Xue Bai

A Cross-Linguistic Exploration of Context Updating Mechanisms

Göttinger Schriften zur Englischen Philologie
Band 13

2021

Universitätsdrucke Göttingen

S | E | P
Seminar für Englische Philologie

Xue Bai

An Exploration of Context Updating Mechanisms
from a Cross-Linguistic Perspective

erschienen als Band 13 in der Reihe „Göttinger Schriften zur Englischen Philologie“ in den Universitätsdrucken im Universitätsverlag Göttingen 2021

Xue Bai

An Exploration of Context Updating Mechanisms from a Cross-Linguistic Perspective

Göttinger Schriften zur
Englischen Philologie, Band 13

Universitätsverlag Göttingen
2021

Bibliographic information

The German National Library lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at http://dnb.dnb.de.

Contact
Xue Bai
E-Mail: baixue110194@gmail.com

Typesetting and layout: Xue Bai/Frauke Reitemeier

https://univerlag.uni-goettingen.de
ISBN: 978-3-86395-491-8
DOI: https://doi.org/10.17875/gup2021-1593
ISSN: 1868-3878
eISSN: 2512-6970

To my family and teachers

Table of Contents

Chapter 1 Introduction

1.1 An introduction to presupposition

In communication, it is intriguing how information is exchanged and processed by participants. And promoting interchange efficiency is a default rule that participants adhere to. To achieve this interchange, every participant presupposes certain information in communication. For example, when this paper is submitted, I presuppose, without making an inquiry, that its readers have already mastered the English language. Presupposition is what a person employs on a daily basis, no matter what the native language of that person is. And it is fascinating how a presupposition is projected cross-linguistically. Research into this topic can deepen the comprehension of human language and language processing.

Presupposition, which has been researched extensively since the 1970s, is a complicated notion in linguistic studies. To give a general concept, in a conversation, presupposition can be perceived as certain information that is taken for granted by participants. For example, in (1),

(1) a. A: The president of the United States is handsome.
B: The United States has a unique president.
b. A: Mary regrets sleeping in her math class.
B: Mary has slept in her math class.

c. A: John is happy, too.
   B: Someone other than John is happy.
d. A: It wasn't Ben that washed Susan's car.
   B: Someone washed Susan's car.
e. A: Ann went to Walmart again.
   B: Ann has been to Walmart before.
f. A: Mary's sister has a teddy bear.
   B: Mary has a sister.
g. A: Mary knows that the president of the United States is handsome.
   B: The president of the United States is handsome.
   The United States has a unique president.

the presupposition of sentence A in each pair is the corresponding sentence B. And these presuppositions are elicited by different triggers[1], such as the definite article in (1a), a matrix predicate in (1b), an additive particle in (1c), the cleft construction in (1d), an aspectual adverb in (1e), and a possessive noun phrase in (1f). What is more, one presupposition can itself contain other presuppositions similar to those found in (1g). In (1g), the matrix predicate *know* triggers a presupposition that what Mary knows is true, and the definite article in the complement clause elicits another presupposition that *the United States has a unique president*.

In the literature on presuppositions, the projection problem[2] is one of the most debated topics, which is how to account for the presuppositions of a complex sentence from the presuppositions of its parts. To address this problem, three major lines of inquiry have been carried out, namely asymmetric, symmetric and hierarchical approaches, which involve the fields of semantics, pragmatics, and syntax. In these various approaches, some are purely pragmatic and others are semantic integrated with pragmatic principles. To be specific, a pragmatic account emphasizes the attitudes and knowledge of conversation participants, which is known as speaker presupposition in the way that it is conversationalists rather than sentences that presuppose. For example, sentence (1a. A) can be interpreted as a sincere utterance only under the circumstance that the proposition (1a. B), *the United States has a unique president*, is taken for granted by a speaker and his addressees. A semantic account highlights "a relation between sentences or propositions, and a presupposition is defined in terms of truth conditions" (Karttunen 1973: 169). To illustrate, in bivalent semantics[3], when sentence A presupposes sentence B, in order for sentence A to have a truth value, i.e. to be defined, sentence B has to be true. Following the semantic account, sentence (1a. A) has truth values only under the condition that the proposition (1a. B) is true. In addition, it has been

1 Presupposition triggers function divergently in their projection behaviors and accommodation, which is not the concern of the present paper. (See Zeevat 2002 for detailed classification.)
2 The projection problem originated in Langendoen and Savin (1971).
3 In bivalent semantics of classical logic, the number of truth values is two, denoted by 1 and 0.

acknowledged that a purely semantic framework is inadequate to account for presupposition projection patterns. Thus, some pragmatic notions or principles have to be employed, such as the notion of local context applied by Karttunen (1974) and reconstructed by Schlenker (2009).

In this paper, I investigate numerous accounts on their predictions about presupposition projection patterns while focusing especially on the redundancy effect. Among these approaches, the asymmetric one is borne out in most English constructions. The symmetric and hierarchical proposals have not been thoroughly tested. The aim of this paper is to explore these frameworks. What is more intriguing concerning the literature on presupposition projection is that the vast majority of the work has focused on English data. A framework of presupposition projection in other languages has not been developed, which is the reason the present paper employs empirical evidence from Japanese and Mandarin Chinese (hereafter Chinese) to investigate the validity of the current mechanisms.

1.2 An overview of the chapters

The present paper consists of six chapters. Chapter 2 is an overview of seminal proposals in the presupposition projection research, put forward by Stalnaker (1974), Karttunen (1973, 1974), Heim (1983), and Schlenker (2008, 2009). These proposals vary in their degree of descriptive and explanatory adequacy, among which, Schlenker's account is the relatively adequate one in its descriptive and explanatory strength. Accordingly, Schlenker's theory is the building block of the present paper.

Chapter 3 is an exploration of the left-right asymmetric approach to presupposition projection on the basis of Schlenker's proposal. The asymmetric direction is quite promising in English in that it can predict the presupposition projection patterns of most English constructions. My finding is that the asymmetric framework runs into problems with Japanese and Chinese data both theoretically and empirically. Specifically, I firstly analyze Japanese and Chinese constructions, which cannot be elucidated by the asymmetric theory. Additionally, I have conducted two experiments in Japanese and one in Chinese to confirm that the asymmetric proposal lacks descriptive adequacy. On the basis of these outcomes, other directions of presupposition projection should be investigated.

Chapter 4 is devoted to the evaluation of the symmetric approach. As specified by previous linguistic studies, the adequacy of the symmetric approach in English constructions has been investigated by linguists, including Peters (1979), Beaver and Krahmer (2001), George (2008), Fox (2008), Schlenker (2009, 2010), Schwarz (2015), and Mandelkern et al. (2017) among many others. The output is that the symmetric direction is sufficient to explicate the presupposition projection patterns in English disjunctions and conditionals. By contrast, the symmetric framework is rebutted by English conjunction data. Previous research has been restrict-

ed to employing English empirical evidence. Thus, I investigate whether the symmetric framework is adequate to account for presupposition projection in Japanese. To accomplish this, I have conducted four experiments to inspect the adequacy of the symmetric account in major Japanese constructions, including conjunction, conditional, and disjunction. The results of the tests reveal that the symmetric direction is promising in Japanese, although more experiments should be conducted to reach a categorical conclusion.

Chapter 5 is the investigation of the third research direction, the hierarchical framework, which has been explored by several linguists, including Ingason (2016), Mandelkern and Romoli (2017), and Schlenker (2020). In these linguistic studies, two major hierarchical directions have been suggested. One is Ingason's proposal that hierarchically higher elements are computed prior to hierarchically lower elements, regardless of linear order, a hypothesis that is further examined by Mandelkern and Romoli (2017). The other one is Schlenker's generalization that hierarchically lower elements are evaluated prior to hierarchically higher elements, contrary to Ingason's proposal. In general, regarding the hierarchical framework, no detailed mechanism is on the market. Consequently, what I have completed in this chapter is merely overviews of these studies and brief evaluations of their adequacy with syntactic structures of major constructions in English, Japanese, and Chinese as evidence. A detailed hierarchical updating mechanism awaits further research. Chapter 6 concludes the present paper.

Chapter 2 Presupposition projection

2.1 Introduction

This chapter of the present paper is an overview of linguistic works in presupposition, which covers prominent accounts of presupposition projection and the problems existing in these accounts in a non-exhaustive way. Given that the theories of presupposition projection are complex and linguists often adopt and modify accounts that are prior to their own theories, I structure this overview following the time line and only focus on a few seminal papers written by Langendoen and Savin (1971), Stalnaker (1974), Karttunen (1973, 1974), Heim (1983, 1990) and Schlenker (2007, 2008).

For a framework of presupposition projection to be powerful, it is warranted to be both descriptively and explanatorily adequate. To be descriptive demands that an approach is able to describe presupposition projection facts correctly. To be explanatory denotes that an approach can accurately predict the presupposition projection patterns of connectives and be based on independently needed assumptions as much as possible. For example, the left-to-right human parsing is an instantiation of such assumptions on account that utterance unfolds in time and it is not possible to utter two words at a time in spoken language. This left-to-right parsing is in line with what people independently comprehend and is thereby well-accepted. It is preferable for a theory of presupposition projection (any theory, potentially) to be compatible with such independently motivated assumptions.

Moreover, the accounts I review in this chapter vary in their degree of descriptive and explanatory adequacy.

The structure of this chapter is as follows. Section 2.2 is a brief introduction to existing presupposition projection hypotheses. Starting from section 2.3, I detail prominent accounts of presupposition projection, which are of significance for the present paper. Section 2.3 is an outline of Stalnaker's pragmatic proposal of presupposition projection, which separates presupposition from the semantic explanations of content and truth-values of a proposition. Section 2.4 focuses on the semantic accounts of presupposition projection incorporated with pragmatic notions, which are explored by Karttunen (1974) and Heim (1983) respectively. Lastly, section 2.5 is Schlenker's new pragmatic analysis of presupposition projection, which is by far the descriptively and explanatorily adequate account.

2.2 A brief overview of existing hypotheses of presupposition projection

The earliest proposal of presupposition projection is the cumulative hypothesis put forward by Langendoen and Savin in their 1971 paper, *The Projection Problem for Presuppositions*. To address the projection problem, they suggest that the presuppositions of a complex sentence are the augment of all the presuppositions of its elementary clauses. This cumulative approach can explicate the projection patterns of presuppositions in some cases, while it makes false predictions in other cases. Now I illustrate the cumulative approach in concrete examples. In (2a),

(2) a. Mary knows that Bill has stopped beating his wife.
Presupposition: Bill used to beat his wife.
b. Bill used to beat his wife and Bill has stopped.
#Presupposition: Bill used to beat his wife.
c. If Haldeman is guilty, then Nixon is guilty, too.
#Presupposition: Someone other than Nixon is guilty. (Adopted from Soames 1979: 659)

the complement clause *Bill has stopped beating his wife* presupposes that *Bill used to beat his wife*. The cumulative hypothesis predicts that this presupposition is inherited to be the presupposition of (2a) as a whole, which is intuitively correct. In the case of (2b), the second conjunct in the conjunction presupposes that *Bill used to beat his wife*. Accordingly, the cumulative hypothesis predicts that (2b) inherits this presupposition, which is contrary to introspective judgment[4]. Similar to (2b), the

[4] Examples such as (2b) that are utilized to discredit the cumulative hypothesis are explicated differently by Soames (1979). Soames suggests that the cumulative hypothesis can be added a constraint, which is presuppositions can be cancelled by conversational implicatures. In the case of (2b), if the speaker presupposes that *Bill used to beat his wife*, then he would not utter it in the first conjunct, which leads to the conclusion that the speaker does not presuppose it. In this

presupposition trigger *too* in (2c) elicits a presupposition *someone other than Nixon is guilty*, which is predicted by the cumulative hypothesis to be inherited by (2c). Nevertheless, (2c) as a whole does not have this presupposition intuitively. Instances such as (2c) provide substantiation that the cumulative hypothesis is not an adequate proposal of presupposition projection.

The inadequacy of the cumulative hypothesis has sparkled the debate on presupposition projection, especially regarding the projection problem. Since then, various approaches have been put forth, as (3) demonstrates briefly.

(3) Frameworks of presupposition projection
The pragmatic system: speaker presupposition (a pragmatic account put forward by Stalnaker (1974))
The bivalent semantic system: sentential presupposition (a semantic account developed by Karttunen (1973))
The trivalent semantic system: the Kleene system

In chapter 2 and 3, I focus on the pragmatic and the bivalent semantic system, starting with Stalnaker's speaker presupposition and Karttunen's semantic presupposition. Building on some principles of these two linguists' work, other seminal accounts will also be covered, such as Heim's CCP proposal (1983) and Schlenker's pragmatic framework (2008). In chapter 4, I proceed with the investigation of the trivalent semantic system through Peters (1979), Beaver and Krahmer (2001), and George (2008) among many others.

2.3 The pragmatic account of presupposition projection

Stalnaker pursues the pragmatic analysis of presupposition projection in his 1974 paper, *Pragmatic Presuppositions*, and he renders the notions discussed in his 1974 paper more explicit in his 2002 paper, *Common Ground*. Stalnaker puts forward that a presupposition is "what a speaker takes for granted or seems to take for granted" in a conversation, which can be judged in contexts and through "attitudes and intentions of a speaker and his audience" (Stalnaker 1974: 48). For example, in a sentence, *my cousin isn't a boy anymore* (Stalnaker 1974: 53), one context is that the speaker's cousin has grown up and the presupposition is that *the cousin is a male*. Another context is that the speaker's cousin has gone through gender change and the presupposition is that *she is young*. As stated by Stalnaker, when a speaker presupposes some information, the speaker assumes that his hearer does the same, which is explained through the notion of common belief. Given that the notions

case, this cumulative presupposition is conversationally cancelled. Even though the cumulative hypothesis plus the conversational implicature constraint can expound examples such as (2b), it does not provide explanations for the elimination of the presupposition in (2c). And instances such as (2c) prove the inadequacy of the cumulative hypothesis.

such as common belief are of importance in this paper, it is efficient to clarify them now.

(4) Common belief: A proposition *P* is a pragmatic presupposition when *P* is believed by a speaker, and the speaker believes that his addressee believes *P,* and he believes that his addressee recognizes that he is pre supposing *P*.
Context: Context is the set of propositions that are background in formation in a conversation.
Common ground: Common ground is the set of propositions that are accepted by all conversation participants in a context to be true.
Context set: The set of possible worlds that is compatible with the common ground (some linguists use context in their work instead of context set).

A distinction between common belief and common ground is warranted to be noted. Common belief is that a speaker assumes that some information is mutually believed or shared among all conversationalists. Sometimes a divergence exists between common belief and the actual belief shared by all conversation participants (common ground). The difference in these two notions can explicate a phenomenon: When a speaker utters something, an addressee does not accept or even challenges his utterance. In this case, the challenged utterance is just common belief rather than common ground. Now that the important notions in Stalnaker's proposal are clarified, I proceed with an overview of Stalnaker's work in the next section.

2.3.1 Stalnaker's speaker presupposition

Stalnaker's proposal is known as speaker presupposition (Stalnaker 1974) in the way that, when a speaker assumes or believes a presupposition, he believes that his belief is shared by his hearers. This belief and shared presupposition is not static in a conversational context. For instance, in a conjunction, the dynamic process of context changing is achieved through the assertion of both conjuncts. Context and general conversational rules regarding efficient communication are the building blocks of Stalnaker's account. Moreover, Stalnaker states the projection patterns of presupposition in conjunctions, as demonstrated in (5).

(5) a. Mary has stopped crying and she is relaxed now (A_p and B).
b. Mary is relaxed now and she has stopped crying (A and B_p).
c. Mary has been crying and she has stopped (A and B_p). ($_p$ stands for presupposition)

In conjunctions (5), time *t* is prior to the utterance of the first conjunct *A* and time t_1 is prior to the utterance of the second conjunct *B*. And the context at time *t* is the original context. Moreover, a presupposition must be satisfied by its corresponding context. To be specific, in (5a), the original context must be a

context where the presupposition of the first conjunct *Mary has been crying* is satisfied. Under this condition, it is felicitous to utter *Mary has stopped crying*. Further, this original context is updated at time t_1, when the first conjunct is uttered, and the assertion that *Mary is not crying now* is augmented to the original context and acknowledged by the speaker and his addressees. Therefore, at time t_1, the original context has changed. Moreover, the presupposition *Mary has been crying,* which is entailed by the original context*,* is inherited by the updated context and becomes the presupposition of (5a) as a whole through the utterance of this conjunction. In (5b), the presupposition of the second conjunct, *Mary has been crying*, is neither related to *A* nor satisfied by the assertion of *A*. According to Stalnaker, this presupposition in *B* is projected to be the presupposition of the conjunction as a whole. (5a) and (5b) have identical conjuncts in reverse orders. The fact that they are predicted by Stalnaker's proposal to have the same presupposition *Mary has been crying* captures the symmetric feature of conjunctions. In (5c), in line with Stalnaker's account, the presupposition *Mary has been crying* in *B* does not get projected to be the presupposition of (5c) as a whole, for the reason that the presupposition is automatically satisfied by the assertion of the first conjunct, *Mary has been crying*. To sum up, instances in (5) capture the projection patterns of presuppositions in conjunctions, following Stalnaker's proposal.

Stalnaker's proposal of presupposition projection in conjunctions has a few aspects that are essential. Firstly, when a conjunct is uttered, it becomes the common belief among conversation participants. Secondly, in the course of a conjunction, the context changes and this process is successive through the assertion of both conjuncts. Thirdly, in proper communication, it is possible to not build specific rules about presuppositions into the semantics. For example, when a person utters *he knows something*, if that something being uttered is false or in doubt, that person would not utter it using the word *know*, which is a matter of rational conversation and sincere exchange of information.

Stalnaker holds the ground that the pragmatic account can fit into complex contexts better than the semantic analysis that gives stringent explanations to words and constructions. I detail two of the merits Stalnaker outlines. The first point is that, with the assistance of Grice's conversational cooperative principle, the pragmatic account can provide natural explanations for some seemingly puzzling situations in a way that the semantic line cannot. For instance, in the following scenario, two people, A and B, are talking to each other.

(6) A utters: Are we going to take a long walk?
B replies: It is raining.

B's reply seems irrelevant to A's question. Nonetheless, from a pragmatic view, A assumes B to be a cooperative participant of the conversation, following which, A would build a connection between *taking a long walk* and *raining*. Under this consideration, A perceives that the information that B takes for granted in this conversation is that, *when it rains, they shouldn't take a walk outside*. B's presupposition can be

perceived by A in the pragmatic account, not in a semantic one, given that no relation can be built semantically among the words A and B utter.

The second point is that actual conversation can be quite complicated, where a speaker can express some information that he knows is not a shared belief among his addressees on purpose. For example, (7) is what a person says to his colleagues.

(7) I am thinking about upgrading my car.

Through the utterance of this sentence, the speaker passes on the information that *he has a car* as a presupposition, although he is aware that his colleagues do not have the previous knowledge that *he has a car*. The speaker assumes that his colleagues accommodate[5] and accept the presupposition that *he has a car*. This type of information sharing and accommodation between conversation participants do occur often in communication, which increases conversation efficiency. Another phenomenon of accommodation appears in conversations, which is that a speaker may assume something is believed by all participants without being sure that it is. Subsequently, a hearer can act as if he believes the speaker to keep the conversation undisturbed if that information is not critical in the conversation. In this type of accommodation, the hearer does not actually believe the speaker and only comes to recognize that something has been expressed by the speaker in the course of a conversation.

To conclude, Stalnaker's account captures the complexity of actual conversations and describes the projection facts of presupposition in non-embedding conjunctions, i.e. the example (5). For Stalnaker, conversation efficiency is essential. Stalnaker's work is influential in presupposition research, which has been subject to a great deal of reviews by linguists such as Soames (1982), Heim (1990), and Schlenker (2007, 2009). Some issues in Stalnaker's proposal are outlined in the next section.

2.3.2 Some issues in Stalnaker's analysis

In this section, I outline three points of criticism made by Soames (1982) concerning Stalnaker's proposal. Firstly, Soames suggests that Stalnaker's proposal of context change during the utterance of a conjunction does not hold for all connectives, the disjunction in (8) is a case in point.

(8) Either the king of France is in hiding or there is no king of France.
(Cited from Soames 1982: 492)

---

5 The notion of accommodation is proposed by Lewis in his 1979 paper, *Scorekeeping in a Language Game*, as shown in the following:

If at time t something is said that requires presupposition P to be acceptable, and if P is not presupposed just before t, then within certain limits, presupposition P comes into existence at t (adopted from Lewis 1979: 340).

(9) A truth table for disjunction in classical logic

p	q	p∨q
1	1	1
1	0	1
0	1	1
0	0	0

Disjunction is a complicated construction in the literature on presuppositions. As the truth table (9) demonstrates, unlike conjuncts in a conjunction, disjuncts in a disjunction need not be true, as long as the whole disjunction is true (the disjunction as a whole is false only in the case that both disjuncts are false). In line with this fact, the presupposition of the first disjunct in (8), *there is a king of France*, does not enter the context due to the utterance of this first disjunct. Further, this presupposition is cancelled later by the second disjunct, *there is no king of France*. It is not transparent how Stalnaker's assertion-based proposal can be applied to disjunctions where disjuncts are only uttered, not asserted. I will return to the analysis of disjunction[6] throughout the course of this paper.

The second problem is that context can block the inheritance of a presupposition, which is not preferable for an account of presupposition projection that relies heavily on context. Consider the example (10).

(10) a. The king of France is in hiding.
Presupposition: There is a unique king of France.
b. The king of France isn't in hiding.
Presupposition: There is a unique king of France.
c. There is no king of France.
d. Therefore, the king of France isn't in hiding. (Adopted from Soames 1982: 490)

When the context entails (10c) first, it is felicitous to utter (10d) (the same as 10b) subsequently. Under this context, the presupposition *there is a unique king of France* for (10b) and (10d) does not get projected. This problem highlighted by Soames (1982) will not be analyzed much in this paper.

---

6 In linguistic studies, disjunction is a well-discussed topic. This note is merely to introduce one direction of disjunction research where it is treated as scalar implicatures. Scalar implicatures are inferences derived from the comparison between a sentence and its alternatives, as the following sentence reveals:

Mary has a bike or a car.

Alternative: Mary has a bike and a car (sentence X).

Scalar implicature: The speaker s believes that Mary does not have both ($\neg Bs(X) \rightarrow Bs(\neg X)$)

In this example, the alternative is stronger than the original sentence. The fact that the speaker *s* does not utter *X* implies that the speaker does not believe *X* is true, $\neg Bs(X)$. Unless other reasons are indicated, it is possible that *s* believes *X* is false, $Bs(\neg X)$. In this way, the exclusive reading of a disjunction is derived. (See Chemla 2007 and Chemla 2008 for more details.)

The third issue in Stalnaker's account is that although it seems to function well in assertions, problems emerge when it is applied to account for speech acts other than assertions, as in the case of command (11).

(11) My teacher demands that I stop eating in the class. (Adapted from Karttunen 1973)

In (11), the complement clause presupposes that *I have been eating in the class*. When this complement clause is embedded under the matrix predicate *demand*, in order for the command action of the speaker's teacher being sincere, the proposition *I have been eating in the class* should be presupposed and satisfied by the context. However, this presupposition predicted by Stalnaker's proposal that *I have been eating in the class* is not necessarily satisfied by the context, given that the speaker's teacher can have false beliefs. Stalnaker's account cannot explicate command cases such as (11). This point related to speech acts will not be discussed much in this paper.

These issues raised by Soames (1982) are supported by many linguists such as Rothschild (2008) and Schlenker (2009), who propose that a purely pragmatic account cannot suffice to shed light on presupposition projection patterns. All in all, Stalnaker's proposal is neither descriptively nor explanatorily adequate. When Stalnaker develops his pragmatic analysis of presupposition projection, Karttunen puts forward a semantic analysis of presupposition projection, which is introduced in section 2.4.

2.4 The semantic accounts of presupposition projection incorporated with pragmatic notions

The semantic analysis of presupposition is defined as a semantic relation between two sentences and emphasizes on content and truth-conditions of propositions. Among linguists, Karttunen (1974) and Heim (1983) explore that presupposition projection cannot be accounted for solely from the perspective of semantics. To amend this, they make use of pragmatic notions that are essential in Stalnaker's account and develop them further. I start with Karttunen's work in 2.4.1.

2.4.1 Karttunen's analysis of presupposition projection

2.4.1.1 The projection problem

As explored in Stalnaker (1974), in a conjunction such as (5a), where the two conjuncts are not related semantically, the presupposition of the conjunction as a whole is straightforward. At the stage when the second conjunct is uttered, the first conjunct is admitted by the context and its presupposition is thereby inherited by the entire conjunction. Nevertheless, in a complex sentence (12), the presupposition of the sentence as a whole is not so salient.

(12) If the primary school principal in my hometown has a son, the principal's son is very cute.

In (12), the consequent clause presupposes that *the principal has a son*; however, this presupposition is not inherited by the entire sentence, given that this presupposition is entailed by the antecedent clause under a conditional operator *if*. The difficulty regarding how to account for the presuppositions of a complex sentence from the presuppositions of its parts is non-trivial. This projection problem (Langendoen and Savin 1971) is further explored by Karttunen (1973), which is presented in the next section.

2.4.1.2 An overview of Karttunen's work

I now analyze how Karttunen accounts for the projection problem with complex sentences through his "hole, plug, and filter" proposal (1973). To illustrate, in a complex sentence, a "hole" matrix predicate let all the presuppositions of its complement clause through, and these presuppositions become the presuppositions of the entire sentence, as (13a) shows.

(13) a. I know that John has stopped smoking.
b. I ask John to stop smoking.
c. If the primary school principal in my hometown has a son, the principal's son is very cute.

In (13a), the matrix predicate *know* is an instance of "hole", and the presupposition in its complement clause, *John used to smoke*, becomes the presupposition of (13a) as a whole. A "plug" matrix predicate blocks presuppositions of its complement clause and prevents them from being projected, as (13b) demonstrates. In (13b), the non-finite complement clause presupposes that *John used to smoke*; however, (13b) as a whole does not inherit this presupposition. In Karttunen's terms, this presupposition is blocked by the attitude predicate *ask*. "Filter" modifies and cancels some presuppositions in a complex sentence as in (13c), whose cancellation I have examined in the example (12) above. All in all, Karttunen employs "hole, plug, and filter" to categorize predicates and connectives to expound their effects on the projection of presuppositions.

On the basis of the "hole, plug, and filter" proposal, Karttunen puts forth the projection patterns of presuppositions in conjunctions, conditionals, and disjunctions. Firstly, I recapitulate Karttunen's account in conjunctions (14).

---

[7] The conditionals discussed in this paper are indicative conditionals, for the reason that the presuppositions in subjunctive conditionals may not be categorized in the same way as presuppositions generated by other presupposition triggers. As a matter of fact, Karttunen and Peters (1979) conclude that subjunctive conditionals belong to conversational implicatures, not conventional implicatures, where presuppositions are associated with meanings of words and grammatical constructions. (See Karttunen and Peters 1979 for more details.)

(14) a. Mary has stopped smoking and she is happy.
b. Mary is happy and she has stopped smoking
c. Mary used to smoke and she has stopped smoking.

In (14a), the first conjunct presupposes that *Mary used to smoke*. Accordingly, the entire conjunction inherits this presupposition. In (14b), the second conjunct presupposes that *Mary used to smoke*. Under the circumstance that this proposition is not entailed by the first conjunct, the entire conjunction inherits this presupposition. In (14c), the second conjunct presupposes that *Mary used to smoke*, which is entailed by the first conjunct. Consequently, this presupposition gets filtered out, and the conjunction (14c) as a whole presupposes nothing. The abstract presupposition projection patterns are in (16).

Secondly, I demonstrate how Karttunen explicates the projection patterns of a disjunction[8] in (15).

(15) Either John has never smoked or John has stopped smoking.

As stated by Karttunen, in (15), the second disjunct, *John has stopped smoking*, presupposes that *John used to smoke*. If the first disjunct has no semantic relation with this presupposition, then this disjunction as a whole presupposes that *John used to smoke*. In (15), the negation of the first disjunct is that *John has smoked*, which entails the presupposition of the second disjunct, *John used to smoke*. This presupposition is thereby filtered out, and this disjunction (15) as a whole presupposes nothing. The abstract presupposition projection patterns of disjunctions are in (16).

(16) In a sentence S, S has the form of A and B/if A then B
If A presupposes P, then S presupposes P.
If B presupposes P, then S presupposes P, unless A semantically entails P.
In a sentence S, S has the form of A or B
If A presupposes P, then S presupposes P.
If B presupposes P, then S presupposes P, unless the negation of A semantically entails P.

Karttunen's proposal can provide descriptions for many instances of English constructions. Nonetheless, when a sentence gets complicated, the entailment relation discussed above may not be observed through semantics alone, which makes it necessary to add context into the proposal. In section 2.4.1.3, I proceed with Karttunen's modified account with the notion of context and local context.

[8] A point should be made transparent about disjunctions, which is that a speaker who utters a disjunction indicates that "the speaker is not assuming the truth of the proposition expressed by the disjunction," divergent from conjunctions (Soames 1979: 651).

2.4.1.3 Karttunen's local context

In this section, I recapitulate Karttunen's implementation of context into his semantic account of presupposition projection. To illustrate, in a disjunction (17),

(17) Either John is not a student majoring in Biology, or he has given up learning math.

the presupposition of the second disjunct is that *John has studied math*, and the negation of the first disjunct is that *John is a student majoring in Biology*. No semantic relation can be built between these two propositions, unless a speaker holds a belief that *students majoring in Biology study math*. Under this context, this sentence is a sincere utterance of the speaker, although the presupposition of the second disjunct, *John has studied math*, gets filtered out. Considering the complexity of sentences, Karttunen concludes that the semantic analysis alone is not adequate, and the notion of context should be included in the mechanism of presupposition projection.

On the basis of the implementation of context, Karttunen develops a notion of local context in his 1974 work, *Presupposition and Linguistic Context*. To be specific, in a complex sentence, constituents of it are not all evaluated with respect to the original context but instead with their respective local contexts. And the presuppositions of sentence constituents should be entailed by their local contexts in order for the constituents to be admitted.[9] For instance, in (18),

(18) The president of the United States is diligent and people in the United States have started to trust him.

the initial context firstly must satisfy and entail the presupposition of the first conjunct, *there is a unique president of the United States*. The context that results from incrementing the original context with the first conjunct is the local context for the second conjunct. Further, the local context of the second conjunct must entail the presupposition of the second conjunct, *people in the United States didn't trust the president before*. Under this mechanism, (18) is felicitous and admissible. I derive the mechanism of the satisfaction of the local context in (19):

(19) A conjunction *A and B* is uttered in the context *c*,
c is the original context and the local context for *A*, *c* must entail the presuppositions of *A* if *A* has any;
c+*A* (*c* is incremented by *A*) is the local context for *B*, which must entail the presuppositions of *B* if *B* has any.

This mechanism of local context is applied recursively to satisfy the presuppositions of the constituents of a complex sentence.

[9] That presuppositions of a sentence should be entailed by the context where the sentence is uttered is known as the bridge principle put forward by Stalnaker (1978). (See von Fintel (2008) and Romoli (2012) for more discussion.)

To conclude, in Karttunen's proposal, the presuppositions of the constituents of a complex sentence must be satisfied by their corresponding local contexts. Through this process, if sentence constituents are admissible in their respective local contexts, this sentence as a whole is admissible. Karttunen's proposal is reviewed by linguists such as Heim (1983). In the next section, I detail some issues in Karttunen's work.

2.4.1.4 Issues in Karttunen's proposal

Karttunen's "hole, plug, and filter" proposal is descriptively adequate in the way that it describes the projection facts of predicates and connectives from a threefold system: "the truth-conditional/content property, the presupposition property, and the heritage property" (Heim 1983: 398). According to Heim's review (1983) of Karttunen's proposal, this threefold system is as follows: a lexical item's truth conditional content; how a connective contributes in the way of presupposition projection; and how sentential connectives (like *if*) function on presuppositions of their arguments respectively (as stated by Heim 1983: 398). These three parts should all be specified in Karttunen's proposal. For example, a sentential connective *if* contributes nothing in the way of presupposition while it lets through the presuppositions of its arguments. As specified by this mechanism, Karttunen's proposal has weak predictive power in the way that it cannot guarantee the projection behaviors of a new connective. All in all, Karttunen's proposal is descriptively but not explanatorily adequate.

Subsequently, another issue addressed by Soames (1979) is demonstrated in (20).

(20) If John doesn't have children, then it wasn't John's child who won the fellowship.
Presupposition 1: John has a child.
Presupposition 2: Someone won the fellowship. (Adopted from Soames 1979: 657)

According to introspective judgment, (20) only generates the second presupposition. The problem that lies in Karttunen's framework is that it is not able to dismiss the first presupposition.

All in all, Karttunen's account lacks explanatory power, a problem which is addressed by Heim (1983), encapsulated in section 2.4.2.

2.4.2 Heim's dynamic semantic analysis of presupposition projection

Prior to the detailed analyses of Heim's proposal, I now illustrate an important aspect of her work. Heim (1983) has continuously explored the satisfaction and admittance condition account, which is proposed by Stalnaker and adopted by Karttunen. In the admittance account, two aspects are essential. Firstly, when a simple sentence is uttered, its presuppositions must be entailed by the context (or

in Stalnaker's terms, presuppositions of a sentence must be entailed by the common ground in order for the sentence to be admitted).

Secondly, in the case of a complex sentence, its admittance condition is determined on the basis of the admittance conditions of its constituents. Heim examines this admittance condition account in (21).

(21) I shared the room with a police officer, and she paid the rent.
(Adopted from Heim 1990: 22)

In (21), the personal pronoun *she* normally requires a salient woman or information about a salient woman being provided and entailed by the context. Otherwise, the conjunct *she paid the rent* cannot be admitted. In (21), the initial context is updated by the first conjunct. By the time the second conjunct is uttered, the local context of the second conjunct has already entailed the information of *some police officer, a human*. This information of *a human* expresses that the gender of that human can be male or female, which is the stage where accommodation comes to work. In order to admit the second conjunct, information of *some female* must be entailed by the local context of the second conjunct. Hence, through accommodation, this police officer should be a female. Therefore, it is not necessary for the original context to entail all the presuppositions of a complex sentence, as long as the presuppositions of the constituents of a complex sentence are satisfied by their corresponding local contexts. With these two aspects being clarified, I proceed with an overview of Heim's proposal in the next section.

2.4.2.1 An overview of Heim's work

In the satisfaction and admittance condition account, context is not static in the course of a sentence. Accordingly, questions are raised regarding how the context is changed in a complex sentence and how the constituents of a complex sentence contribute to the updating process. In Karttunen's work, context change is essentially a relation between contexts and sentences. As I have reviewed, Karttunen's proposal is explanatorily inadequate. To address this problem, Heim develops Context Change Potential (CCP) to instruct operations of context change in her 1983 work. CCP is one aspect of the meaning of a sentence (the other aspect is the truth-conditions of a sentence), i.e. sentences have CCPs.[10] Under the CCP, a proposition is a set of possible worlds. That is, sentences and contexts have the same semantic type. Following this, the context updating process is a function from context (a set of possible worlds) to context (a set of possible worlds). And the CCP of a complex sentence is derived from the CCPs of its constituents. As long as the truth-conditional content of a connective is

[10] As Strawson (1950) argues: "Meaning is a function of a sentence or expression; truth and falsity are functions of the use of a sentence or expression" (Strawson 1950: 327). According to Strawson, the use of a sentence or expression is related to time and worlds where the sentence or expression is being evaluated.

determined, its projection behavior is also determined. To elaborate, the CCP of *and* is presented in (22a).

(22) a. c+A and B= (c+A)+B
b. It is sunny and Mary's sister is happy.
c. Mary has a sister and Mary's sister is happy.

In a conjunction *A and B, c+A* is only defined if the initial context *c* admits *A*, then the result of executing *A* on *c* has to admit *B*.

In a concrete example (22b), the initial context *c* is intersected with a set of possible worlds where *it is sunny*. This execution eliminates possible worlds where *it is not sunny*. Subsequently, the outcome of this execution has to admit the second conjunct. In order for the second conjunct to be admitted, the presupposition of the second conjunct, *Mary has a sister*, must be entailed by the above outcome. However, the presupposition, *Mary has a sister,* is not entailed by the first conjunct, *it is sunny*, which leads that the initial context *c* must entail the presupposition. Therefore, it must be the common ground that *Mary has a sister*, and this presupposition thereby gets inherited in (22b). Under this condition, the local context for the second conjunct is a set of possible worlds where *it is sunny* and *Mary has a sister* are both satisfied. By contrast, in the case of (22c), *c+A* is the local context of *B* and must entail the presupposition of *B, Mary has a sister*. In (22c), the assertion of *A* itself satisfies the presupposition, which indicates that the initial context *c* does not need to entail this presupposition. Accordingly, the presupposition does not get inherited and need not be in the common ground, unlike (22b).

The CCP functions not only in conjunctions, but also in conditionals, negations, and disjunctions, as (23) demonstrates.

(23) a. c+if A, B= c\(c+A)\(c+A+B)
b. c+not S= c\c+S
(M\N stands for the intersection of M with the complement of N)
c. John's sister is not nice.
d. c[(p∨q)]=c[p]∪(c\c[p])[q]
e. Either John has never smoked or John has stopped smoking.

In (23a), *if A, B* is only defined if *c* admits *A*, and *c+A* admits *B*. And in (23b), *not S* is only defined if *c* admits *S*. In a concrete example (23c), *c+ John's sister is not nice* is only defined if *John's sister is nice* is defined. For *John's sister is nice* to be defined, the presupposition, *John has a unique sister*, has to be satisfied by *c*. Subsequently, the execution *c\c+S* eliminates worlds where *John's sister is nice*. Thus, worlds where *John's sister is not nice* are reserved, and the presupposition *John has a sister* gets projected.

In (23d), firstly, *c* is updated by *p*. Subsequently, all worlds that satisfy *p* are eliminated, whose result is updated by *q*. To demonstrate this process in a concrete example (23e), the first disjunct, *John has never smoked*, updates the context *c*. Then

in the step of $c\backslash c[p]$, all worlds where *John has never smoked* are eliminated, which reserves worlds where *John has smoked*. These worlds are the local context for the second disjunct and must satisfy the presupposition of the second disjunct, *John used to smoke*. This presupposition is indeed satisfied. Further, the second disjunct updates the context to a new context where *John used to smoke and he has stopped*. During this process, the disjunction (23e) presupposes nothing. As examples (22) and (23) demonstrate, the CCP, where the meaning of a sentence is a device to change and update contexts, can address the projection problem.

To sum up, Heim's CCP proposal can correctly describe and predict presupposition projection patterns of connectives in the way that the projection behaviors of connectives are encoded in the semantics of these connectives. Nonetheless, one serious problem lies in Heim's proposal, which is introduced in the next section.

