Chapter Two

Literature Review

This chapter gives a general review of the literature relevant to this study. First, theories of conjunctions are introduced. Second, studies on the relationship between conjunctions and reading are discussed. Third, research on the effects of logical conjunctions on reading comprehension as well as the difficulty levels of types of conjunctions are explored. Finally, research questions are formulated.

Theories of Conjunctions

The classification scheme for logical conjunctions in the present study was based on the work of Halliday and Hasan (1976). They proposed the notion of cohesion whereby explicit linguistic devices relate one element in the text to another and thus create texts through cohesive ties between structurally seemingly unrelated propositions. For cohesive devices, they classified them into four: reference, substitution, ellipsis, and conjunctions. The term, *conjunctions*, according to Halliday and Hasan (1976), encompasses the general meaning of connectives as words or expressions that link two or more clauses or sentences to express a coherent relation. Conjunctions may, therefore, be used by the author or reader of a text as *signals* that indicate how to integrate information into text and what should be inferred about the relation between two events (Gernsbacher, 1997). Conjunctions are also referred as *connectives* or *conjuncts* (Robertson, 1968; Nippold et al. 1992). In a word, conjunctions in the present study are explicit cohesion devices that serve to join

phrases, clauses, or sentences in spoken or written discourse.

There are a variety of terms which act as conjunctions in English. Halliday and Hasan (1976) categorized the three types of expressions under the heading of conjunction. They are described below:

1. adverbs, including:
   simple adverbs (‘ coordinating conjunctions”), *eg: but, so, then, next*
   compound adverbs in *–ly, eg: accordingly, subsequently, actually*
   compound adverbs in *there-* and *where-, eg: therefore, thereupon, whereat*
2. other compound adverbs, *eg: furthermore, nevertheless, anyway, instead, besides*
   prepositional phrases, *eg: on the contrary, as a result, in addition*
3. prepositional expressions with *that* or other reference item, the latter being
   (1) optional, *eg: as a result of that, instead of that, in addition to that*
   (2) obligatory, *eg: in spite of that, because of that*

(p. 231)

In addition to grammatical categorization, Halliday and Hasan classified conjunctions into four types of semantic logical relations: additive, adversative, causal, and temporal. Conjunctions of additive relations, such as “and” and “for instance”, add new information, examples or make restatement to support previous argument. Conjunctions of adversative relations, like “*but*” and “*instead*”, contrast two arguments and generally bring out another important message. Conjunctions of causal relations, like “*because*” and “*therefore*”, signify a cause-effect relationship between two arguments. Conjunctions of temporal relations, like “*before*” and “*finally*”, link two arguments in time sequence as well as hint the time of a great change. A summary of the categories and subcategories are presented in the table below.

Table 1

Summary Table of Conjunctions of Logical Relations*

Category	***Subcategories***	***Examples***
Additive	Simple	*and, nor, or*
	Complex	*furthermore, alternatively*
	Apposition	*that is, for instance*
	Comparison	*likewise, in the same way*
Adversative	Adversative "proper"	*yet, but, however*
	Contrastive	*in fact, on the other hand*
	Correction	*instead, rather*
	Dismissal	*in any case, anyhow*
Causal	Causal, general	*so, consequently*
	Causal, specific	*for this reason, as a result*
	Reversed causal	*for, because, it follows*
	Conditional	*in that case, otherwise*
	Respective	*in this respect, aside from this*
Temporal	Temporal, simple	*then, previously*
	Complex	*at once, meanwhile, until then*
	Internal temporal	*next, secondly, then*
	Correlative forms	*first…then, in the end, finally*
	"Here and now"	*up to now, from now on*
	Summary	*to sum up, in short, briefly*

Note*. Table 1 adapted from Halliday and Hasan (1976), p. 242.

The Relationship between Conjunctions and Reading

A number of studies have been carried out into the investigation of the relationship between knowledge of conjunctions and performance of reading. The findings revealed a significant correlation between comprehension of conjunctions and reading comprehension. Robertson (1968) and Stoodt (1972) studied children in primary school and had the same finding that a students' ability to identify the relationship signaled by conjunctions were positively correlated with their reading

performance. The study by Cox et al. (1990) suggested that knowledge of conjunctive cohesion is the result of learning to read and maturation. They found that understanding of logical relations and cohesion in texts was the key to separating good readers from bad readers. Reversely, in their study of basal reading programs, Franks et al. (1997) found that early texts provided young readers with an amount of exposure to the content with logical conclusions. They proposed that reading provided a natural context that helped children build up their knowledge of logical relations as well as logical connectives. Cain (2003), who studied skilled and less-skilled comprehenders aged 7-8 years, reported that less-skilled comprehenders used fewer connectives in the story they produced as well as failed to make adequate use of connectives. In her study, “less-skilled comprehenders were found to be less likely to include cohesive devices to mark local or global integration.” She claimed that “the ability to use sophisticated connectives did not simply arise from good reading experience.” Rather, as she strongly suggested, “deficits in this skill is more plausibly associated with the cause of poor comprehension.” These studies revealed one thing in common. Conjunctions as well as logical relations are inseparable from reading in first language acquisition.

