Presupposition Projection and Entailment Relations

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Abstract

In this dissertation, I deal with the problem of presupposition projection. I mostly focus on compound sentences composed of two clauses and conditional sentences in which the second clause carries a presupposition. The central claim is that the presupposition carried by the second clause projects by default, with the exception of cases in which the presupposition entails the first clause (or, in disjunctive sentences, the negation of the first clause). In the latter cases, the presupposition should not project, since it is logically stronger than the first clause (or its negation). Thus, in conjunctions, if the presupposition projected, the speaker's assertion of the first clause would be uninformative. As for conditionals and disjunctions, if the presupposition projected, the speaker would show inconsistency in his/her beliefs by showing uncertainty about the truth value of the first clause (or its negation). I argue that, in conditionals, this uncertainty is conversationally implicated whereas, in disjunctions, it results from the context's compatibility with the first disjunct. I maintain that, in cases where projection is blocked, the presupposition is conditionalized to the first clause (or its negation). I demonstrate that the conditionalization is motivated in a straightforward way by the pragmatic constraints on projection just described and that, contrary to what is defended by the so-called 'satisfaction theory', presupposition conditionalization is a phenomenon independent from local satisfaction.

Resumen

En esta tesis, trato el problema de la proyección de presuposiciones. Me centro mayoritariamente en oraciones compuestas de dos cláusulas y en oraciones condicionales cuya segunda cláusula contiene una presuposición. El argumento central es que la presuposición contenida en la segunda cláusula proyecta por defecto, con la excepción de casos en los que la presuposición entraña la primera cláusula (o, en las oraciones disyuntivas, la negación de la primera cláusula). En estos últimos casos, la presuposición no debería proyectar, puesto que es lógicamente más fuerte que la primera cláusula (o su negación). Por tanto, en las oraciones conjuntivas, si la presuposición proyectase, la aseveración de la primera cláusula por parte del hablante no sería informativa. En cuanto a las oraciones condicionales y disyuntivas, si la presuposición projectase, el hablante mostraría inconsistencia en sus creencias al mostrar incertidumbre acerca del valor de verdad de la primera cláusula (o su negación). Sostengo que, en oraciones condicionales, esta incertidumbre es implicada conversacionalmente mientras que, en las oraciones disyuntivas, resulta de la compatibilidad contextual de la primera cláusula. Mantengo que, en casos en los que la proyección es bloqueada, la presuposición es condicionalizada a la primera cláusula (o su negación). Demuestro que la condicionalización es motivada de manera directa por las restricciones de tipo pragmático descritas arriba y que, contrariamente a la idea defendida por la así llamada 'teoría de la satisfacción', la condicionalización de la presuposición es un fenómeno independiente de la satisfacción local de la misma.

Contents

Chapter 1

Introduction

One of the distinctive features of presuppositions is that they *project*. That is, presuppositions escape from the scope of operators such as negation, modals, *believe*-type verbs, the IF operator and the question operator. Put another way, these operators target the truth-conditional content of a sentence but not its presuppositional content. Let us start with some examples of presupposition projection. Intuitively, the sentence in (1.1a), carries the presupposition in (1.1b):

(1.1) a. Chris has given up writing

  b. ⤳ Chris used to write

The presupposition in (1.1b) is 'triggered' by the aspectual verb *give up*. Lexical expressions like aspectual verbs, factive verbs, definite noun phrases, possessive noun phrases, and particles like *too, also, again, still, yet* are presuppositional triggers. Additionally, syntactic constructions (i.e. clefts and pseudo-clefts), and focused constituents may also trigger presuppositions. In (1.1b), I use the symbol ⤳ to indicate that the sentence in (1.1b) expresses the presupposition carried by the sentence in (1.1a). I will use this notational device throughout the thesis.

As we can see in the next examples, when (1.1a) is embedded within the scope of an operator, the presupposition in (1.1b) projects to the main context. As a result, each of the sentences in the following examples, considered as a whole, also carries the presupposition in (1.1b):

(1.2) a. Chris has not given up writing/ It is not true that Chris has given up writing

  b. It is possible that/ Perhaps/ Maybe Chris has given up writing

    c. Lenny thinks/believes that Chris has given up writing

    d. If Chris has given up writing, he must be depressed.

    e. Has Chris given up writing?/ Is it true that Chris has given up writing?

Note that, if presuppositions are defined as propositions whose truth the speaker takes for granted for the purposes of the conversation or communicative exchange (Stalnaker (1973, 1974)), there is nothing surprising in the fact that they project. That is, the linguistic fact that presuppositions project is just a reflection of the fact that a speaker who is committed to the truth of a proposition for the purposes of a communicative exchange will keep his/her commitment regardless of whether the sentence that contains the presuppositional trigger is within the scope of an operator. For instance, if a speaker is committed to the truth of the proposition that Chris used to write (1.1b), s/he will keep his/her commitment to the truth of this proposition when s/he asserts that Chris has given up writing (1.1a), denies that Chris has given up writing (1.2a), raises the issue of whether Chris has given up writing (1.2b, 1.2d), reports that someone thinks that Chris has given up writing (1.2c), or asks whether Chris has given up writing (1.2e).

Nevertheless, there are many cases in which the speaker uses a presuppositional trigger without presupposing the proposition triggered. For example, the second clause of the conjunctive sentence in (1.3a) carries the presupposition in (1.3b). However, (1.3a), as a whole, does not carry this presupposition, which just reflects the fact that the speaker of (1.3a) does not presuppose that (1.3b):

(1.3)   a. Chris used to write, but he has given up writing

    b. $\not\rightsquigarrow$ Chris used to write

Furthermore, in many other cases, the speaker uses a presuppositional trigger without committing him/herself to the truth of the proposition triggered. For example, both the consequent of the conditional sentence in (1.4a) and the second clause of the disjunctive sentence in (1.4b) carry the presupposition in (1.4c). However, neither (1.4a), as a whole, nor (1.4b), as a whole, carries this presupposition, which reflects the fact that the speaker of (1.4a) and (1.4b) does not presuppose that (1.4c). Moreover, unlike what happened with the conjunction in (1.3a) above, and, on the assumption that (1.4a) is not part of a *modus ponens* argument[1], the speaker of (1.4a, b) shows uncertainty about the truth value of (1.4c):

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[1]For the time being, I will assume that the speaker is uncertain about the truth value of the antecedent of indicative conditional sentences.

(1.4)   a. If Chris used to write, he has given up writing

           b. Either Chris did not use to write or he has given up writing

           c. $\not\leadsto$ Chris used to write

In cases like (1.3a), (1.4a) and (1.4b) above, it is said that the presupposition carried by the second clause does not project to the main context. In the literature (Karttunen 1973, 1974; Karttunen & Peters 1979; Gazdar 1979a, b; Heim 1983b; van der Sandt 1988, 1992; Geurts 1999; Beaver 2001, among others), there has been a considerable amount of effort in order to make systematic predictions about the projection and lack of projection of presuppositions in compound sentences.

The goal of this thesis is to achieve a better understanding of the pragmatic constraints that block the projection of the presuppositions carried by the second clause of a compound sentence, with special emphasis on the phenomenon of conditionalization of these presuppositions. The projection problem needs another look because the two main theories that have established themselves as providing the best explanation for the projection phenomenon, notwithstanding their merits, have not accomplished the goal of making correct predictions for all the data available. There are glaring counterexamples both to the framework proposed by Karttunen (1974), Heim (1983b) and Beaver (2001) (also called 'the satisfaction theory' by Geurts (1996)) and to the framework proposed by van der Sandt (1992), van der Sandt and Geurts (1991), and Geurts (1999) (i.e. the binding and accommodation theory of presupposition). Let us see some of these counterexamples.

Intuitively, the conditional sentence in (1.5a) carries the presupposition in (1.5b). Thus, it is said that the presupposition in the consequent of (1.5a) projects to the main context. This would be correctly predicted by the binding theory; however, the satisfaction theory would predict that (1.5a) carries the conditional presupposition in (1.5c):

(1.5)   a. If Lida cares about her health, she will stop smoking.

           b. $\leadsto$ Lida smokes.

           c. $\not\leadsto$ If Lida cares about her health, she smokes.

Also intuitively, the conditional sentence in (1.6a) carries the conditional presupposition in (1.6b). Thus, it is said that the presupposition in the consequent of (1.6a) does not project to the main context. This would be correctly predicted by the satisfaction theory; however, the binding theory would predict that the sentence in (1.6a) carries neither the conditional presupposition in (1.6b) nor the non-conditional presupposition in (1.6c):

(1.6)   a. If Chris is in Copenhagen, Lenny will discover that he's staying at a
             hotel near the Tivoli Gardens.

          b. ⤳ If Chris is in Copenhagen, he's staying at a hotel near the Tivoli
             Gardens.

          c. ⤳̸ Chris is staying at a hotel near the Tivoli Gardens.

One might be tempted to draw the conclusion that the satisfaction theory makes
correct predictions for cases like (1.6a), where a presupposition triggered in the
consequent of a conditional sentence is conditionalized to the antecedent. How-
ever, I will show that the correct predictions are just coincidental. The fact that,
in (1.6a), the presupposition in the consequent is conditionalized is motivated by
pragmatic constraints that have not been taken into consideration by the satisfac-
tion theory. By contrast, in (1.5a), no pragmatic constraint blocks the projection
of (1.5b) and thus, there is no reason why the presupposition in the consequent
should be conditionalized. As a result, the genuine conditional presupposition in
(1.6b) is inferred, unlike what happens with the material implication in (1.5c).
Nonetheless, as we will see below, the satisfaction theory posits the systematic
conditionalization of any presupposition triggered in the consequent of a condi-
tional sentence and thus, makes the same prediction in both cases.

As for the binding theory, it makes correct predictions for cases like (1.5a), where
a presupposition triggered in the consequent of a conditional sentence holds un-
conditionally and thus, projects to the main context. However, in cases like (1.6a),
where projection to the main context is blocked, this theory predicts 'intermediate
accommodation', which roughly means that, if a presupposition is triggered in the
consequent of a conditional sentence and cannot project to the main context, it
should be interpreted in conjunction with the antecedent. Thus, according to the
binding theory, in (1.6a) above, the presupposition of the consequent, i.e. (1.6c),
should be accommodated in the antecedent. The resulting structure would be as
follows:

(1.7) If (Chris is in Copenhagen and [he is staying at some cheap hotel near the
       Tivoli Gardens]), Lenny will discover this.

The sentence above is equivalent to the following sentence, which carries neither
the conditional presupposition in (1.6b) nor the unconditional presupposition in
(1.6c):

(1.8) If Chris is in Copenhagen, then (if [he is staying at some cheap hotel near
       the Tivoli Gardens], Lenny will discover this)

Thus, intermediate accommodation precludes the possibility of obtaining conditional presuppositions. However, this is a counterintuitive prediction for cases like (1.6a). Furthermore, intermediate accommodation results in a structure that distorts the meaning of the sentence. For instance, (1.7) does not preserve the meaning of (1.6a).

In this thesis, I hypothesize that the presuppositions carried by the second clause of a compound sentence either project to the main context or are conditionalized to the truth of the first clause (in conditional and conjunctive sentences) or to the truth of the negation of the first disjunct (in disjunctive sentences). The conditionalization occurs in cases where the presupposition carried by the second clause (symmetrically or asymmetrically) entails the first clause or the negation of the first disjunct. If the entailment is symmetric, it gives rise to a tautological conditional presupposition, as happens in cases like (1.3a), (1.4a) and (1.4b) above, where the first clause or the negation of the first disjunct expresses the same proposition as the presupposition carried by the second clause. However, if the entailment is asymmetric, the conditionalization gives rise to a non-trivial conditional presupposition, as we have seen in the example in (1.6b). In this example (and similar cases), the non-triviality of the conditional presupposition is due to the fact that the antecedent (of the conditional presupposition) does not entail the consequent (of the conditional presupposition) either by itself or with the help of a lexical entailment or trivial world knowledge, but there are additional, non-trivial, contextual premises which are required in order for the entailment to obtain. So what is crucial for my hypothesis is not so much what a sentence/clause entails all by itself but rather what a sentence/clause entails in a particular context. This view of entailment will lead to a better understanding of the phenomenon of presupposition. In the following section, I will provide an overview of the main points of my proposal, which will be fully developed in Chapter 4.

1.1 Overview of the Proposed Analysis

I said above that, whenever the conditionalization of the presupposition takes place, it is motivated by pragmatic constraints that block projection. However, these constraints differ depending on the type of compound sentence. Thus, my hypothesis is that, in conditional and disjunctive sentences, it is the uncertainty that the speaker shows with respect to the truth value of the antecedent or the negation of the first disjunct that blocks the projection of the presupposition carried by the second clause. In cases of symmetric entailment, the antecedent or the negation of the first disjunct contains exactly the same information as the presup-

position carried by the consequent or second disjunct. Therefore, if the speaker
presupposes the proposition triggered in the second clause, s/he should not show
uncertainty about the truth value of the antecedent or the negation of the first
disjunct, since it would be inconsistent with one's beliefs to be uncertain about
the truth value of a proposition that one presupposes. Thus, the presupposition
is conditionalized to the truth of the antecedent or the negation of the first dis-
junct, giving rise to a tautological conditional presupposition, which amounts to
not having a presupposition at all, as we can see below:

(1.9)   a. If Chris used to write, he has given up writing.

         b. Either Chris did not use to write or he has given up writing.

         c. ⤳ If Chris used to write, Chris used to write.

In cases where the entailment is asymmetric, the antecedent or the negation of
the first disjunct is logically weaker than the presupposition carried by the con-
sequent or second disjunct. If the speaker presupposes the proposition triggered
in the consequent or second disjunct, s/he should not show uncertainty about the
truth value of the antecedent or the negation of the first disjunct, since it would be
inconsistent with one's beliefs to be uncertain about the truth value of a proposi-
tion which is entailed by (and thus, is logically weaker than) a proposition that one
presupposes. Thus, the presupposition triggered in the second clause is condition-
alized but, this time, the conditionalization gives rise to a non-trivial conditional
presupposition, as we can see below:

(1.10)   a. If Chris is in Copenhagen, Lenny will discover that he's staying at a
            hotel near the Tivoli Gardens.

         b. Either Chris is not in Copenhagen or Lenny will discover that he's
            staying at a hotel near the Tivoli Gardens.

         c. ⤳ If Chris is in Copenhagen, he's staying at a hotel near the Tivoli
            Gardens.

As for the uncertainty about the truth value of the antecedent of a conditional
sentence, I hypothesize that it results from a conversational (quantity) implicature
that derives from the fact that the antecedent is not asserted. In the case of the
uncertainty about the truth value of the negation of the first disjunct, it results from
the pragmatic constraint associated with the clauses of disjunctive sentences. In
Chapter 4, I will further elaborate on this topic; however, I would like to make
some comments on it here.

In indicative (genuinely hypothetical) conditional sentences, the utterance of the antecedent: *if* $\varphi \ldots$ gives rise to the conversational implicature that it is not the case that the speaker believes that φ: $\neg Bel_S\varphi$. This is because the speaker has not asserted that φ. If we consider belief as a form of necessity (i.e. doxastic necessity), the latter can be expressed as follows: $\neg\Box_{Dox}\varphi$ which, in turn, is equivalent to $\Diamond_{Dox}\neg\varphi$, i.e. it is compatible with the speaker's beliefs that $\neg\varphi$. Since φ is entailed by the presupposition carried by the consequent, this presupposition should not project. Suppose that π is the presupposition carried by the consequent. If π projected, the speaker would show inconsistency in his/her beliefs. On the one hand, we would have $\Box_{Dox}\pi$ and, on the other, $\neg\Box_{Dox}\varphi$, where π entails φ. Sometimes I will use the term *doxastic (in)defensibility* to refer to the (in)consistency of speakers' beliefs.

In regard to disjunctive sentences, Stalnaker (1975) makes the following generalization: "*a disjunctive statement is appropriately made only in a context which allows either disjunct to be true without the other*" (1975: 147). Thus, both disjuncts should be compatible with the context[2] and, on the assumption that speakers believe (or act as if they believe) everything that is in the context, both disjuncts should be compatible with the speaker's beliefs. Therefore, if a speaker utters *Either* φ *or* $\ldots$, φ should be compatible with the speaker's beliefs: $\Diamond_{Dox}\varphi$, which is equivalent to $\neg\Box_{Dox}\neg\varphi$, i.e. it is not the case that the speaker believes that $\neg\varphi$. Since $\neg\varphi$ is entailed by the presupposition carried by the second disjunct, the presupposition should not project. In the same way as above, suppose that π is the presupposition carried by the second disjunct. If π projected, the speaker would show inconsistency in his/her beliefs. On the one hand, we would have $\Box_{Dox}\pi$ and, on the other, $\neg\Box_{Dox}\neg\varphi$, where π entails $\neg\varphi$.

Turning back to the examples in (1.10), the utterance of the antecedent of (1.10a) or the first disjunct of (1.10b) in a context that entailed that Chris is staying at a hotel near the Tivoli Gardens would be doxastically indefensible, i.e. the speaker would show inconsistency in his/her beliefs. By contrast, the utterance of the antecedent of (1.10a) or the first disjunct of (1.10b) in a context that entailed (1.10c) would be doxastically defensible, i.e. the speaker would show consistency in his/her beliefs.

With respect to conjunctive sentences, I argue that, in cases where there is an entailment relation between the first clause and the presupposition carried by the

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[2]As we will see in the next chapter, Stalnaker (1975) makes similar remarks with respect to the antecedent of indicative conditional sentences, which should also be compatible with the context. Stalnaker does not state that this is a presupposition but rather a 'pragmatic constraint'. Other researchers (notably Leahy 2011) go further and explicitly state that indicative conditionals presuppose that their antecedents are epistemically possible for the speaker.

second one, conjunctive sentences may also carry conditional presuppositions. In conjunctions, it is the assertion of the first clause that blocks the projection of the presupposition carried by the second clause. This was already noted by van der Sandt (1988). If the entailment is symmetric, the first clause contains exactly the same information as the presupposition carried by the second clause. Thus, if the speaker presupposes the proposition triggered in the second clause, s/he should not assert the first clause, since it would be uninformative to assert a proposition that one presupposes. Therefore, the presupposition is conditionalized to the truth of the first conjunct, giving rise to a tautological conditional presupposition, as we can see below:

(1.11)   a. Chris used to write, and he has given up writing.

           b. ⇝ If Chris used to write, Chris used to write.

In cases where the entailment is asymmetric, the first conjunct is logically weaker than the presupposition carried by the second conjunct. Thus, if the speaker presupposes the proposition triggered in the second conjunct, s/he should not assert the first conjunct, since it would be uninformative to assert a proposition which is entailed by (and thus is logically weaker than) a proposition that one presupposes. Thus, the presupposition triggered in the second clause is conditionalized but, this time, the conditionalization gives rise to a non-trivial conditional presupposition, as was the case with (1.10) and we can see below:

(1.12)   a. Chris is in Copenhagen, but Lenny won't discover that he's staying at a hotel near the Tivoli Gardens.

           b. ⇝ If Chris is in Copenhagen, he's staying at a hotel near the Tivoli Gardens.

Put another way, the assertion of the first clause of (1.12a) in a context that entailed that Chris is staying at a hotel near the Tivoli Gardens would be redundant. By contrast, it is informative to assert the first clause of (1.12a) in a context that entails (1.12b). Furthermore, if the interlocutors presuppose (1.12b), the hearer infers that Chris is staying at a hotel near the Tivoli Gardens just after the speaker asserts that Chris is in Copenhagen. That is why the sentence in (1.12a) (and similar sentences) are often perceived as presupposing the presupposition carried by the second clause.

In order to achieve a better understanding of the constraints that block projection, it is useful to compare the cases above, where it is the presupposition in the second

clause that entails the first clause or the negation of the first disjunct with cases where the entailment goes the other way round, so that it is the first clause or the negation of the first disjunct that asymmetrically entails the presupposition carried by the second clause.

In conditional and disjunctive sentences, the speaker's uncertainty about the truth value of the antecedent or the negation of the first disjunct does not block the projection of the presupposition carried by the second clause. This is because the latter is logically stronger than the presupposition and it is not inconsistent with one's beliefs to be uncertain about the truth value of a proposition which entails (and thus, is logically stronger than) a proposition that one presupposes. Van der Sandt (1988, 1992) already notes that, in these cases, the sentence has an interpretation on which the presupposition projects. This is what happens in the sentences below, where the presupposition carried by the second clause projects:

(1.13)   a. If Chris is staying at a hotel near the Tivoli Gardens, Lenny will discover that he's in Copenhagen.

   b. Either Chris is not staying at a hotel near the Tivoli Gardens or Lenny will discover that he's in Copenhagen.

   c. ⤳ Chris is in Copenhagen.