2.4.2.2 An issue in Heim's analysis

A problem with Heim's proposal is identified by Mats Rooth in his personal communication to Heim in 1986 and is highlighted by Soames (1989) and Heim (1990). The problem is Heim's overstatement of the explanatory force of the CCP proposal. In the CCP, the inheritance conditions and the projection patterns of presuppositions are determined by the semantics of connectives, for instance, the CCP of *and* is fully determined by the truth-conditional meaning of *and*, demonstrated by (24a).

(24) c+A and B=
  a. (c+A)+B
  b. # (c+B)+A
  c. Mary used to stay up all night and she has stopped (A and B_p).

In (24a), the initial context *c* first intersects with *A*, and the result intersects with *B*. (24a) and (24b) are semantically equivalent and have identical truth-conditional meaning, indicating that the CCP account predicts the existence of (24b). However, the problem is that natural language functions only in the former order (24a), not in the latter order (24b). To illustrate with a concrete example, (24c) is a felicitous sentence intuitively. As specified by the updating mechanism (24a), *A* is admitted by *c*, where worlds *Mary used to stay up all night* are reserved. Subsequently, *B* is evaluated in worlds where *c*+*A* is satisfied. The presupposition of *B*, *Mary used to stay up all night*, is entailed by worlds where *A* is admitted. Thus, (24c) is predicted by the mechanism (24a) to be felicitous, in accordance with the introspective judgment.

According to the updating mechanism (24b), *B* must firstly be admitted by *c*, which requires the presupposition of *B* must be satisfied by the initial context *c*. Thus, the initial context *c* in (24c) must entail that *Mary used to stay up all night*, which renders the utterance of the first conjunct redundant. And (24c) is thereby predicted by the mechanism (24b) to be redundant and degraded, contrary to

intuition. Example (24c) confirms that the mechanism (24b) is deviant; however, this deviant mechanism cannot be ruled out by Heim's system.

Conjunction is not the only construction where Heim's proposal is problematic; (25) is an instance of a disjunction.

(25) c[(p∨q)]=
a. c[p]∪(c\c[p])[q]
b. c[q]∪(c\c[q])[p]
c. Either John has never smoked or John has stopped smoking.

As I have analyzed above, the computation process (25a) is predicted by the CCP. Given that disjunction is a symmetric construction, the computation process (25b) potentially exists. Following (25b), when the second disjunct in (25c), *John has stopped smoking*, is computed first, the disjunction projects a presupposition, *John used to smoke*. This outcome is incompatible with the intuition that (25c) presupposes nothing.

Predicted but unobserved mechanisms such as (24b) and (25b) lead Heim's theory to be overpowerful in its explanatory force. At the same time, these unobserved mechanisms result in false predictions of presupposition projection, causing the CCP account to be explanatorily inadequate. Under this consideration, the updating procedure for each connective must be stipulated. Consequently, Heim's proposal is descriptively adequate but lacks explanatory force.

To address the explanatory problem with Heim's dynamic proposal, Schlenker (2007, 2008) puts forward a static theory, the Transparency theory, which is introduced in the next section.

2.5 A new pragmatic analysis of presupposition projection

In the Transparency theory, Schlenker (2008) states that the projection behavior of a connective is derived from its bivalent semantics and syntax, combined with two pragmatic principles, Be Articulate and Be Brief. For the reason that Schlenker's proposal is complicated, it makes sense to explain the two pragmatic principles prior to the analysis of his proposal.

2.5.1 Two pragmatic principles employed by Schlenker

The two pragmatic principles, Be Articulate[11] and Be Brief are adopted by Schlenker from Grice's conversational cooperative principles. Be Articulate specifies articulating a sentence in its full structure, as instantiated in (26).

[11] Be Articulate is not an original Grice's principle, but can be made one.
Grice (1981) suggests adding a new maxim of manner to account for presuppositions, as follows:
If your assertions are complex and conjunctive, and you are asserting a number of things at the same time, then it would be natural, on the assumption that any one of them might be challengeable, to set them out separately

(26) a. It is raining and John knows it. (*p and p'*: *p* is the presuppositional part and *p'* is the assertive part)
b. John knows it is raining. (*p̲p'*[12]: the underlined *p* stands for the presupposition of *p'*)

Sentences (26a) and (26b) are semantically equivalent and convey the same amount of information. (26a) is a sentence in its full structure, which follows the principle of Be Articulate, while (26b) does not. In Schlenker's theory, a sentence with a presupposition in it should be presented in the form of a conjunction, *p and p'*. As stated by Schlenker, *p* is a distinguished part in a sentence's bivalent meaning and "should be made syntactically apparent" (Schlenker 2008: 171).

The other principle Be Brief indicates avoiding unnecessary prolixity and not stating things that are redundant (or transparent in Schlenker's terms). For example, in a conjunction, *John lives in New York city and John lives in the US*, when the first conjunct is uttered, it contributes the information that *John lives in the US*, because New York is a city in the US. Following this, it is redundant to utter the second conjunct, *John lives in the US*. The utterance of the second conjunct violates the principle of Be Brief. In the two principles, Be Brief is ranked above Be Articulate, which indicates that, under the circumstances that Be Brief is not violated, Be Articulate should be followed.

2.5.2 Global redundancy and incremental redundancy

Schlenker's account makes use of the notion of redundancy. Thus, it is necessary to be more transparent about it. The notion of redundancy or triviality is firstly put forward by Stalnaker (1978), which is that "a speaker should not assert what he presupposes to be true or what he presupposes to be false." The former is "to do something that is already done" and the latter is "self-defeating" (Stalnaker 1978: 89). Further, this notion of redundancy can be divided into two types: global redundancy and incremental redundancy, which have been explored by linguists such as Fox (2008) and Mayr and Romoli (2016) among many others.

Global redundancy, in simple terms, is that when a sentence is completed, some information is assessed as redundant in the sentence as a whole. And incremental redundancy states that some information is judged as redundant when evaluated at the stage of utterance. These two notions are explicated in (27).

(27) Scenario a: All conversation participants know that Mary has hepatitis.
Utterance a: # Mary is sick

and so make it easy for anyone who wants to challenge them to do so (Grice 1981).
This principle resembles Be Articulate.

12 The underline format and italics are used in the original work.

Scenario b: The speaker in this scenario is aware of Mary's health conditions, and no one else is.
Utterance b: Mary is sick and John knows that Mary is sick.

In (27a), the context contains information that *Mary has hepatitis*, which denotes that *Mary is sick*. This presupposition renders the utterance *Mary is sick* redundant. The utterance in (27a) is globally redundant in view of the fact that this entire sentence is entailed by the context. The utterance in (27a) is also incrementally redundant for the reason that it is judged as redundant when it is uttered, no matter what information may follow it. In scenario (27b), conversationalists except the speaker have no knowledge pertaining to Mary's health conditions, and the utterance, *Mary is sick,* simply contributes this information into the context. Subsequently, the second conjunct in (27b), *John knows that Mary is sick*, augments the information that *John is aware of Mary's health conditions*. When the entire sentence (27b) is evaluated, the first conjunct, *Mary is sick*, is globally redundant for the reason that the second conjunct alone conveys the same amount of information as the whole conjunction. The first conjunct in (27b) is not incrementally redundant in view of the fact that it actually makes a contribution to the context at the stage of its utterance.

As maintained by Schlenker, only information that is incrementally redundant can be judged as transparent, no matter how the sentence ends, as (27a) shows. Considering the incremental redundancy in Schlenker's account, what is uttered first and what is uttered later do matter, as these determine the essentiality of linear order and left-right asymmetry in his account. Now that the crucial notions in Schlenker's account are elucidated, I proceed with an overview of Schlenker's proposal in the next section.

2.5.3 Schlenker's pragmatic analysis of presupposition projection

I explore Schlenker's theory from four perspectives. Firstly, I recapitulate Schlenker's theory of Transparency, which is summarized as follows:

(28) Principle of Transparency:
Given a Context Set C, a predicative or propositional occurrence of d is transparent (and hence infelicitous) in a sentence that starts with the string α (d and, just in case for any constituent γ of the same type as d and for any sentence completion β, C |= α (d and γ) β ⇔ α γ β. A predicative or propositional occurrence of d̲d' is acceptable in a string α (d̲d' and γ)β if and only if the articulated form of d̲d' , d and d' is ruled out because d is transparent (or incrementally redundant). (Adopted from Schlenker 2007: 6)

In line with Schlenker's theory, when *d* is transparent in *d and d',* it is incrementally redundant, no matter how the sentence ends. Therefore, *d̲d'* should be uttered in lieu of *d and d'*. In the definition, *d̲d'* can be either the type of a predicate or a

proposition, which indicates that the computation of presupposition can be below the sentential level or at the sentential level.

Moreover, Schlenker puts forth that "the only information that needs to be computed concerns the words that speech act participants have pronounced" (Schlenker 2007: 7).

Secondly, I introduce a feature of Schlenker's theory: The Transparency theory is static in view of the fact that Schlenker denies that the context needs to be updated with the content of constituents of a sentence. To elaborate, John utters (29) to Mary.

(29) Beijing is a big city and its traffic jam is severe.

If this sentence is computed in accordance with Heim's proposal, the initial context *c* is firstly updated by worlds where *Beijing is a big city*. In Schlenker's proposal, however, the initial context *c* is only changed in the way that the information *John believes that Beijing is a big city* is added. This information does not necessarily enter the common ground, which indicates that Mary can opt not to accept that *Beijing is a big city*. Schlenker emphasizes that he does not perceive *meaning* as a function to change contexts.

Thirdly, Schlenker's theory can give rise to almost full equivalent results with Heim's CCP. For example, in (30),

(30) a. Mary knows it is raining and Mary is happy.
b. Form pp' and q

in Heim's proposal, the presupposition is *it is raining*, which can also be derived from Schlenker's theory of Transparency, as follows:

(31) *It is raining and Mary knows it* is contextually equivalent to *Mary knows it is raining*.
Mary knows it is raining is in the form of *pp'*.
In the theory of Transparency, if *pp'* is accepted, the form *p and p'* must be ruled out.
If the form *p and p'* is ruled out, *p* (*it is raining*) must be transparent.
The context entails *p*, which makes the utterance of *p* transparent.
Accordingly, *p* (*it is raining*) is the presupposition that is entailed by the context.

Fourthly, the explanatory problem with Heim's theory is resolved in Schlenker's work. For example, in the case of a conjunction *pp' and q* in (30), the unobserved processing order *q and pp'* is ruled out by virtue of the left-right computation order. Schlenker's theory is explanatory in the way that "if two expressions have the same truth-conditional contribution and the same syntax, they have the same projection behavior" (Schlenker 2008: 182), which is elaborated in (32).

(32) Unless John didn't come, Mary will know that he is here. (Adapted from Schlenker 2008)

In (32), the connective *unless* is on a par with *if not* with regard to truth-conditional contribution. Hence (32) is tantamount to (33a).

(33) a. If John came, Mary will know that he is here.
b. If John came, he is here.

According to introspective judgment, the presupposition of (32) is (33b), which is predicted by Schlenker's theory. The derivation is as follows:

(34) Under the Transparency theory,
in *c*,when a conditional, *if p, (q and γ)β* is equal to *if p, γβ*. Then the structure *if p, γβ* is the chosen structure because *q* is transparent. Corresponding to (33a): *if p*= if John came; *q*=he is here; *γ* =Mary will know that he is here.
Suppose *c* entails that *if p, q*, then *if p, (q and γ)* is equal to *if p, γ*. Accordingly, the presupposition of (32) and (33a) is *if John came, he is here*.

To conclude, Schlenker develops the theory of Transparency integrated with Be Articulate and Be Brief to account for presupposition projection. This theory follows left-right asymmetric computation order and is assisted by syntactic rules. For example, as Schlenker argues, under syntactic rules, the antecedent clause of a conditional should be computed prior to a consequent clause. Nevertheless, the order of computation in a conditional is quite complicated and is a topic I will explore further in chapter 4 and chapter 5. All in all, Schlenker's theory equips both descriptive and explanatory force and solves the explanatory problem with Heim's CCP proposal.

Prior to chapter 3, I summarize the prominent proposals of presupposition projection that I have investigated in this chapter with regard to their descriptive and explanatory power in the table (35).

(35) A summary of the proposals of presupposition projection

proposal	descriptive power	explanatory power
the cumulative hypothesis	no	no
speaker presupposition	no	no
Karttunen's semantic account	yes	no
Heim's semantic account	yes	no
the Transparency theory	yes	yes

2.6 An outlook at chapter 3

Schlenker reevaluates his theory of Transparency in his 2009 paper, *Local Contexts*. His assessment is that there is no independent motivation for Be Articulate. Accordingly, in his 2009 paper, Schlenker develops a theory of local context that is both descriptively and explanatorily adequate to account for presupposition projection without the stipulation of Be Articulate. Schlenker's local context is the building block for many recent linguistic studies on presupposition projection, including Rothschild (2008, 2011), Mayr and Romoli (2016), Romoli (2017), Mandelkern (2017, 2019) and Chung (2018). Thus, it is worth exploring Schlenker's local context further in the next chapter. In chapter 3, in addition to encapsulating the linguists' work established on Schlenker's local context, I will advance to the investigation of the validity of Schlenker's theory in Japanese and Chinese.

Chapter 3 Local context: the left-right asymmetric approach to presupposition projection

3.1 Introduction

In chapter 2, I recapitulated the presupposition projection patterns explored in several prominent proposals. As investigated, Stalnaker's account lacks descriptive and explanatory force, as it cannot explicate projection patterns of conjunctions embedded under other operators. Nor can his assertion-based account in conjunction be applied to other connectives. Karttunen's proposal is not explanatory, as his threefold system cannot adequately predict the projection facts of less common sentential connectives. Heim builds on Karttunen's proposal to solve Karttunen's explanatory problem; however, Heim's proposal predicts the existence of computation orders of sentential connectives that are not attested in languages. Consequently, Heim's proposal is explanatorily inadequate. Heim's explanatory problem is addressed by Schlenker, who develops a theory of Transparency in Schlenker (2007, 2008). The theory of Transparency equips both descriptive and explanatory force.

Nonetheless, in Schlener's later paper (2009), *Local Contexts*, he puts forward that in practical conversations, it sometimes can be too complicated to be articulated. Further, there is no independent motivation for Be Articulate. Therefore, Schlenker (2009) reconstructs the notion of local context to account

for presupposition projection facts, which is divergent from the local context notion in Karttunen's work. Since Schlenker's local context is the building block of many recent linguistic studies on presupposition projection and the redundancy effect, it is sensible to investigate the local context proposal in this chapter.

The structure of chapter 3 is as follows. Section 3.2 outlines Schlenker's local context. Section 3.3 is devoted to examining how Schlenker's proposal can be extended to the redundancy effect. In section 3.3, I firstly investigate whether Schlenker's proposal can provide explanations for the redundancy effect in English. Under the amendment made by Mayr and Romoli (2016), Schlenker's proposal can explicate the redundancy effect in English constructions. Subsequently, I explore whether Schlenker's approach can expound the redundancy effect in Japanese and Chinese, two languages in which Schlenker's proposal encounters issues. All the investigation in section 3.3 is theoretical analysis, which is followed by my empirical work in section 3.4. In section 3.4, I present two experiments I have conducted in Japanese and one in Chinese to examine whether Schlenker's prediction of the redundancy effect can be supported by Japanese and Chinese data. The output is negative, which motivates either the modification to Schlenker's proposal or the exploration of other solutions. In section 3.5, I recapitulate a modification put forward by Chung (2018). Moreover, in section 3.6, I encapsulate Rothschild's "loosen-up" semantic account of presupposition projection incorporated with Schlenker's order constraint.

3.2 Local context

In the research on presupposition projection, context and local context have played a key role. Stalnaker (1974) develops a notion of context, which is not static in the computation of a sentence. What is uttered enters the context and is taken for granted by conversationalists. Kattunen (1974), on the other hand, employs a notion of local context, which is that constituents in a complex sentence are not all evaluated with respect to the initial context *c*. Instead, they are evaluated and admitted in their corresponding local contexts. Additionally, the presuppositions of these constituents must be satisfied and entailed by their local contexts in order for the constituents to be admissible. If constituents of a complex sentence are admitted in their respective local contexts, then the complex sentence as a whole is admitted as well. Building on Karttunen's work, Heim (1983) develops her CCP account, where the meaning of a sentence is a function to instruct context change. Heim also employs this notion of local context in the context updating process. A similarity is shared among these accounts, which is words that are uttered enter the common ground and the context is updated accordingly. By contrast, in Schlenker's static theory of Transparency, the words uttered are only the speaker's belief, and the context is not updated accordingly.

Furthermore, in Schlenker (2009), although he follows Karttunen and Heim's proposals in terms that a presupposition must be satisfied by its local context, he reconstructs the notion of local context as the next section demonstrates.

3.2.1 Schlenker's reconstruction of local context

In Schlenker's reconstruction of local context, four aspects are essential. Firstly, local context does not affect the truth conditions of a sentence, no matter how the sentence ends. Local context is transparent in this way. Secondly, local context is the smallest domain that a person needs to restrict his attention to, when he assesses a sentence. Irrelevant worlds should be disregarded in order to promote the efficiency of a computation process. For instance, in a sentence, *Mary has passed her exams and she is happy*. When an interpreter intersects the initial context *c* with the first conjunct, *Mary has passed her exams*, worlds where *Mary didn't pass her exams* are irrelevant and make the conjunction false no matter how the sentence ends. Thus, the interpreter only needs to restrict his attention to the worlds that are the outcome of executing the first conjunct on the initial context *c*.

Thirdly, the computation of local context in Schlenker's proposal only concerns the words that have been pronounced, for the reason that utterance unfolds in time, and no one has access to words that have not been pronounced. Schlenker's computation of local context is thereby a left-right incremental process. Fourthly, the assessment of the local context of an expression E (presupposition trigger E) is concerned with the information that comes before E without waiting for the completion of a sentence S. Therefore, Schlenker's proposal is a word-by-word computation mechanism that can account for both propositional and predicative types of expressions.

3.2.2 The computation of local context

As stated by Schlenker, two steps are taken to define local context. The first step is to find out the transparent restriction on the initial context *c*, which is *c'*, a set of denotations that will not affect the truth conditions of a sentence no matter how the sentence ends. For example, in a conjunction *p and q* in (36),

(36) For every constituent *q*, for every good final *b* (sentence ending *b*),
$c \vDash^{c' \to c \wedge p}$ [(*p and* $^{c'}$*q b*)] $\Leftrightarrow$ [(*p and q b*)]
($c \vDash^{c' \to p} F$ denotes that under an assignment function in which *c'* denotes *p*, every world *w* in *c* makes *F* true).
(Adopted from Schlenker 2009: 15)

p and $^{c'}$*q b* is equivalent to *p and q b* with relative to *c*, which denotes that the restriction *c'* is transparent. In a conjunction, *Mary has passed her exams and she is happy*, *c'* is the execution of the first conjunct on *c*, which contain worlds where *Mary has passed her exams*. This execution does not affect the truth conditions of this conjunction, no matter how the conjunction ends.

The second step is to determine if a bottom element exists. A bottom element is the strongest restriction that can be made without affecting the truth conditions of an entire sentence with relative to the context set. The bottom element entails all other restrictions. The fact is that the restrictions that can be made on *c* have possibly different strength. For example, a sentence *S* is processed under an initial context *c*. The restriction *c'* denotes a set of worlds, which excludes a world *w* in *c*. Since a person does not have access to the entire sentence *S* at this stage, it might be that *S* is true in that excluded world *w*. In this case, through the computation of *c'* on *S,* the person will produce the result that the truth value of *S* is false, because the world *w* that makes *S* true is excluded. In this case, the restriction *c'* goes too far. In other words, all worlds in *c* must be included before the computation of *S*. Thus, *c* is the strongest restriction that can be made and *c* is the bottom element (the local context of *S)*. As specified by Schlenker, as long as "the semantics is extensional, and the domain of individuals in each possible world is of finite size, then the existence of local context is guaranteed and a bottom element can be ensured" (Schleker 2009: 52).

Subsequently, I demonstrate how local context is derived in a concrete example (37).

(37) Mary has passed her exams and she is happy. (p and q)

The local context of the second conjunct, *Mary is happy,* can be evaluated under different conditions. For example, it can be evaluated with respect to the initial context *c*, the first conjunct, or the intersection of *c* and the first conjunct. Among these three options, the intersection of *c* and the first conjunct is the strongest one that can be made, for the reason that this option eliminates worlds where *Mary didn't pass her exams*. Worlds where *Mary didn't pass her exams* make the first conjunct false and thus the entire conjunction false regardless of the second conjunct. Further, I demonstrate how the intersection of *c* and the first conjunct is the bottom element and the local context of the second conjunct. In (37), assuming that *c'* exculdes a world *w* where *Mary has passed her exams*, the sentence *S* is true in this world *w*. In this case, the truth value of the sentence *S* is determined as false, in view of the fact that the world *w* that makes *S* true is excluded. Thus, all worlds that are the outcome of the execution of the first conjunct on *c* must be included, and *c*∧*p* is the local context of *q* in (37).

Moreover, I elaborate on how Schlenker's local context can be applied to explicate presupposition projection patterns in (38).

(38) Mary is a very good student and she knows that she can be complimented by her teacher.
Form: c, p and q̲q'

In (38), the initial context *c* is intersected with the first conjunct, *Mary is a very good student*. The outcome of this intersection is the incremental local context for the second conjunct (the local context for *q̲q'* is *c*∧*p)*. Since the presuppositions of a

constituent must be satisfied by its local context, the presupposition of the second conjunct, *Mary can be complimented by her teacher*, must be entailed by its local context. Therefore, $c \cap p$ must entail q, which indicates that c must guarantee that *if p, q*, demonstrated in (39):

(39) $(c, (p \text{ and } \underline{q}q'))$ is satisfied *if and only if* $c \vDash$ (*if p, q*).

Consequently, the presupposition of (38) is a conditional presupposition, *if Mary is a very good student, she can be complimented by her teacher.*

To conclude, the local context of an expression E can be comprehended as the semantic contribution by words that precede E. Schlenker's general mechanism is that the presuppositional behavior of any connective is predicted once its non-dynamic semantics and syntactic environment have been specified. Additionally, a presupposition must be satisfied by its local context, a finding that can be traced back to Karttunen (1974), although the notion of local context in Karttunen's proposal is divergent from it in Schlenker's account. In Schlenker's local context, a sentence is computed from worlds in a context set to truth values, which is on a par with Karttunen's proposal but dissimilar to Heim's account.

Schlenker's local context is by far the descriptively and explanatorily adequate account of presupposition projection. Accordingly, the remainder of this chapter is devoted to investigate the efficacy of Schlenker's proposal, especially from the perspective of the redundancy effect. Section 3.3 is the theoretical exploration of the redundancy effect under Schlenker's local context in English, Japanese, and Chinese. Section 3.4 is the empirical examination of the redundancy effect under Schlenker's local context in Japanese and Chinese.

3.3 The redundancy effect under Schlenker's local context

3.3.1 Introduction

In Schlenker's theory, the computation of local context follows the left-right asymmetric processing order. Most crucially, an interpreter only needs to restrict his attention to words that have been pronounced. The interpreter is unable to predict what will come later in a sentence, as it is natural in human language parsing. Further, the interpreter can eliminate irrelevant worlds in the context to make the computation process efficient. When computation and conversation efficiency are considered, it is redundant to articulate information that is already indicated by the local context or information that is contradictory to the local context (the redundancy effect rooted in Stalnaker 1978). Accordingly, I investigate the two types of redundancy, namely global redundancy and incremental redundancy, on the basis of Schlenker's theory.

(40) a. # John drives to the University everyday and he has access to a vehicle.
b. John has access to a vehicle and he drives to the University everyday.
c. John drives to the University everyday.

In (40a), the first conjunct presupposes that *John has access to a vehicle* and asserts that *he makes use of it to get to the University everyday*. This first conjunct contributes this information into the initial context and the local context of the second conjunct entails the information, in line with Schlenker's theory. Accordingly, Schlenker's theory predicts that it is redundant to utter *John has access to a vehicle* in the second conjunct. In (40a), the utterance of the second conjunct is globally redundant since (40a) can be replaced by (40c). This second conjunct is also incrementally redundant for the reason that "if a final constituent in a sentence is globally redundant, it is always incrementally redundant as well" (Mayr and Romoli 2016: 7).

In the case of (40b), the first conjunct, *John has access to a vehicle*, is not incrementally redundant, given that at the time of evaluation (after its utterance), this conjunct contributes information to the context regardless of what comes later in the sentence. Further, the second conjunct in (40b), combined with the first conjunct, makes (40b) provide the same amount of information as (40c), which renders the first conjunct in (40b) globally redundant. From the fact that a conjunct, *John has access to a vehicle*, is judged differently in two conjunctions (40a) and (40b) with regard to redundancy, it can be observed that redundancy is sensitive to the order of constituents in a sentence.

(40a) and (40b) are both globally redundant. Nevertheless, judged by intuition, (40a) is degraded in contrast to (40b) being acceptable. Additionally, (40a) is predicted by Schlenker's theory to be incrementally redundant, while (40b) is not. Therefore, between the two types of redundancy, incremental redundancy is the one that should guide sentence judgment. All in all, since the processing of a sentence is a left-right incremental procedure, the judgment of redundancy should be as well, according to Schlenker.

3.3.2 An exploration of the redundancy effect in English

In the previous section, I have inspected that Schlenker's theory can account for the redundancy effect of English conjunctions (40). In this section, I proceed with examining whether Schlenker's theory functions in two other major English constructions, relative clause and disjunction. Firstly, two English relative clauses are in (41).

(41) a. # Taylor is a rich bachelor who is a man.
b. Taylor is a man who is a rich bachelor.

Under the consideration that Taylor is a unisex name, in (41a), the main clause *Taylor is a rich bachelor* contributes the information that *Taylor is an unmarried male and is rich* into the context. Subsequently, the relative clause, *who is a man*, augments no new information into the context. Schlenker's theory predicts that the utterance of such a clause is redundant, which is consistent with introspective judgment. In (41b), the main clause contributes the information that *Taylor is a male* into the context, which is updated further by the relative clause, *who is a rich bachelor*. Through this update, more information pertaining to Taylor is acquired. Schlenker's theory predicts that the utterance of such a clause is natural, a prediction which is intuitively correct. The two relative clauses in (41) confirm that the left-right processing order is sufficient to explicate the redundancy effect of English relative clauses.

Secondly, whether Schlenker's local context theory equips explanatory power to account for the redundancy effect in English disjunctions is examined in (42).

(42) a. Either Mary isn't pregnant, or she is and it doesn't show.
b. Either Mary isn't pregnant, or it doesn't show. (Cited from Mayr and Romoli 2016:2)

In propositional logic, disjunction[13] *p or q* is tantamount to *p or (not p and q)*. As a result, in (42a), the local context of the second disjunct should contain the negation of the first disjunct, which is *Mary is pregnant*. Given the fact that the local context of the second disjunct contains the information that *Mary is pregnant,* the utterance of *she is* in the second disjunct is predicted by Schlenker's theory to be redundant. However, (42a) is intuitively felicitous, which casts doubt on Schlenker's account. This problem is addressed in Mayr and Romoli (2016), which is presented in the next section.

3.3.3 Mayr and Romoli's amendment to Schlenker's local context theory

Mayr and Romoli (2016) explore the incorrect prediction of Schlenker's proposal in (42a). As I have introduced in the previous section, (42a) is intuitively felicitous while it is predicted by Schlenker's theory to be redundant. To prove the felicity of (42a) (repeated below as (43a)), the crucial point lies in how to substantiate that *she is* is not redundant. Mayr and Romoli implement a notion of exhaustification as (44) demonstrates.

(43) a. Either Mary isn't pregnant, or she is and it doesn't show.
b. Either Mary isn't pregnant, or it doesn't show. (Cited from Mayr and Romoli 2016: 3)

(44) $[[\mathrm{EXH}]](p)(w) = p(w) \wedge \forall q \in \mathrm{Excl}(p, \mathrm{Alt}(p))[\neg q(w)]$
A notion of exhaustification applies to a proposition and affirms it, while negating a subset of its alternatives[14] (for instance, the alternative operator

[13] Peters (1979) describes disjunction as $[\![S_1 \text{ or } S_2]\!]_T = [\![S_1]\!]_T \cup ([\![S_1]\!]_F \cap [\![S_2]\!]_T)$.
[14] Horn alternatives (see Horn 1972).

> for *and* is *or*; the alternative word for *all* is *some*). These alternatives are the ones that can be consistently negated without contradicting the proposition; and the negation of these alternatives together with the proposition would not lead to the automatic affirmation of another alternative. (Adapted from Mayr and Romoli 2016: 11)

In line with this notion of exhaustification[15], the alternative of (43a) is *Mary isn't pregnant, and she is and it doesn't show*, which is a contradiction. The negation of such contradiction does not yield any effect on the sentence. Hence, in this particular case, this notion of exhaustification is not effective. To address this problem, a linguist Meyer proposes to add a constraint to the global redundancy notion in her 2013 dissertation, *Ignorance and Grammar*. Meyer suggests that, when constructing a simplified sentence (as in (43b)) out of a globally redundant sentence (as in (43a)), the working results of exhaustification should not be ignored. Depending on this constraint, the alternative of (43b) is *Mary isn't pregnant and it doesn't show*, which is not a contradiction. Given that the exhaustification of (43a) and (43b) are not equivalent to each other, it is not possible to substantiate that *she is* is redundant. Under this circumstance, the promising result that (43a) is not redundant is obtained. This approach to explicating the felicity of (43a) does not make use of the notion of local context, only the left-right incrementality with the assistance of Meyer's constraint.

Subsequently, Mayr and Romoli (2016) develop another approach, which is to couple Schlenker's notion of local context with the constraint of exhaustificaton. Considering (45),

> (45) Mary isn't pregnant or she is happy. (Adopted from Mayr and Romoli 2016:27)

under the restriction of exhaustification, the interpretation of this sentence should be the intersection of *Mary isn't pregnant or she is happy* and the negation of its

---

[15] Chierchia, Fox, and Spector (2012) account for exhaustification in the following way:
In two sentences, a. Joe or Bill will show up.
b. Joe and Bill will show up. (*b* is *a*'s alternative and is more informative than *a*)
when a speaker utters *a*, it can be deduced that *b* is not the belief of the speaker. For the reason that if the speaker holds the belief of *b,* he should utter so, according to Grice's maxim of quantity. Moreover, the belief that the speaker takes *b* to be false can be strengthened through exhaustification, i.e. tantamount to inserting a silent *only*. The derivation is as follows:
a. B_s(show up(j))∨show up(b))
b. B_s(show up(j))∧show up(b)) (B_s stands for *the speaker believes that*)
Add a silent *only* to *a* and evaluate it with respect to *b*.
Only (B_s(show up(j))∨show up(b)))
=B_s(show up (j))∨show up(b))∧¬ B_s(show up(j))∧show up(b))
=B_s(show up (j))∨show up(b))∧¬(show up(j))∧show up(b))) (through neg-raising)
Therefore, the utterance of *a* is to commit to the negation of *b*.

alternative *Mary isn't pregnant and she is happy*[16]. In this case, the local context of the second disjunct is both worlds where *Mary is pregnant* and *Mary is not pregnant*. Therefore, no restriction can be made on the local context of the second disjunct, which indicates that its local context is the initial context *c*. Following this line of argumentation, in (43a), the local context of the second disjunct is the original context *c*, and no restriction regarding Mary's pregnancy can be made. Consequently, the utterance *she is (pregnant)* is not redundant.

All in all, the first approach Mayr and Romoli explore employs an independent constraint to derive the felicity of (43a). The second approach integrated with Schlenker's local context can explicate the acceptability of (43a) directly. To strive for simplicity, the second one is the preferable account to explicate the redundancy effect in English disjunctions. Mayr and Romoli's research provides substantiation for Schlenker's theory.

3.3.4 A summary of the redundancy effect in English

Thus far, Schlenker's theory can account for the redundancy effect in many English constructions such as conjunctions and relative clauses. The most troubling construction, disjunction, can be categorized into two types, inclusive and exclusive disjunctions. The left-right asymmetric processing mechanism is effective for inclusive disjunctions. The reason is as follows: In an inclusive disjunction, when the first disjunct is true, the entire disjunction is true regardless of the truth value of the second disjunction (see the truth table in (46a)); accordingly, the second disjunct is evaluated in worlds where the first disjunct is false.

(46) a. The truth table for inclusive disjunction in classical logic

p	q	p∨q
1	1	1
1	0	1

16 To illustrate, the alternative of example (45) is *Mary isn't pregnant and she is happy*. And the negation of this alternative is *Mary is pregnant or she is not happy*. This negation is derived from the *De Morgan's laws*: (1) $\neg(p \vee q) \Leftrightarrow (\neg p) \wedge (\neg q)$

(2) $\neg(p \wedge q) \Leftrightarrow (\neg p) \vee (\neg q)$.

The exhaustification of (45) is the conjunction of *Mary isn't pregnant or she is happy* and *Mary is pregnant or she is not happy*, which is $(\neg p \vee q) \wedge (p \vee \neg q)$. This conjunction is true in the following two cases: (1 or 0) and (0 or 1); (0 or 1) and (1 or 0), and false in the next two cases: (1 or 1) and (0 or 0); (0 or 0) and (1 or 1). According to the two true cases, the truth or falseness of *q* does not affect the truth of the conjunction, as long as $\neg p$ and *q* do not have the same truth value at the same time. Consequently, it does not matter whether the second disjunct is *Mary is happy* or *Mary is not happy*. The local context of the second disjunct is both worlds where *Mary is pregnant* and *Mary is not pregnant*. In other words, no restriction can be made on the local context of the second disjunct.

0	1	1
0	0	0

b. The truth table for exclusive disjunction in classical logic

p	q	p∨q
1	1	0
1	0	1
0	1	1
0	0	0

Schlenker's theory, on the other hand, cannot expound the redundancy effect in exclusive disjunctions. The reason is as follows: In an exclusive disjunction, when the first disjunct is true, the truth or falseness of the second disjunct still affects the truth conditions of the disjunction (see the truth table in (46b)); accordingly, the local context of the second disjunct cannot be restricted. This divergence between inclusive and exclusive disjunctions can be resolved by Mayr and Romoli's amendment. By and large, Schlenker's local context theory is sufficient to account for the redundancy effect of English constructions.

Further, the merit of a generalized theory is that it can be proved adequate in more than one language. Thus, I will investigate Schlenker's theory in Japanese in the next section.

3.3.5 An exploration of the redundancy effect in Japanese

In this section, I investigate whether Schlenker's prediction for the redundancy effect can be proven effective in two major Japanese constructions, conjunction and relative clause. The rationale is as follows. Conjunctions provide solid evidence when judging the adequacy of a theory of presupposition projection. And relative clauses in head-final languages such as Japanese and Korean have been studied by linguists, such as Ingason (2016) and Chung (2018), to examine presupposition projection theories.

Firstly, in Japanese, conjunction is signified by a clitic such as the morpheme *-te* in (47). Since *-te* is attached to the first conjunct, the structure of a Japanese conjunction is commonly like (47d). The structure (47d) is divergent from a structure of an English conjunction in (48b).

(47) a. Ame-ga fut-te-i-*te*, Mary-ha ame-ga fut-te-iru
rain-Nom fall-Ger-Prog-*Conj*, Mary-Top rain-Nom fall-Ger-Prog
koto-o sit-te-i-mas-u.
thing-Acc know-Ger-Prog-Pol[17]-NPst[18]

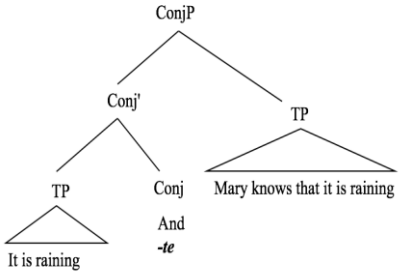
[17] *Pol* stands for Polite, an honorific usage in Japanese which originates from Japan's hospitable culture.

'It is raining and Mary knows that it is raining.'

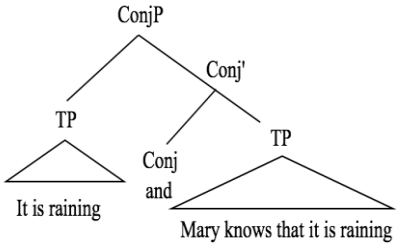
b. Ame-ga fut-te-i-*te,* Mary-ha sore-o sit-te
rain-Nom fall-Ger-Prog-*Conj*, Mary-Top that-Acc know-Ger
-i-mas-u.
-Prog-Pol-NPst
'It is raining and Mary knows that.'

c. # Mary-ha ame-ga fut-te-iru koto-o sit-te
Mary-Top rain-Nom fall-Ger-Prog thing-Acc know-Ger
-i-te, ame-ga fut-te-i-mas-u.
-Prog-Conj, rain-Nom fall-Ger-Prog-Pol-NPst
'Mary knows it is raining and it is raining.'

d. A simplified tree structure of (47a)[19]



(48) a. It is raining and Mary knows that it is raining.
b. A simplified tree structure of (48a)



Conjunction (47a) is judged as acceptable by a Japanese native speaker who provides (47b) as the most natural way to express the same amount of information as (47a). According to Schlenker's theory, in (47a), the first conjunct *it*

[18] NPst stands for non-past. Japanese has two major types of tense, past and non-past tense.

[19] The rationale for the structure in (47d) is that in Japanese conjunctions, *and* is expressed through a clitic, a morpheme *–te* or *–i*, which is attached to the first conjunct. The verb in the first conjunct is non-finite and the verb in the second conjunct is finite. This construction is known as the "Altaic Pattern". The non-finite conjunct is regarded as a "gerund-like" clause and is treated as "a (morphosyntactically) subordinate clause" (see Rudnitskaya 1998 and Kubota and Lee 2015). Under this theory, in a Japanese conjunction, the c-command relation is that the second conjunct c-commands the first conjunct as in (47d).

is raining enters the original context. The local context for the second conjunct thereby entails that *it is raining*. The second conjunct updates the context with information that *Mary knows about the raining situation*. Following Schlenker's left-right processing order, conjunction (47a) is not incrementally redundant, given that both conjuncts augment new information into the context. True to the native speaker's judgment, (47a) is globally redundant because it is trivial to state *it is raining* again in the second conjunct. Hence, (47b) is the most natural version of (47a). In (47c), the first conjunct *Mary knows that it is raining* enters the original context, and accordingly, the local context of the second conjunct entails the information that *it is raining*. Thus, Schlenker's theory predicts that the utterance of *it is raining* in the second conjunct is redundant, which aligns with the native speaker's judgment. Conjunctions in (47) verify that Schlenker's left-right processing proposal is effective in Japanese conjunctions.

Secondly, I explore Japanese relative clauses to investigate Schlenker's theory. In (49),

(49) John-ga mibouzin-no zyosei-ni at-ta.
John-Nom widow-Gen woman-Dat meet-Pst
'John met a woman who is a widow.'
(Adapted from Ingason 2016: 5)

mibouzin (*widow*) in the relative clause contributes the information of *a woman who has lost her husband* into the context. Subsequent to the relative clause, the head noun *zyosei (woman)* adds nothing new into the context. Therefore, Schlenker's theory predicts that (49) is redundant. However, judged by native speakers, this sentence is not redundant. In Japanese, a relative clause is in prenonminal position, which can cause problems for Schlenker's left-right processing mechanism, as investigated by Ingason (2016) and Chung (2018).