In addition to the evidence from L1 research literature, there are L2 researches proving that the command of conjunctions is highly related to reading achievement. Geva (1992) reported that there was a significantly positive correlation between L2 students’ comprehension of textual information in the context of an academic environment and their ability in logical implications of conjunctions among university-level ESL learners. In her study, students’ comprehension of logical

relationships was measured by an intrasentential conjunction task, an intersentential conjunction task, and a discourse-level conjunction task. An academic text comprehension (ATC) task was also employed as a means of measurement of comprehension of academic discourse. The results were “conceptualized as a developmental pyramid which describes the growing ability of L2 readers to comprehend logical meanings of conjunctions in texts as their L2 proficiency increases.”

Geva’s (1992) study was reduplicated by Wu (1994). He investigated 135 university-level Taiwanese EFL students through a simulated TOEFL test, with the listening section being omitted. The results indicated clearly that Taiwanese university EFL students with better language proficiency demonstrated a better ability in dealing with the logical implications of conjunctions in both intra- and inter- sentential levels. His finding was quite consistent with Geva’s (1992) in that students’ comprehension of logical relationships and use of English conjunctions between sentences were closely related to their overall reading ability.

Chung (2000) made an investigation into the relationship between signals and reading comprehension. She compared four versions of authentic texts: non-signaled passages, passages embedded with logical connectives, passages with headings, and passages with logical connectives and headings in combination. The results distinguished poor from good readers in that poor readers needed to rely on very explicit signals as meaning-making device, such as logical connectives and headings. The finding also suggested that logical connectives, which act as a “2-way signal”, might have given the poorer readers more guidance as to what was relevant in the

subsequent text. The 2-way signals connect information in the previous paragraph with that of the subsequent paragraph(s) and may play various other roles such as establishing different kinds of “text relations” (Hoey, 1983).

Goldman and Murray (1992) had a comparative study of native-English and ESL speakers on knowledge of connectors and reading comprehension. In their study, 20 native and 20 ESL university students participated in a multiple-choice, rational cloze procedure, with the connectors being removed. The results showed that native-English speakers performed significantly better than ESL speakers, suggesting that “improving ESL proficiency requires instruction that fosters understanding of intersentential meaning, relationships between sentences, and how to use connectors to help construct these relationships so that accurate, coherent, and rich mental models can be produced.”

All of the studies reviewed above share one point in common: whether in L1 or L 2, students’ competence with conjunctions is significantly related to their reading performance. But, what do the roles that logical conjunctions play in reading, or what are their effects on text comprehension? The literature to be reviewed in the next section focuses on this aspect.

The Effects of Logical Conjunctions on Reading Comprehension

Although logical conjunctions are closely related to reading, the roles they play are not undisputed, nor are their effects on reading comprehension. Some studies concluded that logical conjunctions play a facilitating role in the comprehension of the texts (e.g. Soltis and Pflaum, 1979; Britton et al. 1982; Geva & Ryan, 1985; Loman & Mayer, 1983; Caron et al. 1988; Millis & Just, 1994; Golding et al. 1995;

and others). But to some degree in certain aspects, other researches disapproved of this (e.g. van Dijk, 1977; Irwin, 1982; Crewe et al. 1985; Millis et al. 1993; Sanders & Noordman, 2000; and others). The varied effects of conjunctions point out the literature to be reviewed.

Studies on logical conjunctions with facilitating effects. A number of studies reported that perception of conjunctions contribute to reading comprehension, suggesting that students' knowledge of logical conjunctions interacted positively with the comprehension of written texts. For example, Soltis and Pflaum (1979) instructed primary school students of different ethnic groups with logical connectives and found that students improved not only in the production of connectives but also in their reading achievements. The study suggested that comprehension of conjunctions had a positive effect on reading comprehension. In the study by Geva and Ryan (1985), children in grade 5 and 7 were found to benefit from the highlighting of conjunctions in their comprehension of expository texts. They reported that highlighting of conjunctions was facilitating in the process of reading.