Nonetheless, it is not impossible to obtain a different interpretation of the sentences in (1.13a) and (1.13b) on which (1.13c) does not project, so that the sentences are interpreted as not carrying the latter presupposition. Van der Sandt (1988) points out that, if a further assumption is added to the context in these cases, the presupposition does not project. I argue that this second interpretation only arises if this further assumption is conversationally implicated, which is not always the case. Before proceeding, I should stress that by 'conversational implicature' (Grice (1975)), I mean *defeasible inference which as such can be cancelled* (see van Canegem-Ardijns and van Belle (2008)). That is, it might be the case that the speaker did not intend to implicate the proposition that φ but that, nonetheless, the hearer inferred that φ, erroneously thinking that the speaker's intention was to conversationally implicate that φ.

Let us take the examples in (1.13a) and (1.13b). If it were conversationally implicated that the only place in Copenhagen where Chris might be is at a hotel near the Tivoli Gardens, the antecedent of (1.13a) and the negation of the first disjunct of (1.13b) would be no longer more informative than the presupposition in (1.13c) and thus, the constraint on projection would be operative again, so that the presupposition would not project but would be trivially conditionalized. The conditionalization is trivial on the assumption that the additional contextual premise

that is required in order for the antecedent of the conditional presupposition to entail the consequent, namely $\forall x(Tx \rightarrow Cx)$, where Tx stands for *x is in the Tivoli Gardens* and Cx stands for *x is in Copenhagen*, is considered trivial world knowledge. Put another way, if it were conversationally implicated that, if Chris is in Copenhagen, he is staying at a hotel near the Tivoli Gardens, the presupposition in (1.13c) would not project. Furthermore, if the latter implication were conversationally implicated, the conditional implication that, if Chris is staying at a hotel near the Tivoli Gardens, he is in Copenhagen would be perfected into a biconditional. That is, *conditional perfection* would be attained.

According to Horn (1984, 2000) and Levinson (2000), conditional perfection is conversationally implicated. Specifically, in the cases we are concerned with, what is conversationally implicated is that the antecedent of an implication is the *only* sufficient condition for its consequent. In the example above, the implication that, if Chris is in Copenhagen, he is staying at a hotel near the Tivoli Gardens does not lend itself to be conversationally implicated and thus, the first interpretation prevails. However, as we will presently see, there are other cases in which conditional perfection may be conversationally implicated. For instance, van der Sandt's (1988, 1992) example below may be interpreted as presupposing that John's wife is dead or as not presupposing the latter proposition:

(1.14) If John murdered his wife, he will be glad that she is dead.

In order to obtain the non-presuppositional interpretation, the antecedent of the implication in (1.15a) below must be interpreted as the only sufficient condition for its consequent (1.15b). That is, it must be conversationally implicated that (1.15c):

(1.15)   a. If John murdered his wife, she is dead.

           b. If and only if John murdered his wife, she is dead.

           c. If John's wife is dead, he murdered her.

In van der Sandt's example, unlike what happens in (1.13a) and (1.13b), the latter implication is amenable to be conversationally implicated. If it actually is conversationally implicated, then the presupposition that John's wife is dead does not project but is trivially conditionalized to the antecedent of the sentence, i.e. (1.15a). However, note that it is not the fact that the antecedent entails the presupposition carried by the consequent, but rather the conversational implicature (henceforth, CI) in (1.15c) that blocks the projection of the presupposition that

John's wife is dead. If the CI in (1.15c) is inferred, in order for the sentence in (1.14) to be felicitous, the presupposition that John's wife is dead shoud not project since, from both the CI and the presupposition taken together, it follows that John murdered his wife. But then, the speaker's uncertainty about the truth value of the antecedent of (1.14) would be unjustified.

As van der Sandt (1988) points out, if a continuation like (1.16a) below follows, the presupposition in (1.16b) projects. In Chapter 4, section 4.2, I will argue that this is due to the fact that the CI in (1.15c) above is cancelled:

(1.16) a. If John murdered his wife, he will be glad that she is dead. But, if she took those pills herself, he won't be glad that she is dead.

   b. ⤳ John's wife is dead.

Also, note that, in the cases we are concerned with here, if conditional perfection is conversationally implicated, it is the conditional implication, not the conditional sentence, that is perfected into a biconditional. Therefore, conditional perfection may also occur in conjunctive and disjunctive sentences in which the first clause or the negation of the first disjunct entails the presupposition carried by the second clause.

Turning back to the asymmetric entailment of the presupposition by the first clause, now in conjunctive sentences, the assertion of the first clause does not block the projection of the presupposition carried by the second clause. This is because the latter is logically stronger than the presupposition, and it is not uninformative to assert a proposition which entails (and thus, is logically stronger than) a proposition that one presupposes. This is what happens in the sentence below, where the presupposition carried by the second clause projects:

(1.17) a. Chris is staying at a hotel near the Tivoli Gardens, and Lenny will discover that he's in Copenhagen.

   b. ⤳ Chris is in Copenhagen.

Note that the analysis I have sketched in this overview predicts conditional presuppositions in cases where the first clause or the negation of the first disjunct is entailed by the presupposition carried by the second clause, and presupposition projection in cases where the first clause or the negation of the first disjunct entails the presupposition carried by the second clause (unless conditional perfection is conversationally implicated). Therefore, if my hypothesis is correct, the

phenomenon of presupposition conditionalization is independent of the local entailment (i.e. entailment by the local context) of the presupposition carried by the second clause, contrary to what is argued by the satisfaction theory, and occurs in cases where there is no global entailment (i.e. entailment by the global context) of this presupposition. For instance, (1.18)(=(1.10a)) would only be felicitously uttered in a global context that did not entail that Chris is staying at a hotel near the Tivoli Gardens:

(1.18) If Chris is in Copenhagen, Lenny will discover that he's staying at a hotel
         near the Tivoli Gardens.

By contrast, a sentence like (1.19)(=(1.13a)) would only be feliciously uttered in a global context that entailed that Chris is in Copenhagen (we have seen that, in this case, it is not easy to achieve conditional perfection):

(1.19) If Chris is staying at a hotel near the Tivoli Gardens, Lenny will discover
         that he's in Copenhagen.

In fact, whenever there is global entailment, there is local entailment. This happens in extensional contexts and, if the domain of quantification is restricted to the common ground, also in intensional contexts, and is regardless of whether the first clause or the negation of the first disjunct also entails the presupposition carried by the second clause (as is the case in (1.19)) or not. However, as we have seen, local entailment does not imply presupposition conditionalization.

Furthermore, it follows from my hypothesis that, in cases where the first clause or the negation of the first disjunct symmetrically entails the presupposition carried by the second clause, it is the fact that the presupposition entails the first clause or the negation of the first disjunct that blocks the projection of the presupposition, and not the other way round (unlike what is argued by the satisfaction theory). Thus, for instance, in (1.20a)(=(1.9a)), it is the fact that the presupposition carried by the consequent entails the antecedent that blocks the projection of the presupposition, so that the latter is conditionalized to the antecedent, giving rise to the tautological conditional presupposition in (1.20b)(=(1.9c)):

(1.20)   a. If Chris used to write, he has given up writing.

           b. $\rightsquigarrow$ If Chris used to write, Chris used to write.

However, if the presupposition carried by the consequent did not project due to the fact that it is entailed by the antecedent, it would not project either in the

variant of (1.20a) in (1.21a); however, (1.21b) projects. Note that, in this case, it would be very difficult (if not impossible) to attain conditional perfection by conversationally implicating that, if Chris used to write, he used to write for four different book publishers:

(1.21) a. If Chris used to write for four different book publishers, he must have given up writing.

  b. ⇝ Chris used to write

Finally, I would like to further elaborate on the phenomenon of non-trivial conditionalization of presuppositions in compound sentences. As was said above, the non-triviality of a conditional presupposition (or, more generally, of a conditional sentence) is due to the fact that there are additional, non-trivial, contextual premises which are required in order for the antecedent to entail the consequent. We saw that, in cases like (1.22a)(=(1.10a)) and (1.22b)(=(1.10b)), where it is the presupposition carried by the second clause that asymmetrically entails the antecedent or the negation of the first disjunct, the resulting conditional presupposition, in (1.22c)(=(1.10c)), is always non-trivial:

(1.22) a. If Chris is in Copenhagen, Lenny will discover that he's staying at a hotel near the Tivoli Gardens.

  b. Either Chris is not in Copenhagen or Lenny will discover that he's staying at a hotel near the Tivoli Gardens.

  c. ⇝ If Chris is in Copenhagen, he's staying at a hotel near the Tivoli Gardens.

The conditional presupposition in (1.22c) is fully acceptable because the hearer infers that there must be additional contextual premises that make possible an entailment between antecedent and consequent. However, as was said above, the antecedent does not entail the consequent (either by itself or with the help of a lexical entailment or trivial world knowledge) and thus, the conditionalization is non-trivial.

In cases where the entailment goes the other way round, so that it is the first clause or the negation of the first disjunct that asymmetrically entails the presupposition carried by the second clause, the conditionalization of the presupposition may also give rise to a non-trivial conditional presupposition. Remember that, in these cases, the presupposition carried by the second clause is only conditionalized if the conditional implication that results from the entailment is perfected

into a biconditional (if, by contrast, conditional perfection is not inferred, the pre-supposition projects regardless of the conditional implication). In these cases, the resulting conditional presupposition will be trivial or non-trivial depending on whether the antecedent all by itself or with the help of a lexical entailment or trivial world knowledge entails the consequent, or whether additional, non-trivial, contextual premises are required. Thus, for instance, in (1.23a)(=(1.14)), the re-sulting conditional presupposition, in (1.23b)(=(1.15c)), is trivial. This is because the antecedent of the conditional presupposition together with a lexical entailment entails the consequent. The lexical entailment is as follows: $\forall x(Mx \rightarrow Dx)$ where Mx stands for *x is murdered* and Dx stands for *x is dead*:

(1.23)   a. If John murdered his wife, he will be glad that she is dead.

         b. $\rightsquigarrow$ If John murdered his wife, she is dead.

By contrast, if additional contextual premises are required in order to attain the entailment, the resulting conditional presupposition is non-trivial. Let us see an example of a conditional sentence (though the discussion can be extended to dis-junctive and conjunctive sentences). The sentence in (1.24a) carries the presup-position in (1.24c) in its consequent; however, (1.24c) does not project but is con-ditionalized to the antecedent of (1.24a), so that the conditional presupposition in (1.24b) arises:

(1.24)   a. If Jade does not have a green card, she will regret having to leave the States.

         b. $\rightsquigarrow$ If Jade does not have a green card, she will have to leave the States.

         c. $\nrightarrow$ Jade has to leave the States.

Similar cases to that in (1.24a) have been studied in the literature (Beaver (2001), Schlenker 2010, Lassiter 2011); however, the explanations which have been pro-vided in order to account for the conditionalization of presuppositions in com-pound sentences are unsatisfactory, since they have always been based on the assumption that presuppositions are conditionalized by default in compound sen-tences, so that cases such as (1.24a) above, in which a genuine conditional pre-supposition obtains, have been understood as illustrating the accommodation of the default 'semantic' conditional presupposition as a whole. This approach will be explained in Chapter 3, section 3.2.

In cases like (1.24a), world knowledge intervenes providing the additional con-textual premises which are necessary in order for the hearer to infer an entailment

relation between the antecedent and the presupposition carried by the consequent. This set of premises may take the form of a generalization, which in the example in (1.24a) would be that, in order for a foreigner to live permanently in the States, s/he must have a green card (I will use the letter $\mathcal{P}$ as a metavariable for this type of generalization). The hearer may not be aware in advance of these generalizations, but s/he can infer them because, normally, s/he will be aware of broader generalizations that make it possible to make a connection between certain elements in the sentence. In relation to (1.24a), it is the common knowledge that people need a certain amount of documentation in order for them to leave permanently in a country that leads the hearer to make a connection between *green card* and *the States* and thus, infer $\mathcal{P}$. At the moment when $\mathcal{P}$ is inferred, it is also inferred that the antecedent of the sentence entails the presupposition carried by the consequent. However, if this entailment were asymmetric, it could not prevent the presupposition in the consequent from projecting. We would have the same situation as in (1.25a)=((1.13a)), in which, notwithstanding the asymmetric entailment by the antecedent, the presupposition in the consequent projects (1.25b):

(1.25)   a. If Chris is staying at a hotel near the Tivoli Gardens, Lenny will discover that he's in Copenhagen.

        b. ⇝ Chris is in Copenhagen.

Thus, in the same way as before, what really blocks the projection of the presupposition in (1.24c) is the inference that the entailment goes both ways. That is, once again, conditional perfection is conversationally implicated. Specifically, what is conversationally implicated in (1.24a) is that the only reason why Jade would have to leave the States is that she does not have a green card. That is, the hearer infers that the antecedent of the implication in (1.26a) below is the only sufficient condition for the consequent (1.26b) or, what amounts to the same thing, the hearer infers (1.26c):

(1.26)   a. If Jade does not have a green card, she will have to leave the States.

        b. If and only if Jade does not have a green card, she will have to leave the States.

        c. If Jade has to leave the States, she does not have a green card.

Therefore, just as happened in (1.23a) above, in (1.24a), it is not the fact that the antecedent entails the presupposition carried by the consequent but the defeasible inference (or CI) in (1.26c) that blocks the projection of the presupposition

in (1.24c). If (1.26c) is inferred, in order for the sentence in (1.24a) to be felici-
tous, the presupposition in (1.24c) should not project since, from both (1.26c) and
(1.24c) taken together, it follows that Jade does not have a green card. But then,
the speaker's uncertainty about the truth value of the antecedent of (1.24a) would
be unjustified.

Note that, if the sentence in (1.24a) is followed by a continuation like (1.27a)
below, the defeasible inference in (1.26c) is cancelled, in which case the presup-
position in (1.27b) projects. This behaviour is characteristic of conversational
implicature:

(1.27)   a. If Jade does not have a green card, she will regret having to leave the
               States. But, if she has committed a crime, she won't regret having to
               leave the States.

            b. ⤳ Jade has to leave the States.

It is important to stress that, even though the continuation in (1.27a) cancels the
inference in (1.26c), the crucial generalization, i.e. $\mathcal{P}$, and the implication $\mathcal{P}$
gives rise to, i.e. (1.26a), still hold. However, once (1.26c) is cancelled, the
presupposition in (1.24c) is asymmetrically entailed by the antecedent of (1.24a).
Since the antecedent of (1.24a) is logically stronger than the presupposition in
(1.24c), the presupposition can project.

A remaining question is why, in cases where non-trivial world knowledge inter-
venes, conditional perfection is always attained, whereas when the antecedent of
the sentence entails the presupposition carried by the consequent either all by it-
self or with the help of a lexical entailment or trivial world knowledge, this is not
always the case (e.g. (1.25a) above). Though this question will be addressed in
Chapter 4, I will advance the following hypothesis: Conditional perfection is a
relevance-based implicature (Horn 2000, 2004), in the sense that the antecedent
of an implication becomes relevant if it is interpreted not just as a sufficient con-
dition but also as a necessary condition for the consequent. In cases like (1.24a)
above, the hearer infers that the antecedent and the presupposition carried by the
consequent stand in an entailment relation *after* establishing relevance between
two elements of the sentence, one of which is part of the antecedent of the sen-
tence, and the other part of the presupposition carried by the consequent. Since
the hearer infers that the two elements are relevant to each other, and it is the
establishment of this link that makes it possible for him/her to infer the crucial en-
tailment, it seems natural that the entailment is interpreted as going both ways, so
that the antecedent of the sentence is interpreted not just as a sufficient condition
but also as a necessary condition for the presupposition carried by the consequent.

1.2 Chapter Summary and Thesis Structure

The core idea of this thesis is that the presuppositions carried by compound sentences project by default; however, the projection phenomenon can be pragmatically constrained, in which case the relevant presuppositions are conditionalized. Assertion, in conjunctive sentences, and uncertainty, in conditional and disjunctive sentences, are the two pragmatic constraints that preclude projection. Ultimately, assertion and uncertainty become constraints on projection in order to preserve informativeness and doxastic defensibility, respectively. It should be stressed that the entailment relations between (potential) presuppositions and other propositions within the same compound sentence, which have occupied a central role in the previous discussion, are not per se constraints on projection. What they do is bring about contexts in which the assertion of a certain proposition and the uncertainty that the speaker shows about the truth value of a certain proposition become constraints.

As was discussed in the preceding overview, if the presupposition (symmetrically or asymmetrically) entails the first clause (or, in disjunctions, the negation of the first clause) of the compound sentence in which it is triggered, the presupposition does not project but is conditionalized. This is because, in these cases, the presupposition contains exactly the same information as the first clause (or the negation of the first disjunct) if the entailment is symmetric, or is logically stronger than the first clause (or the negation of the first disjunct) if the entailment is asymmetric. Therefore, if the presupposition projected, the speaker's uncertainty about the truth value of the first clause (or the negation of the first disjunct) would be doxastically indefensible, and the speaker's assertion of the first clause would be redundant. In either of the two cases, the compound sentence would be infelicitous.

As for cases in which it is the first clause (or the negation of the first disjunct) that, on its own or together with additional contextual premises, asymmetrically entails the presupposition carried by the second clause, my hypothesis predicts that, in principle, the presupposition projects. This is because, in these other cases, the presupposition is logically weaker than the first clause or the negation of the first disjunct and thus, the speaker's uncertainty about the truth value of the first clause (or the negation of the first disjunct), or the speaker's assertion of the first clause, does not make the compound sentence infelicitous. However, in some of the latter cases (notably when world knowledge intervenes), the presupposition carried by the second clause does not project but is non-trivially conditionalized. I hypothesize that, in these cases, the presupposition does not project because the conditional implication that results from the entailment of the presupposition by

the first clause (or the negation of the first disjunct) is interpreted as a bicondi-
tional. That is, it is conversationally implicated that the presupposition carried by
the second clause entails the first clause (or the negation of the first disjunct), so
that a symmetric entailment is inferred. As a result, the first clause (or the nega-
tion of the first disjunct) is no longer logically stronger than the presupposition
carried by the second clause and thus, in order for the sentence to be felicitous,
the pragmatic constraints on projection become operative again.

Finally, in this introduction, I have focused on sentences composed of simple
clauses. However, there are compound sentences whose clauses are themselves
compound. The constraints on projection operate in the same way regardless of
whether the clauses of compound sentences are simple or compound.

The dissertation is structured as follows: In Chapter 2, I explain the Stalnakerian
concepts of *common ground* and *context set of the speaker/the hearer/the con-
versation*, the notions of *presupposition* and *assertion* and how the latter notions
relate to the common ground and to each other. Another concept that will be
crucial is that of a proposition being *compatible* with the context set (Stalnaker
1975). I define the notions of *global context* and *local context* and argue that the
projection problem amounts to determining what propositions are entailed by the
global context, so that the phenomenon of presupposition projection is not exclu-
sive to compound sentences but affects the discourse under consideration, regard-
less of whether the latter is a whole conversation, a segment of conversation, or
a compound sentence. I also address the issue of presupposition *accommodation*.
Chapter 3 is a critical review of the literature on presupposition projection. I start
with Karttunen's (1973) filtering theory and Gazdar's (1979a, b) cancellation ap-
proach. I continue with the satisfaction theory, focusing on Karttunen (1974) and
Heim (1983b) and, in relation to this theory, I also address the so-called 'pro-
viso problem' (Geurts 1996) and review several analyses which develop ways to
reconcile the counterintuitive predictions that result from the satisfaction theory
with the empirical facts (Karttunen & Peters, 1979; Beaver 2001; Pérez Carballo's
2008; Lassiter 2011). I end the chapter with a review of the binding and accom-
modation theory (van der Sandt 1992; van der Sandt and Geurts 1991; Geurts
1999). In Chapter 4, I present my own analysis. I provide a detailed explana-
tion of the pragmatic constraints on presupposition projection focusing on com-
pound sentences that carry a presupposition in the second clause. I argue that,
in conjunctive sentences, projection is constrained in order to avoid redundancy
between what is presupposed and what is asserted by the speaker; that is, in order
to preserve informativeness. However, in conditional and disjunctive sentences,
the constraint on projection is triggered in order to preserve consistency between
what is presupposed by the speaker and what the speaker is uncertain about; that
is, in order to preserve the assumption that the speaker is consistent in his/her

beliefs. Also, I elaborate on the hypothesis that, as a result of the constraints on projection, presuppositions are conditionalized and that this conditionalization is, in many cases, non-trivial. I end the chapter by explaining cases for which my analysis would in principle predict presupposition projection but, in which, a conversational implicature, namely conditional perfection, may prevent the presupposition from projecting, giving rise to a (trivial or non-trivial) conditional presupposition. Finally, in Chapter 5, I address the subject of focal presuppositions and focused components which, despite being on focus, trigger existential presuppositions. The presuppositional content triggered by possessive and definite noun phrases which follow an indefinite noun phrase within the same stretch of discourse will be also dealt with in Chapter 5.