In these two Japanese constructions, conjunction supports Schlenker's proposal, while relative clause rejects it. This discrepancy motivates linguists to either modify Schlenker's proposal or to explore other solutions to account for these empirical data. In the following section, I examine five more phenomena in Japanese and Chinese, which could potentially be problematic for Schlenker's theory.

3.3.6 A discussion of Schlenker's local context in Japanese and Mandarin Chinese

In this section, to examine whether Schlenker's local context theory is adequate in Japanese and Chinese, I investigate five constructions and phenomena, namely Japanese relative clause, null argument phemonemon, *sooda* construction, scrambling, and Chinese nominal modification constructions (hereafter NMC).

Firstly, a Japanese relative clause is dissimilar from its English counterpart from a number of aspects. The first difference is that a Japanese relative clause is in pre-nominal position while an English relative clause is in post-nominal posi-

tion, as I have inspected in the previous section. The second difference is that a Japanese relative clause employs no relative pronoun such as that, who, etc. The third difference is demonstrated in (50).

(50) a. Japanese
Watakusi-ga sono hito-no namae-o wasure-te-simat-ta
I-Nom *that person*-Gen name-Acc forget-Ger-end.up-Pst
okyakusan…
guest
'A guest whose name I have forgotten…' (Adapted from Kuno 1973: 237)
b. English
A *guest whose name* I have forgotten…

In (50a), the head noun *guest* in the main clause coindexes with a resumptive pronoun *that person* in the relative clause. Taking account of the linear order processing, in (50a), when *that person* is encountered in the relative clause, no preceding information can assist with the comprehension of *that person.* Consequently, *that person* can only be processed when the main clause or the entire sentence is available. In this process, the evaluation of *that person* has to be delayed, which is inconsistent with Schlenker's theory. Schlenker's theory is substantiated to be effective in an English relative clause as (50b) demonstrates. In (50b), the interpretation of *whose name* in the relative clause is indeed accomplished on the fly. With (49) and (50) as evidence, Japanese relative clauses do not verify Schlenker's proposal.

Secondly, I inquire into the null argument phenomenon in Japanese concerning how it affects Schlenker's word-by-word proposal. Null arguments are studied extensively by linguists in world languages. Among those languages, some are inflectional rich such as Spanish and Italian, both of which have inflectional endings and agreement markers to license null arguments. Other languages such as Japanese and Chinese have no number or person inflections, making the identification of null arguments a much debated topic. Consider the following data.

(51) (Pro ga) ki-ta noni, Taroo-wa kaettyat-ta?
come-Pst even though Taro-Top go.home-Pst
'Did Taro go home, even though someone had come?' (Adopted from Isao 2017: 163)

The subject of the adverbial clause of concession is null. It is not possible to fully compute the adverbial clause only with the information of *came even though*, which does not make much contribution to the context. When the complete sentence is accessible, the subject of the adverbial clause is different from the subject of its main clause, and can be identified from the discourse. Pertaining to such null argument instances, a question can be raised regarding semantic processing. If semantic processing deals strictly with the string, *came even though*, then the null subject would potentially cause problems for Schlenker's word-by-word

computation mechanism. If semantic processing works with more than literal words, then presumably, a covert subject is there to be processed, which does not function against Schlenker's theory. Further research should be conducted to resolve this issue.

Thirdly, I explore a Japanese *sooda* construction in (52), which is adopted from Takahashi (1994).

(52) Mary-ga John-ni nanika-o age-ta onna-ni
Mary-Nom John-Dat something-Acc give-Pst woman-Dat
at-ta *sooda.*
meet-Pst I heard
'I heard that Mary met a woman who had given something to John.'

In the processing of (52), the complement clause *Mary met a woman who had given something to John* is a complete sentence itself with tense information, which should be computed on the fly. Through this way, the complement clause is executed in the actual world *w*, which is incorrect in (52). The complement clause should rather be executed in the speaker's belief worlds, which cannot be achieved from Schlenker's on-the-fly processing mechanism. In the English translation, *I heard that* is uttered prior to the complement clause, which provides the speaker's belief worlds for the computation of the complement clause and gives rise to the correct outcome. Japanese has constructions such as *sooda* that can stand alone without the assistance of an overt subject *I*, which does not support Schlenker's framework.

Fourthly, I explore Japanese scrambling constructions in (53) to examine Schlenker's local context theory.

(53) Scenario: A teacher A who works at a middle school is talking to his colleague B
A utters: Ikura tyuui si-temo si-tarinai, ayauin-des
much attention do-though do-not enough,dangerous-Pol
-u *tyuugakusei-ha.*
-NPst *middle.school.students-Top*
'No matter how much attention you pay, middle school students still have radical behaviors/ middle school students can be dangerous.'

In (53), *dangerous* is dislocated and scrambled to precede the subject *middle school students*. Following the linear order computation mechanism, information that precedes the subject cannot be properly processed until the subject is available. Scrambling constructions such as (53) are quite common in Japanese and can potentially cause problems for Schlenker's on-the-fly mechanism.

Fifthly, I analyze Chinese NMCs to explore Schlenker's theory in a concrete example (54).

(54) Nage chaoshi you guonei-de *nazhong* mianfen
Which supermarket have China-Comp *that.kind* flour
henduo-de *xiangchang*?
much-Gen *sausage*
'Which supermarket sells the sausage with a lot of flour inside whose kind we have in China?'

(54) is a complex sentence where the head noun *sausage* has two modifiers: a PP (with a lot of flour inside) and a relative clause. And *sausage* coindexes with a resumptive pronoun *that kind* in the relative clause. In accordance with the linear order processing, when *that kind* is encountered in the relative clause, no preceding information can assist the comprehension of *that kind*. Consequently, *that kind* can only be processed when the main clause or the entire sentence is available. In this process, the evaluation of *that kind* has to be delayed, which is incompatible with Schlenker's theory. Sentence (54) resembles the Japanese example (50), which can be explicated if the computation process is delayed until an entire sentence is available.

The two constructions in section 3.3.5, combined with the five phenomena and constructions in this section, motivate amendments to Schlenker's local context updating mechanism, which have been advanced in the last few years. Specifically, Chung's modification to Schlenker's theory is recapitulated in section 3.5, and Rothschild's "loosen-up" semantic account of presupposition projection incorporated with Schlenker's order constraint is introduced in section 3.6. Prior to the overview of these amendments, I will firstly present the empirical work I have completed to investigate whether Schlenker's local context proposal can account for the redundancy effect in Japanese and Chinese to corroborate with the theoretical analyses in this section.

3.4 Tests of the redundancy effect

I have conducted two tests pertaining to the redundancy effect in Japanese. The first one is to obtain basic judgments regarding whether Schlenker's theory is predictive in Japanese. The second one is to scale the acceptability of sentences for the purpose of detailed analyses. These two tests are presented in section 3.4.1 and 3.4.2 respectively. Moreover, I've undergone a fairly rudimentary test in Chinese to corroborate with the Japanese data in section 3.4.3.

3.4.1 Test one of the redundancy effect in Japanese

3.4.1.1 Design

The first experiment is a judgment task: Participants are requested to read sentences and judge which one of the following four choices is correct, as (55) demonstrates.

(55) A dog bit me with teeth.
A. This sentence has superfluous parts.
B. This sentence is natural.
C. This sentence is grammatically incorrect.
D. None of the above, please indicate _____

If a participant assesses the sentence (55) as redundant, then he should choose option A. If he views the sentence (55) as natural, then he should opt for option B. Options A and B are sufficient for a judgment task to function. However, given that Japanese is a free word-order language, the word order I employ in some complex sentences may not be accepted by some participants and may thereby be judged as ungrammatical (option C). Moreover, there may be other reasons in addition to redundancy for a test sentence to be degraded, i.e. culturally-based language usage; thus, option D is available for participants to indicate reasons for the unnaturalness of a sentence. Lastly, multiple choices can be made on each sentence; for example, a sentence can be judged as both C and D.

The rationale for this test is as follows. In the English sentence (55), when a reader processes *A dog bit me,* the reader is automatically aware of the information that *a dog biting is using teeth*. Consequently, it is redundant to employ the phrase *with teeth* later in the sentence. This computation process is what Schlenker's left-right mechanism predicts. Accordingly, whether Schlenker's mechanism holds for Japanese is examined through sentences such as (56).

(56) # Inu-ga ha-de watasi-o kan-da.
dog-Nom teeth-Dat I-Acc bite-Pst
'A dog bit me with teeth.'

In (56), in line with Schlenker's theory, when *ha-de (teeth)* is processed first, this sentence should not be interpreted as redundant, for the reason that *teeth* do not necessarily entail *bite* (teeth can also be a part of canine anatomy). The later encounter of the word *bite* contributes new information into the context. Therefore, Schlenker's mechanism predicts (56) to be not redundant, which is contrary to native speakers' introspective judgment. Instances such as (56) render Schlenker's theory to be not predictive.

The test consists of 20 core sentences such as (56), whose corresponding minimal-pair sentences are mixed in the test such as (57).

(57) Inu-ga surudoi ha-de watasi-o kan-da.
dog-Nom sharp teeth-Dat I-Acc bite-Pst
'A dog bit me with sharp teeth.'

In (57), the phrase *sharp teeth* does not entail *bite*, and the later encounter of *bite* updates the context. Accordingly, Schlenker's theory predicts (57) to be not redundant.

My prediction is that the key test group (hereupon group A) disproves Schlenker's theory. By contrast, the minimal-pair group (hereupon group B) proves it. If my prediction is verified correct, this discrepancy in Japanese data is challenging for Schlenker's theory, and an explanation is in order.

3.4.1.2 Materials, Procedure and Participants

I've constructed 44 Japanese sentences[20], 20 in group A and 24 in group B. These sentences are of two types: simple sentences such as (56) and relative clauses such as (58).

(58) a. # Tanaka-ha zyosei-no ueitoresu-o sit-te-ir-u.
Tanaka-Top woman-Gen waitress-Acc know-Ger-Prog-NPst
'Tanaka knows a waitress who is a woman.'
b. Tanaka-ha ueitoresu-no zyosei-o sit-te-ir-u.
Tanaka-Top waitress-Gen woman-Acc know-Ger-Prog-NPst
'Tanaka knows a woman who is a waitress.'
c. ? Tanaka-ha suteki-na zyosei-no ueitoresu -o sit-te-
Tanaka-Top nice-Cop woman-Gen waitress-Acc know-Ger-
ir-u.
Prog-NPst
'Tanaka knows a waitress who is a nice woman.'

I have explicated the rationale for the simple sentences in (56) and (57). Thus, I only clarify the rationale for relative clauses in this section. Each relative clause in group A, such as (58a), has two corresponding relative clauses in group B such as (58b) and (58c). In (58a), in line with Schlenker's theory, *zyosei (woman)* is encountered first, and the later computation of *ueitoresu (waitress)* adds new information into the context, which should make (58a) non-redundant. Nevertheless, (58a) is intuitively redundant in Japanese. In the case of (58b), *ueitoresu (waitress)* is processed earlier than *zyosei (woman)*. The word *waitress* entails the information of *a woman and her occupation,* which makes the later utterance of *woman* redundant. Therefore, Schlenker's theory predicts (58b) to be redundant, which is intuitively incorrect. Relative clauses such as (58b) are employed as crucial evidence by Ingason (2016) to disprove Schlenker's theory, and I thereby add (58c) into group

[20] The complete test material is in Appendix 1. Four sentences (example 14, 15, 35, 36 in Appendix 1) in the test are adapted from Ingason (2016) in order to inspect his approach, which is essential for this paper.

B to further investigate Japanese relative clauses. In (58c), *nice woman* is computed earlier than *waitress*, and *nice woman* does not entail *waitress*. The later encounter of *waitress* thereby augments new information into the context. (58c) is predicted by Schlenker's theory to be not redundant. The judgment on (58c) is to be determined by the test. As I have discussed in section 3.3, Japanese relative clauses do not verify Schlenker's mechanism in various aspects, and this test will reveal more.

I recruited 13 Japanese native speakers through friends. These participants have bachelor's degrees and above. Participants accessed the online test which was generated from a Chinese software *wenjuanxing* via https://www.wjx.cn/jq/69698843.aspx, and they judged sentences on this webpage. After completing the test, they clicked on a submit button. This operation recorded their results that were then electronically transmitted to me. Participants spent 15 minutes on average completing the task. Subsequent to my inspection of their answers, I interviewed them concerning said answers. The interviews spanned from a half hour to an hour, depending on their answers. Participants were rewarded ten euros for their contribution. If the interview exceeded the allotted time, the participant received 13 euros.

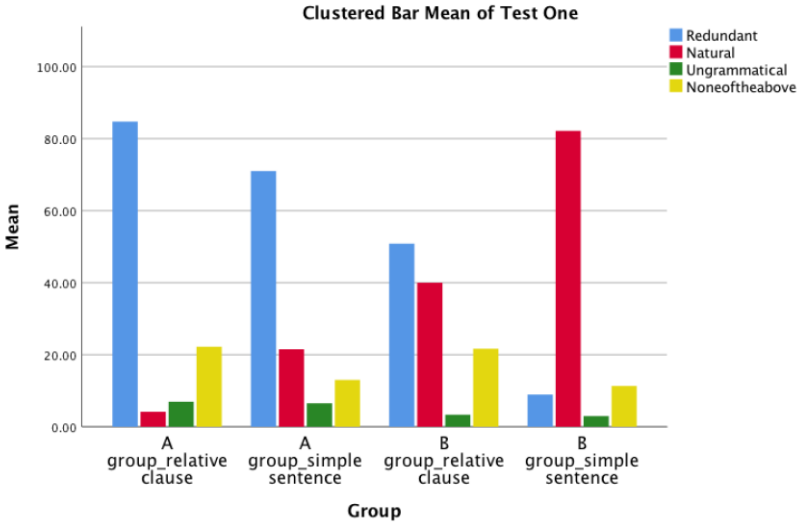
3.4.1.3 Results

When the test results were transmitted to me electronically, I downloaded the data and analyzed them through a software, Statistical Package for The Social Sciences (SPSS). I carry out this analysis using the test output of twelve participants, for the reason that the thirteenth participant was not available for the crucial interview.

The following bar chart [21] (59) produces the distribution of sentence acceptability rate divided by four test groups.

[21] As can be noticed from the bar chart, the combined percentage in each group is higher than 100%, which is a predicted outcome. The reason is that the test is designed to permit multiple choices for each question.

(59) The output of test one



(A group is the key test group; B group is the minimal-pair group.)

In this section, I analyze the basic results that are produced by the graphs and then proceed with a detailed inspection in the next section. As observed from (59), the output of the simple sentence group is straightforward: The key sentence group exhibits a strong tendency of redundancy. By contrast, the minimal-pair group manifests naturalness. This output is consistent with my conjecture that Schlenker's theory is not predictive for the former but predictive for the latter. The relative clause group conveys mixed information. To be specific, the key relative clause group shows a cogent tendency of redundancy, which disproves Schlenker's theory. The minimal-pair relative clause group, however, does not exhibit much discrepancy between redundancy and naturalness, an observation in need of closer inspection. All in all, this test indicates that Japanese data do not support Schlenker's theory, although a distinct conclusion cannot be drawn solely in the light of the chart (59).

3.4.1.4 Discussion

In this section, I inspect the test results in detail following the group division, namely the simple sentence subgroup in group A, the relative clause subgroup in group A and the relative clause subgroup in group B.

Firstly, the prediction of group A is that sentences in this category exhibit redundancy, which is borne out. There is a rating in group A that should be explicated: The simple sentence subgroup demonstrates 15% lower in redundancy and 20% higher in naturalness than the relative clause subgroup does. This discrepancy is accounted for through my interviews with testees, which is illustrated in (60).

(60) a. Inu-ga ha-de watasi-o kan-da.
dog-Nom teeth-Dat I-Acc bite-Pst
'A dog bit me with teeth.'
b. The frequencies of (60a)[22]

		Responses		Percent of Cases
		N	Percent	
Q26[a]	a26	11	84.6%	91.7%
	b26	2	15.4%	16.7%
Total		13	100.0%	108.3%

As can be observed from (60b), 15.4% of testees judge (60a) as not redundant, and the ground they provide for their assessment is that (60a) can be perceived as an emphatic usage. For example, when (60a) appears in a scenario where an adult teaches a young child, this emphasis, *a dog bites with teeth,* can assist the child's learning process.

Moreover, as stated by some participants, (60a) is acceptable in Japanese, although, strictly speaking, it is redundant. This type of usage occurs in both Chinese and Japanese, as the expressions (61) exhibit.

(61) a. Japanese
gak*kou*-ni tou*kou*suru
school-Dat go.to.*school*
'go to school'
b. Chinese
mantian-de xingkong
sky-Gen starry.*sky*
'starry sky'

In (61a), *school* occurs twice in the phrase *go to school*, and in (61b), *sky* occurs twice in the phrase *starry sky*. These expressions are technically redundant but are in daily use to convey emphasis.

Secondly, I examine the statistics of the relative clause subgroup in group A from one perspective. It is discernable from the bar chart that the rating for option D is 22%, which is unpredicted. I clarify this rating through (62).

(62) a. Tarou-ga zyosei-de gengogakusya-dearu miboujin-ni
Tarou-Nom woman-Conj linguist-be widow-Dat
at-ta.
meet-Pst
'Tarou met a widow who is a woman and a linguist.'

[22] The tables in my experiments were exported directly from SPSS. Their layouts are slightly different from other tables in the thesis.

b. The frequencies of (62a)

		Responses		Percent of Cases
		N	Percent	
Q36[a]	a36	9	56.3%	75.0%
	b36	1	6.3%	8.3%
	c36	2	12.5%	16.7%
	d36	4	25.0%	33.3%
Total		16	100.0%	133.3%

It is transparent from (62b) that participants choose *d* when they opt for *a*, *b*, or *c* at the same time, for the reason that the sum percentage of cases *a*, *b*, and *c* exactly amounts to 100%. The reason for this outcome was uncovered during my interviews with the testees. Some of them find it abnormal to indicate the nature of a human being in the following way: *a widow is a woman*. Moreover, some of them do not perceive it as appropriate to indicate the nature of a human being and the person's occupation in one sentence, such as *a widow who is a woman and a linguist*. When this factor is elucidated, it is salient that, in the key test group, relative clauses hold a strong tendency of redundancy, which does not verify Schlenker's theory.

Thirdly, I inspect the data of the minimal-pair group. The simple sentence subgroup exhibits an evident tendency of naturalness, which seems to verify Schlenker's theory and is in accordance with my prediction. The relative clause subgroup, however, conveys indeterminate information in the way that the redundancy rate is slightly higher than the naturalness rate, as (59) displays.

I interpret these data from two perspectives. I firstly examine the relative clauses in this group through (63).

(63) a. Tarou-ha mibouzin-no zyosei-ni at-ta.
Tarou-Top widow-Gen woman-Dat meet-Pst
'Tarou met a woman who is a widow.'

b. The frequencies of (63a)

		Responses		Percent of Cases
		N	Percent	
Q14[a]	a14	1	7.7%	8.3%
	b14	11	84.6%	91.7%
	d14	1	7.7%	8.3%
Total		13	100.0%	108.3%

In (63a), *mibouzin (widow)* is processed first, which encodes the information of *a woman and her marital status*. Schlenker's left-right computation process renders the later utterance of *zyosei (woman)* redundant. Nevertheless, as the frequency table (63b) displays, 84.6% of the participants assess this sentence as natural. Instances such as (63) indicate that Schlenker's theory is not adequate to explicate Japanese relative clauses.

Now that the naturalness rating in this group is explicated, secondly, I proceed with the explanation of the redundancy rating in this group. As described in section 3.4.1.2, for relative clauses, I construct two relative clauses in group B to contrast with each relative clause in group A. One set of relative clauses is demonstrated in (63a) and the other set is in the following (64a).

(64) a. ? Tanaka-ha suteki-na zyosei-no ueitoresu-o sit-te-
Tanaka-Top nice-Cop woman-Gen waitress-Acc know-Ger-
i-ta.
Prog-Pst
'Tanaka knew a waitress who is a nice woman.'

b. The frequencies of (64a)

		Responses		Percent of Cases
		N	Percent	
Q17[a]	a17	10	62.5%	83.3%
	b17	3	18.8%	25.0%
	c17	1	6.3%	8.3%
	d17	2	12.5%	16.7%
Total		16	100.0%	133.3%

(65) Tanaka knew a waitress who is a nice woman.

(65) is the English counterpart of (64), and (65) is not redundant intuitively, which can be corroborated by Schlenker's theory. In line with Schlenker's account, in (65), *a waitress* entails *a woman*, but not *a nice woman*. The same mechanism should be applied to the Japanese sentence (64a): *sutekina zyosei (nice woman)* does not entail *ueitoresu (waitress)*. Consequently, in line with Schlenker's theory, (64a) should not be degraded. Nevertheless, (64a) is assessed by native speakers as redundant, which does not support Schlenker's theory.

In order to account for the redundancy in (64a) judged by native speakers, I summarize the possible orders of computation that are on the market, as shown in (66).

(66) Possible orders of computation
a. Left-right asymmetric computation mechanism (Schlenker 2009)
b. Right-left computation mechanism
c. Symmetric computation mechanism (Schlenker 2009, 2010)
d. Delayed evaluation (Chung 2018)
The computation of a sentence should wait until an entire sentence is available;
the processing of a sentence should not be done on the fly.

e. Inside-out generalization (Schlenker 2020)
In an NMC, a head noun can have multiple modifiers. The order of computation should be as follows: The head noun is computed first, which is followed by the modifier that is in proximity to the head noun.
f. Hierarchical computation mechanism (Ingason 2016)

Among these six options, the left-right asymmetric processing makes incorrect predictions in the case of (64a). And this outcome is substantiated by participants through my interviews that they do not take account of the left-right order when they assess a sentence. Further, it is not transparent, at this stage, how the right-left processing, the symmetric processing, and the hierarchical processing can explicate the redundancy in (64a).

Further, the delayed evaluation is promising, for the reason that when the entire sentence (64a) is available for testees, the judgment that (64a) is redundant can be made. Aside from the delayed evaluation proposal, Schlenker's insider-out generalization seems to function as well in the case of (64a). According to Schlenker (2020), the head noun *waitress* is processed first. Subsequently, its modification construction *nice woman* is processed later. During this process, the word *woman* does not add anything new into the context which has already been updated by *waitress*. Therefore, the redundancy in (64a) is predicted by Schlenker's generalization. I cannot reach a categorical conclusion at this point regarding which order of computation is preferable in explicating Japanese data. These orders of computation will be examined throughout this paper: The delayed evaluation will be discussed in chapter 3; the symmetric computation mechanism will be explored in chapter 4; the inside-out generalization and the hierarchical computation mechanism will be investigated in chapter 5.

To conclude, relative clauses in the minimal pair group disprove Schlenker's theory, represented by (63a) and (64a): (63a) is predicted by Schlenker's theory to be redundant, but judged by native speakers as not redundant; (64a) is conjectured by Schlenker's framework to be not redundant, but assessed by native speakers as redundant. This discrepancy is confirmed by the data that, in this group, the rate of redundancy is almost tantamount to the rate of naturalness.

All in all, among the four groups, only the simple sentence subgroup in group B confirms Schlenker's theory, an outcome which suffices to cast doubt on it. This first test provides a basic judgment that Schlenker's theory is not predictive pertaining to the redundancy effect in Japanese sentences. To obtain more detailed results, I proceed with a second test presented in the next section.

3.4.2 Test two of the redundancy effect in Japanese

3.4.2.1 Design

The second experiment is a judgment task: Participants are requested to read sentences and rate their naturalness from the scale of 1 to 7, 1 being the least natural and 7 the most natural, as (67) presents.

(67) Mary takes a bath with water.

completely unnatural	1	2	3	4	5	6	7	completely natural

The test was conducted as follows: Participants accessed the test via a link, where they assessed sentences and made their judgments online. Afterwards, a submit button appeared, through which the participants' answer sheets were recorded.

In this test, if a participant rates a sentence as 4 or below 4, a follow-up question automatically appears to inquire the reason for the participant's choice. I design the test this way in order to comprehend the participants' rationale for their choices. (68) is an instantiation of the pop-up questions that appear in the test.

(68) The reason for (67)'s unnaturalness is:
A. This sentence has superfluous parts.
B. This sentence is grammatically incorrect.
C. None of the above, please indicate _____

If a participant rates a sentence as 5 or above, he/she advances to the next question. I design the test this way for two reasons: Firstly, this rating system provides a more precise acceptability frame of sentences; secondly, participants are more thorough in the task when required to explain their choices.

3.4.2.2 Materials, Procedure and Participants

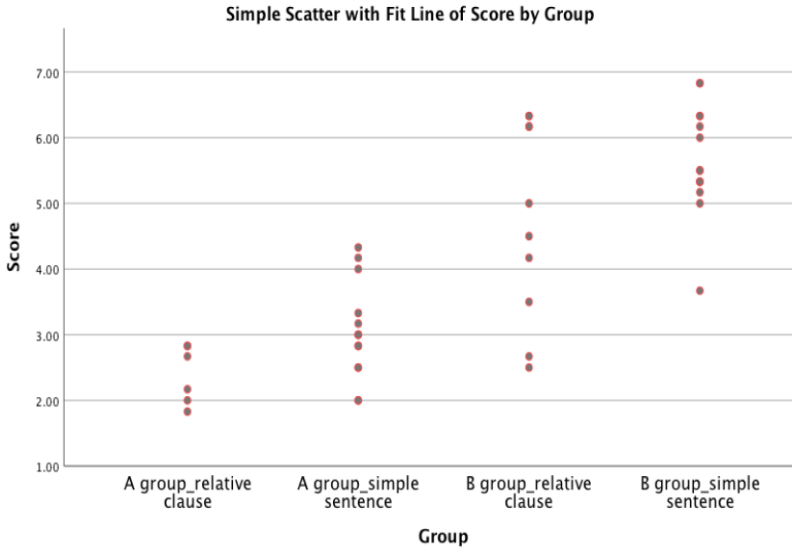
I recruited seven participants from friends for this online test. Participants accessed the test which was generated from the Chinese software *wenjuanxing* via https://www.wjx.cn/jq/70562853.aspx, where they judged test sentences. When they completed the task, a submit button appeared, through which the results were recorded by the software and transmitted to me electronically. Participants spent on average 40 minutes completing the test. Subsequent to my inspection of their answers, they were interviewed by me regarding said answers. The interviews averaged about half an hour. Each Participant received a remuneration of ten euros for their engagement. Further, test materials, group division, and predictions in this test are on a par with those from test one.

3.4.2.3 Results

When the test results were transmitted to me electronically, I downloaded the data and analyzed them in the SPSS software. The outcome is analyzed on the basis of six answer sheets. I eliminated one answer sheet, for the reason that one partici-

pant was not available for an interview. (69) is the outcome of this test, divided by group.

(69) The output of test two



In this section, I inspect the basic patterns revealed by the graph and examine the data in detail in the next section. The results are on a par with the results from test one. Score 4 is where I draw the line between unnaturalness and naturalness. The naturalness of group A in general is lower than that of group B, in view of the fact that the highest rating of naturalness in group A is 4.5 while a portion of group B is rated between 6 and 7. To be specific, some sentences in group B have an average score of 6.83 as (70) displays.

(70) The statistics of Q42

Descriptive Statistics

	N	Minimum	Maximum	Mean
Q42	6	6	7	6.83
Valid N (listwise)	6			

In general, the chart (69) demonstrates the following. Firstly, the unnaturalness rating of group A is not consistent with Schlenker's theory. Secondly, the simple sentence subgroup in group B is in accordance with Schlenker's prediction. Thirdly, the relative clause subgroup in group B conveys mixed messages, for the reason that the rating is scattered from 2.5 to 6.5. Detailed inspection is in the next section.

3.4.2.4 Discussion

In this section, I interpret the data from test two in detail. I start with the illustration of the score patterns that are on a par with the patterns in test one. Subsequently, I focus on some abnormal ratings.

To begin with, I clarify the basic patterns of the outcome of test two from four perspectives. Firstly, in group A, some sentences in the simple sentence subgroup are rated as passing the naturalness line, which is predicted in light of the results of test one. The reason for this rating is that some sentences are treated by native speakers as emphatic usage, as I have discussed in section 3.4.1.4. Secondly, in group A, the relative clause subgroup is consistent with my prediction that Schlenker's theory is not borne out in Japanese relative clauses. The fact that this result is compatible with that of test one provides cogent evidence for my prediction. Thirdly, in group B, eight dots among nine in the simple sentence subgroup are rated above 5, which suffices to prove the naturalness of sentences in this group. I inspect that one dot in this section. Fourthly, in group B, the relative clause subgroup exhibits scatter patterns that are in line with the data from test one. As can be observed from the patterns, eight dots are scattered, among which, four are above the natural boundary and the other four are below the natural boundary. Just as I have inspected in section 3.4.1.4, half of the relative clauses in this group is judged as natural, and the other half is judged as redundant by native speakers, both of which disprove Schlenker's theory.

Subsequently, I proceed to examine the abnormal rating in the output. As can be discerned from the chart (69), some sentences in the simple sentence subgroup of group B are rated as below 4, which is explicated through (71).

(71) a. Watasi-ha seiketu-na mizu-de ofuro-ni hairi-mas-u.
I-Top clean-Cop water-Dat bath-Dat have-Pol-NPst
'I take a bath in clean water.'

b. The statistics of (71a)

Descriptive Statistics

	N	Minimum	Maximum	Mean
Q24	6	2	7	3.67
Valid N (listwise)	6			

The rationale for this sentence is that *taking a bath* entails *using water*, but not *using clean water,* for the reason that a person can also bathe in a river, whose water is not exactly clean. From the statistics in (71b), some participants sense the rationale for this sentence (the maximum rating is 7, completely natural), while more of them evaluate this sentence as unnatural, judging from the mean 3.67. From the interviews, I understand the participants' grounds for their judgments. They strongly associate *bath* with *body cleansing*, which explains their belief that uttering the word *clean* is redundant. Japan has a specific bath culture, a cultural factor that can elucidate the abnormal unnaturalness rating of (71).

On the ground that the abnormality in test two has been clarified, test one and two yield unanimous results, which suffices to disprove Schlenker's theory. All in all, Schlenker's proposal derives correct interpretations for most English constructions. In contrast, his proposal makes incorrect predictions for Japanese and Chinese constructions and phenomena, as I have investigated in section 3.3. Moreover, the empirical work that I present in this section corroborates with the theoretical analyses. Thus, my conclusion is that Schlenker's theory is not adequate to elucidate Japanese and Chinese data. Prior to introducing amendments to Schlenker's theory, in the next section, I briefly present Chinese empirical evidence to corroborate with my conclusion.

3.4.3 A test of the redundancy effect in Mandarin Chinese

In this section, I present a rudimentary test in Chinese to investigate Schlenker's local context theory. (72) is a pair of Chinese NMCs.

(72) a. Laizi Beijing-de Zhongguo ren…
coming.from Beijing-Comp China person
'A Chinese who is from Beijing…'
b. # Laizi Zhongguo-de Beijing ren…
coming.from China-Comp Beijing person
'A Beijinger who is from China…'

In (72a), under Schlenker's word-by-word processing, when the word *Beijing* is processed, it contributes the common knowledge that *Beijing is a city in China* into the context. Consequently, the articulation of the word *China* should be judged as redundant. I invited ten native speakers to judge this construction, and they concluded that (72a) is natural in Chinese, which is incompatible with Schlenker's prediction. Subsequently, (72b) has the same modifiers on the noun *person* as (72a), only in reverse order from (72a). In (72b), the word *China* is processed first, and *Beijing* later adds more specific information about the person, which should not be redundant. Nevertheless, native speakers judged (72b) as redundant. According to a few anonymous participants, the redundancy in (72b) is not determined from linear order.

What I can conclude from the Japanese and Chinese experiments is the following. When participants interpret a sentence, they do not take account of linear order as a factor. These experiments provide evidence that the incremental mechanism is not adequate in explicating Japanese and Chinese evidence. The investigation in section 3.3 and section 3.4 motivates revision of Schlenker's proposal, a task to which I turn in the next section.

3.5 Chung's modification to Schlenker's theory

3.5.1 An overview of Chung's proposal

Chung (2018) puts forward that "Schlenker's algorithm should not be run word-by-word, but rather domain-by-domain, possibly postponing the computation of local context" (Chung 2018: 314). Chung investigates Schlenker's proposal from two perspectives, attitude predicates and the scrambling phenomenon in Korean. Firstly, I recapitulate Chung's evaluation of Korean attitude predicates in the example (73).

(73) Korean
John-un [Mary-ka (cikum-to) keysokhayse tambay-lul
John-Top [Mary-Nom (now-also) continuously cigarette-Acc
pi-n-tako] mit-nun-ta.
smoke-Prs-Comp] believe-Prs-Decl
'John believes that Mary continues to smoke.' (Adopted from Chung 2018: 315)

(74) John believes that Mary continues to smoke.

(74) is the English counterpart of (73). As specified by Schlenker's theory, in (74), the matrix predicate *believe* is processed first, which contributes John's belief worlds into the context. The complement clause is thereby executed in John's belief worlds, which is the correct interpretation of (74). The same mechanism should be applied to the Korean sentence (73), where the matrix predicate *believe* follows the complement clause. In line with Schlenker's left-right processing order, in (73), the presupposition *Mary has been smoking* cannot be restricted to John's belief worlds, for the reason that, when the complement clause *Mary continues to smoke* is processed, the matrix predicate *believe* has not been encountered. (73) establishes evidence that the left-right processing mechanism cannot make correct predictions in Korean.

Secondly, Chung inspects Schlenker's proposal through the scrambling phenomenon in Korean, which also exists in Japanese, as I have examined in (53).

(75) Korean
[Mary-ka keysokhayse tambay-lul pi-n-tako] John
Mary-Nom continuously cigarette-Acc smoke-Prs-Comp John
-un t mit-nun-ta.
-Top t believe-Prs-Decl
'That Mary continues to smoke, John believes.' (Adopted from Chung 2018: 316)

In (75), the complete complement clause is scrambled to the initial position of the sentence. Accordingly, without access to the matrix subject and predicate, the presupposition *Mary has been smoking* is computed in the global context and in the actual world. This computation process following Schlenker's mechanism derives

incorrect interpretation for (75), whose complement clause is supposed to be executed in John's belief worlds.

On the basis of these data, Chung concludes that the left-right asymmetric processing order does not apply to Korean. Chung thereby proposes his account, domain-by-domain evaluation: "The local context of an expression can be calculated only at points where an interpreter has access to the semantic values of the parsed expressions," and the access point to semantic values is at the clausal level (Chung 2018: 320). Chung's domain-by-domain evaluation is executed at the clausal level, and the calculation of local context should be delayed until a full clause is available. As specified by Chung, his proposal can solve the problems that Schlenker's theory encounters in the cases of (73) and (75). To elaborate, in (73), the local context is not computed until the attitude predicate *believe* is encountered, and it is only at this point where a full clause is accessible to an interpreter. Further, in (75), the evaluation of the scrambled complement clause is delayed until the matrix clause is encountered.

All in all, this delayed evaluation proposal can explicate Korean empirical data. Only when a complete sentence is available, correct judgments regarding Korean sentences can be made. Chung's proposal is promising in propositional cases, which is reviewed by Schlenker (2020), as the next section presents.

3.5.2 Issues in Chung's proposal

Schlenker evaluates Chung's proposal in his 2020 manuscript, where he addresses two doubts with regard to Chung's proposal. One point is that Chung's domain-by-domain computation process cannot provide explanations for sub-sentential presupposition projection. The other point is that Chung's delayed evaluation potentially indicates that sentence elements are processed simultaneously, when a full sentence is available. Schlenker claims that an order of computation exists in NMCs. To be specific, in (76),

(76) # Laizi zhongguo-de Beijing ren
coming.from China-Comp Beijing person
'A Beijinger who is from China…'

the head noun *person* is modified by two modifiers, *Beijing* and *who is from China*. According to Schlenker (2020), an order of computation exists between these two modifiers. The one that is in closer proximity to *person* is added into the context first. In (76), *Beijing* is entered in the context first. Subsequently, *who is from China* does not update the context. (76) is thereby predicted by Schlenker's hypothesis to be redundant, which is intuitively correct. The predicative type of expression in (76) cannot be accounted for by Chung's delayed evaluation proposal where a sentence is evaluated all at once. Although Chung's account cannot explicate the computation of local contexts in predicative cases, his proposal is worth exploring, which is left for future research.

In addition to Chung's modification to Schlenker's proposal, a linguist, Rothschild, who is inspired by Schlenker's local context theory, brings forward a modification to Heim's CCP account coupled with Schlenker's left-right constraint. Rothschild's reconstruction of Heim's proposal (2008) is encapsulated in section 3.6.

3.6 The "loosen-up" semantic account of presupposition projection incorporated with Schlenker's order constraint

A major issue in Heim's CCP proposal is that, to address its non-explanatory problem, the projection behaviors of each connective should be stipulated, which is not a preferred outcome for a generalized theory. Inspired by Schlenker's local context theory, Rothschild (2008, 2011) proposes to not abandon Heim's dynamic semantic account and to adopt Schlenker's left-right processing constraint to circumvent the non-explanatory problem.

For starters, Rothschild adopts Heim's CCP proposal where the meaning of a sentence updates contexts from a set of possible worlds to another set of possible worlds. The CCP is the effect of the truth-conditions of a sentence on contexts and is defined over contexts. The basic idea is that every sentence α has a CCP, and α is defined only if its CCP is also defined (α is true in the set of possible worlds). Further, this rule is applied recursively. For example, in a sentence, *John stopped stealing food*, this sentence is defined if and only if *John used to steal food* is satisfied in all worlds in the context. Under this condition, in all of the worlds where *John used to steal food*, that *John doesn't steal food anymore* is true in some of those worlds. When the context does not entail *John used to steal food*, this sentence is undefined.

Further, in the case of a complex sentence with constituents α and ß, an arbitrary binary operator * connects α and ß: α*ß. This sentence is defined if α and ß are both defined. Otherwise, the sentence would result in presupposition failure. Rothschild puts forward that there is no need to stipulate the projection behaviors of each connective. Rothschild's rationale is that, as long as the truth-conditions of a connective are captured, the order of projection does not matter. Rothschild names his modification to Heim's approach as the *loosen-up* dynamic account, which functions on any connective, as summarized in (77).

(77) a. C [A∧B] is defined if C[A] [B] or C[B] [A] is defined.
b. C [A∨B] is defined if C[¬A] [B] or C[¬B] [A] is defined. (Cited from Rothschild 2008a:4)

In (77a), a conjunction $A \wedge B$ is defined in context c in either of the following two cases: A is firstly computed with c, the result is then computed with B; B is firstly computed with c, the result is then computed with A. In a disjunction (77b), two orders of computation are available: A is firstly computed with c, then the negation of A on c is computed with B; B is firstly computed with c, then the

negation of *B* on *c* is computed with *A*. Regarding the computation process of a disjunction in (77b), Heim (1990) highlights that there is no rationale why an intermediate step, ¬*A* or ¬*B,* is necessary. Moreover, Rothschild states the similar concern: "The rules for disjunction are much less intuitive than the rules for conjunction" (Rothschild 2008a: 2).