Loman and Mayer (1983) investigated the effects of signaled techniques on the understandability of expository prose. Signals, in their study, consisted of previewed sentences, underlined headings, and logical conjunctions. They studied high school students by dividing them into a signaled group and non-signaled group. The results indicated that the signaled group performed better on recall of conceptual information and on generating high quality problem solutions. Chung (2000) further explored Loman and Mayer's (1983) study by examining which signals aid reading comprehension. She suggested that the subjects whose proficiency was below that of

advanced learners benefited from the use of logical conjunctions at the macrostructure level.

Caron et al. (1988) studied the effects of conjunctions from sentence pairs. Eighty-one university students took part in the experiment, which was designed as a paired-associate experiment with pairs of simple sentences. The pairs were classified into two types: unconnected pairs and paired of sentences connected by conjunctions. The resulted revealed that pairs of sentences connected by conjunctions were much better recalled. Therefore, they strongly suggested that conjunctions, especially "because" gave rise to inferential elicitation in the process of reading. Millis and Just (1994) also explored the influence of connectives on sentence comprehension. They designed four experiments to investigate whether presence of connectives affected the time to recognize the verb in the first sentence or clause as well as the occurrence of reactivation effects. The results indicated that connectives decreased the verb-cognition time, increased the integration and coherence of the ultimate sentence representation, and helped students answer comprehension questions more accurately and faster. The authors finally concluded that a Reactivation Hypothesis, meaning "connectives evoke inter-clause integration and the reactivation of the first clause", was supported.

In addition to sentence comprehension, a number of studies focus on the role conjunctions play in the comprehension of expository or science texts. Moreover, conjunctions of four types of logical relations were further examined individually. For example, in the study by Golding et al. (1995), the effects of causal and adversative conjunctions were compared. The results reported that the presence of *therefore*

contributed to increased overall of recall, whereas the presence of *but* resulted in decrease of reading time and its absence eliminated the inverted U-function for recall, which is the normal course of comprehension[1]. Degand et al. (1999) focused on the impact of causal conjunctions on expository discourse comprehension. An experiment with two versions of texts was administered to 53 university students. One version contained at least three causal connectives which signaled backward and forward relations (because/ so), while the causal conjunctions in the other version were replaced by a full stop. In their study, the presence of connectives was claimed to actually improved comprehension of expository. Degand and Sanders (2002) further compared the impact of conjunctions on expository text comprehension in L1 and L2. As Degand et al. (1999), the scope of the study was limited to conjunctions of causal relations. The researchers conducted a similar experiment to 54 university students, who were native speakers of French studying Dutch, as well as to 23 students, who were native speakers of Dutch studying French. The results showed that the texts with explicit causal connectives lead to better comprehension performance than the texts without. They strongly suggested that the presence of conjunctions "had an overall positive influence on text understanding, and there is no difference in impact between L1 and L2." The role causal connectives were also explored in the comprehension of science texts. In the study by Maury and Teisserenc (2005), 93 university students took part in the experiment, which measured their understanding of the text with

[1] Keenan et al (1984) measured the incidental memory for the second sentence of sentence pairs that varied across four level of causal relatedness. He found the memory for the second sentence followed a quadratic, U-shaped function. That is, memory was best for moderately related sentence pairs (Level 2 and 3) and lowest for the lowest level of relatedness (Level 1) and the highest level of relatedness (Level 4). Myers et al. (1987) further stated that texts with no-connective versions should result in a quadratic, inverted- U curve.

verb-completion scores, first- and second-clause reading times, and comprehension questions. The results contradicted the study of Caron et al. (1988) in the increase of inference generation. However, they discovered that *because* did enhance the on-line integration progress.

Studies on logical conjunctions without facilitating effects. Even though plenty of researches support the facilitating effect conjunctions, several studies still reported that logical conjunctions do not have a positive effect on certain areas in the reading performance. For instance, some research findings have not shown any gains in recall (e.g. Irwin, 1982). van Dijk (1977) even maintained that the relation between propositions is determined "by the relatedness of the facts denoted by them" (p.47), implying that devices like connectives are relatively unimportant.

Some studies suggest that the readability and coherence of a text are not necessarily improved by the use of logical connectives. Crewe et al. (1985) studied 98 ESL students with a division of two groups. One group read the texts with logical connectives, and the other group read the texts without. They found that there was no significant difference between them because both groups were successful in processing the text and making the inherent logical connections between the discourse units. Crewe (1990) further put forth that readers' communication with the texts was not affected when the texts were devoid of connective links, but misuse and overuse of connectives would make the discourse difficult to process and even appear illogical.