Chapter 2

The Presuppositions of a Discourse

2.1 Presupposition as Contextual Entailment

The goal of this chapter is to set up the theoretical basis on which the proposed analysis in Chapter 4 is founded. I take as a point of departure Stalnaker's (1973, 1974, 1978) notion of *speaker presupposition*, which I consider necessary in order to understand the phenomenon of presupposition. However, in the literature (Beaver 2001, van der Sandt 2006), it has been argued that Stalnaker's notion is only applicable to the analysis of presupposition when presuppositions are regarded as general assumptions and beliefs which are presumably shared by all the participants in a conversation but not necessarily associated with any particular sentence, let alone with particular expressions, syntactic constructions or focused constituents (i.e. so-called 'presuppositional triggers') within a discourse. By contrast, I argue that Stalnaker's notion is equally applicable to the propositions that, during the course of a discourse or conversation, are evoked due to the presence of certain lexical expressions, syntactic constructions or focused constituents. All these linguistic devices indicate that the speaker presupposes a certain proposition except for cases in which, if the speaker presupposed the relevant proposition, s/he would be uninformative at least in one of his/her assertions or would show inconsistency in his/her beliefs, as was seen in Chapter 1, section 1.1.

This view represents a crucial shift with respect to theories which focus mostly on the process of inference of presuppositions by the hearer. This is in particular the case with the binding and accommodation theory, which takes the hearer's perspective and thus, maintains that presuppositions are inferences that come into existence upon the utterance of certain lexical items, syntactic constructions, etc. and that have the particularity that they must be added to the context before the

truth-conditional content is processed so that the relevant sentences can be interpretable. By contrast, from a shared (speaker/hearer) perspective, I focus on the presuppositional phenomenon in itself, not just on the inference of presuppositions, and maintain that the presuppositions of a discourse or conversation (or of a segment of discourse or conversation) should be entailed by the context that precedes the utterance of the segment under consideration and thus, should not be added to the preceding context, since the preceding context already entails them.

As for the issue of accommodation, which I will address in section 2.2, I argue that accommodation, when it occurs, does not consist in the hearer's addition of inferred propositions to the context but in the hearer's realization that the inferred propositions are entailed by the context in which the (discourse or conversation) segment is uttered. In this connection, I maintain that the participants in a communication exchange usually have just partial knowledge of what the context is like. By accommodating a proposition which is presupposed by the speaker, the hearer increases his/her knowledge about the context. Now the question arises as to why then the context is referred to as the 'common ground', when the reality is that there is no common ground until after accommodation. The answer is that the context ends up being common ground upon the recognition on the part of the hearer that the crucial presuppositions hold in the context.

Karttunen (1974) defines the context as "[the] set of logical forms that describe the background assumptions, that is, whatever the speaker chooses to regard as being shared by him and his intended audience" (1974: 182). Each of these logical forms expresses a unique proposition which is presupposed by the speaker. As is well known, a proposition can be modelled as a function that assigns truth-values to sentences with respect to possible worlds and thus, it may be identified with the set of possible worlds where it is true. In Stalnaker (1978), all of the latter sets are intersected, so that the resulting set, i.e. the *intersection set* or *context set*, is the set of worlds where each and every proposition in the context is true:

(2.1) Context set = $\bigcap \{[\![\varphi_1]\!], [\![\varphi_2]\!], \ldots, [\![\varphi_n]\!]\}$, where $[\![\varphi_i]\!]$ is the proposition expressed by φ_i, i.e. the set of worlds where the sentence φ_i is true, for all i $(1 \leq i \leq n)$.

Stalnaker regards the context as a *presumed common ground* of propositions to which the participants in the conversation commit themselves just for the purposes of the conversation. So, the context set is the set of worlds where each and every proposition in the common ground is true. On this view, the common ground can be seen as the conjunction of every one of the sentences that expresses every one of the propositions which is presupposed by the participants in the conversation and thus, the common ground entails every one of these sentences:

(2.2) Common ground = $\varphi_1 \wedge \varphi_2, \wedge, \ldots, \wedge \varphi_n$.

Stalnaker (1978) states that "[a] proposition is presupposed if the speaker is disposed to act as if he assumes or believes that the proposition is true, and as if he assumes or believes that his audience assumes or believes that it is true as well. [...] The propositions presupposed in the intended sense need not really be common or mutual knowledge; the speaker need not even believe them. He may presuppose any proposition that he finds convenient to assume for the purpose of the conversation, provided he is prepared to assume that his audience will assume it along with him." (1978: 328).

Therefore, *presupposing*, in Stalnaker's sense, is a propositional attitude and involves the possibility that the interlocutors pretend that they believe what they do not actually believe. That is, the speaker and the hearer may be acting as if they believe what they presuppose, without actually believing it; however, this aspect of the concept of *acting as if* is not exclusive to presupposition. The speaker may also act as if s/he believes what s/he asserts without actually believing it; in the same way, the hearer may act as if s/he believes what the speaker asserts without actually believing it; and the speaker may even show uncertainty about the truth of p, knowing that p or that ¬p is the case. Notwithstanding all this, it may also be that the interlocutors are sincere in what they presuppose, i.e. it may be that the interlocutors actually assume or believe what they presuppose.

Stalnaker points out that a NONDEFECTIVE CONTEXT (Stalnaker 1978: 328) is one in which all the participants in the conversation presuppose the same propositions. However, in real life, often the context is defective. As Stalnaker also points out, at the beginning of the conversation, the set of propositions to which the speaker commits him/herself for the purposes of the conversation (i.e. the context set of the speaker) generally does not coincide with the set of propositions to which the hearer commits him/herself for the purposes of the conversation (i.e. the context set of the hearer). Note that, as a conversation is an exchange between two or more people, there is not just one speaker and thus, it is most probable that the context set of the conversation does not coincide with any of the context sets of the participants in the conversation. Furthermore, it is most probable that the context set of the conversation is not the union of the context sets of the interlocutors. This is because the different context sets may contain propositions that will not be presupposed during the course of the conversation; that is, it may be that, at the beginning of the conversation, the interlocutors, separately, are disposed to act as if they assume or believe certain propositions which, eventually, will not be presupposed. And it is also most probable that the context set of the conversation is not the intersection of the context sets of the different interlocutors, since the context set of the conversation may contain propositions that were not in the con-

text set of some interlocutor or another; however, this is not a problem as long as whoever the hearer is at a given time accommodates the presuppositions of whoever the speaker is at that time. I elaborate on the notion of *accommodation* in the next section. So, on this view, the context set of the conversation contains all the propositions which are presupposed by whoever the speaker is at the different times during the course of the conversation. Since, when the speaker presupposes a proposition, s/he acts as if s/he assumes or believes that the hearer assumes or believes that proposition and, usually, the hearer does not object but acts as if s/he assumes or believes that proposition as well, the hearer presupposes whatever the speaker presupposes, even though, in many cases, that proposition was not in the context set of the hearer at the beginning of the conversation. It is in this sense that the idea that there is a *common ground* between the interlocutors upon which the conversation takes place should be understood.

From this perspective, the presuppositions of the participants in a conversation must be entailed by the context that precedes the beginning of the conversation, i.e. the global context in which the conversation takes place. In the same way, if, instead of considering a whole discourse or conversation, we are concerned with the analysis of a shorter communication exchange, e.g. the utterance of a compound sentence, the presuppositions of the interlocutors must be entailed by the context that precedes the utterance of the compound sentence, i.e. the global context in which the compound sentence is uttered. Thus, the projection problem, introduced in chapter 1, amounts to determining what propositions, within the set of propositions which might be inferred by the hearer due to the presence of presuppositional triggers, must be entailed by the context that precedes the utterance of the discourse segment under consideration, i.e. the global context in which the discourse segment under consideration is uttered. Put another way, to say that a presupposition projects (to the main context) amounts to saying that the global context entails that presupposition which, in turn, amounts to saying that the participants in the communication exchange presuppose that proposition. Note that, strictly speaking, it is not accurate to say that a given presupposition does not project; it would be preferable to say that, it often happens that a proposition is not presupposed notwithstanding the presence of a so-called presuppositional trigger which, in a different context, would signal that the speaker presupposes the crucial proposition. For instance, if the sentence or the clause that contains the relevant presuppositional trigger were uttered in isolation, the presence of the relevant presuppositional trigger would signal that the speaker presupposes the crucial proposition. But this is not the only case; if the sentence or the clause that contains the relevant presuppositional trigger were uttered within a discourse in which the speaker had not asserted the crucial proposition (or a proposition which is entailed by it) nor had s/he shown uncertainty about the truth value of

the crucial proposition (or of a proposition which is entailed by it), the relevant presuppositional trigger would also signal that the speaker presupposes the crucial proposition. Let us see an example. Suppose it has been rumoured that Chris used to be a writer, but the speaker of (2.3) does not know whether this is true. Since the consequent of (2.3) contains a presuppositional trigger, namely *given up*, the proposition that Chris used to write is triggered at the moment when *given up* is uttered; however, the (global) context in which the whole conditional sentence in (2.3) is uttered must not entail that Chris used to write in order for (2.3) to be felicitous. This is because the speaker of (2.3) makes the supposition that Chris used to write and thus, shows uncertainty about the truth value of the proposition that Chris used to write. Therefore, the speaker indicates that s/he does not presuppose that Chris used to write (see Stalnaker (1974)):

(2.3) If Chris used to write, he must have given up writing (since I never see him write).

By contrast, the speaker of (2.4) does not show uncertainty about the proposition that Chris used to write so that, in this case, the presence of the presuppositional trigger *given up* in the consequent of the sentence is an indication that the speaker presupposes that Chris used to write. Thus, the (global) context in which the whole conditional sentence in (2.4) is uttered must entail that Chris used to write in order for the sentence to be felicitous:

(2.4) If Chris is sick, he must have given up writing.

In the Introduction, I said that a speaker would be uninformative if s/he asserted a proposition that s/he presupposes or that is entailed by (and thus is less informative than) a proposition that s/he presupposes. In a similar way, a speaker would show inconsistency in his/her beliefs if s/he showed uncertainty about the truth value of a proposition that s/he presupposes or that is entailed by (and thus, is less informative than) a proposition that s/he presupposes. However, I did not elaborate any further on the notions of 'informative assertion' and '(genuine or feigned) uncertainty about the truth value of a proposition'. I will make use of Stalnaker's notion of *acting as if* in order to relate the last two notions to the notion of 'presupposition':

(2.5) If a speaker informatively asserts that π, s/he acts as if s/he assumes or believes that π but not as if s/he assumes or believes that his/her interlocutor assumes or believes that π. Thus, a speaker who is informative does not assert a proposition that s/he presupposes.

(2.6) If a speaker shows uncertainty about the truth value of π, s/he indicates that s/he does not assume or believe that π (i.e. s/he does not act as if s/he assumes or believes that π). Thus, a speaker who shows consistency in his/her beliefs does not show uncertainty about the truth value of a proposition that s/he presupposes.

So in order to determine if a proposition (π) that is a member of the set of propositions which might be triggered within a discourse is entailed by the global context in which the discourse has taken place, we will have to see first whether π or any proposition entailed by π has been asserted at some point during the preceding discourse. If π or any proposition entailed by π has been asserted, π should not be entailed by the global context. Secondly, we will have to see if, at some point during the preceding discourse, the speaker has shown uncertainty about the truth value of either π or any proposition entailed by π. If s/he has, the global context should not entail π. Put another way, if, at some point during the discourse that precedes the utterance of a sentence or a clause (ψ_π, which carries the presupposition that π), the speaker asserts either π or a proposition entailed by π, and the speaker is informative, this means that s/he does not presuppose that π, to the effect that π should not be entailed by the global context or, stated yet another way, π should not project. Furthermore, if, at some point during the discourse that precedes the utterance of ψ_π, the speaker shows uncertainty about the truth value of either π or a proposition entailed by π, this means that s/he does not presuppose that π, to the effect that π should not be entailed by the global context or, put another way, π should not project.

Let us see some examples which illustrate that the phenomenon of presupposition projection and lack of projection may be observed in discourse segments larger than compound sentences[1]. Neither the small discourse in (2.7a), as a whole, nor that in (2.7b), as a whole, carries the presupposition in (2.7c):

(2.7)   a. Chris used to write; but, some years ago, he got a depression and never fully recovered. At some point, he gave up writing.

   b. Maybe Chris used to write; but, in all these years, I've never seen him write. Maybe he gave up writing.

   c. $\nrightarrow$ Chris used to write

In the small discourses in (2.7a) and (2.7b) above, the projection of the presupposition in (2.7c) is blocked. In (2.7a), this is because, previously within the same

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[1]Van der Sandt (1988) already notes that the projection phenomenon is not exclusive to compound sentences.

discourse segment, the speaker asserts that (2.7c). In (2.7b), the projection of the presupposition in (2.7c) is blocked because, previously within the same discourse segment, the speaker shows uncertainty as to whether (2.7c) is true. Thus, in neither of these cases does the speaker presuppose that (2.7c).

By contrast, if the speaker does not assert that (2.8c)(=(2.7c)) (or a proposition which is entailed by (2.8c)) nor does s/he show uncertainty about the truth value of (2.8c) (or a proposition which is entailed by (2.8c)), (2.8c) projects; that is, the speaker presupposes that (2.8c). That is the case in the small discourses in (2.8a) and (2.8b) below:

(2.8) a. As far as I know, Chris has never been depressed. What's more, he has always struck me as a cheerful person. However, some years ago, he gave up writing.

b. As far as I know, Chris has never been depressed. However, in the last couple of years, he hasn't had anything published. Maybe he has given up writing.

c. ⤳ Chris used to write

The examples in (2.7) and (2.8) also illustrate that the notion of *global context* depends on what the discourse or discourse segment under analysis is. This is not to deny that the context changes with each new proposition that is added to it. But if our question is what is presupposed by a discourse segment as a whole, we will have to see what the context should be like before the segment is uttered, i.e. what the global context (in which the segment is uttered) must be like. In turn, in order to know what the global context must be like, we will have to see what propositions, within the set of propositions which are triggered within the segment under analysis (due to the presence of presupposition-inducing expressions), are presupposed by the interlocutors.

Thus, for instance, we know that the small discourse in (2.7a) does not presuppose (2.7c); that is, the (global) context in which (2.7a) is uttered should not entail (2.7c). We know that because the speaker of (2.7a) does not presuppose (2.7c). And, in turn, we know that the speaker does not presuppose that (2.7c) because s/he asserts (2.7c) at the beginning of (2.7a) (on the assumption that the latter assertion is informative). The same goes for (2.7b), only in this case we know that the speaker does not presuppose that (2.7c) because s/he shows uncertainty about the truth value of (2.7c) at the beginning of (2.7b) (on the assumption that the speaker shows consistency in his/her beliefs).

The opposite case is illustrated in (2.8a) and (2.8b). The (global) context in which these small discourses are uttered should entail (2.8c). We know that because the

speaker of (2.8a) and (2.8b) presupposes (2.8c). And, in turn, we know the speaker presupposes (2.8c) due to the following facts: i. the proposition expressed by (2.8c) is elicited by the use of the presuppositional trigger *given up*. ii. However, (2.8c) is not asserted at any point within (2.8a) or (2.8b) (nor is any proposition entailed by (2.8c)); so, the speaker has not asserted anything that might constitute a constraint on projection. iii. The speaker does not show uncertainty about the truth value of (2.8c) (or about the truth value of any proposition entailed by (2.8c)) at any point within (2.8a) or (2.8b); so, the speaker has not shown uncertainty about the truth value of any proposition to the effect that this uncertainty might constitute a constraint on projection either.

In other words, if the speaker's intention had been to inform his/her audience that Chris used to write, s/he would have asserted that Chris used to write. However, by presupposing that Chris used to write, the speaker gives the status of membership in the common ground to the latter proposition. Note that, whereas it might be argued that (2.8c) is an entailment of the last sentence of (2.8a), this argument would not be valid in the case of (2.8b), which also carries the presupposition in (2.8c).

The remainder of this section is structured as follows: First, in section 2.1.1, I will address the process of context incrementation. Following Stalnaker (1978), I will argue that the context is incremented with the content of each consecutive assertion. I will also argue that the presuppositions of a discourse segment (considered as a whole) are not added to the context in which the segment is uttered, since these presuppositions must be part of the context in order for the segment to be felicitously uttered. The small discourses in (2.7) and (2.8) will serve to illustrate the latter point. In section 2.1.2, I will put forward the view that, when a declarative sentence that carries a presupposition is uttered, what is presupposed, i.e. the presuppositional content of the sentence, is a proposition that does not contain any free variables, whereas what is asserted, i.e. the asserted content of the sentence, may be a propositional function whose free variables are bound by an antecedent in the presupposed proposition. We will see that one of the advantages of this approach is that it does not run into the so-called *binding problem* (Karttunen and Peters (1979)).

2.1.1 Context Incrementation

It is now widely accepted that the context is not static but changes with each incoming sentence during the course of a conversation. The idea dates back to Karttunen (1974) and Stalnaker (1974, 1978). According to Karttunen, the context is recursively *incremented* with the logical form of each new incoming sentence.

Thus, Karttunen computes the *union* of the context (i.e. *C*) that precedes the utterance of a sentence, considering the context as a set of logical forms, and the set that contains the logical form an the incoming sentence (i.e. $\{\chi\}$): $(C \cup \{\chi\})$.

By contrast, Stalnaker (1978) computes the *intersection* between the context set that precedes an assertion and the set of worlds in which the asserted sentence is true, assuming that the assertion has not been rejected. Thus, as the context is incremented with each consecutive assertion, the context set is reduced to the set of its worlds where the asserted sentence is true. Thus, for instance, the context set that results from the assertion of χ is: $(C \cap [\![\chi]\!])$, where C is the context set that precedes the assertion of χ, and $[\![\chi]\!]$ is the set of worlds where χ is true[2].

At this point, I will elaborate on Stalnaker's (1978) notion of *assertion* and on how the concept is reinterpreted in this dissertation. I will start by quoting the following passage from Stalnaker (1978):

> [H]ow does the CONTENT of an assertion alter the context? [...] To make an assertion is to reduce the context set in a particular way, provided that there are no objections from the other participants in the conversation. The particular way in which the context set is reduced is that all of the possible situations incompatible with what is said are eliminated. [...] [T]he essential effect of an assertion is to change the presuppositions of the participants in the conversation by adding the content of what is asserted to what is presupposed. This effect is avoided only if the assertion is rejected. (Stalnaker 1978: 330).

In Stalnaker (1978), the content of an assertion is a proposition. However, I will argue in the next section that, in cases where a declarative sentence carries a presupposition, the speaker's assertion may not constitute a proposition but a propositional function. This is not problematic since, at the time the sentence is uttered, the free variables in the assertion are bound to values in the presupposition, which makes it possible to know which worlds are compatible with the assertion and which ones are not.

Continuing with Stalnaker, his first principle of assertion states that a proposition which is asserted must be compatible with, but not entailed by, the context set: "A proposition asserted is always true in some but not all of the possible worlds in the context set." (1978: 331). By contrast, a proposition which is presupposed is always true in all the worlds of the context set. This is what differentiates

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[2]I use the Greek letters φ, ψ, χ and π as metavariables over logical forms of sentences. When I need to refer to the proposition expressed by χ, I will write *the proposition that* χ, instead of writing $[\![\chi]\!]$.

presupposition from assertion. This is also the reason why I argue that the presuppositions of a discourse (or conversation) segment considered as a whole should not be added to the context in which that segment is uttered; if, in order for a discourse (or conversation) segment to be felicitously uttered, the context in which it is uttered must entail its presuppositions, the addition of these presuppositions to the context would be redundant. As we will see in the next section, this is regardless of whether there are interlocutors who do not know, prior to the utterance of the segment, that certain propositions are true in all the worlds of the context set, since the context set that matters is the context set of the discouse (or conversation) segment under consideration, which is the intersection of the propositions which have been presupposed by the speaker (or the different speakers in a conversation), and not the particular context set of an interlocutor or other.

As Stalnaker explains, to assert a proposition which is true in all the worlds of the context set is redundant since it amounts to asserting a proposition which is presupposed. That is, what is informatively asserted cannot have common ground status before it is asserted or, put another way, what is informatively asserted cannot be true in all the worlds of the context set that precedes the assertion. In this light, it is easy to understand the statement in (2.5), repeated below:

(2.9) If a speaker informatively asserts that π, s/he acts as if s/he assumes or believes that π but not as if s/he assumes or believes that his/her interlocutor assumes or believes that π. Thus, a speaker who is informative does not assert a proposition, π, that s/he presupposes.

That is why a sentence such as *John has stopped smoking and he smoked* is anomalous. The initial context C entails that John smoked; when the content of the first assertion *he does not smoke* is added to C, the resulting context C' goes on entailing that John smoked or, what comes to the same thing, the proposition that John smoked is true in all the worlds of C'; therefore, the assertion of the second clause *he smoked* does not have any effect on C' and thus, the assertion of the second clause is redundant or uninformative. The resulting context C' is the so-called *local context* of the second clause.