In addition to the computation procedure in (77), Rothschild implements a left-right order constraint on his account in order to cope with the fact that asymmetry does get observed in constructions such as conjunctions. To illustrate, in (78a) and (78b),

(78) a. Mary used to be a teacher and she is not a teacher anymore.
b. Mary is not a teacher anymore and she used to be a teacher.

the two conjunctions are logically equivalent. Nevertheless, according to intuition, (78a) is acceptable while (78b) is deviant, which suffices to confirm that asymmetry exists in symmetric connectives. To deal with this asymmetric empirical evidence, Rothschild transforms his seemingly symmetric approach into an asymmetric one by adding Schlenker's left-right order constraint. As a result, Rothschild's account can give rise to all Heim's presupposition projection outputs and avoid its non-explanatory criticism.

To conclude, Rothschild proposes that Heim's CCP proposal can be modified to be an explanatory approach without the stipulations of the projection behaviors of each connective under his loosen-up framework. Rothschild's proposal will be revisited in chapter 5.

3.7 A summary of chapter 3

In this chapter, I investigate Schlenker's asymmetric approach to presupposition projection in English, Japanese, and Chinese. The outcome is summarized in (79).

(79) A summary of the exploration of Schlenker's local context theory

language	Schlenker's local context theory
English	adequate in English constructions except disjunction
Japanese	inadequate
Chinese	inadequate

The outcome is undesirable for a generalized theory. Consequently, I have overviewed two amendments to Schlenker's theory, namely Chung's delayed evaluation proposal and Rothschild's loosen-up dynamic semantic account coupled with Schlenker's order constraint. In the next chapter, on the ground that the asymmetric direction is inadequate to explicate presupposition projection patterns, I examine another major line of research, the symmetric approach to presupposition projection, and inspect its validity in English and Japanese.

Chapter 4 The symmetric approach to presupposition projection

4.1 Introduction

The incremental framework of presupposition projection is inspected in chapter 2 and chapter 3, which states that essentially only information that comes prior to an expression *E* is considered, when computing the local context of *E* (in Schlenker's theory). Schlenker's mechanism is effective in most English constructions, whereas it does not suffice to account for Japanese and Chinese empirical evidence, as I have investigated in section 3.3 and 3.4. The exploration in chapter 3 confirms that Schlenker's proposal lacks descriptive adequacy, which motivates the investigation of other mechanisms to account for presupposition projection. The aim of this chapter is to delve into the second major research direction of presupposition projection, the symmetric approach.

I approach the symmetric framework from English data firstly. Consider the following data:

(80) a. Either the bathroom is well hidden, or there is no bathroom.
b. Either there is no bathroom, or the bathroom is well hidden. (Attributed to Barbara Partee)

The incremental mechanism of presupposition projection runs into problems in disjunctions such as (80), which have been examined by linguists such as Schlen-

ker (2008, 2009) and Rothschild (2008a, 2008b, 2011) among many others. To elaborate, the incremental framework of presupposition projection predicts (80a) to have a presupposition *there is a unique bathroom*. The rationale is as follows: When a presupposition trigger *the bathroom* is encountered, the presupposition it elicits must be satisfied by its local context no matter what comes later in the sentence. Let us now see what the incremental mechanism predicts for (80b), which is the same disjunction as (80a) with a reverse order of disjuncts. In (80b), the disjunction is of the form *p or q'*, which amounts to *p or (not p and q')*. Therefore, the local context for the second disjunct should be the initial context intersected with the negation of the first disjunct. Accordingly, the local context for *q'* is *c* intersected with *there is a bathroom*. Further, the presupposition of *q'*, *there is a unique bathroom*, must be entailed by its local context. Thus, the presupposition of (80b) is *if there is a bathroom, there is a unique bathroom*. Since this presupposition is trivially true, (80b) as a whole does not presuppose anything. To sum up, the incremental mechanism of presupposition projection predicts that (80a) presupposes that *there is a unique bathroom*, whereas (80b) presupposes nothing. However, (80a) and (80b) intuitively have the same presupposition, which verifies that the asymmetric framework is not adequate. To address this problem, many linguists, such as George (2007), Fox (2008), Schlenker (2009b, 2009c, 2012), and Rothschild (2011) among many others, propose to keep the option of a symmetric account open.

The aim of this chapter is twofold. Firstly, I explore whether the symmetric framework is sufficient to account for presupposition projection patterns in major English constructions, namely conjunction, conditional and disjunction. Secondly, I intend to explore whether the symmetric approach can account for Japanese empirical facts.

The structure of this chapter is as follows. In section 4.2, I introduce the trivalent account of presupposition projection, which is symmetric underlyingly, to lay the foundation for further examinations of symmetric proposals. In section 4.3, I examine the symmetric framework in detail through Chemla and Schlenker's 2012 paper, which motivates further investigations of the symmetric account. These debates advanced by Romoli et al. (2011), Schwarz (2015), Mandelkern and Romoli (2017b), and Mandelkern et al. (2017, 2019) are recapitulated in section 4.4. In section 4.5, I proceed with my experiments in major Japanese constructions, namely conjunction, conditional and disjunction, to investigate the adequacy of the symmetric framework.

4.2 The strong Kleene semantics of presupposition projection

In the research of presupposition projection, trivalent accounts[23] based on the strong Kleene system[24] have been recognized to be capable of dealing with the symmetric readings of disjunctions. This theory of trivalent semantics of presupposition projection is illustrated by Peters (1979), and further developed by Beaver and Krahmer (2001), George (2008), and Fox (2008) among many others.

In trivalent semantics, a proposition can have the value of true, false, and a third value, # (indeterminate between true and false; obtained from presupposition failure). Accordingly, the satisfaction of a presupposition in trivalent semantics denotes that an asserted proposition does not receive the third value in any world in the context. Moreover, trivalent semantics is symmetrical; for instance, in a disjunction, the order of disjuncts does not matter, which predicts that disjunctions (80a) and (80b) yield the same presupposition.

I elaborate on how the same presupposition can be derived for (80a) and (80b) (repeated below as (81a) and (81b)) under the trivalent semantic account.

(81) a. Either the bathroom is well hidden, or there is no bathroom (p or q).
b. Either there is no bathroom, or the bathroom is well hidden (p or q).

(82) The strong Kleene truth table for disjunction

p∨q	1	0	#
1	1	1	1
0	1	0	#
#	1	#	#

In (81a), when the presupposition on the first disjunct is not satisfied, the value of *p* is #. The reason for the presupposition failure on the first disjunct is *there is no bathroom*. Under this condition, the value for *q* is 1. The entire disjunction thereby

[23] The trivalent theory of presupposition projection in this paper refers to the strong Kleene system unless indicated otherwise.

[24] The Kleene system (three-valued system) is part of many-valued logic where the number of truth-values is not restricted to only two. The mathematician and logician Stephen Kleene employs a third truth degree, undefined, in the system. The Kleene system is generally known as the strong Kleene system. There also exist the middle Kleene and the weak Kleene system developed by other scholars. (See Beaver and Krahmer 2001 for a summary.)
The weak Kleene system differentiates from the strong Kleene system mainly from the perspective that in the weak Kleene system, any combination with the third value results in the third value for the entire sentence. Additionally, the weak Kleene system can be related to the cumulative hypothesis of presupposition projection from the view that, if any of the arguments of a connective has the third value, then the sentence as a whole also receives the third value. (See Beaver 2001, chapter 2 for more details.)

has the truth value of 1. In the case of (81b), *p* is 1 when there is no bathroom. Accordingly, the entire disjunction has the truth value of 1, no matter the value of *q*. Therefore, the outcome that (81a) and (81b) are presuppositionless can be derived.

The trivalent account of presupposition projection can provide explanations for presupposition projection in disjunctions, as discussed by George (2008) and Fox (2008) among many others. Nonetheless, the trivalent account does not seem to be able to explicate the presupposition projection patterns in conjunctions, as (83) manifests.

(83) a. John is incompetent and he knows it.
b. John knows that he is incompetent and he is. (Adapted from George 2008: 9)
c. The strong Kleene truth table for conjunction

p∧q	1	0	#
1	1	0	#
0	0	0	0
#	#	0	#

In a conjunction, both conjuncts have to receive the truth value of 1 in order for a conjunction to be true. Specifically, in (83a), when the first conjunct is true, the presupposition of the second conjunct is satisfied. (83a) thereby receives the value of 1 and does not have a presupposition. Given that the trivalent account is symmetric, (83b) is predicted to share the presuppositionlessness of (83a). By contrast, in (83b), the first conjunct has to receive the truth value of 1; otherwise the entire conjunction results in 0 or #. When the first conjunct is true, its presupposition, *John is incompetent*, must be satisfied. Under this condition, the second conjunct is true as well, through which the entire conjunction receives the value of 1. Thus, (83b) does have a presupposition, *John is incompetent*. On the basis of (83), the trivalent account is not adequate to elucidate presupposition projection in conjunctions. This is observed by George (2008), who states that the strong Kleene system does not function well in a conjunction that has presuppositions on the first conjunct such as (83b).

To address the problem with conjunctions, Fox (2008) and George (2008) employ an incremental version of the strong Keene system (observed by Peters 1979 as well) by coupling the symmetric system with left-right processing. In this way, the system deals with arguments connected by an operator on the fly and has no regard for the value of the second argument that follows the first one (basically on a par with the asymmetric framework put forward by Schlenker (2009)). Following this, the order of arguments is taken into account and asymmetry is introduced into the system. In this incremental version of the trivalent account, instances such as (83) can be explicated.

To sum up, the strong Kleene account of presupposition projection is symmetric underlyingly and has no ability to take order into account. When coupled with the incremental constraint, the strong Kleene semantics can be imposed left-right asymmetry to deal with English propositional connectives. In the revised theory, George (2008) concludes that presuppositions in the first argument of major connectives get projected from the first argument and are derived as non-conditional presuppositions; presuppositions in the second argument of major connectives are derived as conditional (weaker) presuppositions. See the truth tables (84) and the summarized outcomes (85).

(84) The strong Kleene truth tables for conjunction, conditional[25], and disjunction

P∧Q	1	0	#	P → Q	1	0	#	P ∨Q	1	0	#
1	1	0	#	1	1	0	#	1	1	1	1
0	0	0	0	0	1	1	1	0	1	0	#
#	#	0	#	#	1	#	#	#	1	#	#

(85) The predicted presuppositions for connectives *and, if, or*
The strong Kleene semantics:[26]

a. p and q̲q̲' presupposition: if p, q
b. q̲q̲' and p presupposition: if p, q
c. if p, q̲q̲' presupposition: if p, q
d. if not q̲q̲', not p presupposition: if p, q
e. p or q̲q̲' presupposition: if not p, q
f. q̲q̲' or p presupposition: if not p, q

---

[25] Conditionals in this paper are analyzed as material implication, coined by Bertrand Russell. The material implication analysis relates to the truth-functional theory of conditionals, i.e. the truth value of a conditional is determined by the truth values of its parts (see Edginton 2014). According to Russell, material implication "holds for nothing except for propositions, and holds between any two propositions of which either the first is false or the second is true" (Principles of Mathematics 1903). The material implication analysis (*p*→*q*: *p* materially implies *q*) is specified by the following truth table:

p	q	p→q	p	¬q	¬(p∧¬q)	¬p	Q	¬p∨q
1	1	1	1	0	1	0	1	1
1	0	0	1	1	0	0	0	0
0	1	1	0	0	1	1	1	1
0	0	1	0	1	1	1	0	1

which is equivalent to ¬*(p*∧¬*q)* and ¬*p*∨*q*.

[26] (85d) is the contraposition of (85c). A conditional has three related conditionals: converse (interchange of the clauses), inverse (negation of the clauses), and contraposition (interchange of the clauses of the inverse conditional). The contraposition conditional (85d) is equivalent to the original conditional (85c).

An asymmetric version of the strong Kleene semantics suggested by George (2008):

a. p and q̲q'	presupposition: if p, q
b. q̲q' and p	presupposition: q
c. if p, q̲q'	presupposition: if p, q
d. if not q̲q', not p	presupposition: q
e. p or q̲q'	presupposition: if not p, q
f. q̲q' or p	presupposition: q

To summarize, when a presupposition is on the second argument of major connectives, the strong Kleene semantics and its revised version both predict conditionalized presuppositions. To be specific, in a conjunction *p and q̲q'*, if the first conjunct receives the value of 0, the whole conjunction is 0. Therefore, the first conjunct must receive 1, and the presupposition of the second conjunct must be satisfied. Accordingly, a conditionalized presupposition *if p, q* is the outcome. In the case of a conditional *if p, q̲q'*, when the antecedent clause receives the value of 0, the entire conditional is always 1. In order for the consequent clause to have an effect on the truth value of the conditional, the antecedent clause must receive 1, and the presupposition of the consequent clause must be satisfied as well. Thus, a conditionalized presupposition *if p, q* is the outcome. In the case of a disjunction *p or q̲q'*, when the first disjunct receives 1, the entire disjunction is true regardless of the second disjunct. If the second disjunct should affect the truth value of the whole disjunction, the second disjunct must be evaluated on the negation of the first disjunct. And the presupposition on the second disjunct must be satisfied; therefore, the presupposition for a disjunction *p or q̲q'* is a conditionalized presupposition *if not p, q*.

The discrepancy of predictions made by the strong Kleene semantics and its revised version lies in the cases where a presupposition is on the first argument of major connectives. In these cases, the strong Kleene semantics predicts conditionalized presuppositions, while the revised version predicts non-conditional presuppositions, as exhibited in (85).

George's proposal on the trivalent system of presupposition projection is promising. The question is whether the trivalent theory can bear further scrutiny through English data and empirical evidence from other languages. I proceed with the overview of previous linguistic work on the examination of the trivalent account in English starting from section 4.3.

4.3 Schlenker's symmetric account of presupposition projection

4.3.1 An overview of Schlenker's proposal

Schlenker (2008, 2009) has advanced some prominent theories in the research of presupposition projection. During the exploration of his asymmetric account, Schlenker recognizes the problem that disjunctions cannot be accounted for by it. Consequently, he proposes to leave the option of a symmetric framework open (see Schlenker 2010). As specified by Schlenker, in a symmetric framework, the local context of an expression *E* should involve information that not only comes before *E* but also comes after *E*. In other words, all of the information except *E* should be computed when trying to determine the local context of *E*.

Now I elaborate on Schlenker's account. In the case of (86a) (repeated from (80) above),

(86) a. Either the bathroom is well hidden, or there is no bathroom.
b. Either there is no bathroom, or the bathroom is well hidden.
c. The strong Kleene truth table for disjunction

p∨q	1	0	#
1	1	1	1
0	1	0	#
#	1	#	#

when the presupposition trigger is on the first disjunct, information that is to the right of the presupposition trigger should also be computed. Therefore, the local context of the first disjunct (where the presupposition trigger lies) should entail the content of the negation of the second disjunct, *there is a bathroom*. In this case, the presupposition of (86a) is predicted by Schlenker's theory to be *if there is a bathroom, there is a unique bathroom*, which is trivially true. For (86b), given that the presupposition trigger is on the second disjunct, the first disjunct has already been taken into account, when computing the local context of the second disjunct. According to the truth table, when the first disjunct is true, the whole disjunction is true. Thus, the projection of the presupposition on the second disjunct is conditioned on the falsity/negation of the first disjunct. In this case, the presupposition of (86b) is predicted by Schlenker's theory to be *if there is a bathroom, there is a unique bathroom*, which is on a par with it in (86a). Schlenker's predictions for disjunctions (86) are intuitively correct.

The set of disjunctions in (86) is one of the crucial examples in the exploration of the symmetric account in George (2008), Fox (2008), and Schlenker (2010). Although differences can be perceived in the detailed derivations, the symmetric accounts derive the correct presuppositions for disjunctions. The above studies

approach the symmetric direction theoretically, and I proceed with the overviews of some empirical work such as Chemla and Schlenker (2012).

Chemla and Schlenker (2012) design inferential experiments to investigate the symmetric account in disjunction through a presupposition trigger, the additive particle *too* in French. They select this trigger for two reasons. One is that "*too* needs an antecedent, which can force the information that comes after *too* to be used to satisfy a presupposition" (Chemla and Schlenker 2012:186). The other reason is that, in the research of presupposition projection, it is acknowledged that a presupposition elicited by *too* cannot be derived by local accommodation (or is rather difficult to be derived by local accommodation). When this local accommodation factor is under control, the generated inferences can be recognized that they are derived from presupposition projection.

In Chemla and Schlenker's work, they construct disjunctions in the following way:

(87) Ann too will make a stupid decision, or her brother won't decide to study abroad. (disjunction q̲q' or p) (Cited from Chelma and Schlenker 2012: 196)

The trigger *too* in the left disjunct requires a proposition that *someone else will make a stupid decision*. In the symmetric account, if this proposition is not satisfied with the information that comes before a presupposition trigger, the information that comes after the trigger can also be employed to satisfy the presupposition. In (87), the negation of the second disjunct, *Ann's brother decides to study abroad,* can be used to satisfy the presupposition that *someone else will make a stupid decision.* Accordingly, the presupposition of (87) is a conditionalized presupposition: *if Ann's brother decides to study abroad, someone other than Ann (presumably Ann's brother) will make a stupid decision*. This presupposition forces global accommodation that *if Ann's brother decides to study abroad, Ann's brother will make a stupid decision*. Disjunctions such as (87) are employed in Chemla and Schlenker's experiments.

Chemla and Schlenker examine disjunctions, *p or q̲q',* in the canonical order and disjunctions, *q̲q' or p,* in its reverse order. They predict that these two orders of disjunctions have an identical conditional presupposition, namely, *if not p, q*. If their prediction is verified correct by the experiments, then the symmetric theory is adequate to account for presupposition projection (at least in disjunctions). If unconditional presuppositions are elicited from *q̲q' or p,* then the symmetric theory is not preferable to the incremental theory. In the test, they invite native speakers of French to judge whether inferences induced by the French *aussi* (*too)* in disjunctions are conditionalized or not. Further, they embed these sentences under operators *if* and *unless*[27] to investigate whether the elicited symmetric readings are

[27] Schlenker views *unless* as the operator *if*:
Unless p, q is on a par with *if not p, q;*
Unless not p, q̲q' equals *if p, q̲q';*
Unless q̲q', not p equals *if not q̲q', not p.* (See the summarized representation of *if* in (85).)

stable. Their experiments reveal that testees support the conditionalized inferences in these different constructions, which signals that information that precedes and follows a presupposition trigger can all be taken into account to satisfy the presupposition.

Schlenker and Chelma's experiments provide empirical substantiation for the symmetric approach. Additionally, they run an acceptability judgment experiment on native speakers to ensure that constructions such as (87) are not unacceptable. Through these two types of experiments, they reach a conclusion that left-right asymmetry is not "encoded in the lexical entries of operators, but should be seen as a processing bias" (Chemla and Schlenker 2012: 215). All in all, Schlenker concludes that a theory of presupposition projection is underlyingly symmetric, and an asymmetric constraint can be imposed on top of it to account for the presupposition projection patterns in certain connectives.

4.3.2 Issues in Schlenker's proposal

Chemla and Schlenker's study is one of the earliest works to employ experimental methods to investigate presupposition projection. Their experimental results seem promising, although three concerns can be raised. Firstly, the main experiments in Chemla and Schlenker's research are devoted to the investigation of presupposition projection patterns in disjunction and conditional; therefore, other connectives should also be examined to reach an affirmative conclusion. For instance, in the literature on presupposition projection, conjunction has been deployed as solid evidence to prove the adequacy of the asymmetric theory, which has not been investigated in Chemla and Schlenker's study. This leads to a second concern. A theory of presupposition projection can either be asymmetric or symmetric. Chemla and Schlenker conclude that a theory of presupposition projection is symmetric, which indicates that an additional factor must be stipulated to account for the asymmetric presupposition projection patterns in conjunctions. In principle, an account without stipulations would be simpler. Such an additional factor imposed on the account is undesirable.

Moreover, the third concern is that Chemla and Schlenker's study is based solely on the presupposition trigger *too*, which has been a topic debated by linguists (van der Sandt and Geurts (2001), Zeevat (2002) among many others) regarding the idiosyncrasies of *too* in eliciting inferences. Consider the following data.

(88) John: I am already in bed.
Mary: My parents think I am in bed too. (Attributed to Irene Heim)

In (88), Mary's parents may not have the belief triggered by the presupposition trigger *too* that *someone other than Mary is in bed,* and this presupposition is explicated independent of the belief of the subject of the attitude predicate. Example (88) is only an instantiation of the idiosyncrasies of the presupposition trigger *too.* Regarding the concerns about *too*, Chemla and Schlenker highlight that they are not certain that *too* is an optimal choice to build their study on.

These issues have motivated linguists to investigate the strength of the symmetric account empirically, employing various presupposition triggers. Accordingly, in section 4.4, I recapitulate such previous linguistic studies.

4.4 Debate over the symmetric account

Chemla and Schlenker's symmetric proposal motivates the empirical explorations of presupposition projection of English constructions. In addition to disjunction, conditional and conjunction have been investigated by linguists, including Romoli et al. (2011), Schwarz (2015), Mandelkern and Romoli (2017b), and Mandelkern et al. (2017, 2019). Thus, I review whether the symmetric account is effective in English conditional and conjunction in section 4.4.1 and 4.4.2 respectively.

4.4.1 The investigation of the symmetric account on conditionals

4.4.1.1 An overview of the symmetric account in conditionals

In this section, I proceed with an overview of linguistic studies on the exploration of presupposition projection in conditionals from two perspectives.

Firstly, I start with a problem involved in the presupposition projection of conditionals, the Proviso Problem (Geurts 1999). As Geurts states, the proviso problem is that "a presupposition is weakened by a condition that is not intuitively observable" (Geurts 1999: 95). To be specific, in (89),

(89) a. If Fred's wife hates sonnets, then his manager does so, too. (If A_p, B)
b. If Fred hates sonnets, then his wife does so, too. (If A, B_p)
(Adopted from Geurts 1999:95)

the introspective judgment is that both (89a) and (89b) presuppose that *Fred has a wife*. However, theories under discussion in this paper predict a conditional presupposition for (89b), which is *if Fred hates sonnets, he has a wife*. This conditional presupposition is weaker than the unconditional presupposition *Fred has a wife*, which manifests the proviso problem that has been explored by linguists such as Schlenker (2011b) among many others. What they put forward is that firstly, an adequate theory of presupposition projection should be able to elicit both non-conditional and conditional presuppositions. Secondly, that theory should also be capable of selecting a presupposition between the two options.

Romoli et al. (2011) tackle the second problem of selection in conditionals, *if A, then* B_p, where the presupposition *p* is elicited by possessive NPs. They conduct picture matching tasks (see Romoli et al. 2011 for details), whose outcomes reveal that the dependency of *p* on *A* increases the inferencing rate of conditional presupposition, *if A, p*. According to this result, Romoli et al. put forth that this dependency constitutes part of the grounds for the selection between conditional

and non-conditional presuppositions. Consequently, they raise the question regarding what other factors may affect the selection of presuppositions. To address this question, Mayr and Romoli (2016) propose that real world knowledge (for instance) can assist the selection.[28]

To sum up, Romoli et al.'s study concludes that a conditional presupposition, *if A, p,* can be generated from *if A, then* B_p conditionals. Although their research is not conducted from the perspective of an asymmetric or a symmetric theory of presupposition projection, their outcome is in accordance with Chemla and Schlenker's symmetric account and the strong Kleene semantic system.

Secondly, as specified by Chemla, Schlenker, and Romoli et al.'s studies, a conditional presupposition can be generated in *if p, qq'* conditionals. Consequently, a question regarding whether a conditional presupposition can be triggered in *if pp', q* conditionals is raised, which is tackled by Schwarz (2015). Schwarz (2015) focuses on *if pp', q* conditionals where the presupposition *p* is triggered by the aspectual adverb *again*.

The rationale is as follows. In line with the symmetric account, assisted by the truth table (90),

(90) The strong Kleene truth table for conditional (material implication analysis)

p → q	1	0	#
1	1	0	#
0	1	1	1
#	1	#	#

when the consequent clause *q* is true, the whole conditional is true independent of the truth value of the antecedent clause[29]. Thus, only worlds where *q* is false should be taken into account. Under this condition, the truth value of the antecedent clause is assessed. If the antecedent clause *pp'* receives the third value, resulting from presupposition failure, then the entire conditional also receives the third value, #. Therefore, the presupposition *p* of the antecedent clause must be satisfied, which leads the presupposition of the entire conditional to be *if not q, p*.

---

[28] The selection between conditional and non-conditional presuppositions is investigated by Mayr and Romoli (2016b) from the perspective of exhaustification. They propose that a conditional presupposition is predicted. And in some cases, a stronger (non-conditional) presupposition can be obtained via exhaustification (such as the cases of biconditionals and exclusive disjunctions). They also put forth that "independently motivated plausibility considerations decide which reading is chosen with no direct selection of presuppositions needed" (Mary and Romoli 2016b: 895).

[29] Karttunen and Peters (1979) put forward the same analysis for conditionals: A speaker has reasons to believe that the conventional implicatures of the consequent clause are true regardless of the truth or falsity of the antecedent clause.

Further, Schwarz investigates the role of incrementality in presupposition projection by testing conditionals in the canonical order, *if pp', q,* and in the reverse order, *q, if pp'*. Schwarz makes the postulation that presuppositions should be in the form of *if not q, p* regardless of the orders of an antecedent clause and a consequent clause. To test his hypothesis, Schwarz employs inferencing tasks, specifically picture-matching tasks. (See Schwarz (2015) for detailed experiments.)

The results of his experiments suggest that the order of clauses does affect the presuppositionality of conditionals, which indicates that incrementality is a factor in the computation of presuppositions. Schwarz concludes that the main finding is in line with the symmetric account. Generally, Schwarz's finding is consistent with Chemla and Schlenker's conclusion that symmetric readings are derivable. And in the meantime, incrementation still plays an important role in presupposition projection.

4.4.1.2 Issues in the symmetric account

Three issues are raised pertaining to Schwarz's study. One is that aspectual adverb *again* is special in presupposition projection and that it shares some of the properties of *too* as I have encapsulated in section 4.3. To name one idiosyncrasy of *again,* it exhibits different projection behaviors when embedded in conditional and quantificational environments from normal presupposition readings that an event in a sentence has occurred in previous temporal context. (See van der Sandt and Huitink 2003 for more details.) The second complication is that it is not salient to which extent Schwarz's finding with *again* can be extended to other presupposition triggers.

The third complication involves *B, if* A_p conditionals. Schwarz (2015) concludes that *B, if* A_p conditionals substantiate the symmetric account, which is refuted by Mandelkern and Romoli (2017b). Mandelkern and Romoli (2017b) investigate conditionals *B, if* A_p, where $\neg B$ asymmetrically entails *p*. They select this type of conditionals to examine both the asymmetric and the symmetric frameworks. For the reason that the presupposition trigger is on the second argument, the asymmetric and the symmetric directions predict the same presupposition for *B, if* A_p conditionals. The rationale is as follows: When *B* is true, the entire conditional is true independently of the value of *if* A_p. Consequently, to determine the effect of *if* A_p on the value of the conditional, the negation of *B* should be computed. The original context intersected with $\neg B$ is the local context for A_p. Further, $\neg B$ entails *p, p* thereby should not be projected. Accordingly, this conditional is predicted by both the asymmetric and the symmetric frameworks to be presuppositionless. In a concrete example (91),

(91) John isn't in Paris, if he regrets being in France.[30]
(Adopted from Mandelkern and Romoli 2017b:83)

in accordance with the symmetric and asymmetric approaches to presupposition projection, the negation of the consequent clause, *John is in Paris*, entails the presupposition on the antecedent clause, *John is in France*. The presupposition predicted by said theories is *if John is in Paris, he is in France*, which is trivially true, and (91) is thereby presuppositionless. Nevertheless, according to the introspective judgment that Mandelkern and Romoli have made, (91) does presuppose *John is in France*. Taking account of instances such as (91), Mandelkern and Romoli conclude that the symmetric framework is not adequate to predict the presupposition projection patterns of *B, if* A_p conditionals.

There is another perspective to comprehend example (91). Both asymmetric and symmetric accounts discussed in this paper predict a conditional presupposition for (91), which is *if John is in Paris, he is in France*. By contrast, the introspective judgment for (91) is that it has a stronger presupposition *John is in Paris*. This discrepancy can be categorized as an instance of the proviso problem, where a weaker presupposition is predicted by theories, contrary to intuition. Mandelkern and Romoli haven't investigated (91) from the perspective of the proviso problem. Without this consideration, their conclusion that the symmetric framework is not adequate to account for the presupposition projection patterns of *B, if* A_p conditionals could potentially be problematic. It is beyond the scope of the present paper to delve deeper into this discussion.

Thus far, I have recapitulated the predictions of the symmetric theory for presupposition projection of conditionals, which is summarized in (92).

(92) Predictions of presupposition projection theories for conditionals

	canonical order	presupposition	reverse order	presupposition
asymmetry	if Ap, B	P	B, if Ap	if ¬B, p
symmetry	if Ap, B	*if ¬B, p*	B, if Ap	*if ¬B, p*
asymmetry	if A, Bp	if A, p	Bp, if A	P
symmetry	if A, Bp	if A, p	Bp, if A	if A, p

As can be observed from (92), order does not affect the inference of presuppositions in the symmetric theory. In line with the symmetric framework, presuppositions on conditionals can be derived as conditional (weak) presuppositions, no matter the position of the presupposition triggers, a proposal

[30] I have consulted with a native speaker concerning whether (91) presupposes that *John is in France*, and the native speaker subscribes to Mandelkern and Romoli's judgment that (91) does have this presupposition.

made by Chemla and Schlenker (2012), Schwarz (2015), and Mayr and Romoli (2016b).

Thus far, I have recapitulated previous linguistic studies which explore the symmetric account pertaining to English connectives *or*, *if*, *unless*, from which symmetric readings are derivable. In the next section, I proceed with an overview of another major English connective, *and*.

4.4.2 The investigation of the symmetric account on conjunctions

Mandelkern et al. (2017, 2019) embark on investigating whether the symmetric proposal is sufficient to account for presupposition projection in conjunctions.

A conjunction such as (93) is often exemplified to inspect a theory of presupposition projection.

(93) Mary stopped doing yoga and she used to do yoga.

In (93), the first conjunct requires that the original context satisfies a presupposition *Mary used to do yoga,* and it updates the context with an assertion that *Mary does not do yoga now*. Subsequently, the local context of the second conjunct has already entailed that *Mary used to do yoga*, which renders the utterance of the second conjunct, *she used to do yoga,* redundant. To ascertain that the infelicity of (93) is due to presupposition projection, the factor of redundancy is warranted to be controlled.

To achieve this, Mandelkern et al. modify (93) to (94a) where the second conjunct contributes more information than *Mary used to do yoga* into the context.

(94) a. Mary stopped doing yoga and she used to do Jivamukti yoga.
b. Mary used to do Jivamukti yoga and she stopped doing yoga.
(Adopted from Mandelkern et al. 2017: 4)

In this case, the second conjunct is not entailed by its local context and the conjunction as a whole is intuitively felicitous. The contrast between (93) and (94a) clarifies that the problem with (93) is entailment and redundancy rather than presupposition projection. Examples such as (94a) and (94b) are what Mandelkern et al. employ in their study to test whether presuppositions get projected equally out of them.

A problem surfaces with conjunctions such as (94a) and (94b). To illustrate, in (94b), theories of presupposition projection (both asymmetric and symmetric theories) predict (94b) to have a conditional presupposition *if Mary used to do Jivamukti yoga, she used to do yoga*. However, this conditional presupposition is rather difficult to be perceived intuitively for the reason that the first conjunct in (94b) has already asserted that *Mary used to do Jivamukti yoga.* This could lead evaluators to sense a stronger presupposition that *Mary used to do yoga*. To circumvent this problem, Mandelkern et al. embed constructions such as (94a) and (94b) under the antecedent clauses of conditionals. In this way, the first conjunct is not asserted any more. Accordingly, if the presupposition gets projected, then the symmetric theory can thereby be borne out.

To provide concrete examples, (95) demonstrates how Mandelkern et al. investigate whether presuppositions are projected equally out of the "hole" connective *if* (Karttunen 1973).

(95) a. If Mary used to do Jivamukti yoga *and* she stopped doing yoga, then Matthew will interview her for her story.
b. If Mary stopped doing yoga *and* she used to do Jivamukti yoga, then Matthew will interview her for her story.
(Adopted from Mandelkern et al. 2017: 5)

Mandelkern et al. put forth that if the order of conjuncts in the antecedent clauses of (95a) and (95b) does not affect the projection of presuppositions, then the symmetric account holds. Otherwise, the conjunction data provide substantiation for the asymmetric account.

To test whether the symmetric or the asymmetric account is adequate to explicate the presupposition projection patterns in conjunctions, they design inference experiments where participants are requested to determine whether presuppositions are elicited in these two orders of conjunctions. They discover that there is a preference for left-to-right filtering rather than the other way around, suggesting the asymmetric projection pattern in conjunctions. Mandelkern et al. conclude that the symmetric account is not adequate to explicate presupposition projection in constructions such as conjunctions.

4.4.3 A summary of the exploration of the symmetric account in English

All in all, as I have shown in sections 4.3 and 4.4, the symmetric framework has been explored by Chemla and Schlenker (2012), Romoli et al. (2011), Schwarz (2015), Mandelkern and Romoli (2017b), and Mandelkern et al. (2017, 2019) to investigate its adequacy in English connectives *or*, *if*, and *and*. Among these three major operators, *or* presents the strongest substantiation for the symmetric theory. The symmetric proposal on *if* has both defenders and attackers. The symmetric account on *and* has been rejected strongly. These previous linguistic studies recapitulated in this chapter are what is on the market pertaining to the investigation of the symmetric framework. A number of issues are left unresolved and awaits further scrutiny. To elaborate, one issue is that no categorical conclusion that the symmetric framework is adequate to account for presupposition projection in English can be reached. Another one is that the number of presupposition triggers that are employed in previous linguistic studies to investigate the symmetric account is very limited. The symmetric framework is not tenable in the light of the above discussion. Much more research should be conducted to justify it.

Further, these previous studies have been restricted to employing English data. Empirical evidence from other languages can advance the investigation of the symmetric framework, which motivates me to deploy Japanese data to examine the symmetric theory of presupposition projection. This is a task to which I turn next.

4.5 Experiments on the adequacy of the symmetric account in Japanese

On the ground that the symmetric account has not been investigated in Japanese, I aim to conduct experiments on Japanese to inspect whether the symmetric framework is adequate to explicate presupposition projection patterns in major Japanese constructions, namely conjunction, conditional, and disjunction. The structure of this section is as follows. Section 4.5.1 is devoted to presenting my experiments on Japanese conjunctions. Section 4.5.2 introduces my test on Japanese conditionals. Section 4.5.3 is to demonstrate my experiment on Japanese disjunctions. With the outcomes of my empirical work as evidence, I draw a preliminary conclusion that the symmetric account is potentially adequate in Japanese.

4.5.1 Experiments on the adequacy of the symmetric account in Japanese conjunctions

In the literature on presupposition projection, conjunction is a key piece of evidence to support the asymmetric approach to presupposition projection. What is more, in the exploration of the symmetric theory, Mandelkern et al. conclude that presupposition projection in conjunction is indeed asymmetric. Accordingly, I am determined to investigate whether Japanese conjunctions substantiate an asymmetric or a symmetric theory.

To accomplish this, I have conducted two tests with 52 Japanese conjunctions all together. The first test consists of conjunctions of the form *p and q'* and their reversed order conjunctions *q' and p*, a design intended to examine whether presuppositions get projected out of these two orders of conjunctions equivalently. The aim of this experiment is to obtain a preliminary judgment regarding whether symmetric readings are possible in Japanese conjunctions. Subsequently, to ensure that the results from test one holds, I conducted a second experiment where conjunctions of the forms *p and q'* and *q' and p* are embedded under the antecedent clauses of conditionals. This design was inspired by Beaver and Krahmer (2001) and Mandelkern et al. (2017, 2019), as I have discussed in section 4.4. The purpose of this second test is to check whether the symmetric readings are stable in Japanese conjunctions.

4.5.1.1 Test one in Japanese conjunctions

4.5.1.1.1 Design

This experiment is a judgment task where participants are requested to read conjunctions and assess their presuppositions. The conjunctions are of the form *p and q̲q' and their reversed order q̲q' and p*. In accordance with the symmetric account, the presuppositions of these conjunctions should be *if p, q*, regardless of the order of conjuncts. In line with Schlenker's asymmetric theory, the presupposition for *p and q̲q'* is *if p, q*, whereas the presupposition for *q̲q' and p* is *q*.

To test which theory Japanese data support, I have constructed 26 Japanese conjunctions. The presuppositions are elicited by various presupposition triggers, including aspectual verbs (stop, start, continue), aspectual adverb (again), factive verbs and constructions (regret, know, be happy that, be aware that, be sure that), and possessive noun phrases (A's sister/employer). The reason why I employ various presupposition triggers in the test is as follows: Firstly, although different presupposition triggers vary in their strength of presupposition projection, their projection patterns should be predicted by an adequate theory of presupposition projection; secondly, the aspectual adverb *again* has been employed to test the symmetric theory in English (Schwarz 2015).

I was intrigued to check whether Schwarz's proposal could be confirmed by Japanese data. To give a concrete example (96),

(96) a. p and q̲q'
Mary-ha hazi-sir-azu-no dorobou-de, okane-o nusumi
Mary-Top shame-know-not-Gen thief-Conj money-Acc steal
-tsuzuke-te-ir-u.
-continue-Ger-Prog-NPst
'Mary is a shameless thief and she continues to steal money.'

b. q̲q' and p
Mary-ha okane-o nusumi-tsuzuke, hazi-sir-azu-no
Mary-Top money-Acc steal-continue (Conj) shame-know-not-Gen
dorobou-des-u.
thief-Pol-NPst
'Mary continues to steal money and she is a shameless thief.'

c. Conditional presupposition
If Mary is a shameless thief, she has been stealing money.

d. Non-conditional presupposition
Mary has been stealing money.

the presupposition *Mary has been stealing money* is triggered by the aspectual verb *continue*. In the test, for each conjunction, participants are provided with two presuppositions for them to judge: a conditional presupposition (96c) and a non-conditional presupposition (96d).

In these conjunctions, if participants prefer conditional presuppositions in both orders of conjunctions, then the symmetric account is effective. Otherwise, other solutions are warranted to be explored to explicate these Japanese data.

Furthermore, (96a) and (96b) are both felicitous conjunctions, for the reason that the conjuncts in (96a) and (96b) update the contexts and the redundancy effect is under control. For example, in (96b), the first conjunct augments the information *Mary continues to steal money* into the context. *Stealing money* qualifies a person to be *a thief*, but not *a shameless thief*. Therefore, the second conjunct in (96b) *she is a shameless thief* updates the context.