In a study using expository materials, Millis et al. (1993) maintained that the presence of logical conjunctions actually inhibited memory. Four experiments were

designed to investigate the role conjunctions play in reading. The materials were passages with either no connectives, temporal connectives, causal connectives, or intentional connectives (*so that*). They attempted to discuss "connective facilitation and connective interference in the context of three broad theoretical perspectives: an elaboration-based perspective, a resource-based perspective, and a semantic compatibility perspective" (p.319). The results revealed that recall was higher for passages without connectives than with connectives. The researchers accounted for this finding with an elaboration-based perspective, reporting that "connectives constrained readers from generating additional elaborations beyond the explicit connective. This finding also explained with a semantic compatibility perspective: the "event + connective" interpretation provided a comparatively poor match to the normal "event-driven" interpretation of the text. The empirical study of Millis et al. (1993) not only clearly demonstrates the negative effects of conjunctions but also provides a reasonable account.

The research findings show that logical conjunctions have positive effects on some aspects of reading whereas have no effects on others. Sanders and Noordman (2000) studied the role of conjunctions in text processing. They measured 68 university students' reading comprehension of expository texts in three aspects: reading time, verification of statements, and recall. The results showed that the linguistic marker led to faster processing of the subsequent segment as well as representation formation after the reading but did not affect recall. The researchers claimed that explicit conjunctions caused faster processing in reading, but they also implied that the linguistic devices were bound to restrictions. Murray (1995) had

similar findings in his study. With an investigation of additive, causal, and adversative conjunctions respectively, only adversative conjunctions were found to be facilitating. However, the presence of adversative conjunctions only contributed to a reduction in the reading time of the subsequent text, but not in recall. This finding was explained by a processing model, in which adversative connectives were highly constrained by the preceding and upcoming texts.

The literature discussed above indicates an inconsistency in the effects of logical conjunctions on reading comprehension. It also suggests that there are differences among conjunctions of the four types of logical relations. Therefore, the present study is to clarify the effects and differences of the four types of logical conjunctions. To cope with the differences among conjunctions, some previous studies comparing the comprehension of different conjunctions are to be reviewed first in the next section (Steffani and Nippold, 1997; Cain et al. 2005; and others).

Comprehension of Different Conjunctions

A number of studies compared the comprehension of different conjunctions, revealing that not all conjunctions were of equal difficulty (Stoodt, 1972; Nippold et al., 1992; Ozono & Ito, 2003; and others). In Stoodt's study (1972), an investigation was made into twenty-one conjunctions which were most commonly used by the fourth graders. The results showed that they were not equally difficult. Nine of them were comparatively more difficult, which were "when", "so", "but", "or", "while", "where", "how", "that", and "if." And four of them were considerably easier, which were "and", "now", "for", and "as." Similarly, Gardner (1983) studied 16530 students aged 13-15 years with a list of the more frequently occurring connectives in scientific

textbooks. Students' comprehension of these connectives was measured by scientific and everyday texts. Twenty of them were found to be more difficult (listed below), 3 of which were considered especially challenging (underlined).

as (= like)	*conversely*	*essentially*
from this point of view	*hence*	*if*
in contrast	*in practice*	*in turn (in this order)*
in turn (similarly)	*moreover*	*only if*
respectively	*similarly*	*simultaneously*
whereby	*that is*	

Likewise, Steffani and Nippold (1997) studied the competence with connectives in written language between native-English speakers and ESL students. Twenty American students and 20 Japanese ESL students attending university in America participated in a reading task testing adverbial conjunctions. The results revealed that the most two difficult conjunctions were *nevertheless* and *rather* for the Japanese students and the Americans mastered all except *nevertheless*.

In addition to individual conjunction being investigated, several studies (Nippold et al., 1992; Chou, 2002; Ozono & Ito, 2003; Cain et al. 2005; Pretorius, 2006) explored the difficulty level of conjunctions by types of relations. For example, Nippold et al. (1992) had a developmental study of the use and understanding of adverbial conjunctions in 120 adolescents and young adults aged 12-23 years. In their study, adverbial conjuncts were classified into two types: concordant (e.g. *similarly,*

moreover, consequently) and discordant (e.g. *contrastively, rather, nevertheless*). It was found that these two types of conjuncts were equally difficult.