Furthermore, Stalnaker argues that to assert a proposition which is false in all the worlds of the context set amounts to eliminating the whole context set. This view has been disputed by Sandt van der (1988), who argues that "it makes it impossible to identify this proposition univocally and remove it from the context set at a later stage in the discourse or conversation in cases of retractions or denials" (1988: 191). Depending on the nature of what is asserted, it might be that to assert something which is incompatible with the common ground comes down to

disrupting the whole set of presumed assumptions and beliefs. However, in real situations, belief revision occurs without disrupting the whole common ground. Be that as it may, it lies beyond the scope of this thesis to deal with this problem in any detail.

In coordinating conjunctions, every clause is used to make an assertion. But this is not the case with conditional and disjunctive sentences to which I turn now. In relation to the antecedent of an indicative conditional sentence, Stalnaker (1975) states the following:

> It is appropriate to make an indicative conditional statement or sup-
> position only in a context which is compatible with the antecedent.
> (Stalnaker 1975: 146).

Put another way, the antecedent of an (indicative) conditional sentence must be compatible with the context, i.e. true in some of the worlds of the context set. Stalnaker does not say that the antecedent of an indicative conditional must not be entailed by the context and, as a matter of fact, there are cases in which the antecedent is entailed by the context, i.e. true in all the worlds of the context set; however, in these cases, the speaker does not make a supposition. I will address first these cases, and then I will focus on the cases in which the antecedent must be true in just some of the worlds of the context set, i.e. cases in which a conditional sentence is genuinely hypothetical.

It sometimes happens in the course of a conversation that the antecedent of a conditional sentence has been previously asserted. That is, a participant asserts that φ and another replies by saying: if φ, (then) ψ. In this species of *modus ponens* argument, the second participant does not show uncertainty about the truth value of φ. S/he might have replied by saying just (Then) ψ; however, by saying if φ, (then) ψ, s/he emphasizes the fact that ψ follows from φ. In these cases, the antecedent of the conditional sentence is true in all the worlds of the context set, since the antecedent clause has been previously asserted and not rejected and thus, the context in which the conditional sentence is uttered is a context that entails the antecedent[3]. However, in genuinely hypothetical conditional sentences, in which the speaker makes a supposition, the antecedent clause should be compatible with the context, but not entailed by the context. That is, the antecedent should be true in just some of the worlds of the context set. This is because, if the antecedent,

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[3]Note that, in these cases, if the consequent carries a presupposition, the presupposition projects: Speaker A: *Chris is in Copenhagen.* Speaker B: *If Chris is in Copenhagen, Lenny will discover that he's staying at a hotel near the Tivoli Gardens.* ⤳ Chris is staying at a hotel near the Tivoli Gardens.

ψ, were presupposed, i.e. true in all the worlds of the context set and, yet, the speaker made the supposition that, if φ, then ψ, s/he would show inconsistency in his/her beliefs. And this, in turn, is because by making the supposition that, if φ, then ψ, the speaker shows uncertainty about the truth value of φ; put another way, the assertion of a hypothetical conditional sentence, if φ, (then) ψ, in a context that entails φ would be doxastically indefensible.

If, on the other hand, the antecedent, φ, were false in all the worlds of the context set, ¬φ would be presupposed. Thus, if a speaker made the supposition that if φ, then ψ, s/he would also show inconsistency in his/her beliefs for a similar reason to that above: the speaker would show uncertainty about the truth value of φ while presupposing that ¬φ. So, in the same way as above, the assertion of a hypothetical conditional sentence, if φ, (then) ψ, in a context that entails ¬φ would be doxastically indefensible.

As for disjunctive sentences, Stalnaker (1975) argues as follows:

> A disjunctive statement is appropriately made only in a context which allows either disjunct to be true without the other. That is, one may say *A or B* only in a situation in which both *A and not-B* and *B and not-A* are open possibilities. (Stalnaker 1975: 147).

Put another way, all the disjuncts separately must be compatible with, but not entailed by, the context, i.e. all the disjuncts separately must be true in just some of the worlds of the context set. So, in order for a disjunctive sentence, (φ or ψ), to be felicitously asserted in a context, the context set should contain three types of worlds: φ-worlds which are ¬ψ-worlds, ψ-worlds which are ¬φ-worlds and φ-worlds which are ψ-worlds. By contrast, if φ or ψ (or both) were presupposed, i.e. true in all the worlds of the context set and, yet, the speaker uttered the disjunctive sentence (φ or ψ), s/he would show inconsistency in his/her beliefs. And this, in turn, is because by asserting (φ or ψ), the speaker shows uncertainty about the truth value of both φ and ψ; put another way, the assertion of a disjunctive sentence, (φ or ψ), in a context that entails φ or ψ (or both) would be doxastically indefensible.

Also, in a similar way to what would happen if the antecedent of a conditional sentence were false in all the worlds of the context set, if φ or ψ (or both) were false in all the worlds of the context set, then ¬φ or ¬ψ (or both ¬φ and ¬ψ) would be presupposed. Thus, if a speaker uttered the sentence (φ or ψ) in that context, s/he would also show inconsistency in his/her beliefs by a similar reason to that above: the speaker would show uncertainty about the truth value of φ and about the truth value of ψ, while presupposing that ¬φ or that ¬ψ (or both). So,

in the same way as above, the assertion of a disjunctive sentence, (φ or ψ), in a context that entails $\neg\varphi$ or $\neg\psi$ (or both) would be doxastically indefensible.

One of the crucial notions in Stalnaker (1978) is that assertions reduce the size of the context set by eliminating all the possibilities (i.e. possible worlds) which are incompatible with the assertion, so that what is asserted and not rejected becomes presupposed. Both a sentence which is about to be asserted and one which is about to become the antecedent of a conditional sentence or a disjunct in a disjunctive sentence must be true in just some of the worlds of the context set. However, once a sentence is asserted (assuming that nobody objects to it), it is true in all the worlds of the reduced context set, since all the worlds in the initial context set in which the sentence was not true have been eliminated. By contrast, the antecedent of a conditional sentence or a disjunct of a disjunctive sentence remains true in just some of the worlds of the context set, i.e. the same worlds where it was true before it was uttered. This is the reason why the constraint on projection in conjunctive sentences differs so much from the constraint on projection in conditional and disjunctive sentences. The clauses of coordinating conjunctions are used to make assertions, whereas this is not the case with the antecedent of a conditional sentence or the disjuncts of a disjunctive sentence.

Let us consider a conjunctive sentence of the form φ and ψ_π, in which the second clause carries the presupposition that π, so that the asserted content of ψ_π may be a propositional function: ψ^x (however, for convenience, I will write just ψ). By the time ψ_π is uttered, φ is already presupposed (assuming that it has not been rejected). Surely, this does not mean that φ is a presupposition of the sentence φ and ψ_π considered as a whole. In cases in which π entails φ, if π were a presupposition of the whole sentence, asserting that φ would not reduce the size of the context set, which would bring about a lack of informativeness. So it is in order to preserve informativeness that the assertion of φ, when π entails φ, becomes a constraint on the projection of π.

By contrast, in a hypothetical conditional sentence of the form if φ, then ψ_π or in a disjunctive sentence of the form φ or ψ_π, φ is not presupposed by the time ψ_π is uttered. In cases in which π entails φ, if π were a presupposition of the whole sentence, the speaker's uncertainty about the truth value of φ would be infelicitous. But this infelicity would not derive from the fact that the context set has not been reduced, since the speaker is just making a supposition or presenting different possibilities. In this case, the infelicity would derive from the fact that there has been an attempt on the part of the speaker to enlarge the context set with worlds in which φ is false and thus, in which π is false. This attempt would be interpreted as a lack of consistency in the speaker's beliefs. So it is in order to preserve the assumption that the speaker is consistent in his/her beliefs (i.e.

doxastic defensibility) that the uncertainty about the truth value of φ, when π entails φ, becomes a constraint on the projection of π.

I would like to finish this section with a brief discussion on the significance of so-called *local* contexts. The local context of a sentence/clause is the context that immediately precedes the utterance of that sentence/clause. Focusing on compound sentences of the form φ and ψ_π, if φ, then ψ_π and φ or ψ_π, the local context of ψ_π is the context that precedes the utterance of φ incremented by φ; that is the global context in which the whole compound sentence is uttered incremented with the first clause. If we call the global context C and the local context C', $C'=(C + \varphi)$. The '+' sign can be interpreted as the union of two sets of logical forms or as the intersection of two sets of possible worlds (see above).

In cases where π does not entail φ and thus, π can project, the local context does not play any role as far as the entailment of π is concerned. In these cases, C entails π and thus, C' also entails π, but this is just a logical consequence of the fact that C entails π. This argument can be extended to discourse segments larger than compound sentences. Let us take the small discourse in (2.10a)(=(2.8b)) below:

(2.10)   a. As far as I know, Chris has never been depressed. However, in the last couple of years, he hasn't had anything published. Maybe he has given up writing.

           b. $\leadsto$ Chris used to write

The presupposition in (2.10b)(=(2.8c)) is triggered in the last sentence of (2.10a); however, (2.10b) is a presupposition of the whole discourse in (2.10a). The global context (C) in which (2.10a) is uttered should entail the presupposition in (2.10b), since this presupposition is triggered in the last sentence of the discourse and there is no constraint on projection in the preceding discourse that could prevent the presupposition from projecting to the main context. Thus, the intermediate context (C') that results from the assertion of the first sentence (*as far as I know, Chris has never been depressed*) goes on entailing (2.10b), and the same goes for the context (C'') that results from the assertion of the second sentence of the discourse (*in the last couple of years, he hasn't had anything published*). So C'', i.e. the local context of the last sentence (*Maybe he has given up writing*) entails (2.10b). But this is just because C entails (2.10c).

We can turn the argument around and argue that the only place the presupposition that Chris used to write can come from is the global context, since the sentence that contains the presuppositional trigger, *Maybe he has given up writing*, does not

entail that Chris used to write nor does any of the preceding sentences in the small discourse in (2.10a) asymmetrically entail that Chris used to write. Furthermore, as we saw in the overview of chapter 1, even if the presupposition that Chris used to write had been asymmetrically entailed by some intermediate sentence, that would not have precluded the global context from entailing this presupposition. Remember the example in (1.21a), repeated below, in which the first clause asymmetrically entails the presupposition that Chris used to write (in (2.11b)) and, nonetheless, this presupposition is presupposed by the whole compound sentence:

(2.11)   a. If Chris used to write for four different book publishers, he must have given up writing.

   b. ⤳ Chris used to write

The general idea is that, whenever π is entailed by the global context, π is entailed by all the intermediate contexts, including the local context of the sentence in which π is triggered. Furthermore, in cases where π does not entail any of the preceding sentences/clauses, whenever π is entailed by the local context, this means that π is entailed by the global context, regardless of whether some preceding sentence/clause asymmetrically entails π or not. As I remarked in the overview of chapter 1, this is the case with extensional contexts and also with intensional contexts provided that the domain of quantification is restricted to the common ground; that is, provided that the only worlds which are quantified over are the worlds of the context set. I say this because the presuppositions of the common ground do not have to hold in worlds outside of the context set. Thus, in the example below, the counterfactual context in which Chris was not sick when he was young does not entail that Chris used to write:

(2.12) Chris has given up writing. Anyway, if he hadn't been sick for so long when he was young, he would have never become a writer in the first place.

As for cases where π entails φ and thus, π does not project but is conditionalized to φ (or its negation), the local context does entail π but this is just because, as the global context entails the whole conditional presupposition that, if φ, then π, the global context plus φ entails π. In these latter cases too, the presupposition of the whole sentence (i.e. the conditional presupposition) is entailed by the global context.

Finally, we saw in the overview of chapter 1 that, in some cases where φ asymmetrically entails π, π does not project due to a defeasible inference (if π, then φ) that transforms the conditional implication (if φ, then π) into a biconditional.

Remember the discussion on van der Sandt's sentence *If John murdered his wife, he will be glad that she is dead*. In these cases, the presupposition that π does not project but is conditionalized to φ. However, this conditionalization is trivial since φ asymmetrically entails π. Though the defeasible inference (if π, then φ) precludes π from projecting, the defeasible inference is not part of what is presupposed, i.e. the (trivial) conditional presupposition (if φ, then π). So the global context must entail the conditional presupposition that, if φ, then π. However, it should be stressed that the fact that φ asymmetrically entails π does not bring about by itself the conditionalization of the presupposition that π. In order for the conditionalization of π to take place, giving rise to the conditional presupposition (if φ, then π), the defeasible inference (if π, then φ) must be drawn by the hearer, since it is the latter inference that prevents π from projecting, as is shown by the fact that, if the defeasible inference is cancelled, π projects.

2.1.2   Presuppositional and Asserted Content

One of the advantages of the Stalnakerian distinction between presuppositional and asserted content, to the effect that the former is entailed by the context that precedes the utterance of the sentence, whereas the latter is entailed by the context that follows the utterance of the sentence, is that the content of what is asserted does not replicate what is presupposed, but picks up on what is presupposed. As a consequence, the so-called *binding problem* (Karttunen and Peters (1979)), to which I will shortly turn, does not even arise (it does not arise in van der Sandt (1992)).

The term 'asserted content' is valid as long as the sentence/clause under analysis is used to make an assertion. This is the case in coordinating conjunctions, in which every conjunct is used to make an assertion. However, in the case of conditional sentences, the consequent is used to make a hypothetical assertion and, in the case of disjunctive sentences, none of their clauses is used to make an assertion. So, in the latter cases, I will refer to *the non-presuppositional content* of the clause, as opposed to its presuppositional content. According to the approach defended here, the asserted or non-presuppositional content of a sentence/clause that carries a presupposition may contain pronouns that find their potential antecedents in the presuppositional content. That is, these pronouns are encoded as syntactically free variables which are semantically bound by their potential antecedents which are part of the presuppositional content. By contrast, the presuppositional content of the sentence, in the examples we will see in this section, is complete in the sense that it does not contain any syntactically free variables that need to be bound. Before proceeding, it should be stressed that, in cases where the presuppositional

trigger is a particle such as *also, too, even, still, yet*, the asserted content of the sentence is complete. Thus, for instance, the asserted content of *Sam is coming too* is that Sam is coming, and its presuppositional content is that someone other than Sam is coming. However, I will not address these cases here.

Let us start with the simple sentence in (2.13) below:

(2.13) John's brother is sick.

I will use First Order Predicate Logic to give the logical form of the sentence. I will assume a dynamic semantics so that the second occurrence of the variable x may be semantically bound by the existential quantifier, though the variable is out of the scope of the quantifier. However, I am not committed to any particular theory here:

(2.14) $\exists x B(x,j) \wedge Sx$
    where j stands for *John*, $B(x,j)$ stands for *x is a brother of John* and Sx
    stands for *x is sick*.

The sentence carries the presupposition that John has a brother and asserts that *he*, i.e. John's brother, is sick. So $\exists x B(x,j)$ represents the presuppositional content of the sentence and Sx its asserted content. The context that precedes the utterance of the sentence must entail the presupposition that John has a brother so that the sentence can be felicitous. The essential effect that the asserted content (*he is sick*) has on the context is to eliminate all the worlds of the context set where John's brother is not sick, so that all the worlds of the reduced context set are worlds in which John's brother is sick. But this is only possible if the context in which the sentence is uttered entails the presupposition that John has a brother.

Now, consider the sentence in (2.15):

(2.15) Someone has stopped smoking.

In the same way as above, I will give its logical form in a First Order Predicate Logic while assuming a dynamic semantics so that the existential quantifier may bind variables out of its scope:

(2.16) $\exists x \exists t\ S(x,t) \wedge t < n \wedge \exists t' \neg S(x,t') \wedge t \supset\subset t'$, where $S(x,t)$ stands for *x smokes at t*, n stands for *now* (i.e. the time at which the sentence is uttered), and $t \supset\subset t'$ stands for *t abuts t'* (i.e. t is contiguous with t').

The sentence carries the presupposition that someone used to smoke and asserts that s/he (i.e. the person who used to smoke) does not smoke at the present time. So ($\exists x \exists t\ S(x,t) \land t < n$) represents the presuppositional content and ($\exists t' \neg S(x,t') \land t \supset\subset t'$) represents the asserted content.

The context that precedes the utterance of the sentence must entail that someone used to smoke. So the essential effect that the asserted content (*s/he (i.e. the person who used to smoke) does not smoke*) has on the context is to throw out all the worlds of the context set where s/he (i.e. the person who used to smoke) smokes at the time the sentence is uttered, and keep all the worlds of the context set where s/he (i.e. the person who used to smoke) does not smoke at the time the sentence is uttered. But, in order for the asserted content to carry out its essential effect on the context, the context must entail the presupposition that someone used to smoke.

By contrast, if the asserted content did not pick up on the presuppositional content, the free variable in the assertion would not be semantically bound by the existential quantifier in the presupposition, but by another existential quantifier in the assertion: ($\exists x' \exists t' \neg S(x',t') \land t' = n$) and thus, it would be impossible to ensure that x and x' refer to the same individual. Thus, we would run into the binding problem. That is, if we treated what is presupposed and what is asserted as two unlinked propositions, it would not be possible to semantically bind a syntactically free variable that occurs in the assertion to an antecedent in the presupposition. As a result, there would be no way of capturing the fact that the person who used to smoke is the same person as that who does not smoke at the time the sentence is uttered.

2.2   The Issue of 'Accommodation'

One of the most interesting aspects of Stalnaker's (1978) concept of *acting as if* is that it encompasses a notion of *accommodation*, though the term *accommodation* was coined by Lewis (1979). Let us remember Stalnaker's passage about 'presupposition' and 'acting as if', quoted at the beginning of section 2.1:

> A proposition is presupposed if the speaker is disposed to act as if he assumes or believes that the proposition is true, and as if he assumes or believes that his audience assumes or believes that it is true as well. [...] The propositions presupposed in the intended sense need not really be common or mutual knowledge; the speaker need not even believe them. He may presuppose any proposition that he finds

> convenient to assume for the purpose of the conversation, provided
> he is prepared to assume that his audience will assume it along with
> him. (1978: 328).

As was said at the beginning of section 2.1, the participants in a conversation may be acting as if they believe what they presuppose, without actually believing it. Thus, as Stalnaker points out, the common ground is just a *presumed* common ground. In a similar way, the speaker often presupposes propositions which s/he knows are not part of his/her interlocutors' context sets. Nonetheless, the speaker gives these propositions common ground status or, as Karttunen (1974) puts it, the speaker chooses to regard these propositions as being shared by him/her and his/her intended audience.

However, there is more to it than that. Note that, if a speaker gives a proposition (π) common ground status, this means that the speaker is disposed to act as if s/he assumes or believes that π from the beginning of the discourse or conversation, and as if s/he assumes or believes that the hearer assumes or believes that π, also from the beginning of the discourse or conversation. That is, the context that *pre*cedes the start of the discourse or conversation, i.e. the global context, entails the *pre*supposition that π. It often happens that the hearer does not know in advance that a certain proposition, π, holds in the context but, nevertheless, infers that π holds in the context and tacitly agrees to act as if s/he assumes or believes that π; this is accommodation. But it may also be that the hearer knows in advance that π holds in the context, in which case s/he does not need to accommodate that π.

Put another way, all that matters for understanding presupposition is that the speaker (and the hearer) acts as if π is a shared assumption or belief from the beginning of the conversation. This is possible if we think of the context as *the context set of the conversation* (Stalnaker 1978: 329), i.e. the set of worlds where the propositions to which the participants of the conversation commit themselves, just for the purposes of the conversation, are true. That is, the context set of the discourse or conversation does not have to coincide with the interlocutors' individual context sets, let alone with any set of worlds where the genuine assumptions or beliefs of an interlocutor or other are true. Furthermore, the actual world does not have to be one of the worlds of the context set; a proposition can be true in all the worlds of the context set without being true in the actual world and, the other way round, a proposition can be true in the actual world without being true in any of the worlds of the context set.

Let us illustrate all the above with an example. Suppose a speaker utters the sentence *my brother is sick* without having asserted during the course of the conver-

sation that s/he has a brother. The speaker presupposes that s/he has a brother, i.e. acts as if s/he assumes or believes that s/he has a brother and as if s/he assumes or believes that the hearer assumes or believes that s/he (the speaker) has a brother. The hearer usually replies by uttering sentences such as *I'm sorry to hear that*, or asking questions such as *what does he have?* or *since when has he been sick?*. That is, the hearer infers that the proposition that the speaker has a brother holds in the context. Furthermore, usually the hearer behaves cooperatively and thus, acts as if s/he already knew that the proposition that the speaker has a brother held in the context, as is shown by the way in which s/he replies to the speaker. Note that the hearer acts as if s/he already assumed or believed that the speaker had a brother, and not as if s/he had just learned that the speaker had a brother. That is, the hearer is supposed to act as if s/he already knew that the speaker had a brother; otherwise, a reply such as *No, you don't have a brother* would not be considered inappropriate.