My prediction is that it is possible that the symmetric account can be confirmed by Japanese conjunctions, in the light of the fact that Japanese is a verb-final and a free word-order language, and the order of conjuncts thereby may not affect the inference of presuppositions. For Japanese native speakers, the judgment pertaining to a sentence may only be made when an entire sentence is available.

I take account of another factor that may affect the inference of conditional presuppositions: an entailment relation between a conjunct and a presupposition on the other conjunct. For instance, such an entailment relation exists in (96) where *a person stealing money* entails the information that *he is a thief*. If such a close relation is not borne out between a conjunct and a presupposition on the other conjunct, then it is possible that only non-conditional presuppositions will be generated.

4.5.1.1.2 Materials, Procedure and Participants

I constructed 26 Japanese conjunctions, which were checked by three Japanese native speakers to ensure that they are felicitous. This test was conducted online in the way that participants accessed the test which was generated from the Chinese software *wenjuanxing* via https://www.wjx.cn/jq/78343303.aspx (the complete test is presented in Appendix 2). Participants completed this test on this webpage and pressed the submit button at the end of the test. Their judgments were recorded by the software and transmitted to me electronically. (97) is an instantiation of how the test appears on the webpage.

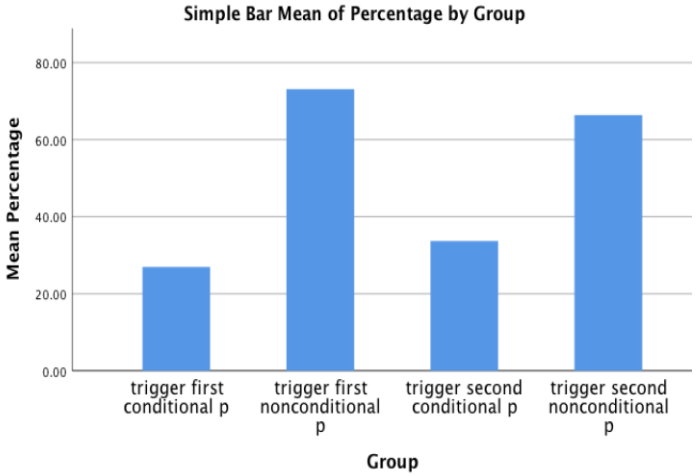
(97) Please read the following sentence, and judge which one between A and B is its presupposition.
Mary continues to steal money and she is a shameless thief.
A. If Mary is a shameless thief, she has been stealing money.
B. Mary has been stealing money.

I invited eleven Japanese native speakers to assess the presuppositions of these conjunctions. It took them 15 minutes on average to complete the task, and they were given a small remuneration of three euros. Following my inspection of their answers, some participants were interviewed by me regarding their answers.

4.5.1.1.3 Results

The answer sheets of eleven participants were transmitted to me electronically. Subsequent to downloading the data, I perceived that three participants chose non-conditional presuppositions for all 26 questions, and they spent quite little time to complete the task. Given these two grounds, these three answer sheets were excluded from the analyses. Subsequently, I analyzed the remaining eight answer sheets in SPSS to derive the output in (98).

(98) The output of *q̲q' and p* conjunctions (trigger first) and *p and q̲q'* conjunctions (trigger second)



In this section, I state the results briefly by group division. The output for the trigger-first group is quite straightforward: Participants tend to select nonconditional presuppositions *q* in this group, which signals that order does play a role in Japanese conjunctions. The outcome for the trigger-second group reveals basically the same pattern as the trigger-first group.

As can be observed from (98), conditional presuppositions are elicited from both orders of conjunctions, which suggests that symmetric readings are possible in Japanese. Subsequently, I am determined to explore whether this outcome is stable. To achieve this, I embed conjunctions under the antecedent clauses of conditionals in the second experiment on Japanese conjunction.

All in all, a conclusion pertaining to presupposition projection in Japanese conjunctions cannot be simply drawn based on this test. Given that this first test is a basic judgment test, I will not discuss its results in detail. Prior to the presentation of the second test, I will report two findings from this test in the next section.

4.5.1.1.4 Analysis

In this section, I specify two findings from this test. The first one is that the aspectual adverb *again* can force information that follows a presupposition trigger to be employed to satisfy the presupposition, as Chemla and Schlenker (2012) and Schwarz (2015) have concluded. An instance is demonstrated in (99).

(99) a. Mary-ha saido sigoto-ni tikokusi-te, namakemono-des-u.
Mary-Top again work-Dat late-Conj lazy.person-Pol-NPst
'Mary is late to work again and she is lazy.'
b. Conditional presupposition
If Mary is lazy, she has been late to work before.
c. Unconditional presupposition
Mary has been late to work before.
d. The statistics of (99a) (1 stands for conditional presupposition; 2 stands for nonconditional presupposition)

		Frequency	Percent	Valid Percent
Valid	1	4	50.0	50.0
	2	4	50.0	50.0
	Total	8	100.0	100.0

As charted in (99d), 50% of the participants judge (99a) as having a conditional presupposition. In (99a), the presupposition trigger *again* is on the first conjunct. If the asymmetric theory is adequate, then the presupposition elicited by (99a) should be the nonconditional presupposition (99c). In line with the symmetric theory, information that follows a presupposition trigger is employed to satisfy the presupposition. The symmetric theory predicts a conditional presupposition (99b) for (99a). This result indicates that symmetric readings are possible in Japanese conjunctions.

The second finding is that the entailment relation between a conjunct and a presupposition on the other conjunct affects the inference of conditional presuppositions. The table (100) presents the statistics of the four test sentences in which a conjunct bears no entailment relation to a presupposition on the other conjunct.

(100) Presupposition triggers *know* and *be sure that*

presupposition_sentence4_6_7_9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	conditional	6	18.8	18.8	18.8
	nonconditional	26	81.3	81.3	100.0
	Total	32	100.0	100.0	

As can be discerned from (100), 81.3% of the generated presuppositions are nonconditional presuppositions.

To sum up, a few conclusions can be drawn from this test. Firstly, order plays a role in the inference of presuppositions in Japanese conjunctions. Secondly, the entailment relation between one conjunct and a presupposition on the other conjunct affects the inference of conditional presuppositions. Thirdly, in Japanese conjunctions, information that follows a presupposition trigger can be employed to satisfy the presupposition, which is a promising indicator for the functionality of the symmetric theory. Fourthly, it is not categorical that the symmetric account operates effectively in Japanese conjunctions, for the reason that only four groups among 13 groups of presuppositions get projected out of both orders of conjunctions equally. (See Appendix 3 for detailed tables.) For the reason that this test does not lead to a transparent conclusion, I conduct a second test on Japanese conjunctions to investigate the symmetric framework, which is presented in the next section.

4.5.1.2 Test two in Japanese conjunctions

4.5.1.2.1 Design

The design of this test is as follows. Firstly, acquired from test one, each conjunction in this test is designed to have an entailment relation between a conjunct and a presupposition on the other conjunct. Secondly, the conjunctions are in the forms of p^+ *and* $\underline{p}p'$ and its reversed order $\underline{p}p'$*and* p^+. Specifically, p^+asymmetrically entails the presupposition p. Given that p^+ contributes more information into the context than p, conjunctions in both orders are not redundant. Thirdly, in the experiment, the presuppositions are generated by various presupposition triggers, including aspectual verbs, aspectual adverbs, factive verbs and constructions, and possessive noun phrases. Fourthly, these conjunctions are embedded under the antecedent clauses of conditionals, whose rational I have discussed in section 4.4.2.

The conjunctions in (101) are instantiations of sentences that I make use of in the experiment.

(101) a. Mary-ga kouka-na tabako-o sut-te-i-ta
Mary-Nom expensive-Cop cigarette-Acc smoke-Ger-Prog-Pst
tosite, kitsuen-o yame-tara, Mary-ha kenkou-ni
as.a.fact(Conj) smoke-Acc stop-if Mary-Top health-Dat
naru-darou.
become-Will
'If Mary used to smoke expensive cigarettes and she has stopped smoking, she will be healthy.'

b. Mary-ga kitsuen-o tome, kouka-na tabako-o
Mary-Nom smoke-Acc stop(Conj) expensive-Cop cigarette-Acc

yoku sut -te-i-ta mono-dat-tara, Mary-ha kenkou
often smoke -Ger-Prog-Pst thing-Cop-if Mary-Top health
-ni naru-darou.
-Dat become-will
'If Mary has stopped smoking and she used to smoke expensive cigarettes, she will be healthy.'

When conjunctions such as (101) are presented to participants, they are provided with a presupposition, as shown in (102a).

(102) a. Presupposition
Mary used to smoke.
b. Instruction
If this presupposition completely matches with your intuition, please choose 7. If it completely doesn't, please choose 1.

1	2	3	4	5	6	7

Subsequently, testees are instructed by (102b) to make their assessments. If the score of a presupposition is above 4, then the presupposition gets projected.

If a theory of presupposition projection is indeed symmetric, then the presupposition *p* should be projected out of the two orders of conjunctions equally. The aim of this test is to investigate further whether the symmetric account is sufficient to explicate the presupposition projection patterns in Japanese conjunctions. My conjecture is that symmetric readings are possible.

4.5.1.2.2 Materials, Procedure and Participants

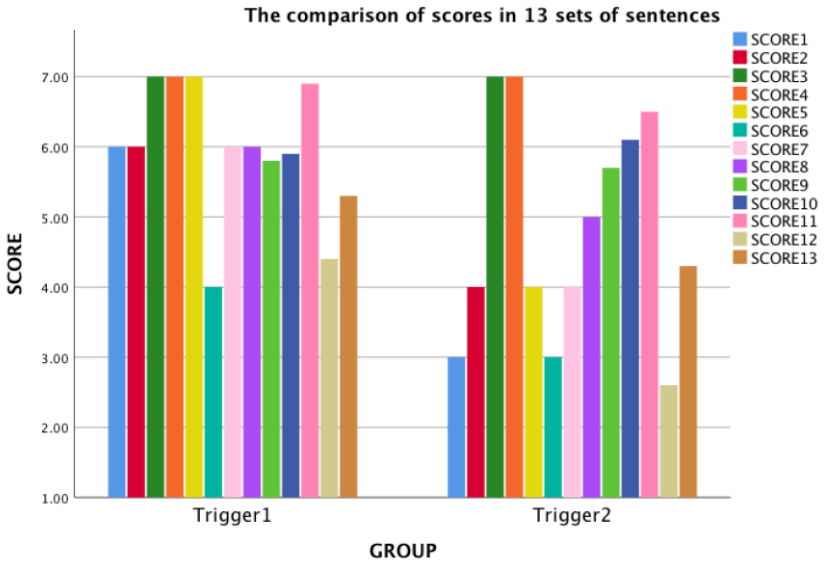
I constructed 26 conjunctions in the form of p^+ *and* $\underline{pp}'$ and their reversed order $\underline{pp}'$*and* p^+, and embedded them under the antecedent clauses of conditionals. These sentences were checked by three Japanese native speakers to ensure that though complicated, the sentences remain felicitous.

This is an online test, generated from the Chinese software *wenjuanxing*. 16 Japanese native speakers were recruited through friends. Participants accessed the test via https://www.wjx.cn/jq/78541797.aspx (the complete test is presented in Appendix 4). Participants completed the test on this webpage and sent their results through a submit button at the end of the test. Their results as well as the time taken on the test were recorded by the software and transmitted to me electronically. Participants spent an average of twelve minutes completing the test. Subsequent to my inspection of their answers, some participants were interviewed. Participants were given a small remuneration of three euros each.

4.5.1.2.3 Results

Subsequent to downloading the data, it came to my attention that one participant spent little time on the test, which led to my exclusion of the participant's answer sheet. Therefore, 15 answer sheets are analyzed through SPSS, and the output is displayed in (103).

(103) The output of test two: p̲p'and p^+ (trigger 1st) vs. p^+ and p̲p' (trigger 2nd)



As can be discerned from the chart, firstly, presuppositions do not get projected out of conjunctions *p^+ and p̲p'* and *p̲p'and p^+* equally, which does not provide cogent proof for the functionality of the symmetric account. Secondly, the average score of the trigger-first conjunctions *p̲p'and p^+* are all above 4, indicating that presuppositions are all elicited in this group. Thirdly, the scores of the trigger-second conjunctions *p^+ and p̲p'* are divergent ranging from 2.6 to 7, which implies that, in some conjunctions, presuppositions are not generated. The detailed analysis is in the next section.

4.5.1.2.4 Analysis

In this section, I inquire into the detailed data through group division, namely the trigger-first group and trigger-second group. I start with the trigger-first group (p̲p'and p^{+}), where two sentences are rated as 4 and 4.4 respectively. These ratings have barely passed the line of the projection of presuppositions and are abnormal in the ratings of this group. To elaborate on this abnormality, the sentence that has an average score of 4 is shown in (104).

(104) a. Mosi John-ga kagakusya-dearu koto-o siawase-da-to
If John-Nom scientist-be thing-Acc happy-Cop-Comp
omo-i, John-ga butsurigakusya-*nara*, John-ha yoi
think-Conj John-Nom physicist-*if* John-Top good
zinsei-o okuru-darou.
life-Acc have-will
'If John is happy he is a scientist, and moreover he is a physicist, he will have a good life.'

b. Presupposition
John is a scientist. (Inspired by Mandelkern and Romoli 2017b)

c. The statistics of this sentence

		Frequency	Percent	Valid Percent
Valid	1.00	3	20.0	20.0
	2.00	1	6.7	6.7
	4.00	4	26.7	26.7
	5.00	1	6.7	6.7
	6.00	2	13.3	13.3
	7.00	4	26.7	26.7
	Total	15	100.0	100.0

(104) is a complicated sentence. Firstly, it has two *if*s , *mosi* and –*nara*, although only –*nara* is compulsory. Secondly, only *scientist* is embedded under *be happy that*. *Physicist* in the second conjunct is there to satisfy the presupposition that is triggered by *be happy that*. As the statistics in (104) reveal, three participants chose 1 and one selected 2, outcomes for which I could not provide explanations. Consequently, I interviewed these four participants to comprehend the reasons for their choices.

These four participants have divergent opinions regarding this sentence: One participant states that *be happy that* does not necessarily convey the truth of its complement clause. Moreover, when this conjunction is embedded under the antecedent clause of a conditional, he considers all the information in this conjunction to be hypothetical. The second participant interprets a conditional connected by *mosi…nara…* to be a subjunctive conditional; therefore, the information inside the antecedent is hypothetical and cannot project a

presupposition. I admit that the grammatical structure *mosi…nara…* can be baffling, which was my concern during the construction of these sentences. After conferring with my consultants, I acquire that subjunctive conditionals have to be expressed by this structure. The usage of this structure, however, does not always convey subjunctive conditionals. In the case of (104), an indicative conditional is expressed. The other two participants report that the presupposition is in fact projected when they are requested to read through (104) again.

All in all, several aspects can be considered regarding this unexpected rating. It is expected that participants perceive sentences differently. Other than this abnormality, the presuppositions elicited in this trigger-first group are well predicted by the symmetric theory of presupposition projection.

Subsequently, I proceed with the interpretation of the trigger-second group. In 13 sentences, the average scores of eight sentences are above 4, as presented by the table (105).

(105) The average scores of eight sentences in the trigger-second group

Trigger	Score
again	6.93
	6.8
	6.47
regret	4.33
stop	4.53
continue	5.67
possessive NP	6.13
be happy that	4.33

As can be observed from the table, these presuppositions elicited by various triggers are in line with the prediction of the symmetric approach.

Moreover, among these eight sentences, four of their presuppositions get projected out of p^+ *and* $\underline{pp}'$ and $\underline{pp}'$*and* p^+ groups equally, as (106) highlights.

(106) The statistics of four sets of sentences in *p⁺ and pp'* and *pp' and p⁺* groups

Trigger	pp'and p+	p+ and pp'
again	7	6.93
	6.87	6.8
continue	5.8	5.67
possessive NP	5.87	6.13

Taking tables (105) and (106) into account, I comprehend that the symmetric readings are possible in Japanese conjunctions. By and large, presuppositions get projected out of both the trigger-first group and the trigger-second group, which implies that the symmetric account can elucidate the presupposition projection patterns in Japanese conjunctions.

4.5.1.3 A summary of the results of the two Japanese tests

The two Japanese tests aim to investigate the efficacy of the symmetric account in Japanese conjunctions. The first test is a basic one to determine some factors that affect the inference of conditional and unconditional presuppositions. I draw two conclusions from the first test. Firstly, order does play a role in the inference of presuppositions in Japanese conjunctions. Secondly, symmetric readings are possible in Japanese conjunctions. Hence, I proceed with a second test on Japanese conjunctions to examine whether the symmetric effect holds. The outcome of the second test is in accordance with the first test in that the symmetric readings are attainable in Japanese conjunctions, whose presuppositions are generated by various triggers, although the strength of inference varies among the triggers.

In order to reach a categorical conclusion that the symmetric account is sufficient to explicate presupposition projection in Japanese conjunctions, more experiments should be conducted. In future experiments, presuppositions should be generated by triggers other than the aspectual adverb *again* and the additive adverb *too*. The reason is as follows. The projection behaviors of these two presupposition triggers have been investigated by linguists such as Chemla and Schlenker (2012) and Schwarz (2015). They conclude that these two presupposition triggers can force information that follows a presupposition trigger to be employed to satisfy the presupposition, a conclusion which is confirmed by my experiments in Japanese. And these two presupposition triggers have their idiosyncrasies which I have inspected in section 4.3 and 4.4. Accordingly, future research should explore the projection behaviors of other presupposition triggers to advance the investigation of the symmetric theory. Further, conjunctions can

be embedded in other linguistic environments such as simple questions, inspired by Rothschild (2008c), Schlenker (2008c), and Krifka (2001), to ascertain that the projection patterns are stable.

4.5.2 An experiment on the adequacy of the symmetric account in Japanese conditionals

Subsequent to the tests on Japanese conjunctions, I proceed with the empirical work on another major construction, conditional.

4.5.2.1 Design

In line with the symmetric approach to presupposition projection, conditional presuppositions are elicited from conditionals with no regard to the position of the presupposition trigger. My aim in this test is to examine whether this prediction holds in Japanese conditionals. To be specific, I make use of two forms of conditionals: *if p̲p', q* where the presupposition trigger is on the antecedent clause, and *if not q, not p̲p'* where the presupposition trigger is on the consequent clause. As I have summarized in (92), the symmetric framework predicts that the presupposition of *if p̲p', q* is on a par with it of *if not q, not p̲p',* which is *if not q, p*.

In this test, I constructed 35 conditionals, where presuppositions are generated by various triggers, including aspectual verbs (stop, start, continue), and factive verbs and constructions (regret, know). The conditionals in (107) are the examples.

(107) a. Conditional if p̲p', q
Mary-ga kanozyo-no ane to kenka-o suru koto
Mary-Nom she-Gen older.sister with fight-Acc do thing
-o koukaisuru-*nara*,Mary-ha kanozyo-o aisi-te-ir-u.
-Acc regret-*if* Mary-Top she-Acc love-Ger-Prog-NPst
'If Mary regrets fighting with her sister, Mary loves her sister.'

b. Conditional if not q, not p̲p'
Mary-ga kanozyo-no ane-o aisi-te-i-nai-*nara*,
Mary-Nom she-Gen older.sister-Acc love-Ger-Prog-not-*if*
Mary-ha ane to kenka-o suru koto-o
Mary-Top older.sister with fight-Acc do thing-Acc
koukaisi-na-i.
regret-not-NPst
'If Mary doesn't love her sister, Mary doesn't regret fighting with her sister.'

c. Conditional presupposition if not q, p
If Mary doesn't love her sister, Mary will fight with her.

d. Unconditional presupposition
Mary fought with her sister.

Each conditional in the test is provided with a conditional presupposition and an unconditional presupposition for participants to judge, based on their intuitions. My conjecture is that the symmetric account is able to predict the presupposition projection patterns in Japanese conditionals.

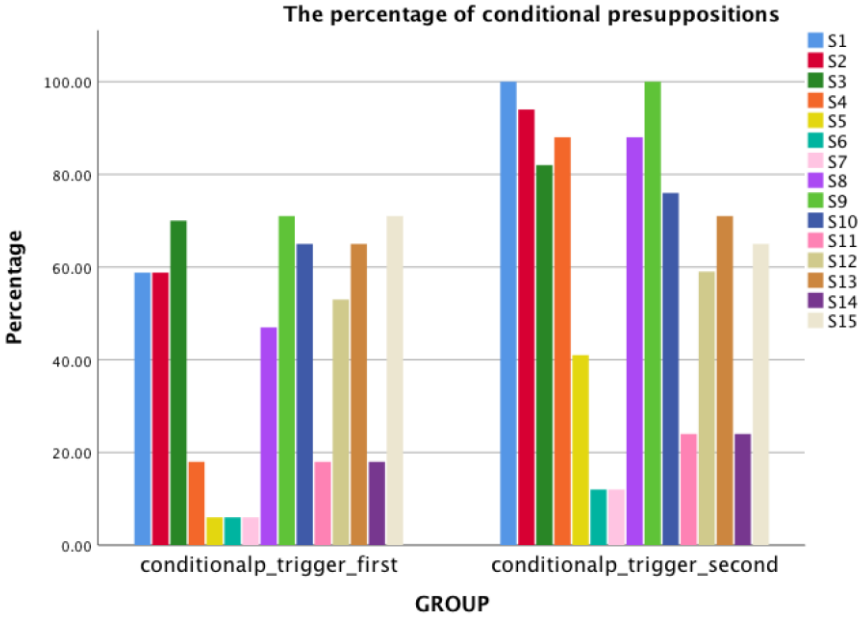
4.5.2.2 Materials, Procedure and Participants

The test consisted of 35 conditionals, which were checked by three Japanese native speakers to ensure that despite the sentences being complicated, they remained felicitous. 19 Japanese native speakers were recruited through friends. This is an online test, generated from the Chinese software *wenjuanxing*. Participants accessed the test via https://www.wjx.cn/jq/78635388.aspx (the complete test is presented in Appendix 5). Participants completed the test on this webpage and sent their results through a submit button at the end of the test. Their results as well as the time they spent on the test were recorded by the software and transmitted to me electronically. It took them on average 23 minutes to complete the test. Following my inspection of their answers, some participants were interviewed. Participants were given a small remuneration of three euros each.

4.5.2.3 Results

When the results were transmitted to me electronically, I downloaded the data from the software. It came to my attention that two participants spent little time completing the task, which led to my exclusion of their answer sheets. Thus, 17 answer sheets are analyzed in SPSS, and the output is demonstrated in (108).

(108)[31] The percentage of conditional presuppositions elicited in trigger-first vs. trigger-second conditionals



As can be discerned from the table (108), firstly, in the trigger-first group (if p̲p', q), the rates of nine generated conditional presuppositions among 15 are higher than 50%, which indicates the information that follows a presupposition trigger can be used to satisfy a presupposition in Japanese conditionals. Secondly, in the trigger-second group (if not q, not p̲p'), the rates of conditional presuppositions are generally higher than the rates in the trigger-first group, which denotes that the information that comes prior to a presupposition trigger can be employed more easily than the information that follows the trigger to satisfy the presupposition. Thirdly, given that there is a discrepancy between the rates of conditional presuppositions in the trigger-first and the trigger-second group, order does play a role in the inference of presuppositions. Fourthly, presuppositions get projected out of the trigger-first and the trigger-second conditionals unequally, suggesting that although symmetric readings are possible in Japanese conditionals, the efficacy of the symmetric account cannot be confirmed categorically. More detailed analyses are in the next section.

[31] This table displays the statistics of 30 conditionals among 35. I will analyze the other five conditionals separately in the next section.

4.5.2.4 Analysis

In this section, I inspect the results in two parts, a separate group which consists of five sentences within the trigger-first group and the trigger-second group respectively.

Firstly, I proceed with the inspection of a separate group, which consists of five conditionals in the form of *if p̲p', q*, where the presupposition *p* is asymmetrically entailed by ¬*q*, inspired by Mandelkern and Romoli (2017b). An instantiation is provided in (109).

(109) a. Conditional if p̲p', q (*p* is asymmetrically entailed by ¬*q*)
John-ga kyousi-dearu koto-o siawase-da-to omou
John-Nom teacher-be thing-Acc happy-Cop-Comp think
-nara, kare-ha eigo kyousi-deha-na-i.
-if he-Top English teacher-Pol-not-NPst
'If John is happy that he is a teacher, he isn't an English teacher.'

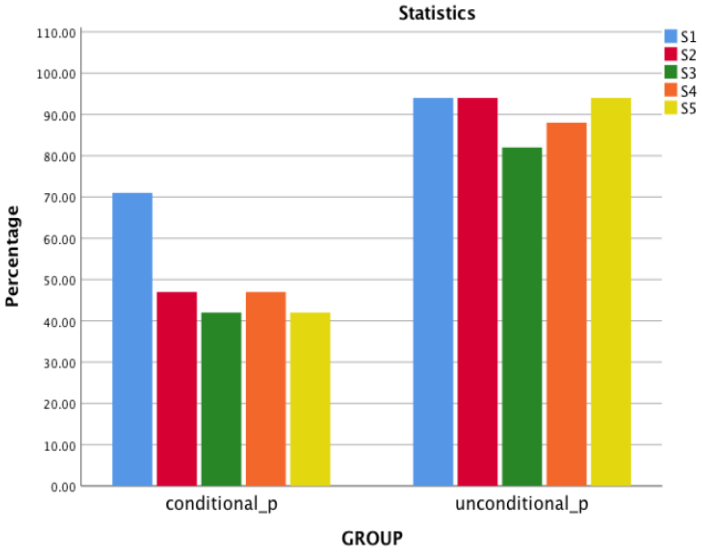
b. Conditional presupposition if not q, p
If John is an English teacher, he is a teacher.

c. Unconditional presupposition
John is a teacher.

In a conditional such as (109a), the symmetric theory predicts it to project a conditional presupposition such as (109b), and the asymmetric theory predicts it to generate an unconditional presupposition. Both predictions are substantiated by the results of the experiment, which is demonstrated in the table (110)[32] .

[32] These five sentences in the test are designed in the way that both presuppositions are available to be selected by participants; therefore, the sum percentage of each sentence can go above 100%.

(110) The statistics of *if* ***p****p'*, *q* conditional where *p* is asymmetrically entailed by ¬*q*

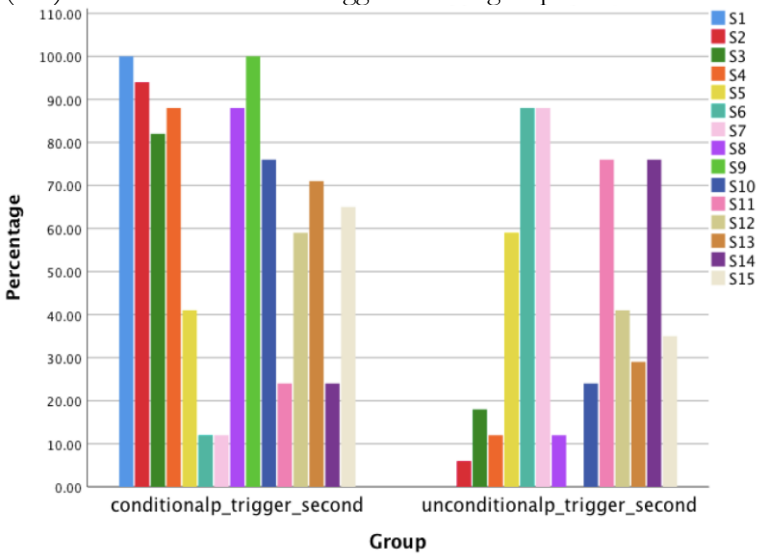


As can be observed from (110), firstly, the rates of conditional presuppositions in each sentence are over 40%, an outcome which provides evidence for the trigger-first group that in Japanese conditionals, information following a presupposition trigger can be employed to satisfy the presupposition. Secondly, conditional presuppositions can be elicited in Japanese when an entailment relation is borne out between an argument and a presupposition on the other argument.

Thirdly, this type of conditionals is deployed by Mandelkern and Romoli (2017b) as rebuttal evidence against the symmetric framework, as I have encapsulated in section 4.4. With my test outcomes as evidence, I argue that this type of conditionals provides corroboration for the symmetric theory. Fourthly, this outcome provides substantiation that an adequate theory of presupposition projection is able to elicit both non-conditional and conditional presuppositions, as I have discussed in section 4.4.

Secondly, I proceed with the analysis of the trigger-second group, whose statistics appear in (111).

(111) The statistics of the trigger-second group



As can be interpreted from the table, the rates of conditional presuppositions in ten sentences among 15 are higher than 50%. Further, the percentages of these ten sentences are much higher than that of the sentences in the trigger-first group where the highest percentage of conditional presupposition is 71%. The statistics indicate that order does affect the projection of presupposition. Moreover, the outcome in this group is in accordance with both the symmetric and asymmetric accounts of presupposition projection, for the reason that both accounts predict that the presupposition of a *if not q, not p'* conditional is *if not q, p*.

Subsequently, I inspect the five sentences whose rates of conditional presuppositions are lower than 50%. (112) is an instantiation.

(112) a. Mary-ga siawase-nara, kanozyo-ha furusato-o hanareru
Mary-Nom happy-if she-Top hometown-Acc leave
-no-o koukaisi-te-i-na-i.
-Nmlz-Acc regret-Ger-Prog-not-NPst
'If Mary is happy, she doesn't regret leaving her hometown.'

b. Conditional presupposition
If Mary is happy, she has left her hometown.

c. Unconditional presupposition
Mary has left her hometown.

I have interviewed four participants regarding (112a), and the core issue is that they sense this sentence to be quite strange, for the reason that leaving one's hometown is not usually a happy event. The conditional presupposition (112b) is also peculiar to them, driving them to opt for the unconditional presupposition.

To conclude, firstly, in *if p̲p', q* conditionals, information that comes prior to and follows a presupposition trigger can all be deployed in the computation of the local context of a presupposition. Secondly, in *if not q, not p̲p'* conditionals, conditional presuppositions can be elicited to a substantial degree. Thirdly, established on the fact that the rates of conditional presuppositions in the trigger-second group are higher than the rates in the trigger-first group, order does affect the inference of presuppositions. Lastly, among 15 sets of sentences, four of them can be treated as eliciting conditional presuppositions equally, regardless of the position of the presupposition triggers, as shown in the table (113).

(113) The rates of conditional presuppositions in four sets of conditionals

type	trigger	continue	be surprised that	be sad that	know
trigger first		65%	53%	65%	71%
trigger second		76%	59%	71%	65%

All in all, the symmetric account is potentially effective to explicate presupposition projection in Japanese conditionals.

A concern should be expressed pertaining to my experiment on Japanese conditionals. Trigger-second conditionals such as *if p, q̲q'* and *if not q, not p̲p'* are known to have the proviso problem, which is an often-discussed topic in the research of presupposition projection. Linguists such as van Rooij (2007) propose that conditional presuppositions can be strengthened to unconditional presuppositions if the antecedent clause and the consequent clause of a conditional are independent of each other. Under this circumstance, an unconditional presupposition is what a processor would perceive from such a conditional. In this paper, I did not explore the proviso problem. When this problem is investigated in future research, it may improve test design on Japanese conditionals, and more transparent results regarding whether the symmetric account is effective in Japanese conditionals can potentially be obtained.

4.5.3 An experiment on the adequacy of the symmetric account in Japanese disjunctions

I have examined whether the symmetric account can predict the presupposition projection patterns in Japanese conjunctions and conditionals in the previous two sections. The experiments confirm two points. Firstly, the order of arguments of a binary connective affects the projection of presuppositions. Secondly, symmetric readings are possible, especially in Japanese conditionals. In this section, I proceed with an exploration of the adequacy of the symmetric account in Japanese disjunctions.

4.5.3.1 Design

In this test, my aim is to determine whether conditional presuppositions can be generated in Japanese disjunctions in the form of *p̲p' or q* and their reversed order *q or p̲p'*. The symmetric account predicts that the presuppositions of these two forms of disjunctions are *if not q, p*. The asymmetric proposal postulates that the presupposition for *p̲p' or q* is *p*, in lieu of *if not q, p*. I inquire into which account can explicate Japanese disjunction data more accurately.

I have constructed 30 Japanese disjunctions where the presuppositions are generated by various triggers, including matrix predicate (be happy that, be surprised that, know), aspectual verb (stop, continue, start), and factive verb (regret). An instantiation is provided in (114).

(114) a. Disjunction q or p̲p'
Mary is poor or she doesn't know that she has lots of money.
b. Disjunction p̲p' or q
Mary doesn't know that she has lots of money or she is poor.

For each disjunction in the test, participants are provided with two presuppositions, as presented by (115).

(115) a. Conditional presupposition if not q, p
If Mary is not poor, she has lots of money.
b. Unconditional presupposition p
Mary has lots of money.

Participants are instructed to choose one presupposition from (115a) and (115b) matching their intuition. My prediction is that the symmetric framework can explicate the presupposition projection patterns in Japanese disjunctions.

4.5.3.2 Materials, Procedure and Participants

The test consisted of 30 disjunctions, which were checked by three Japanese native speakers to ensure that despite their complicated nature, the sentences remained felicitous.

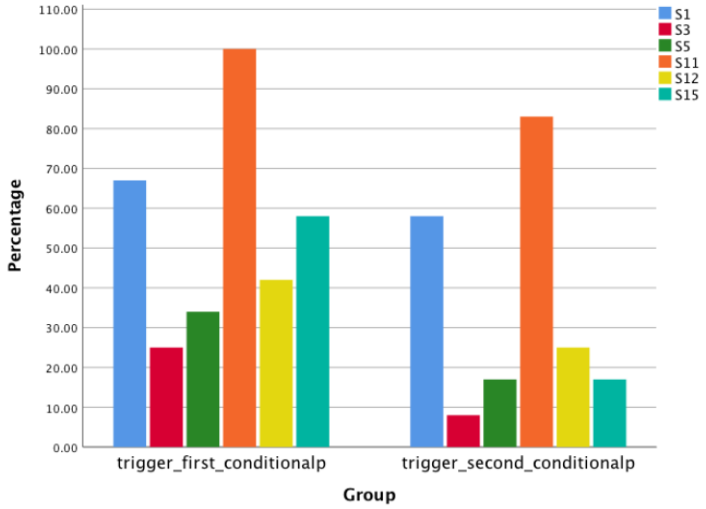
This is an online test, generated from the Chinese software *wenjuanxing*. 20 Japanese native speakers took part in the test. Participants accessed the test via https://www.wjx.cn/jq/78671509.aspx (the complete test is presented in Appendix 6). Participants completed the test on this webpage and sent their results through a submit button at the end of the test. Their results as well as the time spent on the test were recorded by the software and transmitted to me electronically. Participants spent an average of 13 minutes completing the test. Subsequent to my inspection of their answers, some participants were interviewed. Participants were given a small remuneration of three euros each.

4.5.3.3 Results

For the reason that disjunctions of the form *p̲p' or q* and the reversed order *q or p̲p'* are atypical in Japanese, some participants were quite confused by the disjunctions. Upon careful consideration, eight answer sheets were excluded from the analyses. Consequently, I carry out the analyses using the remaining twelve answer sheets in SPSS.

In this section, I present basic findings from the test, which are presented by charts (116) and (117).

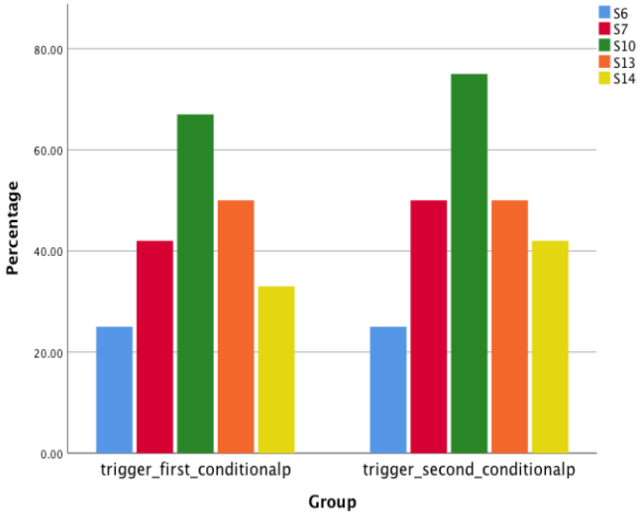
(116) The rates of conditional presuppositions in Japanese disjunctions: trigger-first (p̲p' or q) and trigger-second (q or p̲p') group



The chart (116) is the outcome of six sets of sentences, from which, the prime observation is that order does not play a role in the inference of conditional presuppositions. To be specific, in (116), the rates of conditional presuppositions in trigger-first disjunctions are higher than the rates in trigger-second disjunctions.

Subsequently, the chart (117) is the output of five sets of disjunctions from which it can be observed that although the rates of conditional presuppositions in the trigger-second group are slightly higher than that in the trigger-first group, the discrepancy is minor.

(117) The rates of conditional presuppositions in five sets of disjunctions

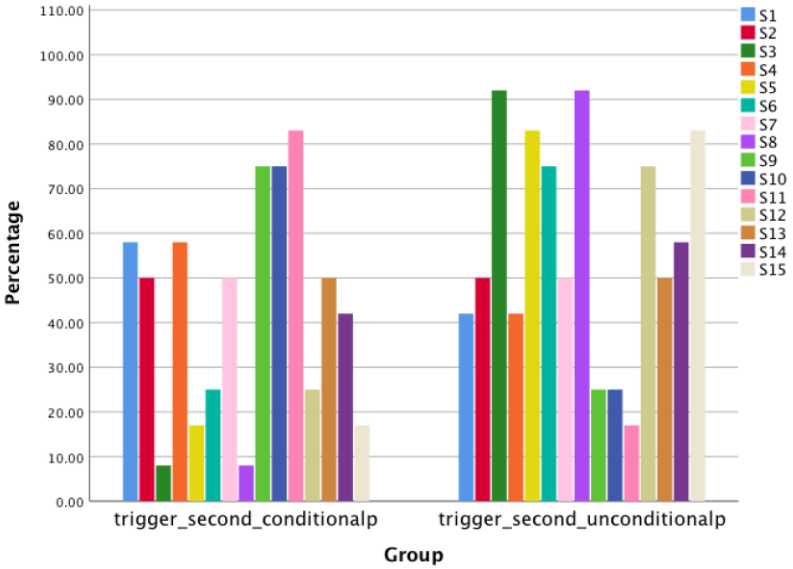


Moreover, in the remaining four sets of disjunctions in the test, conditional presuppositions get projected out of the trigger-first and trigger-second disjunctions equally. All in all, the symmetric account is relatively adequate to explicate presupposition projection in Japanese disjunctions, and order does not play a role in the computation of presuppositions in disjunctions.

4.5.3.4 Analysis

In this section, I proceed with the detailed analyses of the disjunction data following group division, trigger-second disjunctions and trigger-first disjunctions respectively. I start with the interpretation of trigger-second disjunctions, as demonstrated in (118).

(118) The statistics of the trigger-second disjunctions



As can be perceived from the chart, eight disjunctions among 15 were judged by participants to elicit conditional presuppositions at a rate of over 50%, which is a predicted outcome.

