason for this could be that the collocated words generally appear as a unit (at a visually noticeable distance) whilst the associated words are merely randomly distributed throughout the input (not necessarily at a visually noticeable distance). To acquire knowledge of the associations, the number of occurrences alone does not seem to be very effective- unless these occurrences do appear within a sentence or at least within a noticeable reading/hearing distance.

Explicit in-class input is more effective than incidental in-class input in that it effectively links the word form and word meaning. Incidental in-class input has been shown to be more effective than explicit in-class input in that it enhances partially-comprehended vocabulary knowledge, especially contextual vocabulary knowledge, through encountering the same lexical item in different contexts (Schmitt, 2008; Waring & Takaki, 2003). Group B first only had in-class English lessons with explicit learning, where the link between form and meaning was strengthened and then received natural exposure to English input, the order of which (low input to high input) seemed to benefit group B more than group A, who received inverse treatments. If the link between word form and word meaning was established and enhanced previously through the in-class English input, the word collocations and associations could be learned more easily. Previous knowledge of word form and word meaning enhanced the acquisition of associations and collocations.

To facilitate the acquisition of full vocabulary knowledge, it seems that the timing of providing a certain type of vocabulary knowledge is vital. For instance, at the beginning, there is a need to provide the knowledge essential for establishing the link between word form and word meaning; at later moments, there is a need to provide the knowledge for constructing the contextual vocabulary knowledge. This may result from the fact that some types of vocabulary knowledge seem to be mastered sooner than others. Schmitt and Meara’s study (1997) showed that their participants knew the meaning of the words, and only fifty percent of these words were successfully associated with other words. This implies that different types of vocabulary knowledge may be learned to different degrees during the acquisition of a word, and thus different types of vocabulary knowledge should be provided at different times. Therefore, group A, who did not consolidate their knowledge of word form and meaning in class in the first four months, showed a decrease in the high input condition. Probably due to a delayed effect of input, Group A showed an increase in the low input condition, which took place after the high
input condition.

Schmitt and Meara (1997) have pointed out that linking L2 words to L1 translation does not help with the formation of word associations. In our study, we found that through the explicit in-class teaching of word form and word meaning, together with natural exposure to English input, (which stimulated the development of conceptual representations of word meaning in their L2 instead of L1), the association of words did indeed take place. It is therefore advisable that when teaching words explicitly, instructors should not only focus on the L1-L2 translation vocabulary list but also emphasize the importance of learning the word meaning in context, which can be easily achieved through natural exposure to English input.

The acquisition of the collocations and associations showed no significant difference, and there was little evidence that one type of word knowledge was more advanced than the other. In Fitzpatrick and Izura’s (2011) study, Spanish learners of English productively responded to the collocations faster than to the associations. Their data suggests that the acquisition of collocations is less difficult than the acquisition of associations as there was less response time required for the collocations. However, we did not find a difference in the gains of collocations and associations. One possible reason may be that Fitzpatrick and Izura’s study used reaction times as a measure, whilst our study tested the ability to use collocations and associations, operationalized as receptive or productive output in written form. The response time only required processing of the word-level recognition in isolation whilst the receptive or productive outputs of collocations and associations required processing of the word-level recognition not only in isolation but also in context.

The increase of the knowledge of collocations and associations in our learners’ data is small. The change between the means in the two input conditions is no more than two out of ten lexical items. One possible reason is that extra five-hour input sessions are not sufficient for the facilitation of large leaps in development. Beginner learners of English, who have not established a strong link between form and meaning, may need even more exposure to acquire associations and collocations. Another possible reason is the quality of input. Our participants received the English input mostly receptively, watching movies and producing one sentence about the movie or reading the articles and answering some comprehension questions. There is a need for learners to experience a deeper level of word-processing than merely receiving the input. As argued by Hulstijn and Laufer (2001), the more the learners are involved in their input, the more likely they are to acquire the vocabulary. Apart from passively receiving input outside the classroom, the use of English in written and spoken form should also be promoted. For instance, learners can try posting their news on Facebook in English as a productive example of incidental learning.
3.6 Conclusions

Our results did not support the hypothesis that with enhanced input (natural exposure to English input), beginner learners of English in Taiwan demonstrate more learning of contextual vocabulary knowledge than without enhanced input. However, the results did support the hypothesis that the knowledge of linking word form and word meaning would support the acquisition of contextual vocabulary knowledge. Based on these observations, we advise that language instructors should begin with teaching the link between word form and word meaning explicitly, prior to providing any incidental input. With the previously consolidated link between word form and meaning, learners can more effectively develop contextual vocabulary knowledge in the latter learning stages.

The gain of collocations and associations seems small. Five-hour enhanced input per week has little effect on the acquisition of contextual vocabulary knowledge. We speculate that it is due to limited exposure of input, limited involvement of the lexical items, and limited English capacity of these beginner learners. A potential avenue for a future study could be to explore the number of extra hours per week for each level (beginning, intermediate, advanced) which would be sufficient to maximize the acquisition of collocations and associations. By analyzing the corpus data of the input and the manuscripts from the movies or reading texts, researchers would be able to keep track what collocations and associations are learned, retained, and built upon and from which resource they originally came.

Future research could also investigate the difference between the acquisition of collocations and associations, theoretically and empirically. It seems that associations require a stronger link between word form and meaning and stronger construction of conceptual representation than collocations. Although the cognitive data implied that it took more time to process associations than collocations, our results did not find a difference in the performance of associations and collocations.