However, there are cases in which the hearer refuses to accommodate a presupposition of the speaker; that is, though the hearer infers that a certain proposition holds in the context, s/he does not tacitly agree to act as if s/he already knew that it held in the context, but explicitly states that s/he did not know that it did. So it might happen that the hearer replies in the following way: *Do you have a brother?* or, typically, *I didn't know that you had a brother*. Though the hearer has inferred that the proposition that the speaker has a brother holds in the context, s/he does not tacitly agree to act as if s/he already knew that this proposition held in the context, but explicity states that s/he did not know that it did. This is a way of making the speaker assert a proposition that the hearer, for whatever reason, considers difficult to accommodate and that, therefore, should have been asserted. In the example, it is most probable that the speaker continues the conversation by asserting that s/he has a brother (*Yes, I have a brother*).

This kind of situation arises because, strictly speaking, the context is "whatever the speaker chooses to regard as being shared by him and his intended audience", as defined by Karttunen (1974: 182), and not just what is genuinely shared by the speaker and his/her audience. So, at the beginning of a conversation, the interlocutors know only partially the context in which they are. However, as Stalnaker puts it, "in the course of a conversation many clues are dropped about what is presupposed, participants will normally be able to tell that divergences exist if they do" (1978: 329) where the 'clues', if I understand Stalnaker correctly, are the presupposition-inducing expressions uttered by the speaker.

From this perspective, the presuppositions of the participants in the conversation do not come into existence at the moment when they are triggered during the course of the conversation, but are entailed by the context that precedes the begin-

ning of the conversation. Therefore, presuppositions are not 'added to the context' in cases of accommodation. At first blush, this account of *accommodation* seems to conflict with Lewis' (1979) 'rule of accommodation for presupposition', given below:

> If at time *t* something is said that requires presupposition *P* to be acceptable, and if *P* is not presupposed just before *t*, then - *ceteris paribus* and within certain limits - presupposition *P* comes into existence at *t*. (1979: 163).

Lewis' so-called 'rule' is based on his observation that hearers usually do not have problems inferring presuppositions and inferring that the presupposed propositions hold in the context. However, Lewis' way of putting it is misleading since, according to this rule, *pre*suppositions may be 'not *pre*supposed' before the sentence that carries the relevant presuppositional trigger is uttered. Also, according to this rule, *pre*suppositions 'come into existence' at the time when the sentence that carries the relevant presuppositional trigger is uttered. By contrast, according to the notion of 'presupposition' defended in this thesis, what comes into existence at that time is the hearer's inference of the speaker's presupposition and what may also come into existence at that time is the hearer's realization that the speaker's presupposition holds in the context, if the hearer did not know that in advance. So, what Lewis calls 'presupposition *P*' in his rule is the inference, on the part of the hearer, of the proposition that *P*, and also the inference, on the part of the hearer, of the fact that *P* holds in the context, i.e. of the fact that *P* is presupposed by the speaker.

Notwithstanding all that, the idea underlying Lewis' rule is that, if the speaker's utterance carries a presupposition that is not part of the hearer's assumptions about the common ground, the hearer updates her or his assumptions about the common ground (i.e. his or her individual context set) with the information provided by the speaker's presupposition, so that the conversation can proceed smoothly. As we have seen throughout this chapter, this idea was already in Stalnaker (1978). In Lewis' sense, accommodation is just a 'repair strategy' whose aim is to put the hearer's assumptions about the common ground on a level with the speaker's. Also in Lewis' sense, if a sentence carries a presupposition, the hearer accommodates the whole presupposition. However, as we will see in the next chapter, according to some authors, this is not necessarily the case. We will also see that the proposed mechanisms whereby a certain propositional content is accommodated by the hearer vary according to each particular analysis.

Chapter 3

The Projection Problem in the Literature

In this chapter, I will review previous work on the projection problem. I will start with the two most significant theories developed in the seventies: Karttunen (1973) and Gazdar (1979a,b). These two theories are particularly relevant because they represent two distinct ways of conceiving of the projection problem. These two ways are, roughly, that presuppositions do not project to the main context when they are entailed by the preceding discourse (Karttunen 1973), and that presuppositions do not project to the main context when there are pragmatic constraints that preclude their projection (Gazdar 1979).

The first view evolves into the so-called 'satisfaction theory' (Karttunen 1974, Heim 1983b, Beaver 2001, inter alia), which will be critically reviewed in section 3.2. In sections 3.2.2 and 3.2.3, I will explain the theoretical framework and, in section 3.2.4, I will focus on the predictions that result from the theoretical framework. In compound sentences, the theory predicts a systematic conditionalization of all the presuppositions which are triggered in clauses other than the first one in a compound sentence. In many cases, this prediction is counterintuitive and thus, is known as 'the proviso problem' (Geurts 1996). The defenders of the satisfaction theory contend that the goal of a theory of presupposition should be to determine the minimum (i.e. weakest) conditions that a context must meet so that the utterance of a given sentence may be felicitous in that context and thus, a theory of presupposition should not be concerned with the fact that its predictions accord more or less with speakers' intuitions. Most researchers working under this framework try to come up with an adequate theory of accommodation that may account for speakers' intuitions. In the different subsections of section 3.2.4, I will analyze some proposals of this sort.

The second view, i.e. the view that presupposition projection is pragmatically constrained is argued for by van der Sandt (1988). Since the analysis in this thesis, which will be elaborated on in Chapter 4, is heavily influenced by some of the ideas developed in this work, I will comment on it when I present my own analysis.

There is a third view, defended by researchers working on the so-called 'binding and accommodation theory' (van der Sandt 1992, van der Sandt & Geurts 1991, Geurts 1999), which maintains that presuppositions are anaphors which are either bound, or globally or locally accommodated. On this view, only global accommodation amounts to what is known as presupposition projection. Thus, we can say that, according to this theory, presupposition projection does not occur either because the relevant 'anaphor' finds an accessible and suitable antecedent, i.e. a discourse referent, within the discourse segment under consideration and thus, it is 'bound' within the segment, or because the relevant 'anaphor' establishes a discourse referent within the discourse segment under consideration and thus, it is locally accommodated. In section 3.3, I will focus on this theory as well as on the empirical problems it leaves unresolved, which mainly revolve around the issue of conditional presuppositions.

3.1   The Projection Problem in the Early Literature

The first proposal that tackled the projection problem was that of Langendoen and Savin, who also coined the term *projection problem*. Langendoen and Savin hypothesized that the presuppositions of a complex sentence were the sum of the presuppositions carried by their constituent clauses plus the presuppositions of the main clause. However, as we can see in the sentences below, this hypothesis (also known as the *cumulative* hypothesis) proved to be incorrect in many cases. In (3.1a), the presupposition that Shane did something to Molly, which is triggered in the antecedent, projects. However, this is not the case in (3.1b), where the presupposition that Shane did something wrong to Molly, which is triggered in the consequent, does not project. As to (3.1c), the presupposition that Shane has messed up his own life, which is triggered in the consequent, is conditionalized to the truth of the antecedent; that is, it does not hold unconditionally that Shane has messed up his own life, but that, if Shane did something wrong to Molly, he has messed up his own life:

(3.1)   a. If Shane regrets what he did to Molly, he will ask her to forgive him.

          b. If Shane did something wrong to Molly, he deeply regrets having

          done something wrong to her.

    c. If Shane did something wrong to Molly, he will regret having messed up his own life.

Thus, the presuppositions that a compound sentence carries as a whole are not generally the sum of the presuppositions carried by their clauses. In compound sentences, the presuppositions carried by the first clause (when the first clause itself is not composed of two or more clauses) usually project (though there are exceptions, such as the so-called 'bathroom sentences', as we will see in Chapter 4, section 4.2.1). So, it is the presuppositions carried by clauses other than the first one that are of much more interest. In the next two sections, we will see the ways in which Karttunen (1973) and Gazdar (1979) deal with the different projection patterns observed in sentences like those in the examples above.

3.1.1 Karttunen's (1973) Filtering Account

Basing himself on the contrast posed by sentences like (3.1a) and (3.1b) in the examples above, Karttunen (1973) states that a compound sentence has all the presuppositions carried by its first clause and the presuppositions carried by its second clause that are not entailed by the first clause or, in disjunctions, by the negation of the first clause[1]. In cases where a presupposition carried by the second clause does not project, Karttunen says that the presupposition in question is *filtered out*. Hence the name 'filtering conditions' for the set of rules posited by Karttunen, which aim to be the rules by which the different projection patterns abide. Karttunen's (1973) filtering conditions are as follows:

(3.2) **Karttunen's (1973) filtering conditions**

    Conjunctive sentences of the form φ and ψ_π and conditional sentences of the form if φ, then ψ_π presuppose that π unless φ entails π, in which case the presupposition carried by the second clause (i.e. π) is filtered out.

    Disjunctive sentences of the form either φ or ψ_π presuppose that π unless $\neg\varphi$ entails π, in which case π is filtered out.

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[1]In addition to the logical connectives, which behave as 'filters', in Karttunen's terminology, since they sometimes let the presuppositions carried by their clauses become sentential presuppositions and sometimes cancel them, Karttunen's (1973) analysis also covers the so-called 'holes', i.e. verbs whose complement clauses are presupposed by the whole sentence, e.g. factive verbs, and the so-called 'plugs', i.e. verbs whose complement clauses are not presupposed, e.g. verbs of saying such as *say* or *claim*. However, in this thesis, I will restrict myself to the natural language correlates to the logical connectives and thus, I will not deal with Karttunen's analysis of holes and plugs.

Thus, according to Karttunen, the compound sentences in (3.3), considered as a whole, carry the presupposition in (3.3d) since this presupposition is carried by their first clauses:

(3.3)   a. If Shane regrets what he did to Molly, he will ask her to forgive him.

        b. Shane regrets what he did to Molly and will ask her to forgive him.

        c. Either Shane does not regret what he did to Molly or he will ask her to forgive him.

        d. $\rightsquigarrow$ Shane did something to Molly.

By contrast, according to Karttunen, none of the compound sentences is (3.4), considered as a whole, carries the presupposition in (3.4d) since this presupposition is, in each case, carried by the second clause and entailed by the first clause or the negation of the first clause (in the disjunctive sentence in (3.4c), the entailment is between the negation of the first clause and the presupposition):

(3.4)   a. If Shane did something wrong to Molly, he deeply regrets having done something wrong to her.

        b. Shane did something wrong to Molly and deeply regrets having done something wrong to her.

        c. Either Shane did not do anything wrong to Molly or he deeply regrets having done something wrong to her.

        d. $\not\rightsquigarrow$ Shane did something wrong to Molly.

So, for Karttunen, the lack of projection in the sentences in (3.4) is due to the fact that the first clause or its negation entails the presupposition carried by the second clause. However, this is no reason why the presupposition should not project. As we saw in Chapter 1, section 1.1, and will be explained in detail in the next chapter, the projection of a presupposition carried by the second clause of a compound sentence is constrained in all cases where the presupposition entails the first clause or its negation (in disjunctions) since, if the presupposition projected, the utterance of the first clause would be either uninformative (in conjunctions) or doxastically indefensible (in genuinely hypothetical conditionals and disjunctions). In the examples in (3.4), Karttunen's prediction is correct, but this is just because the entailment between the first clause or its negation and the presupposition carried by the second clause is symmetric and thus, the presupposition carried by the second clause entails the first clause or its negation. In cases where

the entailment is asymmetric, Karttunen's analysis makes wrong predictions, as we can see in the example in (3.5) (=(1.21)) below. Regardless of the fact that the antecedent of the conditional sentence in (3.5a) asymmetrically entails the presupposition carried by its consequent, in (3.5b), this presupposition projects:

(3.5)   a. If Chris used to write for four different book publishers, he must have given up writing.

   b. ⤳ Chris used to write

As a matter of fact, one of the criticisms often laid against Karttunen (1973) (notably Gazdar 1979) is that his theory is more descriptive than explanatory. That is, Karttunen describes cases in which there is a certain entailment and the presupposition does not project, but cannot explain why this entailment should be responsible for the lack of projection. The fact is that the entailment of the presupposition by the first clause does not prevent the presupposition from projecting, as we have seen in the example above.

Furthermore, it sometimes happens that a compound sentence, considered as a whole, does not carry a presupposition which is carried by its second clause and, yet, this presupposition is not entailed by the first clause or its negation. Karttunen is aware that, in these cases, his filtering conditions, as defined above, do not yield the correct results. Let us take, for instance, the sentence in (3.1c) from the introduction to section 3.1, repeated below together with its conjunctive and disjunctive counterparts. The compound sentences in (3.6), considered as a whole, do not carry the presupposition in (3.6d), though (3.6d) is the presupposition carried by their second clauses. The first clause of the sentences in (3.6) (or the negation of the first clause) does not entail all by itself (3.6d) and thus, according to Karttunen's filtering conditions, as they stand, (3.6d) should not be filtered out but should project. However, (3.6d) does not project but is conditionalized to the first clause (in (3.6a) and (3.6b)) and to the negation of the first clause (in the disjunction in (3.6c)), giving rise to the conditional presupposition in (3.6e):

(3.6)   a. If Shane did something wrong to Molly, he will regret having messed up his own life.

   b. Shane did something wrong to Molly and will regret having messed up his own life.

   c. Either Shane did not do anything wrong to Molly or he will regret having messed up his own life.

   d. ⤳̸ Shane has messed up his own life.

> e. ⤳ If Shane did something wrong to Molly, he has messed up his own life.

So Karttunen redefines his filtering conditions, to the effect that, if there is a certain set of assumed facts X which, together with the set that contains the logical form of the first clause (or its negation, in disjunctions), entails a presupposition carried by the second clause, this presupposition will be filtered out:

(3.7) **Karttunen's (1973) redefinition of the filtering conditions**

Conjunctive sentences of the form φ and ψ_π and conditional sentences of the form if φ, then ψ_π presuppose that π unless $(X \cup \{\varphi\}) \vDash \pi$, in which case π is filtered out.

Disjunctive sentences of the form either φ or ψ_π presuppose that π unless $(X \cup \{\neg\varphi\}) \vDash \pi$, in which case π is filtered out.

Subsequently, as we will see in section 3.2.2, Karttunen's (1973) redefinition of his filtering conditions, i.e. $(X \cup \{(\neg)\varphi\}) \vDash \pi$, according to which π is 'filtered out', is transformed into Karttunen's (1974) notion that presuppositions must be satisfied (i.e. entailed) by their local contexts.

However, not even the redefined filtering conditions could account for examples like those in (3.6). The question arises as to what the set of 'assumed facts' X would be in this case that together with the set that contains the logical form of the first clause or its negation would entail (3.6d). In the sentences in (3.6), there is not just one generalization in the context that together with the first clause (or its negation) entails the presupposition carried by the second clause, but rather several contextual premises which are required in order to get this entailment. When Karttunen redefines his filtering conditions, he has in mind the following examples (from Karttunen 1973), in which the generalization in (3.8e), together with the first clause of (3.8a) and (3.8b) or the negation of the first clause of (3.8c) would entail the presupposition carried by the second clause, in (3.8d):

(3.8)   a. Geraldine is a Mormon and she has given up wearing her holy underwear.

   b. If Geraldine is a Mormon, she has given up wearing her holy underwear.

   c. Either Geraldine isn't a Mormon or she has given up wearing her holy underwear.

    d. Geraldine has worn holy underwear.

    e. Mormons wear holy underwear.

Another issue is that Karttunen takes for granted that the generalization in (3.8e) is a member of a set of assumed facts, but this is not the case in most contexts. Nonetheless, after the utterance of any of the compound sentences in (3.8), any hearer in possession of basic world knowledge would be able to reconstruct the generalization in (3.8e). In the next chapter, I will elaborate on this topic.

Most important, in cases where there is a single generalization in the context which, together with the first clause or its negation, suffices to get the entailment, and this generalization is non-trivial, as happens in (3.8), the relevant compound sentences also carry non-trivial conditional presuppositions. In the examples above, this conditional presupposition would be: *If Geraldine is a Mormon, she has worn holy underwear.* In Chapter 1, section 1.1, I advanced the argument that only in cases where the additional contextual premise(s) constitute basic world knowledge, or where it can be expressed as a lexical entailment, the conditional presupposition is trivially true. I will further develop this point in the next chapter. However, Karttunen (1973) does not consider the possibility that sentences may carry conditional presuppositions and thus, his position is that compound sentences like those in (3.8) do not inherit the presupposition carried by their second clauses (in the example, (3.8d)) either unconditionally or conditionalized to the first clause or its negation.

Finally, I just want to point out that the fact that the first clause of the compound sentences in (3.8) (and the same applies to the compound sentences in (3.6)), together with a contextual premise, entails the presupposition carried by the second clause should not be enough for the presupposition not to project. In cases where the first clause all by itself entails the presupposition carried by the second clause, there is no constraint that may prevent the projection of the presupposition, and the same should hold for compound sentences like those in (3.8). What is needed in order for the presupposition not to project is that the hearer infers that the entailment goes both ways. As will be explained in the next chapter, this is exactly what happens in (3.8) and, more generally, in all cases where world knowledge intervenes providing the missing premise or premises which are necessary in order for a sentence to be interpretable in a given context.

3.1.2 Gazdar's (1979) Cancellation Account

In this section, I will first outline Gazdar's (1979a, b) approach and then I will focus on two cases that have been considered problematic for his analysis: i. com-

pound sentences where the the first clause (or the negation of the first clause) asymmetrically entails the presupposition carried by the second clause and ii. compound sentences where the presupposition carried by the second clause asymmetrically entails the first clause or its negation. We will see that the first case is not really problematic for Gazdar. As for the second case, it gives rise to genuine conditional presuppositions and here is where Gazdar's theory falls short.

Gazdar's theory is grounded in the interaction between what he calls *clausal implicatures* and *potential presuppositions* in compound sentences. By 'clausal implicatures', Gazdar refers to the uncertainty inferences about the truth value of the clauses of conditional and disjunctive sentences, as well as the uncertainty inferences about the truth value of φ and ψ in conjunctions of the form possibly φ and possibly ψ. Gazdar considers that this type of inference is conversationally implicated. According to Gazdar, clausal implicatures are quantity conversational implicatures in the following sense: The clauses of conditional and disjunctive sentences, as well as the clauses of conjunctive sentences of the form possibly φ and possibly ψ are not asserted. The hearer infers that, since the speaker has not asserted either φ or ψ, this means that s/he is not in a position to assert either φ or ψ. Thus, the hearer infers that, for all the speaker knows, it is possible that φ, $\neg\varphi$, ψ and $\neg\psi$. By 'potential presuppositions' Gazdar refers to the presuppositions carried by the clauses of compound sentences that may or may not be carried by the sentence as a whole.

In Gazdar's system, when a compound sentence is uttered in a context, the context is incremented first by the truth-conditional content of the sentence, then by the set of clausal (quantity) implicatures and, finally, by the set of potential presuppositions. According to Gazdar, a potential presupposition survives as a presupposition of the whole sentence provided that it is consistent with the context, the truth-conditional content of the sentence, the set of clausal implicatures and other potential presuppositions. Thus, clausal implicatures take priority over potential presuppositions to the effect that, if a potential presupposition is inconsistent with a clausal implicature, the latter overrides the former. This feature of Gazdar's analysis has been widely criticized in the literature (van der Sandt (1988, 2010), Beaver (2001), inter alia) on the grounds that presuppositions are generally considered to be computed before the truth conditional content of the sentence is processed, whereas implicatures are computed after the truth conditional content of the sentence has been processed and thus, it does not seem plausible to maintain that implicatures can override presuppositions. However, regardless of whether Gazdar's analysis of uncertainty inferences as quantity implicatures may be correct or not, all Gazdar says about clausal implicatures is that they may cancel *potential* presuppositions; Gazdar does not claim that clausal implicatures may cancel presuppositions which are presupposed by a compound sentence consid-

ered as a whole.

According to Gazdar, sentences of the form if φ, then ψ_π and either φ or ψ_π[2], where π is the presupposition carried by ψ, have the following set of clausal implicatures: $\{P\varphi, P\neg\varphi, P\psi_\pi, P\neg\psi_\pi\}$, where P is Hintikka's (1962) epistemic possibility operator, and $P\varphi$ stands for *for all the speaker knows, it is possible that φ* or *it is compatible with all the speaker knows that φ*. As for the potential presupposition that π, carried by the second clause, Gazdar characterizes it as follows: $K\pi$, where K is Hintikka's epistemic necessity operator, and $K\pi$ stands for *the speaker knows that π*. Gazdar argues that, if $K\pi$ is inconsistent with any of the clausal implicatures, π is cancelled and thus, does not project. In cases where φ symmetrically entails π, the set $\{P\neg\varphi, K\pi\}$ is inconsistent and thus, the potential presupposition that π is cancelled. If the symmetric entailment is between $\neg\varphi$ and π (as happens in disjunctions where the negation of the first clause symmetrically entails the presupposition carried by the second clause), the set $\{P\varphi, K\pi\}$ would be inconsistent.