Subsequently, I examine the remaining seven disjunctions with inference rates of conditional presupposition that are lower than 50%. (119) is an instantiation.

(119) a. Disjunction q or p̲p̲'
Mary-ha zibun-no syokuseikatsu-ni ki-o tsukat-
Mary-Top herself-Gen diet-Dat attention-Acc give-
te-iru, mataha taizyuu-ga fue-ta koto-ni kizui-te
Ger-Prog or weight-Nom gain-Pst thing-Dat aware-Ger
-i-na-i.
-Prog-not-NPst
'Mary pays attention to what she eats or she is not aware that she has gained weight.'

b. Conditional presupposition
If Mary doesn't pay attention to what she eats, she will gain weight.

c. Unconditional presupposition
Mary has gained weight.

In the case of (119), I interviewed four participants, who maintained that, although it is true that *if Mary doesn't pay attention to what she eats, she will gain weight*, it is not a presupposition of this sentence. What I have obtained from the interviews

is that conditional presuppositions will be generated when a disjunct bears an entailment relation to a presupposition on the other disjunct.

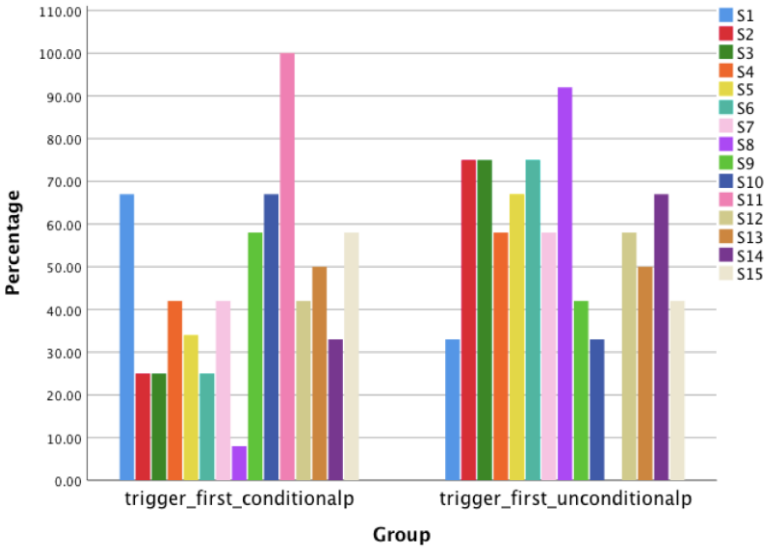
To confirm this judgment, I investigate a disjunction in this trigger-second group, which has the highest inference rate of conditional presupposition, as exhibited in (120).

(120) a. Disjunction q or p̲p'
Mary-ha mazusii-ka, aruiha okane-ga takusan aru koto
Mary-Top poor-Disj or money-Nom much have thing
-o sir-anai-ka-dear-u.
-Acc know-not-Disj-be-NPst
'Mary is poor or she doesn't know that she has lots of money.'
b. Conditional presupposition if not q, p
If Mary is not poor, she has lots of money.
c. Unconditional presupposition
Mary has lots of money.

In (120a), 83% of the participants select the conditional presupposition (120b) by virtue of the entailment relation: *being poor* entails *not having much money*, and the negation of *being poor* can be employed to satisfy the presupposition. All in all, in the trigger-second group, when an entailment relation can be built between *not q* and *p* in a disjunction *q or p̲p'*, conditional presuppositions can be generated.

Secondly, I proceed with the investigation of the trigger-first disjunctions *p̲p' or q*, whose statistics appear in (121).

(121) The statistics of the trigger-first disjunctions



Among the 15 sentences, six of them have rates of conditional presuppositions that are higher than 50%, which can be explicated by the data from the trigger-

second group. Disjunctions in two groups have the same disjuncts, only in reverse order. Since the trigger-second group only has eight sentences with rates of conditional presuppositions that are over 50%, it is foreseeable that the trigger-first group only has six sentences with rates of conditional presuppositions that are over 50%. The reason for this lower than 50% outcome is that participants cannot build a necessary relation between the negation of a disjunct and a presupposition on the other disjunct.

To sum up, in Japanese disjunctions, the information that comes to the left and to the right of a presupposition trigger can all be employed to satisfy the presupposition, and symmetric readings are derivable in Japanese disjunctions. Moreover, order does not play a role in the projection of presuppositions in disjunctions.

4.5.4 A summary of the results of the Japanese tests

Several conclusions can be drawn from the four experiments. Firstly, the general picture emerging from the analyses is that symmetric readings are derivable in Japanese major constructions.Secondly, in Japanese conjunctions and conditionals, order of arguments affects the projection of presuppositions, whereas in Japanese disjunctions, order does not play a role in the computation of presuppositions. Thirdly, conditional presuppositions are not always elicited. Whether a conditional presupposition can be generated depends on the relation between an argument and the presupposition on the other argument. What I can conclude is that Japanese native speakers will opt for conditional presuppositions when an entailment relation is present. Fourthly, what I have acquired from the interviews is that participants do not take account of left-right linear order as a hard-wired factor in the computation of presuppositions. And they have no difficulty in employing information that comes to the right of a presupposition trigger to satisfy the presupposition. Fifthly, I make use of multiple presupposition triggers in these tests. To achieve a more unified result, the number of triggers in future research can be limited. Sixthly, the symmetric account is quite promising in Japanese. To reach a categorical conclusion that the symmetric account is adequate to explicate presupposition projection in Japanese, more research should be conducted.

4.6 A summary of chapter 4

In this chapter, I focus on the symmetric framework of presupposition projection. This direction has been investigated by several linguists regarding its adequacy in English both theoretically (Beaver and Krahmer (2001), Georger (2008), Fox (2008) Romoli et al. (2011)) and empirically (Chemla and Schlenker (2012), Schwarz (2015), Mandelkern and Romoli (2017b), Mandelkern et al. (2017, 2019)). The outcomes are divergent: Presupposition projection in disjunctions has been

confirmed to follow symmetric patterns; presupposition projection in conditionals is proposed to fit into symmetric patterns; and presupposition projection in conjunctions has been confirmed to adhere to asymmetric patterns. It is transparent that more studies should be devoted to this line of research. Further, I have conducted four experiments on the efficacy of the symmetric account in Japanese. What I can conclude from the data is that symmetric readings are possible in Japanese, a free word-order language, and left-right asymmetry may be a processing effect, not a hard-wired pattern in presupposition projection. These results are summarized in the following table.

(122) The summary of the efficacy of the symmetric framework in English and Japanese

The efficacy of the symmetric framework		Yes	No	Possible
English	conjunction		√	
	conditional			√
	disjunction	√		
Japanese	conjunction			√
	conditional			√
	disjunction			√

Chapter 5 The hierarchical framework of presupposition projection

5.1 Introduction

I have investigated the asymmetric approach to presupposition projection in chapter 3 and the symmetric proposal in chapter 4. The asymmetric approach can account for most English constructions except disjunction, whereas it cannot provide explanations for some constructions and phenomena in Japanese and Chinese. The symmetric approach is treated as the last resort to explicate presupposition projection patterns. As noted by Schlenker (2009c) and Schwarz (2015), when the asymmetric framework cannot predict correct presuppositions for a sentence, the symmetric framework comes to the rescue. Additionally, as inspected in chapter 4, the symmetric line cannot explain English presupposition projection patterns in conjunctions, as investigated by Mandelkern et al. (2017, 2019). The exploration of the symmetric framework is restricted to English data. Accordingly, I examine the symmetric framework gleaning from Japanese data. Acquired from my empirical work presented in chapter 4, the symmetric framework is quite promising to explicate presupposition projection in major Japanese constructions. The question of whether the symmetric direction is adequate to predict Japanese presupposition projection patterns awaits further scrutiny.

On the ground that both the asymmetric and the symmetric direction are inadequate to fully explicate presupposition projection in English, Japanese, and Chinese, it is sensible to explore other options to account for presupposition projection facts. Schlenker (2008, 2009) puts forward a preliminary suggestion that the computation of presuppositions might be approached from c-command relations. Romoli (2012) claims that the symmetric account can be coupled with a hierarchical order to account for presupposition projection. Ingason (2016) undertakes a hierarchical approach to presupposition projection that can elucidate projection patterns of relative clauses in Japanese and Korean, which is the earliest hierarchical framework. Building on Ingason's work, linguists such as Romoli and Mandelkern (2017) and Schlenker (2020) put forward various hierarchical hypotheses of presupposition projection.

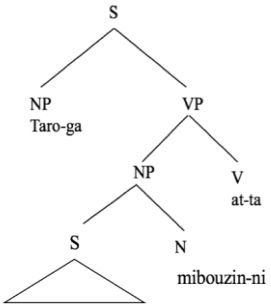
In this chapter, I firstly introduce Ingason's proposal in section 5.2. In section 5.3, I introduce two possible hierarchical approaches highlighted by Romoli and Mandelkern (2017) and assess them briefly in sections 5.3.1 and 5.3.2. In section 5.4, I introduce an "inside-out" hierarchical generalization advanced by Schlenker (2020). Schlenker subscribes to Ingason's hierarchical processing proposal; however, Schlenker puts forth the opposite order of computation from Ingason's work, which I will evaluate briefly. These proposals provide substantiation for hierarchical context updating mechanism. Nevertheless, developing a detailed mechanism is beyond the scope of the present paper and is left for further research.

5.2 Ingason's hierarchical approach

Ingason (2016) presents a hierarchical proposal of presupposition projection. Ingason states that the asymmetric account cannot explain the empirical evidence of relative clauses in two head-final languages, Japanese and Korean, which I have inspected in chapter 3. Ingason puts forward that the relative clause data can be explicated by a hierarchical account. To illustrate, in the case of a Japanese relative clause (123a),

(123) a. Taro-ga zyosei-no mibouzin-ni at-ta.
Taro-Nom woman-Gen widow-Dat met-Pst
'Taro met a widow who is a woman.' (Adapted from Ingason 2016: 4)

b. A simplified structure of (123a)



the asymmetric theory of presupposition projection predicts (123a) to be not redundant: *zyosei (woman)* firstly enters the context which is further updated by *mibouzin (widow)*. For the reason that *mibouzin (widow)* contributes more information than *zyosei (woman)* into the context, it is not a redundant process. Nevertheless, this Japanese relative clause is indeed judged as redundant by Japanese native speakers. Thus, the asymmetric theory is not sufficient to account for Japanese relative clauses.

Accordingly, Ingason proposes a hierarchical hypothesis that "structurally higher elements are entered in the context before lower elements, even if the structurally higher elements are pronounced after the lower elements" (Ingason 2016:1). The hierarchical structure of elements determines the computation order. In (123b), the external head *mibouzin* c-commands the relative clause and is structurally higher than the elements in the relative clause. Therefore, the external head *mibouzin (widow)* is computed first, which updates the context with the information of *a woman who has lost her husband*. Subsequently, the relative clause is computed and augments the information of *a woman* into the context, which does not make a contribution to the context and is thereby predicted by Ingason's proposal to be redundant. I have examined Ingason's proposal through my experiments in section 3.4, which reveal that Ingason's judgments are correct.

Ingason's hypothesis seems quite promising, although he does not provide a detailed update mechanism for such a hierarchical proposal. Ingason's work is built on by Romoli and Mandelkern (2017), which will be introduced in the next section.

5.3 An introduction to other hierarchical approaches

Romoli and Mandelkern (2017) explore antecedent-final conditionals with a presupposition trigger on the antecedent (B, if A_p) to examine the explanatory power of Schlenker's asymmetric and symmetric approaches. In a conditional *B, if* A_p, the asymmetric and symmetric proposals make the same prediction regarding presupposition projection for the reason that there is no information that is to the

right of the presupposition trigger. Only the information that is to the left of the presupposition trigger should be considered when computing the presupposition. In *B, if* A_p, when *B* is true, the conditional is always true regardless of the value of *A,* as demonstrated in (124).

(124) The truth table for conditional (material implication analysis)

p	q	$p \rightarrow q$
1	1	1
1	0	0
0	1	1
0	0	1

Therefore, in order to evaluate *if* A_p, only worlds where *B* is false should be computed. Moreover, the presupposition p on the antecedent clause must be satisfied by the local context of *if* A_p. Consequently, the presupposition of *B, if* A_p is *if* $\neg B$, p. To be specific, in (125),

(125) John isn't in Paris, if he regrets being in France.
(Adopted from Romoli and Mandelkern 2017: 1023)

the negation of *B, John is in Paris,* is computed first, and the local context of *if* A_p thereby entails *John is in Paris*. Since the presupposition *p (John is in France)* is on *A*, the local context of *A* must entail *p*. Accordingly, the presupposition of (125) is *if John is in Paris, John is in France*. This presupposition is trivially true (tautologous conditional presupposition) and (125) as a whole presupposes nothing. In the case of (125), the presupposition on the antecedent clause is filtered when the negation of the consequent clause entails the presupposition, which is a predicted outcome of Schlenker's asymmetric and symmetric accounts. This outcome is refuted by Romoli and Mandelkern (2017) in the way that they highlight that (125) intuitively presupposes *John is in France*, which I have checked with a native speaker who subscribes to Romoli and Mandelkern's assessment.

Moreover, Romoli and Mandelkern's judgment concerning (125) builds on (126), the canonical conditional of (125).

(126) If John regrets being in France, he isn't in Paris. (Adopted from Romoli and Mandelkern 2017: 1023)

They argue that the antecedent-initial conditional (126) intuitively presupposes that *John is in France*, which is predicted by Schlenker's asymmetric approach. And this presupposition should be shared by the antecedent-final conditional (125).

To sum up, the following facts can be established: The asymmetric approach predicts different presuppositions for (125) and (126). It predicts (125) to be presuppositionless and (126) to have a non-conditional presupposition, *John is in France*; the symmetric approach predicts both (125) and (126) to be presuppositionless, as I have summarized in (92); and native speaker's introspective judgment

is that (125) and (126) have the same presupposition that *John is in France*. To account for these discrepancies, Romoli and Mandelkern (2017) propose that the computation of local context can be approached from syntactic structures of sentences rather than linear-order based parsing.

Hence, they put forward two potential hierarchical hypotheses, which will be introduced and assessed briefly in section 5.3.1 and 5.3.2.

5.3.1 The hierarchical transparency approach

Romoli and Mandelkern (2017) present that Schlenker's local context theory can be approached from hierarchical orders in lieu of linear orders, which is named by them as the hierarchical transparency approach. To be specific, when computing the local context of a constituent in a sentence, an evaluator's attention should be restricted to information that c-commands that constituent, regardless of linear order. In a sentence, c-command relation determines which constituent provides the local context for which constituent.

I introduce this hierarchical transparency approach through two constructions. Firstly, the Japanese relative clause in (123a), judged by Japanese native speakers, is infelicitous, an outcome which is in accordance with the prediction made by the hierarchical account. The external head *widow* is hierarchically higher at LF and c-commands the relative clause *who is a woman*. In this framework, *widow* firstly enters the information of *a woman and a woman who has lost her husband* in the context. The context that is updated by *widow* is the local context of the relative clause, rendering the utterance of *who is a woman* redundant.

Secondly, the hierarchical transparency approach is able to account for the computation of the local contexts in Japanese complex sentences. (127) is an instantiation.

(127) Mary-ga John-ni nanika-o age-ta onna-ni at
Mary-Nom John-Dat something-Acc give-Pst woman-Dat meet
-ta *sooda*.
-Past I heard
'I heard that Mary met a woman who had given something to John.' (Adopted from Takahashi 1994: 280)

In (127), the matrix predicate *heard* c-commands the complement clause, which provides that the elements that are structurally lower than *heard* should be computed in the speaker's belief worlds rather than the actual world. This computation process derives correct interpretation for (127), with no regard to linear order.

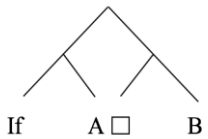
This hierarchical transparency approach is able to address the problems with Japanese relative clauses and Japanese complex sentences in a way that the asymmetric on-the-fly account cannot. To be an adequate theory of presupposition projection, the theory should be proved adequate to account for all major constructions in a language, which is what Romoli and Mandelkern (2017) have inves-

tigated. Given that their proposal is based on antecedent-initial and antecedent-final conditionals, they propose that the syntactic structures of these conditionals can be employed to investigate the adequacy of the hierarchical transparency approach.

In order to derive the same presupposition for (125) and (126), the syntactic structures of antecedent-initial and antecedent-final conditionals should be the same. These conditionals are only linearized differently. This assumption also comes up in Schlenker's 2009 paper. Under this assumption, when computing the antecedent clause, the strongest restriction that can be made on the antecedent clause is the original context. When computing the consequent clause, the strongest restriction that can be made on the consequent clause is the original context intersected with the antecedent clause, since the consequent clause is c-commanded by the antecedent clause.

In order for this hierarchical transparency approach to be adequate to explicate presupposition projection in conditionals, I now discuss two issues that are warranted to be resolved, suggested by Romoli and Mandelkern (2017). The first issue is whether the antecedent clause c-commands the consequent clause in a conditional. As Romoli and Mandelkern claim, if the syntactic structure is as in (128), the c-command relation between the antecedent clause and the consequent clause does not hold.

(128) A potential syntactic structure of a conditional if A, (then) B



(Adopted from Romoli and Mandelkern 2017:1028)

The second issue is that, in a conditional *if A, B*, when computing the antecedent *if A*, the assumed way is to compute *if A* together in lieu of just *A*. In this way, the antecedent clause *if A* c-commands *B*. Accordingly, the local context for *if A* is the original context and the local context for *B* is the original context intersected with *if A*. However, when *A* is computed independently from *if*, *A* and *B* are both potential candidates to be computed first because *A* alone does not c-command *B*. If so, the local context of *A* may not be the original context. The question is to what extent this assumption of computing *if A* together can be supported by syntax. Moreover, assuming that computing *if A* as an entity is supported by syntax, it leads to another issue: When *if A* is computed together, *B* must be computed alone. The reason for this is that when *if A* is computed together and □*B* is computed together, the computation order between *if A* and □*B* is indeterminate. Consequently, in order for the hierarchical transparency approach to function, *if A* must be computed together and *B* must be computed alone. The problem lies in whether this assumption can be supported by syntax.

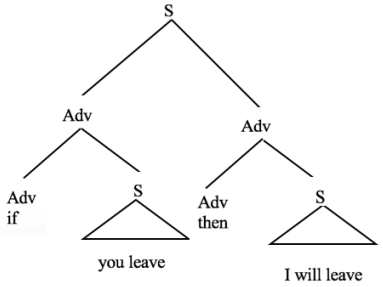
I now proceed with the investigation of these issues to check whether they can be resolved. To explicate the first issue concerning the c-command relation between the antecedent clause and the consequent clause, I firstly present the work of Bhatt and Pancheva (2002). They employ (129) to state the c-command relation between the antecedent clause and the consequent clause.

(129) a. If John leaves, then I will come home.
b. # Then I will come home, if John leaves.
(Adopted from Bhatt and Pancheva 2002: 7)

To elaborate, the ungrammaticality of (129b) is due to the fact that in (129b), the antecedent clause does not c-command the consequent clause; instead, *then* c-commands the antecedent clause, which gives rise to a Condition C violation. This is because Bhatt and Pancheva (2002) assume that, in a conditional, the correlative clause (the antecedent clause) binds the correlative proform (then)[33].

This c-command relation between the antecedent clause and the consequent clause has also been investigated by other linguists such as Geis (1985). Geis (1985) refutes the structure in (128). His rationale is explicated through (130) where *if* and *then* are both analyzed as adverbs.

(130) The simplified structure of a conditional: If you leave, then I will leave.



(Cited from Geis 1985: 139)

Geis claims that *if* is a constituent of the antecedent clause, which indicates that the structure (130) is incorrect.

Subsequently, he suggests that the existence of *then* is to make a semantic contribution to the conditional, as in the case of (131b).

(131) a. If you open the refrigerator, it won't explode.
b. If you open the refrigerator, then it won't explode.
(Adopted from Geis 1985: 148)

The refrigerators in (131a) and (131b) are not in the same scenario: (131a) is true for an ordinary refrigerator; (131b) is about a refrigerator that will explode unless opened. Furthermore, *then* is inspected by Izvorski (1996) to be incompatible with

[33] For a detailed explanation of correlative clause and proform, see Bresnan and Grimshaw (1978).

some types of conditionals and should therefore be excluded, as in (132).

(132) a. If John is dead or alive, #then Bill will find him.
b. If there are clouds in the sky, #then it puts her in a good mood.
(Adopted from Izvorski 1996: 135-136)

The cases in (132) are only two instances of *then* that are inappropriate in conditionals. (132) provides evidence that *if* and *then* do not function equivalently in conditionals as operators.

On the basis of the above analyses, *if* is more fundamental for a conditional than *then,* which is optional. And the assumption that the antecedent clause c-commands the consequent clause in a conditional may be confirmed by further research, which is beyond the scope of the present paper.

To account for the second issue mentioned above, I make use of a Japanese conditional (133).

(133) Mary-ga kenkou-ni ryuuisi-nake-re*ba*, kitsuen-o
Mary-Nom health-Dat pay.attention-not-*if* smoke-Acc
yame-na-i.
stop-not-NPst
'*If* Mary doesn't pay attention to her health, she doesn't stop smok ing.'

In Japanese conditionals, the conditional meaning is transmitted through a clitic *-ba* attached to the antecedent clause of a conditional. It is possible that *if A* in Japanese is computed together, for the reason that *if* is only signified by a clitic. Moreover, no connective *then* exists in a Japanese conditional. In this case, it is possible that *B* gets computed alone in lieu of □*B*. On the whole, in the case of Japanese conditionals, the second issue can potentially be resolved.

To sum up, the issues raised by Romoli and Mandelkern (2017) that may affect the efficacy of the hierarchical transparency approach in conditionals seem to be resolvable, although more investigation is left for future research. Moreover, from what I have inspected in this section, the hierarchical transparency approach predicts correct interpretations for Japanese relative clauses and complex sentences. Thus, the hierarchical transparency approach is worth pursuing and the detailed mechanism awaits further research. And the other hierarchical approach suggested by Romoli and Mandelkern (2017) is introduced in the next section.

5.3.2 The hierarchical approach incorporated into dynamic semantics

The second approach suggested by Romoli and Mandelkern (2017) is the hierarchical computation integrated with a dynamic semantic account. As recapitulated in section 3.6, Rothschild modifies Heim's CCP proposal into a "loosen-up" proposal, which is coupled with Schlenker's order constraint to account for presupposition projection patterns. However, the "loosen-up" dynamic account makes incorrect predictions for some sentences. An antecedent-second conditionals, *B, if*

A_p, is a case in point. The possible CCPs for a conditional predicted by the "loosen-up" dynamic account are demonstrated by (134).

(134) Rothschild's loosen-up account
C [A→B] is defined if (C[A]) [B] or (C[¬B]) [A] is defined.
(Adopted from Rothschild 2011: 20)

When coupled with an order constraint, the CCP for an antecedent-second conditional should be *(C[¬B])[A]*, which predicts a conditional (125) to have a tautologous presupposition, *if John is in Paris, John is in France*. By contrast, (125) intuitively has a strong presupposition *John is in France*.

On the basis of the fact that Rothschild's "loosen-up" dynamic account coupled with a linear order constraint is inadequate in predicting presuppositions, Romoli and Mandelkern (2017) propose to view the order constraint in Rothschild's proposal as a hierarchical order in lieu of a linear order.

To illustrate, Rothschild adopts Heim's CCP proposal where the meaning of a sentence updates contexts from a set of possible worlds to another set of possible worlds. The CCP is the effect of the truth-conditions of a sentence on contexts and is defined over contexts. The basic idea is that every sentence α has a CCP, and α is defined only if its CCP is also defined (α is true in the set of possible worlds). Further, this rule is applied recursively. In the case of a complex sentence with constituents α and ß, an arbitrary binary operator * connects α and ß: α*ß. This sentence is defined if α and ß are both defined. Otherwise, the sentence would result in presupposition failure. This sentence α*ß can be coupled with a hierarchical order constraint that α asymmetrically c-commands ß. The efficacy of this approach is again determined by syntactic structures and c-command relations. A detailed investigation of syntactic structures of major language constructions is, however, beyond the scope of the present paper. Assuming that these structures can be determined categorically, the context updating mechanism where a "loosen-up" dynamic account is coupled with a hierarchical order constraint can thereby be evaluated in detail.

In this section, I have outlined two potential hierarchical frameworks suggested by Mandelkern and Romoli (2017), both of which build on Ingason's proposal. Another hierarchical hypothesis of presupposition projection is on the market, namely Schlenker's "inside-out" generalization, which is introduced in the next section.

5.4 Schlenker's "inside-out" hierarchical generalization

5.4.1 An overview of Schlenker's generalization

Schlenker subscribes to Ingason's hierarchical account that the computation of the local context of a presupposition can be approached from a syntactic point of view. Schlenker makes amendments to Ingason's approach, suggesting that in an NMC, structurally lower modifiers are evaluated earlier than structurally higher modifiers, opposite from the computation order in Ingason's proposal.

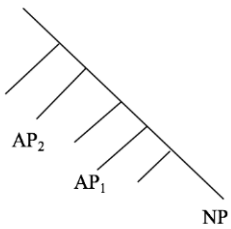
Schlenker's claim is derived from his empirical research, where he composes NMCs with multiple modifiers and invites English, Chinese, and French native speakers to judge the naturalness of these constructions. To illustrate, (135) is the core representation of Schlenker's generalization.

(135) [Modifier_2 [Modifier_1 Head noun]] (Adopted from Schlenker 2020: 5)

In (135), the head noun is computed first. Subsequently, Modifier_1 gets evaluated prior to Modifier_2, although Modifier_2 asymmetrically c-commands Modifier_1. Schlenker calls his claim the "inside-out" generalization.

I now introduce his research on English, French, and Chinese pre-nominal and post-nominal modification constructions. Firstly, Schlenker employs English NMCs to disprove Ingason's account. The crucial evidence Schlenker puts forth is the structure of English pre-nominal adjectives proposed by Cinque (2010), as shown in (136).

(136) Cinque's structure of English pre-nominal adjectives



(Adopted from Cinque 2010: 25)

In (136), although the NP is structurally lower than its modifiers, the native speakers that Schlenker invites to judge NMCs suggest that the NP is computed first, followed by AP_1, and then AP_2.

Secondly, Schlenker proceeds with French NMCs, which have the mirror image word-order compared to English, as demonstrated in (137).

(137) [[Head noun Modifier_1] Modifier_2] (Adopted from Schlenker 2020: 8)

Schlenker analyzes French data from the perspective that the French word order is derived through movement, and the English structure in (136) is the base

structure, which is the one that should be adhered to when elucidating the French data.

Thirdly, Schlenker employs Chinese evidence to assist his claim. Consider the example (138).

(138) Laizi Beijing-*de* Zhongguo ren
coming.from Beijing-Comp China person
'A Chinese who is from Beijing…'

As I have inspected in chapter 3, native speakers judge (138) as a natural construction, an outcome which is consistent with the prediction made by Schlenker's inside-out generalization. In (138), when the second modifier, *China*, forms a constituent with the head noun, *person*, they are computed first. Subsequent to the processing of *a Chinese person*, *Beijing* adds more specific information about this person, which is not redundant. All in all, Schlenker's new hypothesis on the basis of his empirical work is quite intriguing, though two issues should be considered. The first one is that Schlenker's claim should be proved adequate by more theoretical foundations in addition to Cinque's proposal for English pre-nominal adjectives in (136). The other one is that Schlenker's empirical work focuses on predicative types of expressions, which leaves its efficacy in propositional cases untested.

5.4.2 A brief discussion of Schlenker's generalization

Now I proceed with the evaluation of Schlenker's hypothesis from two perspectives, Chinese NMCs and relative clauses respectively.

Firstly, I assess whether Schlenker's generalization can be verified by theoretical foundations of Chinese NMCs from three perspectives. Firstly, Schlenker has examined Chinese NMCs in the form of *modifier+de+modifier+head noun* as in (138). Nevertheless, the syntactic status of *de* is under debate (see Aoun and Li 2003) and no coherent syntactic analysis of *de* is available on the market, a fact which cannot provide a theoretical foundation for Schlenker's claim. Secondly, the *modifier+de+modifier+head noun* NMC is not the only type of Chinese NMCs. Another type is *de-less* NMC, i.e. *modifier+modifiee (head noun)*, which has been explored by linguists such as Paul (2005) and Huang and Li (2009) among many others. As Huang and Li (2009) put forth, the relation between a modifier and a modifiee in a *de-less* NMC is that they are sisters, which potentially complicates the syntactic structures of Chinese NMCs. Thirdly, Paul (2005) exemplifies an instance of intriguing *de-less* NMCs, provided in (139).

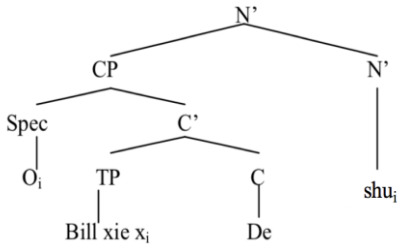
(139) Wo zui taoyan *jia da kong* hua, hutu hua hai keyi.
I most dislike *fake big empty* words muddle-headed talk still fine
'I particularly hate fake bragging empty talk, while muddle-headed talk is fine.' (Adopted from Paul 2005: 778)

In this *de-less* NMC, as a native speaker, I cannot determine which one among the three modifiers should be computed first. As far as I am concerned, these three modifiers are in a parallel position and should be computed simultaneously. This instantiation reveals that Schlenker's empirical study on testing Chinese NMCs through native speaker intuition regarding which modifier is computed first does not always work.

Under these considerations, the theoretical foundations of syntactic structures of Chinese NMCs are lacking, and the empirical testing is not always effective, leading me to doubt Schlenker's claim with Chinese data as evidence.

Secondly, given that Schlenker's study focuses on NMCs, I now explore other predicative types of expressions such as relative clauses. The syntactic structures of Chinese relative clauses have been investigated by linguists, such as Huang, Li, and Li (2000), Pan and Hu (2000), and Gobbo (2007) among many others. They present that, although Chinese does not have relative pronouns, it has relative operators *O*. For example, in a relative clause (140),

(140) a. Chinese
Bill xie-de shu hen bang.
Bill write-Comp book very good
'The book which Bill has written is very good.'
b. A simplified structure of (140a)



(Adopted from Pan and Hu 2004: 19)

the external head *shu (book)* c-commands the relative clause, whose structure resembles the Japanese relative clause structure, cf. (123). If such syntactic structures hold, then the relative clause is computed prior to the external head noun. Accordingly, in the case of (123), the relative clause *who is a woman* is firstly entered in the context, which is further updated by *mibouzin (widow)*. Schlenker's generalization thereby predicts (123) to be not redundant, contrary to intuition. The syntactic structures of relative clauses in Japanese and Chinese such as (123)

and (140) do not substantiate Schlenker's claim. Established on my brief analysis, the syntactic structures of Japanese and Chinese relative clauses cannot be determined, which is a topic for future research.

All in all, Schlenker's new claim established on his empirical outputs is intriguing. More theoretical foundations should be established to substantiate its adequacy. Moreover, whether his generalization can account for presupposition projection in propositional expressions is left for future research.

5.5 A summary of chapter 5

To summarize chapter 5, the hierarchical framework of presupposition projection is under-developed. No detailed updating mechanism is available on the market. What I have completed in this chapter is merely recapitulating the potential proposals of the hierarchical framework and evaluating them briefly. In general, two hierarchical directions have been highlighted by Ingason (2016) and Schlenker (2020) respectively. Ingason (2016) suggests that, in the context updating mechanism, a hierarchically higher element is computed earlier than a hierarchically lower element. Schlenker (2020), on the other hand, proposes the opposite processing order that a hierarchically lower element is computed prior to a hierarchically higher element. Moreover, Ingason's account is further evaluated by Mandelkern and Romoli (2017), who state that a hierarchical proposal of presupposition projection should be coupled with either Schlenker's local context theory or the dynamic semantic theory, although a detailed mechanism has not been developed yet. Established on my evaluation, I cannot determine which proposal between Ingason (2016) and Schlenker (2020) is more adequate to account for presupposition projection, for the following reasons: Firstly, neither Ingason nor Schlenker provides a detailed context updating mechanism; secondly, the syntactic structures of major language constructions and NMCs cannot be determined categorically. These are all open issues in the syntactic field. What I hope to have accomplished in this chapter is to outline the hierarchical frameworks of presupposition projection that are on the market and highlight the feasibility and infeasibility of some syntactic structures.

Chapter 6 Conclusion

In this paper, I have explored the context updating mechanism from a cross-linguistic perspective, focusing on presupposition projection. In the research of presupposition projection, three major directions have been investigated by linguists, namely asymmetric, symmetric and hierarchical frameworks. Among these, the asymmetric framework that I have examined in chapter 2 and chapter 3 has received a great deal of research attention. Among the various asymmetric accounts, Schlenker's local context theory is a relatively descriptively and explanatorily adequate one. Given that this local context theory is based solely on English data, I investigate its efficacy in Japanese both theoretically and empirically. My conclusion is that the local context theory is not adequate to explicate the presupposition projection patterns in various Japanese constructions, a finding which is substantiated by the Japanese empirical tests that I have conducted.

On the ground that the asymmetric proposal is inadequate in predicting presupposition projection patterns, I resort to the second direction, the symmetric framework, which has not been fully evaluated by previous linguistic work. And in the linguistic studies regarding its adequacy in English, the presupposition projection patterns in some English constructions cannot be accounted for. Moreover, the efficacy of the symmetric theory has not been investigated in other languages. Accordingly, I inspect the symmetric account in Japanese. I have conducted four experiments to test whether the symmetric account can explicate presupposition

projection patterns in Japanese major constructions, namely conjunctions, conditionals, and disjunctions. The data provide preliminary evidence that the symmetric account can explicate presupposition projection in Japanese. In order to reach a categorical conclusion, more experiments should be conducted. For instance, constructions with presupposition triggers should be embedded under various linguistic environments to test whether the projection of presuppositions holds. All in all, for the reason that no consensus can be reached regarding whether the symmetric framework is adequate in both English and Japanese, it is sensible to take account of other options, namely the hierarchical framework.

The hierarchical direction of presupposition projection is the least developed among these three frameworks. No detailed mechanism is on the market. Given my brief assessment of the hierarchical hypotheses, this hierarchical direction is quite promising to explicate presupposition projection patterns, although a few caveats should be noted. Firstly, in order to reach a conclusion that the hierarchical framework is adequate, the syntactic structures of major English and Japanese constructions should be determined, which is quite a demanding task. Secondly, this hierarchical direction departs from independently motivated assumptions. For example, linguists aside, most people may not have knowledge regarding hierarchical structures of language constructions. In this regard, the asymmetric direction is more preferable, for the reason that the left-right processing is on the basis of independently motivated assumptions. In any case, more efforts should be committed to this hierarchical framework of presupposition projection.

In this paper, I have concentrated on propositional and predicative types of expressions, but not quantificational cases that are essential in assessing presupposition projection theories. The investigation of the quantificational expressions is left for future research. Moreover, an essential part in the exploration of presupposition projection theories is the research and classification of presupposition triggers. Different presupposition triggers vary in their strength of projecting presuppositions, a topic which should be investigated further.

Appendix 1

1. Tanaka-ha karada-de yuujin-no arukumitu-o fusai-da.
   Tanaka-ha body-Dat friend-Gen path-Acc block-Pst
   'Tanaka blocked his friend's path with his body.'
2. Inu-ga surudoi ha-de watasi-o kan-da.
   dog-Nom sharp teeth-Dat I-Acc bite-Pst
   'A dog bit me with sharp teeth.'
3. Tanaka-ha intaunetto-de syukudai-o kakioe-te sensei-ni
   Tanaka-Top internet-Dat homework-Acc finish-Conj teacher-Dat
   meuru-de teisyutusi-ta.
   email-Dat submit-Pst
   'Tanaka submitted his homework to his teacher via email using the Internet.'
4. Watasi-ha mizu-de syawau-o abir-u.
   I-Top water-Dat shower-Acc take-NPst
   'I take a shower using (cold) water.'
5. Tanaka-ha asi-de gakkou-ni arui-te-ik-u.
   Tanaka-Top foot-Dat school-Dat walk-Conj-go-NPst
   'Tanaka walks to school with his feet.'
6. Watasi-ga doubutu-no inu-o mi-ta.
   I-Nom animal-Gen dog-Acc see-Pst
   'I saw a dog which is an animal.'
7. Tanaka-ha tabemono-no keuki-ga kirai-des-u.
   Tanaka-Top food-Gen cake-Nom hate-Pol-NPst
   'Tanaka hates cake which is food.'
8. Tanaka-ha kyousi-o si-te-iru hito-o takusan sit-te-ir
   Tanaka-Top teacher-Acc be-Ger-Prog people-Acc many know-Ger-Prog
   -u.
   -NPst
   'Tanaka knows many people who are teachers.'
9. Rie-ha tiisa-na kuti-de taber-u.
   Rie-Top small-Cop mouth-Dat eat-NPst
   'Rie eats with her small mouth.'
10. Tanaka-ha kotoba-o tukat-te hanas-u.
    Tanaka-Top words-Acc use-Dat speak-NPst
    'Tanaka speaks using words.'
11. Tanaka-ha sinsen-na syokuzai-o tukat-te ryourisur-u.

Tanaka-Top fresh-Cop food-Acc use-Conj cook-NPst
'Tanaka cooks using fresh food.'

12. Tanaka-ha kinou kitanai mizu-de oyoi-da.
Tanaka-Top yesterday dirty water-Dat swim-Pst
'Yesterday Tanaka swam in dirty water.'

13. Tanaka-ha o-kane-de tabemono-o ka-u.
Tanaka-Top Hon-money-Dat food-Acc buy-NPst
'Tanaka buys food with money.'

14. Tarou-ha mibouzin-no zyosei-ni at-ta.
Tarou-Top widow-Gen woman-Dat meet-Pst
'Tarou met a woman who is a widow.'

15. Tarou-ha mibouzin-de gengogakusya dearu zyosei-ni at-ta.
Tarou-Top widow-Conj linguist be woman-Dat meet-Pst
'Tarou met a woman who is a widow and a linguist.'

16. Tanaka-ha ueitoresu-no zyosei-o sit-te-i-ta.
Tanaka-Top waitress-Gen woman-Acc know-Ger-Prog-Pst
'Tanaka knew a woman who is a waitress.'

17. Tanaka-ha suteki-na zyosei-no ueitoresu-o sit-te-i-ta.
Tanaka-Top nice-Cop woman-Gen waitress-Acc know-Ger-Prog-Pst
'Tanaka knew a waitress who is a nice woman.'

18. Tanaka-ha oisii tabemono-no keuki-ga kirai-des-u.
Tanaka-Top delicious food-Gen cake-Nom hate-Pol-NPst
'Tanaka hates cake which is delicious food.'

19. Watasi-ha inu-no doubutu-o mi-ta.
I-Top dog-Gen animal-Acc see-Pst
'I saw an animal which is a dog.'

20. Tanaka-ha yasasii hito-no kyousi-o takusan sit-te-ir-u.
Tanaka-Top gentle people-Gen teacher-Acc many know-Ger-Prog-NPst
'Tanaka knows many teachers who are gentle people.'