In the study of Ozono and Ito (2000), the difficulty level in the comprehension of illustrative (*for example*), causal and adversative connectives were compared. They studied 60 Japanese ESL university students, who were divided into high, mid, and low groups by English proficiency. The performance in the comprehension of the three types of logical connectives varied between the high and low groups. The high group achieved the highest score for adversative, followed by causal, and then illustrative. But the order was reverse for the low group. From the error analysis, they also found that the low group tended to favor illustrative conjunctions over causal, and causal over adversative while the high group was inclined to select each type of the three evenly. The study pointed out that proficiency played a role in the comprehension of logical conjunctions. Pretorius (2006) also compared these three types of logical conjunctions. By examining the participants, who were ESL university students being divided into four groups by their academic performance, she found that illustrative conjunctions were easier while causal and adversative were more challenging. However, even though the pattern was consistent across different academic groups, the differences between academically poor and good performers were enhanced in the adversative and causal relations. This study was quite comparable with Ozono and Ito's (2003) in the comprehension difficulty sequence of logical conjunctions for the lower achievers in language proficiency or academic performance.

Chou (2002) studied four types of logical conjunctions by implementing an

instruction through narrative and expository texts. Eighty-three Taiwanese EFL students in vocational high school, divided into two classes with equal English proficiency, received the instruction. The results showed that both narrative and expository texts were helpful to students' understanding of logical conjunctions, but they did not change the difficulty order of the four types of conjunctions. The students of both classes performed the worst in temporal conjunctions, a little better in additive, followed by adversative, and the best in causal. Therefore, Chou (2002) concluded that the ascending hierarchy of difficulty for the four types of logical conjunctions was: causal, adversative, additive, and temporal. In addition to testing students' actual performance, Chou (2002) also investigated their feelings about the difficulty of conjunctions by a questionnaire. Interestingly, the data revealed an almost reverse order. The students felt that temporal conjunctions were the easiest, followed by additive, causal were a bit challenging, and adversative were the most difficult. Her study described a discrepancy between the feeling and comprehension toward the level of difficulty among the four types of logical conjunctions, suggesting that experimental testing should be a more appropriate means of measuring students' understanding of conjunctions.

Cain et al. (2005) explored the comprehension and use of the four types of logical conjunctions in relation to age and ability. In the age-related study, 145 young readers aged 8-10 years participated in a narrative cloze task. The results indicated that the participants were poor at selecting the target conjunction, suggesting that performance was dependent on conjunction type, among which additive and adversative were easier while temporal and causal were relatively more difficult. A

similar finding was revealed in the ability-related study. Thirty-five skilled and less-skilled comprehenders aged 8-9 years took part in a receptive vocabulary test. The results showed that “both groups obtained more correct response for additive and adversative conjunctions than for temporal and causal terms.” In comparison of the two studies, it is clear that there are differences in the degree of difficulty as to the types of logical conjunctions. Furthermore, among them, additive and adversative conjunctions are the easier whereas temporal and causal are the more difficult.

The literature reviewed in this chapter shares one point in common: logical conjunctions play a critical role in reading comprehension. However, the conflict of their effects as well as the inconsistency in the comprehension difficulty among types of logical relations has not been resolved. For the effects of conjunctions, some studies claimed that explicit logical conjunctions were beneficial to students’ reading comprehension. Others disagreed with this point of view, maintaining that the linguistic devices were of no help, even constraining production of coherence representation. In addition, even though reading comprehension was measured by reading time, recall, cloze tests, etc., the previous literature was not clear in the examination of reading comprehension. It was not stated definitely what aspect of comprehension was tested: overall comprehension of the texts or an understanding of the detailed information. As for the inconsistency in level of difficulty among conjunctions, the problems lie in varied age and background of the participants, and more importantly, inconsistent approaches of analyzing conjunctions. To put it more clearly, some researches investigated individual conjunctions (Gardner, 1983; Steffani and Nippold, 1997), while others studied logical-relation-classified conjunctions

(Ozono & Ito, 2003; Cain et al. 2005, and others).

Research Questions

Given such inconsistent effects of conjunctions in reading, such inexact definitions of reading comprehension, and such different ways of analyzing comprehension difficulty of conjunctions in previous studies, the present study conducted the effects of conjunctions on reading comprehension in terms of both global and local understanding of the texts as well as compared the conjunctions by classification of logical relations. The following research questions were proposed and investigated.

1. Do conjunctions facilitate Taiwanese vocational high school students' reading comprehension? If yes, in what way?
2. Among the four types of logical conjunctions, which types are more easily comprehended by Taiwanese EFL students, and which types are more challenging?