By way of example, let us take the conditional and disjunctive sentences in (3.4a) and (3.4c), repeated below:

(3.9) a. If Shane did something wrong to Molly, he deeply regrets having done something wrong to her.

   b. Either Shane did not do anything wrong to Molly or he deeply regrets having done something wrong to her.

The set of clausal implicatures associated with the sentences above would be as follows: $\{P(\text{Shane did something wrong to Molly}), P(\text{Shane did not do anything wrong to Molly}), P(\text{he deeply regrets having done something wrong to her}), P(\text{he does not deeply regret having done something wrong to her})\}$. The potential presupposition carried by the second clause of (3.9a) and (3.9b) would be characterized as $\{K(\text{Shane did something wrong to Molly})\}$. The set $\{P(\text{Shane did not do anything wrong to Molly}), K(\text{Shane did something wrong to Molly})\}$ is inconsistent and thus, the potential presupposition is cancelled.

However, van der Sandt (2010) points out that, unless the potential presupposition is itself modalized with K ($K\pi$), the relevant clausal implicature ($P\neg\varphi$) would not be able to cancel the potential presupposition that π. That is, the set $\{P\neg\varphi, \pi\}$, where φ symmetrically entails π, is consistent. The same goes for the set $\{P\varphi, \pi\}$, where $\neg\varphi$ symmetrically entails π (in disjunctions). Thus, unless the presupposition carried by the second clause is modalized with K, there would be no

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[2]I will not address here the case of conjunctive sentences with modalized clauses.

inconsistency between the potential presupposition and the relevant clausal implicature and thus, there would be no reason for the potential presupposition to be cancelled. According to van der Sandt, it is ad-hoc to prefix the presupposition that π with the operator K. A similar objection is raised by Beaver (2001), who argues that Gazdar's formalization is done at a meta-level.

Van der Sandt suggests a way to fix what he considers a problem of Gazdar's analysis. His argument goes as follows: As was noted by Hintikka (1962), the sentence in (3.10a) is consistent, whereas the sentence in (3.10b) is provably inconsistent, where B is Hintikka's doxastic necessity operator, considering belief as a form of necessity (i.e. doxastic necessity). That is, someone may assert that φ and that s/he does not believe that φ and what s/he says would not be inconsistent. However, if someone asserts that s/he believes both that φ and that s/he does not believe that φ, what s/he says is inconsistent:

(3.10)   a. $\varphi \wedge \neg B\varphi$

       b. $B(\varphi \wedge \neg B\varphi)$

Also, Hintikka (1962) defines *doxastic defensibility* in the following way (I take Hintikka's definition from van der Sandt (2010: 45)): "A set of sentences $\{\varphi_1, \varphi_2 \ldots \varphi_n\}$ is doxastically defensible just in case $B[\varphi_1 \wedge \varphi_2, \wedge \ldots \varphi_n]$ is consistent."

Thus, if the sentence in (3.10b) is provably inconsistent, the set $\{\varphi, \neg B\varphi\}$ is doxastically indefensible. Now, the set $\{P\neg\varphi, \pi\}$, where φ symmetrically entails π, is equivalent to $\{\neg K\varphi, \pi\}$. Substituting Hintikka's doxastic necessity operator B for Hintikka's epistemic necessity operator K, we get the set $\{\neg B\varphi, \pi\}$. Therefore, the latter set, though consistent, is doxastically indefensible. The same argument can be reproduced for the case of the disjunction, substituting $P\varphi$ for $P\neg\varphi$ since, in this case, it is $\neg\varphi$ that symmetrically entails π and thus, the relevant clausal implicature that could override the potential presupposition that π would be $P\varphi$.

In chapter 4, I will argue that, if the speaker presupposes that π, then π is contextually necessary, i.e. true in all the worlds of the context set and, since speakers believe (or act as if they believe) what they know is in the context, π is also doxastically necessary. I can claim this because I maintain that presuppositions are entailed by the context that precedes the utterance of the relevant sentence. However, Gazdar rejects this idea and argues that the requirement that presuppositions must be entailed by the context should be abandoned "in favor of the weaker requirement that they [presuppositions] be CONSISTENT with the context." (1979a: 107). Thus, Gazdar's prefixing of potential presuppositions with Hintikka's operator K is unjustified, as is argued by van der Sandt and Beaver.

Let us turn now to cases where φ (in the conditional) or $\neg\varphi$ (in the disjunction) asymmetrically entails π which, in the literature (Soames 1982, Heim 1983, Heim 1990), have been considered problematic for Gazdar. The sets $\{\neg K\varphi, K\pi\}$, where φ asymmetrically entails π, and $\{\neg K\neg\varphi, K\pi\}$, where $\neg\varphi$ asymmetrically entails π, are consistent. So, there is no reason for the potential presupposition that π to be cancelled and thus, π should project. Contrary to what Heim claims, the data support this prediction. As was already noted by van der Sandt (1988) and discussed in the overview of chapter 1, in sentences such as (1.13a) and (1.13b), repeated below, the presupposition carried by the consequent or second disjunct (in (3.11c)) projects:

(3.11)   a. If Chris is staying at a hotel near the Tivoli Gardens, Lenny will discover that he's in Copenhagen.

   b. Either Chris is not staying at a hotel near the Tivoli Gardens or Lenny will discover that he's in Copenhagen.

   c. $\rightsquigarrow$ Chris is in Copenhagen.

As was also noted by van der Sandt (1988) and discussed in the overview of chapter 1, this type of sentence, in which the first clause or its negation asymmetrically entails the presupposition carried by the second clause, may have a different interpretation on which the presupposition does not project. However, for that to occur, the hearer must infer that the presupposition also entails the antecedent or the negation of the first disjunct, which would prevent the presupposition from projecting[3]. That is, the conditional implication that if φ, then π must be perfected into a biconditional (i.e. iff φ, then π). As was also discussed in the overview of chapter 1, conditional perfection does not always obtain in this type of sentence and, when it does not obtain, the sentence has only one interpretation on which the presupposition projects, as happens in (3.11a) and (3.11b) above.

However, in sentences where the conditional implication that if φ, then π may be perfected into a biconditional, so that φ and π symmetrically entail each other, the set $\{\neg K\varphi, K\pi\}$ is inconsistent on this interpretation and thus, π should not project. This is what happens in van der Sandt's example in (1.14), repeated below, on the interpretation that obtains if the hearer infers that, if John's wife is dead, he murdered her (see the overview of chapter 1):

(3.12) If John murdered his wife, he will be glad that she is dead.

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[3]As was mentioned in the overview of chapter 1, and will be explained in detail in chapter 4, this is a defeasible inference which does not follow from the sentence.

So, though Gazdar does not consider the possibility that the hearer may infer conditional perfection and thus, rules out the interpretation on which the presupposition does not project, his system is able to predict this interpretation.

Let us see now some of Soames' (1982) and Heim's (1990) alleged counterexamples to Gazdar's analysis. The example in (3.13a) (discussed in Heim 1990) is from Soames (1976), that in (3.13b) from Soames (1982), and that in (3.13c) from Heim (1990):

(3.13)   a. If Sam paid the bill promptly, his payment is in the mail now.

           b. If France has an intelligent king, then the king of France is the only intelligent monarch in Europe.

           c. If you watch this movie, you will never watch a movie again.

According to Heim and, more generally, to the satisfaction theory, *his payment* in (3.13a), *the king of France* in (3.13b) and *again* in (3.13c) trigger presuppositions which are locally satisfied since they are entailed by the antecedent of each conditional sentence. Thus, according to Heim, the conditional sentences in (3.13) above carry conditional presuppositions which are trivially true and thus, which are too weak to be considered sentential presuppositions. According to Heim, these presuppositions would be *If Sam paid the bill promptly, there was a payment by Sam*, *If France has an intelligent king, France has a king* and *If you watch this movie, you have seen a movie*, respectively. Heim argues that Gazdar is unable to predict this result since, in (3.13a), the relevant clausal implicature, i.e. *for all the speaker knows, it is possible that Sam did not pay the bill promptly*, cannot override the potential presupposition that there was a payment by Sam; in (3.13b), the relevant clausal implicature, i.e. *for all the speaker knows, it is possible that France does not have an intelligent king*, cannot override the potential presupposition that France has a king, and, in (3.13c), the relevant clausal implicature, i.e. *for all the speaker knows, it is possible that the addressee does not watch this movie* cannot override the potential presupposition that the addressee has seen a movie.

However, what Heim takes to be good predictions are not so. Intuitively, in (3.13a), the presupposition that there was a payment by Sam projects; in (3.13b), the presupposition that France has a king projects, and, in (3.13c), the presupposition that the addressee has seen a movie projects. This is as it should be since, as was explained in Chapter 1, section 1.1 (and will be discussed in length in chapter 4), the fact that the speaker is uncertain about whether Sam paid the bill promptly does not prevent him/her from presupposing that Sam paid the bill. In the same way, the fact that the speaker is uncertain about whether France has an intelligent

king does not prevent him/her from presupposing that France has a king. And the fact that the speaker is uncertain about whether the addressee will watch this movie does not prevent him/her from presupposing that the addressee has seen a movie. Thus, Heim's alleged counterexamples to Gazdar are, on closer inspection, examples that reinforce Gazdar's analysis.

Still, as was said in Chapter 1, section 1.1, sentences like those in (3.13), where the antecedent entails the presupposition carried by the consequent, may give rise to an additional interpretation on which the presupposition does not project but is conditionalized. For that, the hearer should infer that the conditional implication that results from the entailment is a biconditional implication. That is, the hearer should infer conditional perfection (with respect to the conditional implication, not with respect to the conditional sentence). However, this does not always occur and, in particular, in (3.13a), there is no reason why the hearer should infer that, if there was a payment by Sam, Sam paid the bill promptly; in (3.13b), there is no reason why the hearer should infer that, if France has a king, France has an intelligent king, and, in (3.13c), there is no reason why the hearer should infer that, if the addressee has seen a movie, the addressee has seen this movie. Therefore, in the examples in (3.13), the additional interpretation on which the presupposition does not project does not arise. But, as was said before, in sentences in which the additional interpretation arises, Gazdar's system is able to predict it for, on this additional interpretation, the antecedent of the sentence, i.e. φ, and the presupposition carried by the consequent, i.e. π, entail each other and thus, the set $\{\neg K\varphi, K\pi\}$ is inconsistent, so that, on this interpretation, π should not project.

Notwithstanding all the above, Heim (1990) provides an example that seems to constitute a genuine counterexample to Gazdar's theory. The example is as follows:

(3.14) If the king has a son over thirty, the king's son is bald.

According to Gazdar (and my own hypothesis), the presupposition that the king has a son, carried by the consequent, should project. This is because, though the hearer shows uncertainty about whether the king has a son over thirty, this uncertainty does not prevent him/her from presupposing that the king has a son. However, intuitively, the presupposition that the king has a son does not project. What seems to be happening here is that the uniqueness presupposition that the definite description *the king's son* should trigger (Russell 1905) fails and thus, *the king's son* is unable to trigger the existence presupposition either. That is, the definite description is unable to trigger the presupposition that the king has an only son. This is probably because, in the antecedent, the speaker makes the supposition that the king has a son over thirty and thus, conversationally implicates that

the king may have several sons since, if the speaker believed that the king may not have more than one son, s/he would have said *if the king's son is over thirty, he's bald.*

Finally, let us focus on compound sentences where the presupposition carried by the second clause asymmetrically entails the first clause or the negation of the first clause, for which Gazdar does not provide a complete explanation. The sets $\{\neg K\varphi, K\pi\}$, where π asymmetrically entails φ, and $\{\neg K\neg\varphi, K\pi\}$, where π asymmetrically entails $\neg\varphi$, are inconsistent. So, the potential presupposition that π should not project. Though the data support this prediction, i.e. π does not project, the sentences in which π asymmetrically entails φ (or its negation) carry the conditional presupposition that if $(\neg)\varphi$, then π, as can be seen in the examples in (1.10) from the overview of chapter 1, repeated below:

(3.15)   a. If Chris is in Copenhagen, Lenny will discover that he's staying at a hotel near the Tivoli Gardens.

      b. Either Chris is not in Copenhagen or Lenny will discover that he's staying at a hotel near the Tivoli Gardens.

      c. ⤳ If Chris is in Copenhagen, he's staying at a hotel near the Tivoli Gardens.

According to Gazdar, the actual presuppositions of a sentence constitute a subset of the set of potential presuppositions and thus, his analysis leaves no room for conditional presuppositions. Therefore, with respect to the sentences above, he would simply say that they do not have the presupposition carried by the second clause. However, though this presupposition does not hold unconditionally, it holds if the antecedent or the negation of the first disjunct does. Thus, the presupposition is not cancelled, as Gazdar would predict, but conditionalized. In this connection, Heim (1990) makes the following observation. If, in this type of sentence, the presupposition carried by the consequent were cancelled, there would be no explanation for the fact that the sentences in (3.16a) and (3.16b) (from Heim 1990) below are anomalous:

(3.16)   a. If John has children, he will bring along his 4-year old daughter.

      b. If he ever watched a movie, he didn't watch Star Wars again.

The sentences above are anomalous because the conditional presuppositions they have (i.e. *if John has children, he has a 4-year old daughter* and *if he ever watched a movie, he watched Star Wars*, respectively) are themselves anomalous. However,

if the potential presupposition carried by the consequent of (3.16a) (i.e. *John has a 4-year old daughter*) and the potential presupposition carried by the consequent of (3.16b) (i.e. *he watched Star Wars*) could be cancelled, there would be no reason why the sentences in (3.16a) and (3.16b) should be infelicitous.

3.2 The 'Satisfaction' Theory

3.2.1 Introduction

The satisfaction theory of presupposition, proposed by Karttunen (1974), is centered on the idea that contexts must entail the presuppositions of the sentences which are uttered in them in order for the sentences to be felicitous. This idea is perfectly plausible and, when it comes to simple sentences, gives rise to correct predictions in accordance with speakers' intuitions. Yet, when it comes to compound sentences, the theory makes a wrong assumption which results in wrong predictions. In compound sentences, the satisfaction theory predicts a systematic conditionalization of the presuppositions carried by clauses other than the first one. This is known as *the proviso problem* (Geurts 1996). In this chapter, I will explain what incorrect assumption the theory makes. We will also see that the satisfaction theorists claim that the counterintuitive predictions which arise in most cases are just weaker than the inferences drawn by the hearers. Furthermore, they argue that a theory of presupposition does not have to account for the speakers' intuitions. That is, they argue that the predictions made by a theory of presupposition do not have to coincide with what the speakers, intuitively, take to be the presuppositions carried by a sentence since, according to these theorists, this is a task that corresponds to a theory of accommodation. So, the bulk of the work carried out by these researchers consists in coming up with a mechanism which may be able to derive the hearers' inferences from the counterintuitive predictions. This section is structured as follows: In 3.2.2, I will explain the way in which Karttunen (1974) arrives at the satisfaction theory and, in 3.2.3, the way in which Karttunen's view is implemented in a dynamic framework by Heim (1983b). In the different subsections of 3.2.4, I will discuss some of the most relevant analyses which, in the literature, have attempted to reconcile the counterintuitive predictions with the speakers' intuitions, thus trying to solve the so-called 'proviso problem'.

3.2.2   Karttunen's (1974): Satisfaction within the Local Context

Karttunen's (1974) analysis stems from Karttunen's (1973) redefinition of the so-called 'filtering conditions'. As we saw in section 3.1.1, Karttunen realizes that there are cases in which a compound sentence does not inherit a presupposition carried by its second clause and, yet, its first clause (or the negation of its first clause) does not entail this presupposition (recall the Mormon examples in (3.8)). In order to account for these cases, Karttunen appeals to a certain *set of assumed facts*, i.e. X, which, together with the logical form of the first clause or its negation $((\neg)\varphi)$, entails the presupposition carried by the second clause (π): $(X \cup \{(\neg)\varphi\}) \vDash \pi$. If we substitute *context* for *set of assumed facts*, we get a rough version of Karttunen's (1974) theory, as we will presently see.

Karttunen (1974) introduces the notion of *satisfaction of presuppositions* so that, in order for a sentence A to be felicitously uttered in a context X, X must satisfy the presuppositions of A, and defines the notion as follows:

(3.17) **Karttunen's (1974) definition of presupposition satisfaction for simple sentences**

Context X *satisfies-the-presuppositions-of* A just in case X entails all the basic presuppositions of A. (1974: 408).

Karttunen's (1974) definition of presupposition satisfaction for complex sentences

Context X satisfies-the-presuppositions-of "if A then B" just in case (i) X satisfies-the-presuppositions-of A, and (ii) $X \cup$ A satisfies-the-presuppositions-of B. (1974: 408).

Karttunen gives the definition for conditionals and adds that the same definition applies to conjunctions and, substituting ¬A for A, to disjunctions.

As can be seen in the definitions above, the so-called *local* context, i.e. the linguistic context that immediately precedes the utterance of a simple sentence, or the utterance of a clause in a compound sentence, is the context that, according to Karttunen, must satisfy the presuppositions of the sentence or the clause in question.

Let us focus on compound sentences of any of the forms φ and ψ_π, if φ, then ψ_π or either φ or ψ_π, where the first clause does not carry any presupposition and the second clause carries the presupposition that π. According to Karttunen, the

context (which I will call C) satisfies the presuppositions of these types of sentence just in case $C \cup \{(\neg)\phi\}$ satisfies-the-presuppositions-of ψ_π, which amounts to saying that C satisfies the presuppositions of these types of sentence just in case $(C \cup \{(\neg)\phi\}) \vDash \pi$. Given the equivalence between $(C \cup \{(\neg)\phi\}) \vDash \pi$ and $C \vDash ((\neg)\phi \rightarrow \pi)$, the latter amounts to saying that C satisfies the presuppositions of ϕ and ψ_π, if ϕ, then ψ_π or either ϕ or ψ_π just in case C entails the material implication $(\neg)\phi \rightarrow \pi$. Thus, it follows from Karttunen's (1974) definitions that $(\neg)\phi \rightarrow \pi$ is the presupposition carried by compound sentences of the types given above.

Karttunen (1974) does not explicitly arrive at this conclusion, which is made explicit in Karttunen and Peters (1979) (henceforth, K&P). Basing themselves on Karttunen's (1974) definitions, K&P formulate their *inheritance rules*, which explicitly state that sentences of any of the forms ϕ and ψ_π, if ϕ, then ψ_π or either ϕ or ψ_π, where π is the presupposition carried by the second clause, inherit conditional presuppositions:

(3.18) **Karttunen and Peters' (1979) inheritance rules**

Conjunctive sentences of the form ϕ and ψ_π and conditional sentences of the form if ϕ, then ψ_π inherit the conditional presupposition $\phi \rightarrow \pi$.

Disjunctive sentences of the form either ϕ or ψ_π inherit the presupposition $\phi \vee \pi$ (which is equivalent to the material implication $\neg\phi \rightarrow \pi$).

According to the predictions above, a sentence like (1.5a), repeated below, would presuppose the material implication in (3.19c) instead of the unconditional presupposition in (3.19b). Therefore, there is a clash between the theoretically predicted conditional presupposition and the intuitively inferred unconditional one. This is the so-called 'proviso problem' in compound sentences:

(3.19)   a. If Lida cares about her health, she will stop smoking.

b. Lida smokes.

c. If Lida cares about her health, she smokes.

In the introduction in 3.2.1, I said that Karttunen (1974) makes a wrong assumption which is responsible for the wrong predictions. I will address this point now. In order to define presupposition satisfaction for compound sentences in a recursive way, Karttunen associates the different clauses of a compound sentence with different contexts. However, as was discussed in Chapter 2, section 2.1, in order to determine what presuppositions are carried by a discourse segment as a whole, we must determine what propositions, within the set of propositions which might

be inferred by the hearer due to the presence of presuppositional triggers (what Karttunen calls 'basic presuppositions'), must be entailed by the context that precedes the utterance of the discourse segment under consideration, i.e. the global context in which the discourse segment under consideration is uttered. So, if the discourse segment under consideration is a compound sentence, we must determine what propositions within the set of basic presuppositions are entailed by the global context, and this is regardless of whether the basic presuppositions are carried by the first clause or by a clause other than the first one. Keeping track of the local context is important as far as the pragmatic constraints that block projection are concerned. That is, the assertion of a presupposition carried by a subsequent clause or the uncertainty shown by the speaker with respect to the truth value of a presupposition carried by a subsequent clause block the projection of the presupposition, which is then conditionalized. So, the local context may bar a basic presupposition from projecting. Apart from that, it plays no role in the determination of the presuppositions carried by a compound sentence as a whole.