21. Tanaka-ha hosonagai asi-de gakkou-ni arui-te-ik-u.
Tanaka-Top long.and.slender foot-Dat school-Dat walk-Ger-go-NPst
'Tanaka walks to school with his long and slender feet.'

22. Tanaka-ha koe-de uta-o utai-mas-u.
Tanaka-Top sound-Dat song-Acc sing-Pol-NPst
'Tanaka sings songs with voice.'

23. Tanaka-ha hosonagai yubi-de piano-o hik-u.
Tanaka-Top long.and.slender finger-Dat piano-Acc play-NPst
'Tanaka plays piano with his long and slender fingers.'

24. Watasi-ha seiketu-na mizu-de ofuro-ni hairi-mas-u.
I-Top clean-Cop water-Dat bath-Dat have-Pol-NPst
'I take a bath in clean water.'

25. Tanaka-ha kousoku intaunetto-de syukudai-o kakioe-te sensei
Tanaka-Top high-speed internet-Dat homework-Acc finish-Conj teacher

-ni meuru-de teisyutusi-ta.
-Dat email-Dat submit-Pst
'Tanaka submitted his homework to his teacher via email using high-speed Internet.'

26. Inu-ga ha-de watasi-o kan-da.
dog-Nom teeth-Dat I-Acc bite-Pst
'A dog bit me with teeth.'
27. Tikaratuyoi tubasa-de tori-ga tob-u.
powerful wing-Dat bird-Nom fly-NPst
'Birds fly with powerful wings.'
28. Tanaka-ha ookii karada-de yuujin-no arukumitu-o fusai-da.
Tanaka-Top strong body-Dat friend-Gen path-Acc block-Pst
'Tanaka blocked his friend's path with his strong body.'
29. Tanaka-ha dekoboko-no miti-o untensur-u.
Tanaka-Top bump-Gen road-Acc drive-NPst
'Tanaka drives on bumpy roads.'
30. Tanaka-ha omosiroi kotoba-o tukat-te hanasi-ta.
Tanaka-Top interesting words-Acc use-Conj speak-Pst.
'Tanaka spoke using interesting words.'
31. Tanaka-ha tabemono-de ryouri-o si-mas-u.
Tanaka-Top food-Dat cook-Acc do-Pol-NPst
'Tanaka cooks with food.'
32. Kinou Tanaka-ha suityou-o oyoi-da.
yesterday Tanaka-Top water-Acc swim-Pst
'Yesterday Tanaka swam in the water.'
33. Rie-ha kuti-de taber-u.
Rie-Top mouth-Dat eat-NPst
'Rie eats with mouth.'
34. Tanaka-ha kurousite kaseida o-kane-de tabemono-o ka-u.
Tanaka-Top with.difficulty earned Hon-money-Dat food-Acc buy-NPst
'Tanaka buys food with his hard-earned money.'
35. Tarou-ha zyosei-no miboujin-ni at-ta.
Tarou-Top woman-Gen widow-Dat meet-Pst
'Tarou met a widow who is a woman.'
36. Tarou-ga zyosei-de gengogakusya-dearu miboujin-ni at-ta.
Tarou-Nom woman-Conj linguist-be widow-Dat meet-Pst
'Tarou met a widow who is a woman and a linguist.'
37. Tanaka-ha zyosei-no ueitoresu-o sit-te-i-ta.
Tanaka-Top woman-Gen waitress-Acc know-Ger-Prog-Pst
'Tanaka knew a waitress who is a woman.'
38. Tanaka-ha hito-no kyousi-o takusan sit-te-i-ru.
Tanaka-Top people-Gen teacher-Acc many know-Ger-Prog-NPst
'Tanaka knows many teachers who are people.'

39. Tanaka-ha keuki-no tabemono-ga kirai-des-u.
Tanaka-Top cake-Gen food-Nom hate-Pol-NPst
'Tanaka hates food which is cake.'
40. Watasi-ha otonasii doubutu-no inu-o mi-ta.
I-Top well-behaved animal-Gen dog-Acc see-Pst
'I saw a dog which is a well-behaved animal.'
41. Tanaka-ha yubi-de piano-o hik-u.
Tanaka-Top finger-Dat piano-Acc play-NPst
'Tanaka plays piano with his fingers.'
42. Tanaka-ha ooki-na koe-de uta-o utai-mas-u.
Tanaka-Top loud-Cop voice-Dat song-Acc sing-Pol-NPst
'Tanaka sings songs with loud voice.'
43. Tori-ga tubasa-de tob-u.
bird-Nom wing-Dat fly-NPst
'Birds fly with wings.'
44. Tanaka-ha miti-o untensur-u.
Tanaka-Top road-Acc drive-NPst
'Tanaka drives on the road.'

Appendix 2

1. Mary-ha byouki-dear-i, undou-o hazime-masi-ta.
   Mary-Top sick-be-Conj, exercise-Acc start-Pol-Pst
   'Mary is sick and she has started to exercise.'
2. Mary-ha undou-o hazime, sosite byouki-dear-u.
   Mary-Top exercise-Acc start(Conj), and sick-be-NPst
   'Mary has started to exercise and she is sick.'
3. Mary-ha hazi-sir-azu-no dorobou-de, okane-o nusumi tsuzuke
   Mary-Top shame-know-not-Gen thief-Conj, money-Acc steal continue
   -te-ir-u.
   -Ger-Prog-NPst
   'Mary is a shameless thief and she continues to steal money.'
4. Mary-ha okane-o nusumi tsuzuke, hazi-shir-azu-no
   Mary-Top money-Acc steal continue(Conj), shame-know-not-Gen
   dorobou-des-u.
   thief-Pol-NPst
   'Mary continues to steal money and she is a shameless thief.'
5. Bill-ha ganko-de, Mary-ha Bill-ga pautiu-ni dounikasite
   Bill-Top stubborn-Conj, Mary-Top Bill-Nom party-Dat no.matter.what
   kuru youni settokusi-ta.
   come so.that persuade-Pst
   'Bill is stubborn and Mary has managed to persuade Bill to come to the party.'
6. Mary-ha Bill-ga pautiu-ni dounikasite kuru youni settoku-si
   Mary-Top Bill-Nom party-Dat no.matter.what come so.that persuade-Conj,
   Bill-ha ganko-des-u.
   Bill-Top stubborn-Pol-NPst
   'Mary has managed to persuade Bill to come to the party, and Bill is stubborn.'
7. Mary-ha dai kazoku-ni umare, kanozyo-no imouto-ha
   Mary-Top big family-Dat born(Conj), she-Gen younger.sister-Top
   totemo waka-i.
   very young-NPst
   'Mary comes from a big family and her sister is very young.'
8. Mary-no imouto-ha totemo waka-ku, Mary-ha dai kazoku-ni
   Mary-Gen younger.sister-Top very young-Conj, Mary-Top big family-Dat

umare-ta.
born-Pst.
'Mary's sister is very young and Mary comes from a big family.'

9. Mary-ha zyou nen kan hatarai-te-i-te, Mary-no ie-ha
Mary-Top ten years time work-Ger-Prog-Conj, Mary-Gen house-Top
utsukusi-i.
beautiful-NPst
'Mary has worked for ten years and Mary's house is beautiful.'

10. Mary-no ie-ha utsukusi-ku, Mary-ha zyou nen kan hatarai
Mary-Gen house-Top beautiful-Conj, Mary-Top ten years time work
-te-i-mas-u.
-Ger-Prog-Pol-NPst
'Mary's house is beautiful and Mary has worked for ten years.'

11. Mary-ha sekininkan-no aru bebiusittau-de, Mary-no yatoinusi-ha
Mary-Top responsibility-Gen have babysitter-Conj, Mary-Gen employer-Top
kanozyo-ni manzokusi-te-ir-u.
her-Dat satisfy-Ger-Prog-NPst.
'Mary is a responsible babysitter and Mary's employer is satisfied with her.'

12. Mary-no yatoinusi-ha kanozyo-ni manzokusi-te-i-te, Mary-ha
Mary-Gen employer-Top her-Dat satisfy-Ger-Prog-Conj, Mary-Top
sekininkan-no aru bebiusittau-des-u.
responsibility-Gen have babysitter-Pol-NPst
'Mary's employer is satisfied with her and Mary is a responsible babysitter.'

13. Mary-ha Bill-ni tasuke-o motomeru koto-ga dek-i, Mary
Mary-Top Bill-Dat help-Acc ask thing-Nom possible-Conj, Mary
-ha Bill-ga sinsetsu-da-to sit-te-ir-u.
-Top Bill-Nom kind-Cop-Comp know-Ger-Prog-NPst
'Mary can ask Bill for help and Mary knows that Bill is a kind.'

14. Mary-ha Bill-ga sinsetsu-da-to sit-te-i-te, Mary-ha Bill
Mary-Top Bill-Nom kind-Cop-Comp know-Ger-Prog-Conj, Mary-Top Bill
-ni tasuke-o motomeru koto-ga dekir-u.
-Dat help-Acc ask thing-Nom possible-NPst
'Mary knows that Bill is a kind, and moreover Mary can ask Bill for help.'

15. Mary-ha kasiko-ku, Bill-ha Mary-ga siawase-dearu koto-o kakusinsi
Mary-Top clever-Conj, Bill-Top Mary-Nom happy-be fact-Acc sure
-te-ir-u.
-Ger-Prog-NPst
'Mary is clever and Bill is sure that Mary is happy.'

16. Bill-ha Mary-ga siawase-dearu koto-o kakusinsi-te-i-te, Mary-ha
Bill-Top Mary-Nom happy-be fact-Acc sure-Ger-Prog-Conj, Mary-Top
kasiko-i.
clever-NPst

'Bill is sure that Mary is happy, and moreover Mary is clever.'

17. Bill-ha sigoto-ga ar-i, Mary-ha Bill-ni takusan-no okane-ga
Bill-Top job-Nom have-Conj, Mary-Top Bill-Dat much-Gen money-Nom
aru koto-o sit-te-ir-u.
havefact-Acc know-Ger-Prog-NPst
'Bill has a job and Mary is aware that Bill has lots of money.'

18. Mary-ha Bill-ni takusan-no okane-ga aru koto-o sit-te
Mary-Top Bill-Dat much-Gen money-Nom have fact-Acc know-Ger
-or-i, Bill-ha sigoto-ga ar-u.
-Prog-Conj, Bill-Top job-Nom have-NPst
'Mary is aware that Bill has lots of money, and moreover Bill has a job.'

19. Mary-ha oogoe-de hanashi-o suru koto-ni nare-te-i-te,
Mary-Top loud-Dat words-Acc do fact-Dat get.used.to-Ger-Prog-Conj,
Bill-ha Mary-ga kyousi-dearu koto-o shit-te-ir-u.
Bill-Top Mary-Nom teacher-be thing-Acc know-Ger-Prog-NPst
'Mary gets used to talking loudly and Bill is aware that Mary is a teacher.'

20. Bill-ha Mary-ga kyousi-dearu koto-o shit-te-i-te, Mary
Bill-Top Mary-Nom teacher-be thing-Acc know-Ger-Prog-Conj, Mary
-ha oogoe-de hanashi-o suru koto-ni nare-te-i-mas-u.
-Top loud-Dat words-Acc do fact-Dat get.used.to-Ger-Prog-Pol-NPst
'Bill is aware that Mary is a teacher, and moreover Mary is used to talking loudly.'

21. Mary-ha namakemono-de, saido sigoto-ni tikoku-sur-u.
Mary-Top a.lazy.person-Conj, again work-Dat late-do-NPst
'Mary is lazy and she is late to work again.'

22. Mary-ha saido sigoto-ni tikokusi-te, namakemono-des-u.
Mary-Top again work-Dat late-Conj, a.lazy.person-Pol-NPst
'Mary is late to work again and she is lazy.'

23. Mary-ha sigoto-ga tokui-dewa-na-ku, futatabi sigoto-o yame-ta.
Mary-Top work-Nom excel.at-Pol-not-Conj, once.again job-Acc quit-Pst
'Mary is not good at working and she has quitted her job again.'

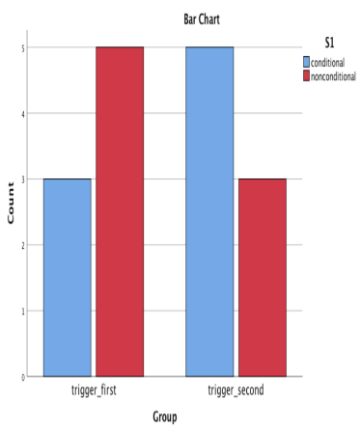
24. Mary-ha futatabi sigoto-o yame, sigoto-ga tokui-dewa-na-i.
Mary-Top once.again job-Acc quit(Conj), work-Nom excel.at-Pol-not-NPst
'Mary has quitted her job again and she is not good at working.'

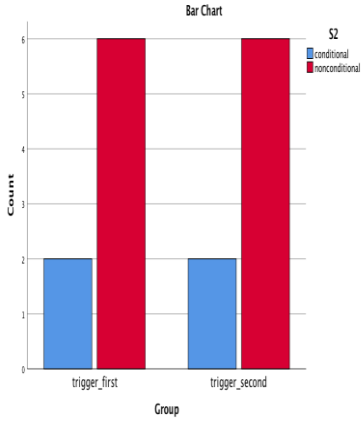
25. Mary-ha koukyuu resutoran-ga suki-de, saido gaisyoku-ni it-ta.
Mary-Top fancy resturant-Nom like-Conj, again go.out.to.eat-Dat go-Pst
'Mary likes fancy restaurants and she has gone out to eat again.'

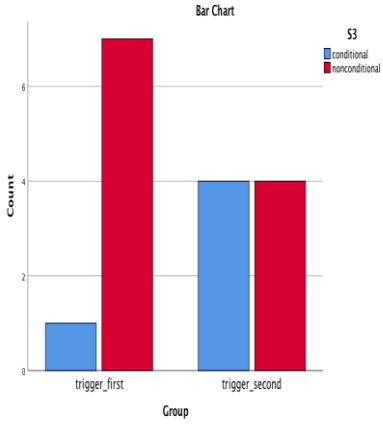
26. Mary-ha saido gaisyoku-ni ik-i, koukyuu resutoran-ga suki
Mary-Top again go.out.to.eat-Dat go-Conj,fancy resturant-Nom like
-des-u.
-Pol-NPst
'Mary has gone out to eat again and she likes fancy restaurants.'

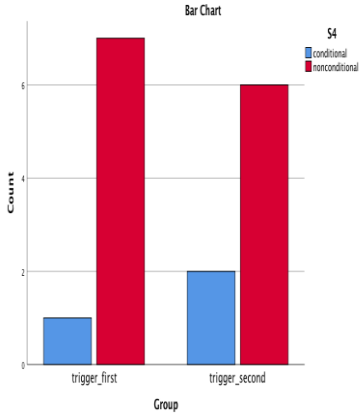
Appendix 3

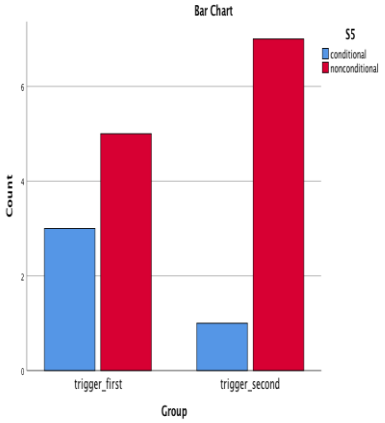
This appendix is the detailed output of test one of the Japanese conjunctions, *pp' and q (trigger first)* and *q and pp'(trigger second)*. In the following bar charts, conditional presuppositions are represented by the blue bar and non-conditional presuppositions are represented by the red bar.

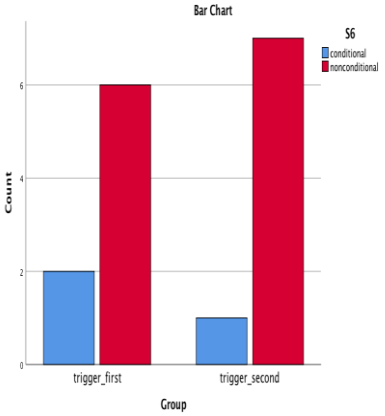


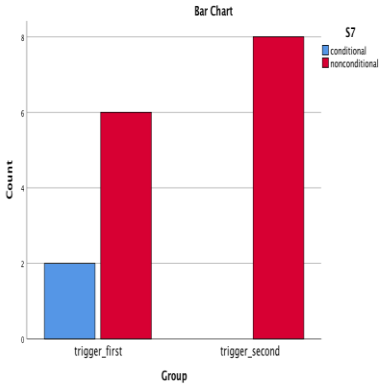


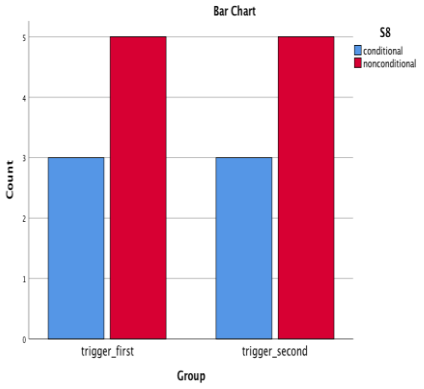


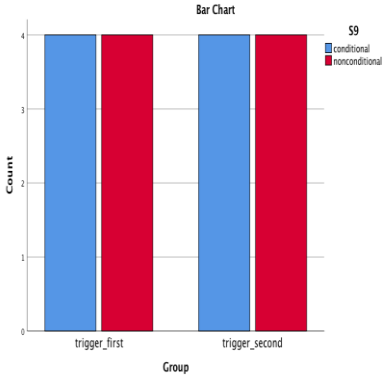


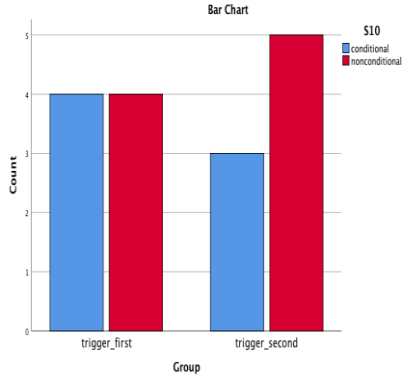

Bar Chart
S5
conditional
nonconditional
Count
0
2
4
6
trigger_first
trigger_second
Group

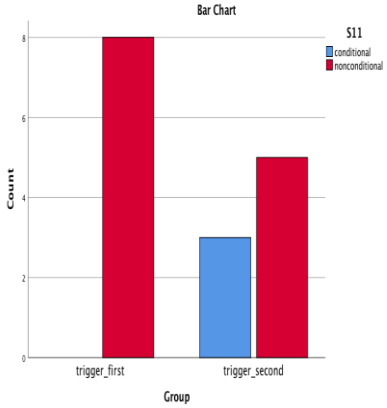

Bar Chart
S6
conditional
nonconditional
Count
0
2
4
6
trigger_first
trigger_second
Group

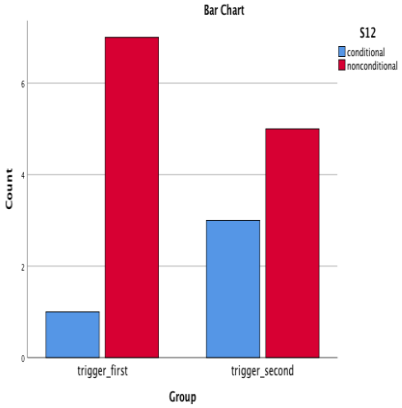

Bar Chart
S7
conditional
nonconditional
Count
0
2
4
6
8
trigger_first
trigger_second
Group

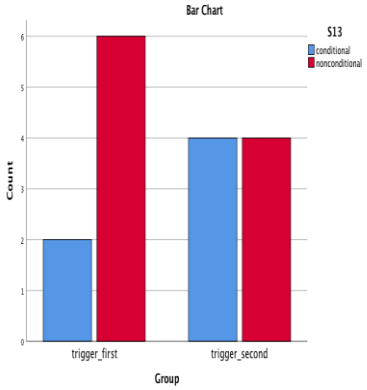

Bar Chart
S8
conditional
nonconditional
Count
0
1
2
3
4
5
trigger_first
trigger_second
Group


Bar Chart
S9
conditional
nonconditional
Count
0
1
2
3
4
trigger_first
trigger_second
Group


Bar Chart
S10
conditional
nonconditional
Count
0
1
2
3
4
5
trigger_first
trigger_second
Group


Bar Chart
S11
conditional
nonconditional
Count
8
6
4
2
0
trigger_first
trigger_second
Group


Bar Chart
S12
conditional
nonconditional
Count
6
4
2
0
trigger_first
trigger_second
Group


Bar Chart
S13
conditional
nonconditional
Count
6
5
4
3
2
1
0
trigger_first
trigger_second
Group

Appendix 4

1. Mary-ga kouka-na tabako-o sut-te-i-ta tosite,
   Mary-Nom expensive-Cop cigarette-Acc smoke-Ger-Prog-Pst as.a.fact(Conj),
   kitsuen-o yame-tara, Mary-ha kenkou-ni naru-darou.
   smoke-Acc stop-if, Mary-Top health-Dat become-Will
   'If Mary used to smoke expensive cigarettes and she has stopped smoking, she will be healthy.'
2. Mary-ga kitsuen-o tome, kouka-na tabako-o yoku
   Mary-Nom smoke-Acc stop(Conj), expensive-Cop cigarette-Acc often
   sut -te-i-ta mono-dat-tara, Mary-ha kenkou-ni naru-darou.
   smoke -Ger-Prog-Pst thing-Cop-if, Mary-Top health-Dat become-will
   'If Mary has stopped smoking and she used to smoke expensive cigarettes, she will be healthy.'
3. Mary-ga takusan-no kouka-na omotya-o mot-te-or-i, omotya
   Mary-Nom many-Gen expensiveCop toys-Acc have-Ger-Prog-Conj,toys
   -o sute-te koukaisi-tara, kanozyo-ha omotya-o taisetsu-ni
   -Acc throw.away-Conj regret-if, she-Top toys-Acc cherish-Dat
   suru-darou.
   do-will
   'If Mary has many expensive toys and she regrets throwing away her toys, she will cherish her toys.'
4. Mary-ga omotya-o sute-ta koto-o koikaisi-te, takusan-no
   Mary-Nom toys-Acc throw.away-Pst thing-Acc regret-Conj, many-Gen
   kouka-na omotya-o mot-te-i-tara, kanozyo-ha omoyua-o taisetsu
   expensive-Cop toys-Acc have-Ger-Prog-if, she-Top toys-Acc cherish
   -ni suru-darou.
   -Dat do-will
   'If Mary regrets throwing away her toys, and moreover she has many expensive toys, she will cherish her toys.'
5. Mosi Mary-ga hazi sir-azu-na dorobou-dear-i, konomama mono-o
   If Mary-Nom shame know-not-Cop thief-be-Conj, continue stuff-Acc
   nusumi tsuzuke-tara, basse-rare-ru-darou.
   steal continue-if, punish-Pass-NPst-will
   'If Mary is a shameless thief and she continues to steal stuff, she will be punished.'
6. Mosi Mary-ga konomama mono-o nusumi tsuzuke, hazi sir

If Mary-Nom continue stuff-Acc steal continue(Conj), shame know -azu-na dorobou-dear-eba, basse-rare-ru-darou.
-not-Cop thief-be-if, punish-Pass-NPst-will
'If Mary continues to steal stuff and she is a shameless thief, she will be punished.'

7. Mosi Mary-ga yoi inu-o ka-i, Mary-no petto-ha kenkou-da
If Mary-Nom good dog-Acc have-Conj, Mary-Gen pet-Top health-Cop -tositara, Mary-ha sekininkan-ga aru hito-da.
-if, Mary-Top responsibility-Nom have person-NPst
'If Mary has a good dog and her pet is healthy, she is a responsible person.'

8. Mosi Mary-no petto-ga kenkou-de, Mary-ha yoi inu-o kat
If Mary-Gen pet-Nom health-Conj, Mary-Top good dog-Acc have-- te-i-tara, Mary-ha sekininkan-ga aru hito-da.
Ger-Prog-if, Mary-Top responsibility-Nom have person-NPst
'If Mary's pet is healthy and Mary has a good dog, she is a responsible person.'

9. Mary-ga yoi hahaoya-de, Mary-no kodomo-ha gyougi-ga yoi
Mary-Nom good mother-Conj, Mary-Gen child-Top behavior-Nom good -nara, Mary-ha manzokusuru-darou.
-if, Mary-Top satisfy-will
'If Mary is a good mother and her child is well-behaved, she will be satisfied.'

10. Mosi Mary-no kodomo-ga gyougi-ga yo-ku, Mary-ga yoi
If Mary-Gen child-Top behavior-Nom good-Conj, Mary-Nom good hahaoya-nara, Mary-ha manzokusuru-darou.
mother-if, Mary-Top satisfy-will
'If Mary's child is well-behaved and she is a good mother, she will be satisfied.'

11. Mosi Mary-ga Rondon-e-no ryokou-ga suki-de, futatabi Igirisu
If Mary-Nom London-to-Gen travel-Nom like-Conj, again England -e ryokou deki-tara, Mary-ha siawase-da.
-to travel do-if, Mary-Top happy-NPst
'If Mary loves travelling to London and she travels to England again, she will be happy.'

12. Mosi Mary-ga futatabi Igirisu-e ryokou-ga deki-te, Rondon ryokou
If Mary-Nom again England-to travel-Nom go-Conj, London travel -ga suki -nara, Mary-ha siawase-da.
-Nom like-if, Mary-Top happy-NPst
'If Mary travels to England again and she loves travelling to London, she will be happy.'

13. Mosi Mary-ga sakkau-ga suki-de, futatabi supoutsugeumu-o
If Mary-Nom football-Nom like-Conj, again sports.game-Acc kansensi-tara, Mary-ha supoutsu-ni tsuite motto manabu-darou.
watch-if, Mary-Top sports-Dat about more learn-will

'If Mary likes football and she is watching sports games again, she will learn more about sports.'

14. Mosi Mary-ga futatabi supoutsugeumu-o kansens-i, sakkau-ga suki
If Mary-Nom again sports.game-Acc watch-Conj, football-Nom like
-nara, Mary-ha supoutsu-ni tsuite motto manabu-darou.
-if, Mary-Top sports-Dat about more learn-will
'If Mary is watching sports games again and she likes football, she will learn more about sports.'

15. Mosi Mary-ha koukyuu resutoran-ga suki-de, saido gaisyokusi-ni
If Mary-Top fancy restaurant-Nom like-Conj, again go.out.to.eat-Dat
iku-nara, Mary-ha motto okane-o kasegu hitsuyou-ga ar-u.
go-if Mary-Top more money-Acc earn necessity-Nom have-NPst
'If Mary likes fancy restaurants and she has gone out to eat again, she needs to earn more money.'

16. Mosi Mary-ga saido gaisyokusi-ni ik-i, mata koukyuu resutoran
If Mary-Nom again go.out.to.eat-Dat go-Conj, and fancy restaurant
-ga suki-nara,Mary-ha motto okane-o kasegu hitsuyou-ga
-Nom like-if, Mary-Top more money-Acc earn necessity-Nom
ar-u.
have-NPst
'If Mary has gone out to eat again and she likes fancy restaurants, she needs to earn more money.'

17. Mosi John-ga Pari-ni or-i, Furansu-ni iru koto-o koukaisi
If John-Nom Paris-Dat be-Conj, France-Dat be thing-Acc regret
-te-iru-nara, John-ha suguni ie-ni kaeru-darou.
-Ger-Prog-if, John-Top soon home-Dat return-will
'If John is in Paris and he regrets being in France, he will go back home very soon.'

18. Mosi John-ga Furansu-ni iru koto-o koukaisi-te-or-i, Pari
If John-Nom France-Dat be thing-Acc regret-Ger-Prog-Conj, Paris
-ni iru-nara, John-ha suguni ie-ni kaeru-darou.
-Dat be-if, John-Top soon home-Dat return-will
'If John regrets being in France, and moreover he is in Paris, he will go back home very soon.'

19. Mosi John-ga gan-o wazurat-te, John-no tsuma-ha John-ga
If John-Nom cancer-Acc have-Conj, John-Gen wife-Top John-Nom
byouki-dearu koto-o kanasim-eba, John-ha byouin-ni iku-darou.
sick-be thing-Acc sad-if, John-Top hospital-Dat go-will
'If John has cancer and his wife is sad that he is sick, John will go to the hospital.'

20. Mosi John-no tsuma-ha John-ga byouki-dearu koto-o kanasim-i,
If John-Gen wife-Top John-Nom sick-be thing-Acc sad-Conj,
John-ga gan-o wazurat-te-i-tara, John-ha byouin-ni iku-darou.

John-Nom cancer-Acc have-Ger-Prog-if, John-Top hospital-Dat go-will
'If John's wife is sad that he is sick, and moreover he has cancer, John will go to the hospital.'

21. Mosi John-ga butsurigakusya-de, kagakusya-dearu koto-o siawase-da
If John-Nom physicist-Conj, scientist-be thing-Acc happy-Cop
-to omou-nara, John-ha yoi zinsei-o okuru-darou.
-Comp think-if, John-Top good life-Acc have-will
'If John is a physicist and he is happy that he is a scientist, he will have a good life.'

22. Mosi John-ga kagakusya-dearu koto-o siawase-da-to omo-i,
If John-Nom scientist-be thing-Acc happy-Cop-Comp think-Conj,
John-ga butsurigakusya-nara, John-ha yoi zinsei-o okuru-darou.
John-Nom physicist-if, John-Top good life-Acc have-will
'If John is happy he is a scientist, and moreover he is a physicist, he will have a good life.'

23. Mosi John-ga eigo-no kyousi-de, kyousi-dearu koto-ga
If John-Nom English-Gen teacher-Conj, teacher-be thing-Nom
siawase-nara, John-ha isshoukenmei hataraku-darou.
happy-if, John-Top work-hard work-will
'If John is an English teacher and he is happy that he is a teacher, he will work hard.'

24. Mosi John-ga kyousi-dearu koto-o siawase-de, eigo-no
If John-Nom teacher-be thing-Acc happy-Conj, English-Gen
kyousi-nara, John-ha isshoukenmei hataraku-darou.
teacher-if, John-Top work-hard work-will
'If John is happy that he is a teacher, and moreover he is an English teacher, he will work hard.'

25. Mosi Mary-ha siritsugakkou-de manan-de-i-te, Bill-ha Mary
If Mary-Top private.school-Dat study-Ger-Prog-Conj,Bill-Top Mary
-ga gakkou-ni tout-te-iru koto-o uresiku omou-nara, Bill-ha
-Nom school-Dat go-Ger-Prog thing-Acc happy think-if, Bill-Top
Mary-o tasukeru-darou.
Mary-Acc help-will
'If Mary studies at a private school and Bill is happy that Mary goes to school, Bill will help her.'

26. Mosi Bill-ha Mary-ga gakkou-ni tout-te-iru koto-o uresiku omo
If Bill-Top Mary-Nom school-Dat go-Ger-Prog thing-Acc happy think
-i, Mary-ha siritsugakkou-de benkyousuru-nara, Bill-ha Mary-o
-Conj, Mary -Top private.school-Dat study-if, Bill-Top Mary-Acc
tasukeru-darou.
help-will
'If Bill is happy that Mary goes to school, and moreover Mary studies at a private school, Bill will help her.'

Appendix 5

1. Mary-ga kitsuen-o yame-reba, kenkou-ni ryuuisur-u.
   Mary-Nom smoke-Acc stop-if, health-Dat pay.attention-NPst
   'If Mary stops smoking, she pays attention to her health.'
2. Mary-ga kenkou-ni ryuuisi-nake-reba, kitsuen-o yame-na-i.
   Mary-Nom health-Dat pay.attention-not-if, smoke-Acc stop-not-NPst
   'If Mary doesn't pay attention to her health, she doesn't stop smoking.'
3. Mary-ga kanozyo-no ane to kenka-o suru koto-o
   Mary-Nom she-Gen older.sister with fight-Acc do thing-Acc
   koukaisuru-nara, Mary-ha ane-o aisi-te-ir-u.
   regret-if, Mary-Top older.sister-Acc love-Ger-Prog-NPst
   'If Mary regrets fighting with her sister, Mary loves her sister.'
4. Mary-ga kanozyo-no ane-o aisi-te-i-nai-nara, Mary-ha
   Mary-Nom she-Gen older.sister-Acc love-Ger-Prog-not-if,Mary-Top
   ane to kenka-o suru koto-o koukaisi-na-i.
   older.sister with fight-Acc do thing-Acc regret-not-NPst
   'If Mary doesn't love her sister, Mary doesn't regret fighting with her sister.'
5. Mary-ga siken-ni goukakusi-ta koto-ni odoroku-no-nara, kinben-ni
   Mary-Nom test-Dat pass-Pst thing-Dat surprise-Nmlz-if, diligent-Dat
   benkyou-o si-te-i-na-i.
   study-Acc do-Ger-Prog-not-NPst
   'If Mary is surprised that she has passed the exam, she does not study hard.'
6. Mary-ga kinben-ni benkyou-o si-te-iru-nara, siken-ni goukakusi-ta
   Mary-Nom diligent-Dat study-Acc do-Ger-Prog-if, test-Dat pass-Pst
   koto-ni odoroka-na-i.
   thing-Dat surprise-not-NPst
   'If Mary studies hard, she is not surprised that she has passed the exam.'
7. Mary-ga suugaku-o manabi-hajimeru-nara, kanozyo-ha siken-no
   Mary-Nom math-Acc study-start-if, she-Top exam-Gen
   yotei-ga ar-u.
   schedule-Nom have-NPst
   'If Mary starts learning math, she has an exam.'
8. Mary-ga siken-no yotei-ga nai-nara, kanozyo-ha suugaku-o
   Mary-Nom exam-Gen schedule-Nom not-if, she-Top math-Acc
   manabi-hajime-na-i.
   study-start-not-NPst

'If Mary doesn't have an exam, she doesn't start learning math.'

9. Mary-ha okane-ga nai-to wakat-te-i-reba, kanozyo-ha sigoto-o
Mary-Top money-Nom not-Comp know-Ger-Prog-if,she-Top job-Acc
mitsukeru-darou.
find-will
'If Mary is sure that she has no money, she will find a job.'

10. Mary-ga sigoto-o mitsuke-nai-nara, okane-ga nai koto-ga tasika
Mary-Nom job-Acc find-not-if, money-Nom not thing-Nom sure
-deha-na-i.
-Pol-not-NPst
'If Mary doesn't find a job, she is not sure that she has no money.'

11. Mary-ha eigo-ga kantan-to sit-te-i-reba, eigo-o
Mary-Top English-Nom easy-Comp know-Ger-Prog-if, English-Acc
manabu koto-o eraba-nai-darou.
study thing-Acc choose-not-will
'If Mary understands that English is easy, she won't choose to study English.'

12. Mary-ga eigo-o manabu koto-o erabe-nara, eigo-ga
Mary-Nom English-Acc study thing-Acc choose-if, English-Nom
kantan-dearu koto-o rikaisi-te-i-na-i.
easy-be thing-Acc understand-Ger-Prog-not-NPst
'If Mary chooses to study English, she doesn't understand that English is easy.'

13. Mary-ga sigoto-ni modoru-no-o kanasimu-nara, kanozyo-ha sono
Mary-Nom work-Dat return-Nmlz-Acc sad-if, she-Top that
sigoto-ga suki-deha-na-i.
work-Nom like-Pol-not-NPst
'If Mary is sad about going back to work, she doesn't like her job.'

14. Mary-ha kanazyo-no sigoto-ga suki-nara, kanozyo-ha sigoto-ni modoru
Mary-Top she-Gen work-Nom like-if, she-Top work-Dat return
-no-o kanasima-na-i.
-Nmlz-Acc sad-not-NPst
'If Mary likes her job, she is not sad about going back to work.'

15. Mary-ga konpyuutau gizutsu-o manabi-tsuzukeru-nara, kanozyo-ha
Mary-Nom computer technology-Acc study-continue-if, she-Top
takusan-no okane-o eru-darou.
much-Gen money-Acc earn-will
'If Mary continues to study computer technology, she will earn lots of money.'

16. Mary-ga takusan-no okane-o kasei-de-i-nai-nara, kanozyo-ha
Mary-Nom much-Gen money-Acc earn-Ger-Prog-not-if, she-Top
konpyuutau gizutsu-o manabi-tsuzuke-mas-en.
computer technology-Acc study-continue-Pol-not
'If Mary doesn't earn lots of money, she doesn't continue to study computer

technology.'

17. Mary-ga ie-o kau noni juubun-na okane-o
Mary-Nom house-Acc buy for.the.purpose.of enough-Cop money-Acc
mot-te-iru koto-ni odoroku-no-da tositara, kanozyo-ha ginkou
have-Ger-Prog thing-Dat surprise-Nmlz-cop if, she-Top bank
kouza-ni tyuui-o harat-te-i-na-i.
account-Dat attention-Acc give-Ger-Prog-not-NPst
'If Mary is surprised that she has enough money to buy a house, Mary doesn't pay attention to her bank account.'

18. Mary-ga zibun-no ginkou kouza-ni tyuui-o harat-te-i-reba,
Mary-Nom herself-Gen bank account-Dat attention-Acc give-Ger-Prog-if,
ie-o kau noni juubun-na okane-ga aru koto-ni
house-Acc buy for.the.purpose.of enough-Cop money-Nom have thing-Dat
odoroku-na-i.
surprise-not-NPst
'If Mary pays attention to her bank account, she is not surprised that she has enough money to buy a house.'

19. Mary-ga furusato-o hanareru-no-o koukaisuru-nara,
Mary-Nom hometown-Acc leave-Nmlz-Acc regret-if,
kanasimu-darou.
sad-will
'If Mary regrets leaving her hometown, she will be sad.'

20. Mary-ga siawase-nara, kanozyo-ha furusato-o hanareru-no-o
Mary-Nom happy-if, she-Top hometown-Acc leave-Nmlz-Acc
koukaisi-te-i-na-i.
regret-Ger-Prog-not-NPst
'If Mary is happy, she doesn't regret leaving her hometown.'

21. Bill-ga kasikoi-nara, issyoukenmei hataraka-naitoikenai koto-o sit
Bill-Nom wise-if, diligent work-have.to thing-Acc know
-te-ir-u
-Ger-Prog-NPst
'If Bill is wise, he knows that he has to work hard.'

22. Bill-ga issyoukenmei hataraka-naitoikenai-to sit-te-i-nai-nara,
Bill-Nom diligent work-have.to-Comp know-Ger-Prog-not-if,
kare-ha kasikoku-na-i.
he-Top wise-not-NPst
'If Bill doesn't know that he has to work hard, he is not wise.'

23. Bill-ga sigoto-o mot-te-iru-no-nara, kare-ha takusan-no okane-o
Bill-Nom job-Acc have-Ger-Prog-Nmlz-if, he-Top much-Gen money-Acc
kasegu koto-ga dekiru koto-o sit-te-ir-u.
earn thing-Nom can thing-Acc know-Ger-Prog-NPst
'If Bill has a job, he knows that he can earn lots of money.'

24. Bill-ga takusan-no okane-o kasegu koto-ga dekiru koto-o shir

Bill-Nom much-Gen money-Acc earn thing-Nom can thing-Acc know
-anake-reba, Bill-ha yoi sigoto-o mot-te-i-na-i.
-not-if, Bill-Top good job-Acc have-Ger-Prog-not-NPst
'If Bill doesn't know that he can earn lots of money, he doesn't have a good job.'

25. Bill-ga okane moti-nara, kare-ha takusan-no hitobito-o tasukeru koto
Bill-Nom money have-if, he-Top many-Gen people-Acc help thing
-ga dekiru koto-o sit-te-ir-u.
-Nom can thing-Acc know-Ger-Prog-NPst
'If Bill is rich, he knows that he can help many people.'

26. Bill-ga takusan-no hitobito-o tasukeru koto-ga dekiru koto-o
Bill-Nom many-Gen people-Acc help thing-Nom can thing-Acc
sir-anai-nara, kare-ha okane mochi-deha-na-i.
know-not-if, he-Top money have-Pol-not-NPst
'If Bill doesn't know that he can help many people, he is not rich.'

27. Bill-ha zikan-ga aru-nara, kare-ha basukettobouru-o suru-to
Bill-Top time-Nom have-if, he-Top basketball-Acc play-Comp
kakusinsi-te-ir-u.
sure-Ger-Prog-NPst
'If Bill has time, he is sure that he will play basketball.'

28. Bill-ha zibun-ga basukettobouru-o suru-to kakusinsi-te-i-nake
Bill-Top himself-Nom basketball-Acc play-Comp sure-Ger-Prog-not
-reba, kare-ha zikan-ga na-i.
-if, he-Top time-Nom not-NPst
'If Bill is not sure that he will play basketball, he doesn't have time.'

29. Bill-ha kyuuka-ga aru-nara, kare-ha kazoku-no tameni
Bill-Top vacation-Nom have-if, he-Top family-Gen fur.the.purpose.of
ryouri-o si-tsuzukeru-darou.
food-Acc cook-continue-will
'If Bill has vacations, he will continue to cook for his family.'

30. Bill-ga kazoku-no tameni ryouri-o si-tsuzuke-nai-nara,
Bill-Nom family-Gen fur.the.purpose.of food-Acc cook-continue-not-if,
Bill-ha kyuuka-ga na-i.
Bill-Top vacation-Nom not-NPst
'If Bill doesn't continue to cook for his family, he doesn't have vacations.'

31. John-ha Furansu-ni iru koto-o koukaisi-te-iru-nara, Pari-niha
John-Nom France-Dat be thing-Acc regret-Ger-Prog-if, Paris-Dat
ina-i.
not-NPst
'If John regrets being in France, he isn't in Paris.'

32. John-no tsuma-ha John-ga byouki-dearu koto-o yorokon-de-iru-nara,
John-Gen wife-Top John-Nom sick-be thing-Acc happy-Ger-Prog-if,
kare-ha gan-o wazurat-teha-ina-i.

he-Top cancer-Acc have-Pol-not-NPst
'If John's wife is happy that he is sick, he doesn't have cancer.'

33. John-ga kagakusya-dearu koto-o siawase-da-to omou-nara,
John-Nom scientist-be thing-Acc happy-Cop-Comp think-if,
kare-ha butsurigakusya-deha-na-i.
he-Top physicist-Pol-not-NPst
'If John is happy he is a scientist, he isn't a physicist.'

34. John-ga kyousi-dearu koto-o siawase-da-to omou-nara,
John-Nom teacher-be thing-Acc happy-Cop-Comp think-if,
kare-ha eigo kyousi-deha-na-i.
he-Top English teacher-Pol-not-NPst
'If John is happy that he is a teacher, he isn't an English teacher.'

35. Mary-ha gakkou-ni tout-te-iru koto-o uresiku omou-nara, siritsu
Mary-Top school-Dat go.to-Ger-Prog thing-Acc happy think-if, private
gakkou-de benkyousi-te-i-na-i.
school-Dat study-Ger-Prog-not-NPst
'If Mary is happy that she studies at school, she doesn't study at a private school.'

Appendix 6

1. Mary-ha naki-tomar-anai-ka, aruiha siawase-ka-dear-u.
   Mary-Top cry-stop-not-Disj, or happy-Disj-be-NPst
   'Mary doesn't stop crying or she is happy.'
2. Mary-ha siawase-ka, aruiha naki-tomar-anai-ka-dear-u.
   Mary-Top happy-Disj, or cry-stop-not-Disj-be-NPst
   'Mary is happy or she doesn't stop crying.'
3. Mary-ha inu-o tatai-ta koto-o koukaisi-te-i-nai-ka, aruiha
   Mary-Top dog-Acc beat-Pst thing-Acc regret-Ger-Prog-not-Disj, or
   onkou-na hito-dearu-ka-dear-u.
   warm-Cop person-be-Disj-be-NPst
   'Mary doesn't regret beating the dog or she is a warm person.'
4. Mary-ha onkou-na hito-dearu-ka, aruiha inu-o tatai-ta koto-o
   Mary-Top warm-Cop person-be-Disj, or dog-Acc beat-Pst thing-Acc
   koukaisi-te-i-nai-ka-dear-u.
   regret-Ger-Prog-not-Disj-be-NPst
   'Mary is a warm person or she doesn't regret beating the dog.'
5. Mary-ha syukudai-o si-tsuzukeru-ka, aruiha taida-dearu-ka-des-u.
   Mary-Top homework-Acc do-continue-Disj, or lazy-be-Disj-Pol-NPst
   'Mary continues to do her homework or she is lazy.'
6. Mary-ha namake-te-iru-ka, aruiha syukudai-o si-tsuzukeru-ka-dear
   Mary-Top lazy-Ger-Prog-Disj,or homework-Acc do-continue-Disj-be
   -u.
   -NPst
   'Mary is lazy or she continues to do her homework.'
7. Mary-ha mazusii-ka, aruiha okane-ga takusan aru koto-o sir-anai
   Mary-Top poor-Disj, or money-Nom much have thing-Acc know-not
   -ka-dear-u.
   -Disj-be-NPst
   'Mary is poor or she doesn't know that she has lots of money.'
8. Mary-ha jibun-ga okane moti-dearu koto-o sir-anai-ka, aruiha
   Mary-Top herself-Nom money have-be thing-Acc know-not-Disj, or
   mazusii-ka-dear-u.
   poor-Disj-be-NPst
   'Mary doesn't know that she has lots of money or she is poor.'
9. Mary-ha ryousin kara taikin-o souzokusuru, matawa sigoto-o

Mary-Top parents from lots.of.money-Acc inherit, or job-Acc
sagas-anakerebaikenai koto-ga fukou-to omo-u.
find-have.to thing-Nom unhappy-Comp think-NPst
'Mary inherits lots of money from her parents or Mary is not happy that she has to find a job.'

10. Mary-ha sigoto-o sagas-anakerebaikenai koto-o fukou-ni omou,
Mary-Top job-Acc find-have.to thing-Acc unhappy-Dat think,
matawa ryousin kara taikin-o souzokusur-u.
or parents from lots.of.money-Acc inherit-NPst
'Mary is not happy that she has to find a job or she inherits lots of money from her parents.'

11. Mary-ha jikatsusuru koto-ga dekiru-ka, aruiha ryousin kara
Mary-Top take.care.of.herself thing-Nom can-Disj, or parents from
okane-o kariru-no-o yame-nai-ka-dear-u.
money-Acc borrow-Nmlz-Acc stop-not-Disj-be-NPst
'Mary can take care of herself or she doesn't stop borrowing money from her parents.'

12. Mary-ha ryousin kara okane-o kariru-no-o yame-nai-ka, aruiha
Mary-Top parents from money-Acc borrow-Nmlz-Acc stop-not-Disj, or
jikatsusuru koto-ga dekiru-ka dear-u.
take.care.of.herself thing-Nom can-Disj-be-NPst
'Mary doesn't stop borrowing money from her parents or she can take care of herself.'

13. Mary-ha otsukiai-o tanosimu, mataha warui koibito-dearu koto-o
Mary-Top relationship-Acc enjoy, or bad girlfriend-be thing-Acc
koukaisi-na-i.
regret-not-NPst
'Mary enjoys being in a relationship or she doesn't regret being a bad girlfriend.'

14. Mary-ha warui koibito-dearu koto-o koukaisi-nai,mataha otsukiai-o
Mary-Top bad girlfriend-be thing-Acc regret-not, or relationship-Acc
tanosim-u.
enjoy-NPst
'Mary doesn't regret being a bad girlfriend or she enjoys being in a relationship.'

15. Mary-ha zibun-no syokuseikatsu-ni ki-o tsukat-te-iru,
Mary-Top herself-Gen diet-Dat attention-Acc give-Ger-Prog,
mataha taizyuu-ga fue-ta koto-ni kizui-te-i-na-i.
or weight-Nom gain-Pst thing-Dat aware-Ger-Prog-not-NPst
'Mary pays attention to what she eats or she is not aware that she has gained weight.'

16. Mary-ha taizyuu-ga fue-ta koto-ni kizui-te-i-nai, mataha
Mary-Top weight-Nom gain-Pst thing-Dat aware-Ger-Prog-not, or

zibun-no syokuseikatsu-ni ki-o tsukat-te-ir-u.
herself-Gen diet-Dat attention-Acc give-Ger-Prog-NPst
'Mary is not aware that she has gained weight or she pays attention to what she eats.'

17. Mary-ha konpyuutaa gizutsu-o manabi-tsuzukeru-ka, aruiha
Mary-Top computer technology-Acc study-continue-Disj, or
taikin-o kasegu-ka-dearu-darou.
lots.of.money-Acc earn-Disj-be-will
'Mary continues to study computer technology or she will earn lots of money.'

18. Mary-ha taibun taikin-o kasegu-ka, aruiha konpyuutau
Mary-Top probably lots.of.money-Acc earn-Disj, or computer
gizutsu-o manabi-tsuzukeru-ka-dear-u.
technology-Acc study-continue-Disj-be-NPst
'Mary will earn lots of money or she continues to study computer technology.'

19. Mary-ha furusato-o hanare-ta koto-o koukaisuru, mataha
Mary-Top hometown-Acc leave-Pst thing-Acc regret, or
Mary-ha siawase-da.
Mary-Top happiness-NPst
'Mary regrets leaving her hometown or she is happy.'

20. Mary-ha siawase-ka, aruiha furusato-o hanare-ta koto-o
Mary-Top happy-Disj, or hometown-Acc leave-Pst thing-Acc
koukaisuru-ka-dear-u.
regret-Disj-be-NPst
'Mary is happy or she regrets leaving her hometown.'

21. Mary-ha sakkau-o tome-nai-ka, aruiha supoutsu-ga kirai-ka-dear-u.
Mary-Top football-Acc stop-not-Disj, or sports-Nom hate-Disj-be-NPst
'Mary doesn't stop playing football or she hates sports.'

22. Mary-ha supoutsu-ga kirai-ka, aruiha sakkau-o tome-nai-ka-dear-u.
Mary-Top sports-Nom hate-Disj, or football-Acc stop-not-Disj-be-NPst
'Mary hates sports or she doesn't stop playing football.'

23. Mary-ha ane to kenka-o si-ta koto-o koukaisi-te
Mary-Top older.sister with fight-Acc have-Pst thing-Acc regret-Ger-
-i-nai-ka, aruiha ane-o aisi-te-iru-ka-dear-u.
-Prog-not-Disj, or older.sister-Acc love-Ger-Prog-Disj-be-NPst
'Mary doesn't regret fighting with her sister or she loves her sister.'

24. Mary-ha ane-o aisi-te-iru-ka, aruiha ane to
Mary-Top older.sister-Acc love-Ger-Prog-Disj, or older.sister with
kenka-o si-ta koto-o koukaisi-te-i-nai-ka-dear-u.
fight-Acc have-Pst thing-Acc regret-Ger-Prog-not-Disj-be-NPst
'Mary loves her sister or she doesn't regret fighting with her sister.'

25. Mary-ha warui gakusei-dearu-ka, mosikuha siken-ni goukakusi-ta

Mary-Top bad student-be-Disj, or exam-Dat pass-Pst
koto-ni odoroka-nai-ka-dear-u.
thing-Dat surprise-not-Disj-be-NPst
'Mary is a bad student or she is not surprised that she has passed the exam.'

26. Mary-ha siken-ni goukakusi-ta koto-ni odoroka-nai-ka, aruiha warui
Mary-Top exam-Dat pass-Pst thing-Dat surprise-not-Disj, or bad
gakusei-dearu-ka-dear-u.
student-be-Disj-be-NPst
'Mary is not surprised that she has passed the exam, or she is a bad student.'

27. Mary-ha suugaku-o manabi-hajime-nai, mataha kanozyo-ha bengaku-o
Mary-Top math-Acc study-start-not, or she-Top study-Acc
taisetsu-ni si-te-ir-u.
care-Dat do-Ger-Prog-NPst
'Mary doesn't start learning math or she cares about her studies.'

28. Mary-ha bengaku-o taisetsu-ni si-te-iru, mahata kanozyo-ha suugaku-o
Mary-Top study-Acc care-Dat do-Ger-Prog, or she-Top math-Acc
manabi-hajime-na-i.
study-start-no-NPst
'Mary cares about her studies or she doesn't start learning math.'

29. Mary-ha saifu-o nakusi-te-kanasii-ka, aruiha okane-ni tsuite ki
Mary-Top wallet-Acc lost-Conj-sad-Disj, or money-Dat about care
-ni si-nai-ka-des-u.
-Dat have-not-Disj-Pol-NPst
'Mary is sad that she lost her wallet or she doesn't care about her money.'

30. Mary-ni totte okane-ha taisetsu-zya-nai, mataha kanozyo-ha
Mary-Dat for mone-Top important-Cop Top-not, or she-Top
saifu-o sitsukusi-ta koto-o kanasin-de-ir-u.
wallet-Acc lost-Pst thing-Acc sad-Ger-Prog-NPst
'Mary doesn't care about her money or she is sad that she lost her wallet.'

Bibliography

Aoun, Joseph, and Yen-hui Audrey Li. *Essays on the Representational and Derivational Nature of Grammar: The Diversity of Wh-Constructions*. The MIT Press, 2003.

Beaver, David, and Emiel Krahmer. "A Partial Account of Presupposition Projection." *Journal of Logic, Language, and Information,* vol. 10, no. 2, Kluwer Academic Publishers, 2001, pp. 147-182. *JSTOR,* http://www.jstor.org/stable/40180276.

Beaver, David. *Presupposition and Assertion in Dynamic Semantics*. CSLI Publications, 2001.

Bhatt, Rajesh, and Roumyana Pancheva. "A Cross-Constructional Analysis of If-Clauses." The Syntax-Semantics Interface in the CP Domain, Berlin, March 2002. Conference Presentation. http://people.umass.edu/bhatt/papers/bhatt-pancheva-if.pdf.

Bhatt, Rajesh, and Roumyana Pancheva. "Conditionals." *The Wiley Blackwell Companion to Syntax*, edited by Martin Everaert and Henk C. Van Riemsdijk, 2nd ed., Wiley-Blackwell, 2017, pp. 1-48. *Wiley Online Library*, https://doi.org/10.1002/9781118358733. wbsyncom119.

Brehen, Richard, et al. "The Symmetry Problem: Current Theories and Prospects." *Nat Lang Semantics*, vol. 26, 2018, pp. 85-110. *Springer*, https://doi.org/10.1007/s11050-017-9141-z.

Bresnan, Joan, and Jane Grimshaw. "The Syntax of Free Relatives in English." *Linguistic Inquiry*, vol. 9, no. 3, The MIT Press, 1978, pp. 331-391. *JSTOR*, http://www.jstor.com/stable/4178069.

Cinque, Guglielmo. *The Syntax of Adjectives*. The MIT Press, 2010.

Chemla, Emmanuel. "Similarity: Towards a Unified Account of Scalar Implicatures, Free Choice Permission, and Presupposition Projection." Sin und Bedeutung, the Amsterdam Colloquium, Amsterdam, September 2007. Conference Presentation. http://www.emmanuel.chemla.free.fr/Material/Chemla-SIandPres.pdf.

- - - . "Projecting Presuppositions with Scalar Implicatures." *Proceedings of SuB 12*, edited by Atle Gronn, University of Oslo Press, 2008, pp. 81-91.

Chemla, Emmanuel, and Philippe Schlenker. "Incremental vs. Symmetric Accounts of Presupposition Projection: An Experimental Approach." *Nat Lang Semantics*, vol. 20, 2012, pp. 177-226. *Springer*, https://link.springer.com/article/10.1007/s11050-012-9080-7.

Chierchia, Gennaro. "On the Explanatory Power of Dynamic Semantics." Sinn und Bedeutung 14, Vienna, September 2009. Conference Presentation.

Chierchia, Gennaro, et al. "The Grammatical View of Scalar Implicatures and the Relationship between Semantics and Pragmatics." *Semantics: An International Handbook of Natural Language Meaning*, edited by Paul Portner et al., Mouton de Gruyter, 2012, pp. 2297–2331.

Cho, Sae-Youn. "Non-Tensed VP Coordination in Korean: Structure and Meaning." *Language and Information*, vol. 9, no. 1, Korean Society for Language and Information, 2005, pp. 35-49.

Chung, Woojin. "Context Updates in Head-Final Languages: Linear Order or Hierarchy?" *Proceedings of Sinn und Bedeutung 22*, vol. 1, edited by Uli Sauerland and Stephanie Solt, CreateSpace Independent Publishing Platform, 2018, pp. 313-329. *Semantics Archive*, https://semanticsarchive.net/sub2018/Chung.pdf.

Dorothy, Ann, et al. "Linear vs. Hierarchical Order in Redundant Modification-Experimental Data." Asymmetries in Language: Presuppositions and beyond, Berlin, July 2019. Conference Presentation. http://www.xprag.de/wp-content/uploads/2019/05/Ahn_etal.pdf.

Eckardt, Regine. "Licensing Or." *Presupposition and Implicature in Compositional Semantics*, edited by Uli Sauerland and Penka Stateva, Palgrave Macmillan, 2007, pp. 34-70.

Edginton, Dorothy. "Indicative Conditionals." *The Stanford Encyclopedia of Philosophy*, edited by Edward Zalta, October 2014. https://plato.stanford.edu/archives/win2014/entries/conditionals/.

Fox, Danny. "Free Choice and the Theory of Scalar Implicatures." *Presupposition and Implicature in Compositional Semantics*, edited by Uli Sauerland and Penka Stateva, Palgrave Macmillan, 2007, pp. 71-120. *Springer*, https://doi.org/10.1057/9780230210752_4.

- - - . "Two Short Notes on Schlenker's Theory of Presupposition Projection." *Theoretical Linguistics*, vol. 34, no. 3, 2008, pp. 237-252. *De Gruyter*, https://www.degruyter.com/view/journals/THLI/34/3/article-p237.xml.

Geis, Michael L. "The Syntax of Conditional Sentences." *Working Papers in Linguistics*, no. 31, 1985, pp. 130-159. *OSU.EDU,* http://hdl.handle.net/1811/81774.

George, Benjamin. "Predicting Presupposition Projection: Some Alternatives in the Strong Kleene Tradition." March 2008. MS. UCLA, California. *Semantics Archive*, https://ling.auf.net/lingbuzz/repo/semanticsarchive/article/001097/.

Geurts, Bart. *Presuppositions and Pronouns*. Elsevier, 1999.

Gillies, Anthony. "Indicative Conditional." *Routledge Companion to the Philosophy of Language*, edited by Delia Graff Fara and Gillian Russell, Routledge, 2012, pp. 449-465.

Gobbo, Francesca Del. "A Comparison between Japanese and Chinese Relative Clauses." *Working Papers in Linguistics*, vol. 17, 2007, pp. 177-197. *UVWPL*, http://hdl.handle.net/11707/557.

Gottwald, Siegfried. "Many-Valued Logic." *The Stanford Encyclopedia of Philosophy*, edited by Edward Zalta, December 2017. https://plato.stanford.edu/archives/sum2020/ entries/logic-manyvalued/.

Hasegawa, Nobuko. "Licensing a Null Subject at CP: Imperatives, the 1st Person and PRO." *Scientific Approaches to Language*, vol. 7, 2008, pp. 1-34. *Semantic Scholar*, http://id.nii.ac.jp/1092/00000181/.

Heim, Irene. "On the Projection Problem for Presuppositions." *Proceedings of the Second West Coast Conference on Formal Linguistics*, edited by D. Flickinger et al., Standford University Press, 1983, pp. 114-125. *Wiley Online Library*, https://doi.org/10.1002/9780470758335.ch10.

- - - . "Presupposition Projection." The Nijmegen Workshop on Presupposition, Lexical Meaning, and Discourse Processes, University of Nijmegen, 1990. Conference Presentation. https://semanticsarchive.net/Archive/GFiMGNjN/ Presupp%20projection%2090.pdf.

- - - . "Presupposition Projection and the Semantics of Attitude Verbs." *Journal of Semantics*, vol. 9, no. 3, 1992, pp. 183-221. http://semantics/uchicago.edu/kennedy/classes/s08/semantics2/heim92.3.pdf.

Horn, Laurence Robert. "On the Semantic Properties of Logical Operators in English." *Research Gate*, University of California, PhD dissertation, 1972. http://www.researchgate. net/publication/247046187_On_the_Semantic_Properties_of_Logical_Operator s_in_English.

Huang, C.-T. James, et al. "Relativization: Order and Structure." International Association of Chinese Linguistics 9, Singapore, June 2000. Conference Presentation. https://scholar.harvard.edu/files/ctjhuang/files/2000_hll_relativization_ singapore_iacl-9.pdf.

Huang, Shi-zhe, and Yen-Hui Audrey Li. "Henda Guwu-More on the Type Matching Constraint on Modification." *Essays on Linguistics*, vol. 39, The Commerce Press, 2009, pp. 157-203.

Ingason, Anton Karl. "Context Updates are Hierarchical." *Glossa: A Journal of General Linguistics*, vol. 1, no. 37, 2016, pp. 1-9. *Glossa*, http://doi.org/10.5334/gjgl.71.

Isao, Lori. "The Layered Structure of the Sentence." *Handbook of Japanese Syntax*, edited by Shigeru Miyagawa, et al., Walter de Gruyter, 2017, pp. 157-186.

Izvorski, Roumyana. "The Syntax and Semantics of Correlative Proforms." *Proceedings of NELS 26*, edited by Kiyomi Kusumo, Harvard University Press, 1996, pp. 133-147.

Jaeggli, Osvaldo, and Kenneth Safir. *The Null Subject Parameter*. Kluwer Academic Publications, 1989.

Karttunen, Lauri. "Presuppositions of Compound Sentences." *Linguistic Inquiry*, vol. 4, no. 2, 1973, pp. 169-193. *JSTOR,* https://www.jstor.org/stable/4177763?seq=1#metadata_info_tab_contents.

- - - . "Presupposition and Linguistic Context." *Theoretical Linguistics*, vol. 1, no. 3, 1974, pp. 181-194. *De Gruyter*, https://doi.org/10.1515/thli.1974.1.1-3.181.

Karttunen, Lauri, and Stanley Peters. "Conventional Implicature." *Syntax and Semantics*, vol. 11, Academic Press, 1979, pp. 1-56. *Research Gate*, http://www.researchgate.net/ publication/259810910_Conventional_Implicature.

Kanayama, Hiroshi, et al. "Coordinate Structures in Universal Dependencies for Head-Final Languages." *Proceedings of the Second Workshop on Universal Dependencies*, edited by Marie-Catherine de Marneffe et al., Association for Computational Linguistics, 2018, pp. 75-84. https://www.aclweb.org/anthology/W18-6009/.

Krifka, Manfred. "For a Structured Meaning Account of Questions and Answers." *Audiatur Vox Sapientia: A Festschrift for Arnim von Stechow,* edited by Caroline Féry and Wolfgang Sternefeld, De Gruyter, 1999, pp. 1-30. https://amor.cms.hu-berlin.de/~h2816i3x/Publications/StructuredQuestions.pdf.

Kubota, Yusuke, and Jungmee Lee. "The Coordinate Structure Constraint as a Discourse-Oriented Principle: Further Evidence from Japanese and Korean." *Language*, vol. 91, no. 3, 2015, pp. 642-675. *Semantic Scholar*, https://doi.org/10.1353/lan.2015.0033.

Kuno, Susumu. *The Structure of the Japanese Language*. The MIT Press, 1973.

Langendoen, D. Terrence, and Harris B. Savin. "The Projection Problem for Presuppositions." *Studies in Linguistic Semantics*, edited by Charles J. Fillmore and D. Terence Langendoen, Holt, Rinehart and Winston, 1971, pp. 55-60.

Larson, Richard K. "Bare-NP Adverbs." *Linguistic Inquiry*, vol. 16, no. 4, The MIT Press, 1985, pp. 595-621. http://semlab5.sbs.sunysb.edu/~rlarson/larson85bnps.pdf.

Lewis, David. "Scorekeeping in a Language Game." *Journal of Philosophical Logic*, vol. 8, no. 1, 1979, pp. 339-359. *JSTOR*, http://www.jstor.org/stable/30227173.

Mandelkern, Matthew, and Jacopo Romoli. "Parsing and Presuppositions in the Calculation of Local Contexts." *Semantics and Pragmatics*, vol. 10, no. 7, 2017b, pp. 1-41. http://dx.doi.org/10.3765/sp.10.7.

Mandelkern, Matthew, et al. "Asymmetry in Presupposition Projection: The Case of Conjunction." *Proceedings of SALT 27*, edited by Dan Burgdorf et al., LSA Publications, 2017c, pp. 504-524. https://journals.linguisticsociety.org/proceedings/index.php /SALT/article/view/27.504/3975.

Mandelkern, Matthew, et al. "We've discovered that projection across conjunction is asymmetric (and it is!)" *Linguistics and Philosophy*, 2019, pp. 1-42. *Springer*, https://doi.org/ 10.1007/s10988-019-09276-5.

Mazurka, Takashi. *Shin Nihongo Bunpo Kenkyu 2: Fukubun [New Japanese Grammar Research 2: Complex Sentences]*. Kurosio Publishers, 1997.

Mayr, Clemens, and Jacopo Romoli. "A Puzzle for Theories of Redundancy: Exhaustification, Incrementality, and the Notion of Local Context." *Semantics and Pragmatics*, vol. 9, no. 7, 2016a, pp. 1-48. http://dx.doi.org/10.3765/sp.9.7.

Mayr, Clemens, and Jacopo Romoli. "Satisfied or Exhaustified: An Ambiguity Account of the Proviso Problem." *Proceedings of SALT 26*, edited by Mary Moroney et al., LSA Publications, 2016b, pp. 892-912. https://journals.linguisticsociety.org/proceedings/index.php/SALT/article/view/26.892/3694.

Minami, Fujio. *Gendai Nihongo Bunpo no Rinkaku [Outline of Modern Japanese Grammar]*. Taishukan Shoten, 1993.

Pan, Haihua, and Jianhua Hu. "Head Noun Movement, Focus, and Topicalization in Mandarin Chinese." *Chinese Syntax and Semantics*, edited by Jie Xu et al., Prentice Hall, 2000, pp. 119-156.

Paul, Waltraud. "Adjectival Modification in Mandarin Chinese and Related Issues." *Linguistics*, vol. 43, no. 4, 2005, pp. 757-793. *De Gruyter*, https://doi.org/10.1515/ling.2005.43.4.757.

Peters, Stanley. "A Truth-Conditional Formulation of Karttunen's Account of Presuppositions." *Synthese*, vol. 40, 1979, pp. 301-316. *Springer*, https://doi.org/10.1007/BF00485682.

Rothschild, Daniel. "Transparency Theory and its Dynamic Alternatives: Commentary on 'Be Articulate'." *Theoretical Linguistics*, vol. 34, no. 3, 2008a, pp. 1-6. *De Gruyter*, https://doi.org/10.1515/THLI.2008.018.

- - - . "Making Dynamics Semantics Explanatory: Presupposition Projection." 2008b. MS. University College London. danielrothschild.com/dynamic explanatory.pdf.

- - - . "Presupposition Projection and Logical Equivalence." *Philosophical Perspectives*, vol. 22, no. 1, 2008c, pp. 473–497. *Semantic Scholar*, https://doi.org/10.1111/j.1520-8583.2008.00154.x.

- - - . "Explaining Presupposition Projection with Dynamic Semantics." *Semantics and Pragmatics*, vol. 4, no. 3, 2011, pp. 1-43. https://dx.doi.org/10.3765/sp.4.3.

Romoli, Jacopo, et al. "An Experimental Investigation of Presupposition Projection in Conditional Sentences." *Proceedings of SALT 21*, edited by Neil Ashton et al., LSA Publications, 2011, pp. 592–608. https://journals.linguisticsociety.org/proceedings/index.php/SALT/article/view/2588/2336.

Romoli, Jacopo. "A Solution to Soames' Problem: Presuppositions, Conditionals, and Exhaustification." *International Review of Pragmatics*, vol. 4, no. 2, 2012, pp. 153-184. *Research Gate*, https://doi.org/10.1163/18773109-00040203.

Romoli, Jacopo, and Matthew Mandelkern. "Hierarchical Structure and Local Contexts." *Proceedings of Sinn und Bedeutung 21*, edited by Robert Truswell, CreateSpace Independent Publishing Platform, 2017, pp. 1017-1034. *Semantics Archive*, https://semanticsarchive.net/Archive/DRjNjViN/RomoliMandelkern.pdf.

Rudnitskaya, Elena L. "Syntactic Properties of the Altaic Coordination Construction in Korean." *STUF-Language Typology and Universals*, vol. 51, no. 2, 1998, pp. 179-198. *De Gruyter*, https://doi.org/10.1524/stuf.1998.51.2.179.

Saito, Mamoru. "Toward the Reunification of Japanese Scramblings." *Formal Approaches to Japanese Linguistics 3*, edited by Maria Cristina Cuervo, The MIT Press, 2001, pp. 287-308.

Schlenker, Philippe. "Anti-Dynamic: Presupposition Projection without Dynamic Semantics." *Journal of Logic: Language and Information*, vol. 16, 2007, pp. 325-356. *Springer*, https://doi.org/10.1007/s10849-006-9034-x.

- - - . "Be Articulate: A Pragmatic Theory of Presupposition Projection." *Theoretical Linguistics*, vol. 34, no. 3, 2008a, pp. 157-212. *De Gruyter*, https://doi.org/10.1515/THLI.2008.013.

- - - . "Presupposition Projection: Explanatory Strategies." *Theoretical Linguistics,* vol. 34, no. 3, 2008b, pp. 287-316. *De Gruyter*, https://doi.org/10.1515/THLI.2008.021.

- - - . 'Presupposition Projection.' *Proceedings of SALT 18*, edited by Tova Friedman and Satoshi Ito, LSA Publications, 2008c, pp. 655-693. https://journals.linguisticsociety.org/proceedings/index.php/SALT/article/view/2503/2252.

- - - . "Local Contexts." *Semantics and Pragmatics*, vol. 2, no. 3, 2009b, pp. 1-78. https://dx.doi.org/10.3765/sp.2.3.

- - - . "Presuppositions and Local Contexts." *Mind, New Series*, vol. 119, no. 474, 2009c, pp. 377-391. *JSTOR*, https://www.jstor.org/stable/40865283.

- - - . "The Proviso Problem: A Note." *Nat Lang Semantics*, no. 19, 2011b, pp. 395-422. *Springer*, https://doi.org/10.1007/s11050-011-9072-z.

- - - . "Inside Out: A Note on the Hierarchical Update of Nominal Modifiers." *Glossa: A Journal of General Linguistics*, vol. 5, no. 60, 2020, pp. 1-19. *Glossa*, http://doi.org/10.5334/gjgl.1130.

Schwarz, Florian. "Symmetry and Incrementality in Conditionals." *Experimental Perspectives on Presuppositions 45: Studies in Theoretical Psycholinguistics*, edited by Florian Schwarz, Springer, 2015, pp. 195–213.

Singh, Raj. "Formal Alternatives as a Solution to the Proviso Problem." *Proceedings of SALT 17*, edited by T. Friedman and M. Gibson, LSA Publications, 2007, pp. 264-281. https://carleton.ca/singhr/?p=169.

Soames, Scott. "A Projection Problem for Speaker Presuppositions." *Linguistic Inquiry*, vol. 10, no. 4, 1979, pp. 623-666. *JSTOR*, http://www.jstor.org/stable/4178136.

- - - . "How Presuppositions are Inherited: A Solution to the Projection Problem." *Linguistic Inquiry*, vol. 13, no. 3, 1982, pp. 483-545. *JSTOR*, http://www.jstor.org/stable/ 4178288.

- - - . "Presupposition." *Philosophical Essays: Natural Language: What it Means and How we Use it*, edited by Scott Soames, Princeton University Press, 1989, pp. 73-130. *JSTOR*, http://www.jstor.org/stable/j.ctt7rgz1.

Stalnaker, Robert. "Pragmatic Presupposition." *Context and Content: Essays on Intentionality in Speech and Thought*, edited by Rober C. Stalnaker, Clarendon Press, 1974, pp. 47-62. https://files.eric.ed.gov/fulltext/ED140617.pdf#page=149.

- - - . "Assertion." *Context and Content: Essays on Intentionality in Speech and Thought*, edited by Rober C. Stalnaker, Clarendon Press, 1978, pp. 78-95. *Wiley Online Library*, https://doi.org/10.1002/9780470758335.ch5.

- - - . "Common Ground." *Linguistics and Philosophy*, vol. 25, 2002, pp. 701-721. *Springer*, https://doi.org/10.1023/A:1020867916902.

Strawson, Peter Frederick. "On Referring." *Mind, New Series*, vol. 59, no. 235, 1950, pp. 320-344. *JSTOR*, http://www.jstor.org/stable/2251176.

Takahashi, Daiko. "Sluicing in Japanese." *Journal of East Asian Linguistics*, vol. 3, no. 3, 1994, pp. 265-300. *JSTOR*, http://www.jstor.org/stable/20100661.

- - - . "Scrambling and Empty Categories." *Formal Approaches to Japanese Linguistics 3*, edited by Maria Cristina Cuervo, The MIT Press, 2001, pp. 47-58.

- - - . "Argument Ellipsis, Anti-Agreement and Scrambling." *Japanese Syntax in Comparative Perspective*, edited by Mamoru Saito, Oxford University Press, 2014, pp. 88-116.

Ueyama, Ayumi. "Two Types of Scrambling Constructions in Japanese." *Anaphora: A Reference Guide*, edited by Andrew Barss, Blackwell Publishing, 2003, pp. 23-71. *Wiley Online Library*, https://doi.org/10.1002/9780470755594.ch2.

van der Sandt, Rob, and Bart Geurts. "Too." *Proceedings of the 13th Amsterdam Colloquium*, edited by M.J.B. Stokhof and R.A.M. van Rooij, ILLC, 2001, pp. 1-6. http://ncs.ruhosting.nl/bart/papers/too.pdf.

van der Sandt, Rob, and Janneke Huitink. "Again." *Proceedings of the 14th Amsterdam Colloquium*, edited by Paul Dekker and Robert van Rooij, ILLC, 2003, pp. 181-186.

van Fraassen, Bas Cornelis. "Singular Terms, Truth Value Gaps, and Free Logic." *The Journal of Philosophy*, vol. 63, no. 17, 1966, pp. 481-495. https://doi.org/10.2307/2024549.

van Rooji, Robert. "Strengthening Conditional Presuppositions." *Journal of Semantics*, vol. 24, no. 3, 2007, pp. 289-304. https://doi.org/10.1093/jos/ffm007.

von Fintel, Kai. "What is Presupposition Accommodation, Again?" *Philosophical Perspectives, Philosophy of Language*, vol. 22, no. 1, 2008, pp. 137-170. *Wiley Online Library*, https://doi.org/10.1111/j.1520-8583.2008.00144.x.

Yoshimura, Noriko. "Scrambling." *Handbook of Japanese Syntax*, edited by Shigeru Miyagawa, et al., Walter de Gruyter, 2017, pp. 807-843.

Yoshio, Nitta. "Basic Sentence Structure and Grammatical Categories." *Handbook of Japanese Syntax*, edited by Shigeru Miyagawa, et al., Walter de Gruyter, 2017, pp. 27-53.

Zeevat, Henk. "Explaining Presupposition Triggers." *Information Sharing: Reference and Presupposition in Language Generation and Interpretation*, edited by Kees van Deemter and Rodger Kibble, CSLI, 2002, pp. 61-87. *Research Gate*, http://www.researchgate.net/publication/2407005_Explaining_ Presupposition_ Triggers.

„Göttinger Schriften zur Englischen Philologie“: Zum Konzept der Reihe

Frauke Reitemeier

Die Reihe „Göttinger Schriften zur Englischen Philologie“ umfasst Schriften zur Forschung aus den Disziplinen englische, amerikanische und postkoloniale Literatur- und Kulturwissenschaft, englische Fachdidaktik, englische Sprache, Literatur und Kultur des Mittelalters, Linguistik des Englischen. Veröffentlicht werden können:

- im Rahmen des BA-Studiengangs (Zwei-Fächer-Bachelor-Studiengang) verfasste Abschlussarbeiten (Bachelor-Arbeiten), die mit ‚sehr gut‘ benotet wurden bzw. die mit ‚gut‘ benotet und entsprechend überarbeitet wurden, so dass sie zum Zeitpunkt der Veröffentlichung mit ‚sehr gut‘ bewertet werden könnten;
- im Rahmen der einschlägigen MA-Studiengänge (Master of Arts/Master of Education) verfasste Abschlussarbeiten (Master-Arbeiten), die mit ‚sehr gut‘ benotet wurden bzw. die mit ‚gut‘ benotet und entsprechend überarbeitet wurden, so dass sie zum Zeitpunkt der Veröffentlichung mit ‚sehr gut‘ bewertet werden könnten.

Zusätzlich können in der Reihe Sammelbände beispielsweise mit den Arbeitsergebnissen aus Kolloquien oder Workshops veröffentlicht werden. Die Werke werden auf Deutsch oder Englisch publiziert.

Presupposition is what people make use of on a daily basis. It is therefore crucial to comprehend how a presupposition gets projected in a sentence. This thesis focuses on three major presupposition projection mechanisms, namely left-right asymmetric, symmetric and hierarchical approaches. For the reason that the majority of previous research is undertaken on the basis of English data, this thesis evaluates these mechanisms employing Japanese and Chinese empirical evidence. The analyses and experimental data in this thesis confirm that, firstly, the left-right asymmetric account which is substantiated by English empirical evidence is not tenable in Japanese and Chinese. Secondly, the symmetric approach appears to be promising in both English and Japanese, though it has not been sufficiently investigated. Thirdly, the hierarchical framework can account for English, Japanese and Chinese empirical evidence.

GEORG-AUGUST-UNIVERSITÄT
GÖTTINGEN

ISBN: 978-3-86395-491-8
ISSN: 1868-3878
eISSN: 2512-6970

Universitätsdrucke Göttingen