3.2.3   Heim (1983b): CCPs as Encoders of Presupposition Heritage Properties

Notwithstanding the proviso problem, Heim (1983b) builds on Karttunen (1974) and, though she replies to one of Gazdar's (1979a) objections against K&P's theory, this objection is not the counterintuitive nature of K&P's predictions. Gazdar objects that, according to K&P, the grammar of English would need to specify three pieces of information for each lexical item: (i) its content (i.e. its truth-conditions), (ii) its presuppositional properties (if any) and (iii) its heritage properties[4]. For instance, for the lexical item *if*, the grammar of English should specify that it has the truth-conditions that it has, that it does not have any presuppositional property (unlike the lexical item *the*, to give an example) and that its heritage properties are those specified by K&P's inheritance rule.

Thus, Heim's aim is two-fold: on the one hand, she wants to provide a rule for each connective from which both the content property and the heritage property may be derived; on the other, she wants to show that K&P's inheritance rule comes down to the combination of Karttunen's (1974) generalization (she focuses on Karttunen's definition of presupposition satisfaction for conditional sentences) with a general principle that she postulates. Heim's redefinition of Karttunen's generalization and her general principle are as follows:

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[4] Heim (1983b) introduces the term *heritage property* to refer to the inheritance rules or projection rules for each connective.

(3.20) **Heim's (1983b: 399) redefinition of Karttunen's (1974) generalization for conditional sentences**

> If "If A, B" is uttered in context c, then c is the local context for A, and c + A (read: "c incremented by A") is the local context for B.

Heim's (1983b: 399) general principle on constituent sentences

> A context c admits a sentence S just in case each of the constituent sentences of S is admitted by the corresponding local context.

Heim argues that the redefinition above might still seem a stipulation since the heritage properties of *if* seem to be independent of its content and presuppositional properties; however, she goes on, the redefinition is just an underspecification of the *context change potential* (henceforth, CCP) for the material implication. CCPs are instructions by which a sentence or a clause, uttered in a given context, is conjoined with its local context. So, according to Heim, in a conditional sentence (If A, B), c + A will only be *defined* (i.e. there will not be a semantic failure) iff c admits A, and c + A + B will be defined iff c + A admits B, where a sentence A is defined in a context c iff c admits A.

Heim maintains that, once the CCP for a given connective is fully specified, both its content property and its heritage property may be derived from the CCP; therefore, we will have two of the properties of a lexical item in a single specification and it will only remain to know what the presuppositional property of the lexical item is (if any). Nevertheless, in order for the truth-conditions to be 'read off' the CCP, the CCP must be derived from the truth-conditions. That is exactly what Heim does. As we can see below, the CCP for conditionals is derived from the truth-conditions of the material implication:

(3.21) **Heim's (1983b: 400) CCP of "if"**

> c + If A, B = c\(c + A \ c + A + B)

> where "M\N" stands for the intersection of M with the complement of N.

If we look at the CCP of *if* above, we may see that Heim subtracts all those worlds where A is true and B is false from the context set, which amounts to subtracting all those worlds where the conditional is false from the context set: first, she subtracts all the worlds where both A and B are true from the worlds of the context set where A is true, so that she only gets worlds where A is true and B is false; then, she subtracts all the latter worlds from the context set so, eventually, she only gets worlds of the context set where If A, B is true.

Let us now see why Heim maintains that the heritage property of conditionals falls out of the CCP of the material implication. As, according to the satisfaction theory, for a sentence (or a clause) to be admitted in a given context, that context has to satisfy the presuppositions of the sentence (or the clause), it follows that, for c + A to be defined in c (i.e. for c to admit c + A), c must entail all the presuppositions of A and, for c + A + B to be defined in c + A (i.e. for c + A to admit c + A + B), c + A has to entail all the presuppositions of B. So, we end up with the conditional 'semantic presupposition' already predicted by K&P, which in Heim's case results from her insistence on keeping projection (or heritage) properties inseparable from truth-conditions in compound sentences.

Moreover, as Heim (1990) herself acknowledges, both Soames (1989) and Rooth (in a personal communication to Heim) note that there is not a one-to-one correspondence between truth-conditions and CCPs, which comes down to saying that there is not a one-to-one correspondence between truth-conditions and heritage properties. That is to say, there are other CCP rules with exactly the same truth-conditions for *if* as the CCP above, but these other rules would give rise to different heritage properties. Thus, positing that the CCP above is the one that obtains the right heritage property for *if* is another stipulation after all. In particular, Rooth remarks that the following CCP:

c + If A, B = c\(c + A \ (c + B))

also gets the right truth-conditions for the material implication; however, this CCP predicts that the presuppositions carried by the consequent are satisfied within the global context c.

Though Heim (1983b) only gives the CCPs of negation and material implication explicitly, the CCP for conjunction is implicit in the CCP for the material implication, as we can see below:

(3.22) **CCP of "and"**

  c + (A and B) = c + A + B

As for the CCP for disjunction, other authors (Zeevat (1992), Veltman (1996), Beaver (2001)) provide the corresponding formula and, more generally, the formulas that determine the way in which each connective updates a previous information state. Thus, the context change formulas that determine the way in which a complex sentence changes the context where it is uttered (or updates a previous information state) are as follows:

(3.23) **Dynamic entries[5] for negation, conjunction, material implication and disjunction**

$C[\neg\varphi] = C - C[\varphi]$

$C[\varphi \wedge \psi] = C[\varphi][\psi]$

$C[\varphi \rightarrow \psi] = C - (C[\varphi] - C[\varphi][\psi])$

$C[\varphi \vee \psi] = C[\varphi] \cup C[\neg\varphi][\psi]$

where $C[\varphi]$ represents the global context (i.e. the common ground) C incremented by the logical form of φ or, what amounts to the same thing, the intersection of the context set and the set of worlds where φ is true.

As can be seen above, $C[\varphi]$ is the local context of ψ in the conjunction and the conditional. So, following Heim (1983b), for ψ to be defined in $C[\varphi]$ (i.e. for $C[\varphi]$ to admit ψ), $C[\varphi]$ must satisfy all the presuppositions of ψ. From the latter, it follows that sentences of the form φ and ψ_π and if φ, then ψ_π will have the presupposition $\varphi \rightarrow \pi$. Likewise, $C[\neg\varphi]$ is the local context of ψ in the disjunction. So, for ψ to be defined in $C[\neg\varphi]$ (i.e. for $C[\neg\varphi]$ to admit ψ), $C[\neg\varphi]$ must satisfy all the presuppositions of ψ. From the latter, it follows that sentences of the form either φ or ψ_π will have the presupposition $\neg\varphi \rightarrow \pi$.

The dynamic entry corresponding to logical disjunction above is provided by Beaver (2001) and reflects K&P's inheritance rule for disjunctions. However, Veltman (1996) defines the update formula for logical disjunction as follows:

$C[\varphi \vee \psi] = C[\varphi] \cup C[\psi]$

From the latter formula, the presupposition $\neg\varphi \rightarrow \pi$ would not be the presupposition that 'projects' in a disjunction of the form either φ or ψ_π. The presuppositions carried by both disjuncts would be satisfied within the global context.

Finally, there is another objection against Heim (1983b), which is raised by Heim herself. Heim (1990) casts doubt on the fact that C (the initial context) should be incremented by A (the antecedent of a conditional sentence) or by $\neg$A (the negation of the first clause, in the case of disjunctions) since, contrary to what happens in coordinating conjunctions in which all clauses are asserted, neither A in the conditional nor $\neg$A in the disjunction is asserted. Heim argues as follows: "why on earth does one add $\sim$A in the course of the context change induced by "A or B"? [...] The same point applies to other connectives, in particular *if . . . then*. Someone who asserts "If A then B" doesn't assert any of A, $\sim$A, B, or $\sim$B, so we have no obvious explanation why there should be a stage at which A has been

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[5]The expression *dynamic entry* is used by Schlenker (2009).

added to the initial context." (1990: 32). This is not to minimize the importance of hypothetical reasoning in conditional sentences, but to call into question the idea that presuppositions may be satisfied by the hypothetical context that results from the hypothetical incrementation of the global context with the antecedent of a conditional sentence.

3.2.4 Counterintuitive Predictions: The 'Proviso' Problem and Proposed Solutions to it

What strikes one most about the proviso problem is the amount of effort that has been put into finding some sort of mechanism or algorithm that makes it possible to strengthen the counterintuitive predictions. It is difficult to understand why it has been widely accepted that the material implication has to be the semantic presupposition of the sentence. That is, it is difficult to understand why Karttunen's (1974) definition of presupposition satisfaction for compound sentences and its later development by Heim (1983b) have not been questioned, with the exception of Heim herself (1990) and a few opponents to the satisfaction theory (Gazdar (1979), van der Sandt (1988, 1992), Geurts (1996, 1999)).

The original appeal of the satisfaction theory lies in its ability to produce a set of rules, in accordance with the truth-conditions of each connective, that are claimed to account for the phenomenon known as presupposition projection in compound sentences. As a matter of fact, the stipulation that presuppositions must be satisfied within their local contexts (from which the dynamic nature of the theory results) is given such a central role in order to avoid the separation between the truth-conditions of the connectives and the projection properties of compound sentences or, as Stalnaker (1974) puts it, the separation between content and context. However, as Stalnaker also points out, though content and context interact with each other, they should be kept separate since the constraints on the truth-conditions of a sentence are a different thing from the constraints on the context in which the sentence is uttered. On this view, there is not a connection between the truth-conditions of compound sentences and their presuppositions beyond the fact that, if the global context does not satisfy these presuppositions, the utterance of the sentence would be inappropriate.

Nevertheless, many researchers have accepted K&P's prediction (i.e. the systematic conditionalization of the presuppositions carried by clauses other than the first one in compound sentences) as something unavoidable. The implausibility of such a prediction has led them to claim that the presupposition that 'projects' does not have to coincide with the proposition that the hearer infers (which is

no longer considered a presupposition but just an 'inference'). The satisfaction theorists defend their stance arguing that they are just concerned with obtaining the theoretical condition that allows a sentence to be uttered in a context, even if this condition is weaker than the presupposition that is ultimately inferred by the hearer; thus, the fully counteintuitive predictions that the theory makes become less troublesome.

In the remainder of this section, I will review several attempts to derive the unconditional proposition, i.e. the proposition which is inferred by the hearer in most cases, from the theoretical result, i.e. the material implication. I will start with K&P's own proposal, and the objections that have been raised against it. Thus, the first attempt to solve the proviso problem comes from K&P themselves. K&P propose that, in a conditional sentence of the form if φ, then ψ_π, the predicted material implication $\varphi \rightarrow \pi$ is *strengthened* so that, eventually, it is inferred that π. The term *strengthening* derives from the fact that the consequent of the material implication entails the whole material implication. Put another way, the consequent of the material implication is *stronger* than the material implication.

Geurts' (1996) rendering of K&P's argument, which he calls *the argument from truth-functionality*, goes as follows:

(3.24) **K&P's strengthening of the conditional presupposition as explained in Geurts (1996: 274) (the argument from truth-functionality)**

> The speaker utters a sentence of the form $\varphi \rightarrow \psi_\pi$ and thus, presupposes that $\varphi \rightarrow \pi$.
>
> Assuming that the speaker's grounds for presupposing $\varphi \rightarrow \pi$ are truth-functional, the speaker knows either that φ is false or that π is true: $K_S \neg \varphi \lor K_S \pi$, where $K_S \varphi$ stands for *the speaker knows that* φ.
>
> As the speaker utters a conditional sentence, it is conversationally implicated[6] that s/he does not know that φ is true and that s/he does not know that φ is false: $\neg K_S \varphi \land \neg K_S \neg \varphi$.
>
> Thus, $K_S \neg \varphi$ is false and, therefore, $K_S \pi$ is true. In words, the speaker knows that π.

Applied to the sentence in (3.25a) below, K&P's reasoning would be as follows: The sentence in (3.25a) presupposes that in (3.25b). On truth-functional grounds, the speaker knows either that $\neg$(Jade flies to Amsterdam) or that Jade

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[6]As we will see in chapter 4, it is not clear that the uncertainty inferences about the truth value of the clauses of disjunctive sentences are in fact conversationally implicated.

has a boyfriend (i.e. $K_S \neg \varphi \vee K_S \pi$). As the speaker utters a conditional sentence, it is conversationally implicated that s/he does not know that it is false that Jade flies to Amsterdam ($\neg K_S \neg \varphi$). Therefore, the speaker knows that Jade has a boyfriend ($K_S \pi$):

(3.25)   a. If Jade flies to Amsterdam, her boyfriend will pick her up at the airport.

　　　　　b. If Jade flies to Amsterdam, she has a boyfriend.

The argument above might also be applied to disjunctions of the form either φ or ψ_π for which K&P predict the conditional presupposition that $\varphi \vee \pi$. As before, on truth-functional grounds, the speaker knows that φ is true or that π is true: $K_S \varphi \vee K_S \pi$. As the speaker utters a disjunction, it is conversationally implicated that s/he does not know that φ is true and that s/he does not know that φ is false: $\neg K_S \varphi \wedge \neg K_S \neg \varphi$. Thus, $K_S \varphi$ is false and thus, $K_S \pi$ is true.

Applied to the disjunctive sentence in (3.26a) below, K&P's reasoning would be as follows: The sentence in (3.26a) presupposes that in (3.26b). On truth-functional grounds, the speaker knows either that Jade does not fly to Amsterdam or that she has a boyfriend (i.e. $K_S \varphi \vee K_S \pi$). As the speaker utters a disjunction, it is conversationally implicated that s/he does not know that it is true that Jade does not fly to Amsterdam ($\neg K_S \varphi$). Therefore, the speaker knows that Jade has a boyfriend ($K_S \pi$):

(3.26)   a. Either Jade does not fly to Amsterdam or her boyfriend will pick her up from the airport.

　　　　　b. Either Jade does not fly to Amsterdam or she has a boyfriend.

We will presently see Geurts (1996) objection to the so-called 'argument from truth-functionality'. However, in my view, the main objection should have been that, even on truth-functional grounds, in the case of the conditional, *the speaker knows that either φ is false or π is true*: $K_S(\neg \varphi \vee \pi)$ is not equivalent to *either the speaker knows that φ is false or the speaker knows that π is true*: $K_S \neg \varphi \vee K_S \pi$[7].

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[7]The proof would be as follows: Assuming the standard interpretation of the knowledge operator K_S *I know that . . .* as universal quantifier over possible words, we may represent K_S as the $\square$ operator. $K_S \varphi \vee K_S \psi$ and $K_S(\varphi \vee \psi)$ are thus respectively represented as $\square \varphi \vee \square \psi$ and $\square(\varphi \vee \psi)$, where the accessibility relation is reflexive and transitive (Hintikka, 1962). It is easy to show that the principle $(\square \varphi \vee \square \psi \leftrightarrow \square(\varphi \vee \psi))$ does not hold. Take a modal language with two propositional letters (P and Q). The following model gives a counterexample at w_1. $M = \langle W, R, V \rangle$ where $W = \{w_1, w_2\}$, $R = \{\langle w_1, w_1 \rangle, \langle w_1, w_2 \rangle, \langle w_2, w_2 \rangle\}$, $V_{w1}(P) = V_{w2}(Q) = 1$ and $V_{w2}(P) = V_{w1}(Q) = 0$. Now $\square(\varphi \vee \psi)$ is true at w_1 (since $(P \vee Q)$ is true at both w_1 and w_2) and $(\square P \vee \square Q)$ is false at w_1 (since both $\square P$ and $\square Q$ are false at w_1).

Therefore, from $K_S(\neg\varphi \vee \pi)$ and the uncertainty inference that it is not the case that the speaker knows that φ is false: $\neg K_S\neg\varphi$, it does not follow that the speaker knows that π is true: $K_S\pi$. The same applies to the disjunction.

In the case of conjunctions of the form φ and ψ_π, for which K&P predict the conditional presupposition that $\varphi \vee \pi$, K&P would argue by modus ponens: since φ is believed to be true, so is π (see Geurts (1996)).

Geurts (1996) raises a well known objection against the solution proposed by K&P. The objection results from the contrast between pairs of sentences such as those in (3.27a) and (3.27b). What Geurts does is embed the conditional presupposition in (3.27c) which, according to K&P, is the 'semantic presupposition' of the conditional sentence in (3.27a) under a factive expression (in (3.27b)):

(3.27)   a. If Jade flies to Amsterdam, her boyfriend will pick her up at the airport.

   b. Chris knows that, if Jade flies to Amsterdam, she has a boyfriend.

   c. If Jade flies to Amsterdam, she has a boyfriend.

   d. Jade has a boyfriend.

According to K&P, upon hearing (3.27a), we get the unconditional inference in (3.27d) by means of the strengthening of the conditional presupposition in (3.27c). Geurts objects that, if such a process of strengthening took place, it would also be possible to get the inference in (3.27d) upon hearing (3.27b), since (3.27b) carries the conditional presupposition in (3.27c), which is the conditional presupposition that K&P predict for (3.27a). However, the hearer does not draw the inference in (3.27d) upon hearing (3.27b), which means that the conditional presupposition in (3.27c) is not strengthened when it is carried by (3.27b). Therefore, Geurts argues, there are no grounds to believe that the conditional presupposition in (3.27c) should undergo a process of strengthening when, as K&P maintain, it is the presupposition of a conditional sentence such as (3.27a). But if the material implication (in (3.27c)) does not undergo any process of strengthening, the question remains for K&P to answer as to why the hearer draws an unconditional inference (in the example, (3.27d)).

The obvious reply to this objection should be that, whereas in (3.27a) the hearer does not draw any uncertainty inference with respect to the truth value of π, i.e. the presupposition carried by the consequent, in (3.27b), the hearer draws the following uncertainty inferences: $\neg K_S\pi$ and $\neg K_S\neg\pi$, since π is now the consequent of a conditional sentence which, in turn, is the complement clause of the factive

verb *know*. Therefore, there is an explanation as to why (3.27c) is not strengthened when it is the complement of a factive verb. However, K&P's explanation as to why (3.27c) should be strengthened when, according to them, it is the presupposition of (3.27a) is still implausible.

Nonetheless, in the recent years, there has been a proliferation of theories that accept K&P's prediction that the material implication is the presupposition of the sentence, and maintain that the strengthening of the material implication needs only occur in cases where the antecedent is not relevant to the consequent, as happens in (3.27a) but not in (3.27b). Thus, according to these theories, when (3.27c) results from (3.27a), the antecedent (*Jade flies to Amsterdam*) is not relevant to the presupposition that Jade has a boyfriend, since Jade's having a boyfriend does not depend in any way on Jade's flying to Amsterdam. However, when (3.27c) results from (3.27b), the antecedent is, indeed, relevant to the presupposition that Jade has a boyfriend, because it is precisely Jade's flying to Amsterdam that makes Chris know that she has a boyfriend (presumably, in Amsterdam; otherwise, the sentence would not make much sense). So, these authors (notably Beaver 1999, 2001, 2006) argue, when someone hears the sentence in (3.27a), s/he just infers (3.27d) whereas, when someone hears the sentence in (3.27b), s/he infers the whole (3.27c). The term *strengthening* is valid as long as conditionals are treated as material implications. There are proposals that defend a different semantics for conditionals from that of the material implication (Pérez Carballo 2008), but the idea persists that the hearer infers just the consequent of the material implication when the antecedent is not relevant to it. This is the way in which the latter proposals refute the objection raised by Geurts (1996). However, with the exception of some earlier approaches (Soames 1982, Heim 1983), the argument that K&P offer in order to account for the unconditional inference is rejected.

Nevertheless, a relevance-based account would not provide an explanation as to why in sentences like those in (3.28a) and (3.28b) below, in which the antecedent is indeed relevant to the presupposition carried by the consequent, the hearer draws the unconditional inference in (3.29a) and (3.29c), instead of the material implication in (3.29b) and (3.29d):

(3.28)   a. If Lida cares about her health, she will stop smoking.

          b. If Lida does not have talent for science, she will regret being enrolled in a Physics PhD program.

(3.29)   a. ⤳ Lida smokes.

          b. ↝̸ If Lida cares about her health, she smokes.

    c. $\rightsquigarrow$ Lida is enrolled in a Physics PhD program.

    d. $\not\rightsquigarrow$ If Lida does not have talent for science, she is enrolled in a Physics PhD program.

In the next sections, I will review the proposals of Beaver (1999), Pérez Carballo (2008), Lassiter (2011) and Singh (2008, 2009). Beaver's and Pérez Carballo's are relevance-based analyses. Lassiter's (2011) probabilistic account overcomes some of the shortcomings of relevance-based analyses. Still, there are data which remain unexplained in Lassiter's own analysis. As for Singh (2008, 2009), he does not appeal to the notion of relevance or lack of relevance of the antecedent of the material implication with respect to the consequent, but designs an ad-hoc algorithm that should be able to yield the unconditional inference drawn by the hearer. We will see that all these proposals are fairly good representatives of the line of thought initiated by K&P, which can be summed up as follows: it is illusory to think that the theoretical predictions are contradicted by the data (as seems to be the general case), since the data do not represent the phenomenon that the theory addresses, i.e. presupposition, but reflects a different phenomenon, i.e. accommodation; therefore, as soon as a theory is provided that explains the process of accommodation, the counterintuitive predictions will be explained away.

3.2.4.1 Plausibility Orderings and Relevance

In order to determine what propositions are accommodated by the hearer upon the utterance of a sentence of the form $\varphi \rightarrow \psi_\pi$, Beaver (1992, 1993) appeals to the notion of presupposition *plausibility* according to the hearer's assumptions about the common ground; that is to say, the hearer decides on the greater or lesser plausibility of a proposition with respect to another according to the set of propositions whose truth s/he takes for granted. This notion is redefined in Beaver (1999) as plausibility orderings on contexts.

Roughly, the argument goes as follows: a given context entails a certain set of propositions and does not entail other propositions. Thus, for instance, after the utterance of a conditional sentence that carries a presupposition in the consequent ($\varphi \rightarrow \psi_\pi$), the hearer may infer either that π or that $\varphi \rightarrow \pi$. So, Beaver (1999) proposes two different contexts:

- Context A entails the conditional presupposition that $\varphi \rightarrow \pi$ and does not entail the presupposition that π.

- Context B entails the presupposition that π and thus, context B trivially entails the presupposition that $\varphi \rightarrow \pi$ as well, but this latter fact does not really matter.

The hearer, according to his/her assumptions about what the context should be like, decides on what ordering is more plausible: A > B or B > A. Whenever context A is preferred to context B or, put it another way, whenever context A is higher than context B in a plausibility ordering on those contexts, the conditional presupposition that $\varphi \rightarrow \pi$ is inferred. In contrast, whenever context B is preferred to context A, the presupposition that π is inferred. The concept is illustrated in the examples in (3.30a) and (3.30b) below (from Beaver (1999)); however, the example in (3.30a) is misleading, as we will see later on in this section. Beaver's argument goes as follows: in the first example, the hearer, according to his/her assumptions about what the context should be like, will decide that a context that entails that there is no more hot water should be preferable to all contexts that entail that, if Jane wants to have a bath, there is no more hot water but do not entail that there is no more hot water. In contrast, in the second example, the hearer, according to his/her assumptions about what the context should be like, will decide that a context that entails that, if Jane takes a bath, there is no more hot water, but does not entail that there is no more hot water should be preferable to all contexts that entail that there is no more hot water:

(3.30)   a. If Jane wants a bath, Bill will be annoyed that there is no more hot water

         b. If Jane takes a bath, Bill will be annoyed that there is no more hot water

Therefore, in the first case, it is inferred that there is no more hot water whereas, in the second case, it is inferred that if Jane takes a bath, there will be no more hot water.

In regard to the first sentence, Beaver formalizes the conditions on the two contexts in a given ordering as follows:

Where σ and τ are contexts, ϖ is a plausibility ordering on contexts and $\star\varpi$ is the domain of an ordering "defined as the set of contexts which are at least as plausible as themselves in the ordering" (Beaver 1999: 14). NHW stands for "no more hot water" and JWB stands for "Jane wants a bath".

$\exists\sigma \in \star\varpi \; \sigma \vDash$ NHW and
$\forall\tau \in \star\varpi$ if ($\tau \nvDash$ NHW and $\tau \vDash$ JWB $\rightarrow$ NHW) then $\sigma >_{\varpi} \tau$

That is, there is a context σ that entails the proposition that there is no more hot water and this context is higher in the plausibility ordering ϖ than all contexts τ that do not entail the proposition that there is no more hot water, but entail the proposition that if Jane wants a bath, there is no more hot water.

As for the second sentence, the conditions are formalized as follows:

where JTB stands for "Jane takes a bath",

$\exists σ \in \star ϖ$ σ ⊭ NHW and σ ⊨ JTB → NHW and
$\forall τ \in \star ϖ$ if τ ⊨ NHW then σ $>_ϖ$ τ

That is, there is a context σ that does not entail the proposition that there is no more hot water but entails the proposition that if Jane takes a bath, there is no more hot water and this context is higher in the plausibility ordering ϖ than all contexts τ that entail the proposition that there is no more hot water.

So, Beaver does not make claims about certain propositions being more plausible than others, but rather defends the idea of certain contexts that entail a certain set of propositions being more plausible than other contexts that entail a different set of propositions and thus, a certain ordering on those contexts being the preferred ordering. As to how the hearer determines what the preferred ordering is, i.e. how the hearer determines the relative plausibility of a context with respect to another, Beaver (1992) argues that it must be 'world knowledge' that guides the hearer on his/her choice. Continuing with this line of reasoning, Beaver (1999) hypothesizes about a certain "common sense knowledge of the world" (1999:18) whose source is, presumably, non-linguistic. If I understand Beaver correctly, the hearer knows in what context s/he is and, therefore, s/he also knows the set of propositions that the context entails; so, the context in which the hearer is ranks higher than any other context in a plausibility ordering or, put another way, the context in which the hearer is is preferable to or more plausible than any other context.

Later on, Beaver (2006) introduces the concept of *relevance*. As was explained before, Beaver is among the authors who support the view that a sentence of the form φ → $ψ_π$ has the semantic presupposition that φ → π. However, Beaver argues, depending on whether φ is *relevant* to π or not (in the material implication), the hearer will accommodate either that φ → π or just that π. In terms of plausibility orderings on contexts, if there is relevance, the hearer will decide that a context that entails φ → π but does not entail π is preferable to all contexts that entail π and, if there is no relevance, the hearer will decide that a context that entails π is preferable to all contexts that entail φ → π but do not entail π. Once again, it must be a certain common sense knowledge of the world that guides the hearer on his/her decision as to whether there is relevance between φ and π or not.

In regard to the pair of sentences in (3.27a) and (3.27b) from section 3.2.4, repeated below, Beaver's argument would go as follows: the material implication in (3.31c) is the semantic presupposition of both sentences (3.31a) and (3.31b). However, the antecedent of the material implication is not relevant to the consequent and thus, upon the utterance of (3.31a), it is just inferred that John has a girlfriend ((3.31d)). By contrast, the sentence in (3.31b) not only presupposes the conditional presupposition in (3.31c), but also presupposes relevance of the antecedent (of the conditional presupposition) to the consequent and thus, the whole conditional presupposition in (3.31c) is inferred:

(3.31)   a. If Jade flies to Amsterdam, her boyfriend will pick her up at the airport.

       b. Chris knows that, if Jade flies to Amsterdam, she has a boyfriend.

       c. If Jade flies to Amsterdam, she has a boyfriend.

       d. Jade has a boyfriend.

Schematically, Beaver (2006) states that:

(3.32) "X factive-verb $\varphi \to \pi$" presupposes relevance of φ to π.
Thus, after the utterance of "X factive-verb $\varphi \to \pi$", the hearer accommodates that $\varphi \to \pi$.

By contrast:

(3.33) $\varphi \to \psi_\pi$ does not presuppose relevance of φ to π.
Thus, after the utterance of $\varphi \to \psi_\pi$, the hearer accommodates just that π[8].

In regard to the notion of *relevance*, Beaver (2006) does not provide any definition. It is difficult to assess the exact nature of the relation. Bowles (1990) provides four definitions of relevance of a proposition r to another proposition q: if r makes q certain, probable, improbable or impossible, then r is relevant to q. Otherwise, r is irrelevant to q. The first definition, i.e. if r makes q certain, then r is relevant to q, amounts to saying that if r entails q, then r is relevant to q. Applying this sense of relevance to conditional presuppositions $\varphi \to \pi$, we obtain that φ is relevant

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[8]Beaver's statement corresponds to the case in which conditional sentences carry unconditional presuppositions. In cases where conditional sentences carry conditional inferences/presuppositions, the antecedent (in the conditional presupposition) should, according to Beaver, be always relevant to the consequent.

to π if φ entails π. However, if φ entailed π, the proposition that $\varphi \rightarrow \pi$ would be trivially true and thus, too weak to be considered a sentential presupposition. The second definition, namely that if φ makes π probable, then φ is relevant to π, seems to reflect what, intuitively, we understand by *relevance* of φ to π. That φ makes π probable means, according to Bowles, that the probability of π given φ is less than 1 but greater than 1/2.

Note that what Beaver's approach, as well as other relevance-based approaches, really needs is a notion of contextual entailment between φ and π. If φ all by itself entails π, then we have logical entailment. But, if φ, together with additional contextual premises, entails π, then φ is relevant to π. However, the other way round, that φ is relevant to π, does not mean that φ, together with additional contextual premises, entails π. As was said above, in cases like (3.28a) and (3.28b) from section 3.2.4, repeated below, the antecedent is relevant to the presupposition carried by the consequent, though relevant in a 'negative' way. So, if relevance were the key notion to determine what is accommodated by the hearer, the hearer would accommodate extremely counterintuitive conditional presuppositions upon the utterance of the sentences in (3.34a) and (3.34b):

(3.34)   a. If Lida cares about her health, she will stop smoking.

          b. If Lida does not have talent for science, she will regret being enrolled in a Physics PhD program.

However, if the relevance-based approaches maintained that the key notion in order to determine what is accommodated by the hearer is contextual entailment, they could argue that, upon the utterance of the sentences above, the hearer will accommodate just the presupposition carried by the consequent, since there is no way that the antecedents of the sentences above, either by themselves or together with other contextual premises, could entail the presuppositions carried by their consequents[9].

Finally, Beaver argues that there are cases in which "X factive-verb $\varphi \rightarrow \pi$" does not presuppose relevance of φ to π. Beaver provides the following example in which it is inferred that there is no more hot water, contrary to what should be expected and contrary to what Geurts (1996) tries to demonstrate, i.e. that conditional presuppositions are never strengthened when they are embedded under factive expressions:

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[9]As was said in Chapter 1, section 1.1, the fact that the antecedent entails the presupposition carried by the consequent does not prevent the presupposition from projecting, unless the hearer infers that the entailment goes both ways. That is, what precludes the projection of the presupposition is that the presupposition entails the antecedent. I will elaborate this point in chapter 4.

(3.35) It is annoying that if Mary wants a bath, there is no more hot water

Following Beaver's line of reasoning, in the example above, the proposition that Mary wants a bath is not relevant to the proposition that there is no more hot water and that is why the latter proposition is inferred. However, the sentence *if Mary wants a bath, there is no more hot water* is a very particular case since, though it has the form of a conditional sentence, it does not express any condition at all. As Horn (2000) explains, Austin (1956) notices that this type of conditional entails its consequent and provides the following example: *There are biscuits on the sideboard if you want some*. So, if someone presupposes that *if Mary wants a bath, there is no more hot water*, s/he also presupposes that there is no more hot water since the latter presupposition does not depend on whether Mary wants a bath or not. The same applies to the sentence in (3.30a). So, both (3.30a) and (3.35) would carry the conditional presupposition as well as the unconditional one. Therefore, (3.35) does not represent a case of strengthening and thus, does not invalidate Geurts' (1996) objection.

3.2.4.2   'Collapsing' Conditional Presuppositions

Pérez Carballo's (2008) point of departure is also the so-called 'semantic presupposition' that If φ, then π which, according to the satisfaction theory, all conditional sentences of the form If φ, then ψ_π have. Pérez Carballo is concerned with proving that there are contexts that 'collapse' the conditional presupposition that If φ, then π in a non-trivial way. He states that a context C 'collapses' a conditional If φ, then π just in case C + (If φ, then π) $\vDash \pi$, where C + (If φ, then π) should be read as C updated with a sentence that presupposes that If φ, then π. However, for that to occur in a straightforward way, Pérez Carballo argues, it is necessary to abandon the material implication analysis of the conditional. In this regard, Pérez Carballo proposes to adopt instead the *Stalnaker conditional*, i.e. the interpretation of conditionals according to Stalnaker's (1968) theory of conditionals and its subsequent implementation (Stalnaker, 1975), though Pérez Carballo only refers to the latter. Thus, he argues, if a context 'collapses' the conditional presupposition, at the same time as the hearer 'accommodates' that If φ, then π, s/he infers that π. Pérez Carballo remarks that his approach differs from the proposals that support a distinction between the processes of presupposition and accommodation since, according to his hypothesis, the 'semantic presupposition' is also accommodated without blocking the inference that π.

Before going on with Pérez Carballo's explanation as to how a context may 'collapse' a conditional, I need to elaborate on Stalnaker's (1968) theory of condition-

als. As is well known, if we treat indicative conditionals as material implications, the falsity of the antecedent suffices to make the conditional true. On this view, Stalnaker argues, nothing would prevent someone who believes in the falsity of the antecedent from affirming that s/he also believes in the truth of the whole conditional, but then the conditional would be twisted out of its true meaning. For instance, Stalnaker goes on, according to the truth functional analysis, if someone is presented with the following sentence (from Stalnaker 1968) and asked whether s/he believes that the sentence is true, s/he would be compelled to say that the sentence is in fact true if s/he believed that the antecedent is false:

(3.36) If the Chinese enter the war, the United States will use nuclear weapons

However, someone who believes (or acts as if s/he believed) in the falsity of the antecedent of the sentence above would not utter or, in the case at hand, admit the whole conditional sentence. Likewise, someone who believes in the truth of the consequent of the sentence above, and does not have an opinion about the antecedent, would object to the whole sentence. In relation to the last point, Stalnaker (1968) maintains that someone who believes in the truth of the consequent would say that the conditional is true. In this regard, Stalnaker argues that the material implication treatment of the conditional fails not because it is unable to capture the 'connection' between the antecedent and the consequent - Stalnaker does not give much importance to this 'connection' - but because it does not capture the intuition that, when it comes to evaluating the truth or falsity of a conditional sentence, we evaluate the truth or falsity of the consequent under the assumption that the antecedent is true. However, both things are related to each other. That is, nothing would be gained from evaluating the truth or falsity of the consequent under the assumption that the antecedent is true, if the antecedent and the consequent were not, somehow, connected to each other.

Stalnaker (1975) states that the aim of his theory is to provide the truth conditions for the indicative conditional since, according to him, the material conditional and the indicative conditional "coincide only in their assertion and acceptance conditions, and not in their truth conditions" (1975: 148). *Acceptance* in Stalnaker (1975) is understood as contextual entailment.

Specifically, Stalnaker (1968, 1975) posits a *selection function*, f, that takes the antecedent, A, of a conditional sentence and the actual world, α, as its arguments and yields a possible world, β, as its value in which A is true. It is in β where the consequent, B, is evaluated; if B is true in β, then the conditional sentence is true in the actual world; by contrast, if B is false in β, the conditional sentence is false in the actual world:

(3.37) **The *Stalnaker* conditional (Stalnaker 1968: 102-103)**

> Consider a possible world in which A is true, and which otherwise differs minimally from the actual world. "If A then B" is true (false) just in case B is true (false) in that possible world.
>
> A > B is true in α if B is true in f(A, α);
>
> A > B is false in α if B is false in f(A, α);
>
> The symbol '>' represents Stalnaker's conditional connective.

Though Stalnaker (1968) was intended to deal primarily with counterfactuals, his account may be extendable to conditional sentences in general, as he himself remarks. In indicative conditionals, the possible world β in which the antecedent is true is one of the worlds of the context set. By contrast, in counterfactual statements (and some subjunctive non-counterfactual conditionals), the possible world β in which the antecedent is true is outside the context set. Stalnaker reasons as follows: a proposition may be compatible with the context (but not entailed by it) or entailed by the context. In the first case, the proposition is true in just some of the worlds of the context. In the second case, the proposition is true in all the worlds of the context and thus, "presupposed, or accepted, in the context" (1975: 142). The antecedent of an indicative conditional should be compatible with (but not entailed by) the context set, in the sense that everything that is presupposed in the actual situation (in which we do not know whether the antecedent is true or false) should be also presupposed in the hypothetical situation in which the antecedent is true. Stalnaker (1975) refers to the latter restriction as *the pragmatic constraint on selection functions*[10].

Turning back to Pérez Carballo, it was mentioned above that, following his line of reasoning, a context C 'collapses' a conditional If φ, then π just in case C + (If φ, then π) ⊨ π. He argues that, if we adopt the material implication semantics of the conditional, we may find contexts that 'collapse' conditionals but, for that, it would be necessary to make the assumption that there is no world in the context where φ is false and π is false. Then, for every world w where ($\varphi \rightarrow \pi$) were true,

---

[10]However, in many cases, simple past subjunctive conditionals are used in a non-counterfactual way, unlike what happens with past perfect subjunctive conditionals which, in most cases (not always), are used in a counterfactual way. I am not referring to cases in which the whole conditional is used in order to show that the antecedent is true such as *If John had polio, he would show the symptoms he's showing now*, but to much more run-of-the-mill cases such as *If John came tomorrow, we would go to the beach*. It is a moot point whether, in these cases, the world β in which the antecedent is true should be a world of the context set or not. In principle, if we recast the sentence in the indicative mood, it still makes sense: *If John comes tomorrow, we will go to the beach*. However, the question arises as to why the subjunctive mood is used. Stalnaker (1975) does not address these cases (cf. K&P).

π would also be true in w. By contrast, if we adopt the Stalnaker conditional (φ > π), we may find contexts that 'collapse' conditionals without having to stipulate that in no world of the context φ is false and π is false. However, in order for a context to 'collapse' a conditional, there must be no connection between the antecedent and the consequent of the conditional 'semantic presupposition' (if φ, then π), which the satisfaction theory predicts for sentences of the form if φ, then ψ_π. His argument goes as follows: for every world w in the context where π is false, there is a world w' in the context where φ is true but π is still false for, as π is totally unrelated to φ, the truth or falsity of φ does not have any bearing on the truth value of π. So, for every world w in the context where π is false, φ > π is also false in w. Therefore, for every world w in the context where φ > π is true, π is also true in w and thus, the context 'collapses' the conditional 'semantic presupposition' if φ, then π.

Pérez Carballo provides the example in (3.38a) below which, according to him (inter alia), presupposes (3.38b). Applying his line of reasoning, we get that for every world w where it is false that Paul has a Bible, there is a world w' where it is true that Paul is not tired but where it is false that Paul has a Bible. This is as it should be, Pérez Carballo argues, for under normal circumstances Paul's tiredness (or lack of) does not have any bearing on Paul's not having a Bible; thus, (3.38b) would be false in w. But then, this means that in every world w where (3.38b) is true, it is also true that Paul has a Bible. So the conditional presupposition in (3.38b) is 'collapsed':

(3.38)   a. If Paul is not tired, he will read his Bible tonight

         b. If Paul is not tired, he has a Bible

However, note that in cases where the presupposition carried by the consequent (π) asymmetrically entails the antecedent (φ) and thus, in order for the sentence to be felicitous, π does not project but is conditionalized to φ, Pérez Carballo's analysis fails. Let us take the examples in (3.39a)(=(1.22a)) and (3.39c), which carry the conditional presuppositions in (3.39b) and (3.39d), respectively:

(3.39)   a. If Chris is in Copenhagen, Lenny will discover that he's staying at a hotel near the Tivoli Gardens.

         b. ⤳ If Chris is in Copenhagen, he's staying at a hotel near the Tivoli Gardens.

         c. If Jade is married, she will regret having cheated on her husband.

         d. ⤳ If Jade is married, she has cheated on her husband.

According to Pérez Carballo, all we need to do in order to collapse a conditional presupposition is to find a world w where the consequent of the conditional presupposition is false but the antecedent is still true. Surely, it is easy to find a world where it is false that Chris is staying at a hotel near the Tivoli Gardens but, nevertheless, Chris is in Copenhagen. Likewise, it is easy to find a world where Jade is married but it is false she has cheated on her husband. So both (3.39b) and (3.39d) should be 'collapsed'. However, upon the utterance of (3.39a) and (3.39c), the hearer does not accommodate that Chris is staying at a hotel near the Tivoli Gardens or that Jade has cheated on her husband. What the sentences above presuppose and thus, what the hearer accommodates is the conditional presuppositions in (3.39b) and (3.39d).

Another problem for this analysis is posed by conditional sentences in which the antecedent makes the presupposition carried by the consequent improbable and thus, the antecedent is relevant to this presupposition. Let us take the examples in (3.28a) and (3.28b) from section 3.2.4, repeated below:

(3.40)   a. If Lida cares about her health, she will stop smoking.

           b. If Lida does not have talent for science, she will regret being enrolled in a Physics PhD program.

Surely, it is easy to find a world where Lida does not smoke (i.e. the presupposition carried by the consequent of (3.40a) is false) and Lida cares about her health (i.e. the antecedent of (3.40a) is true). In that world, the resulting conditional *If Lida cares about her health, she does not smoke* is intuitively true. However, according to Stalnaker, the world in which the consequent is evaluated is exactly like the world where the whole conditional is evaluated with the exception that, in the world where the consequent is evaluated, the antecedent is true. So, if the consequent is false in w, the whole conditional *If Lida cares about her health, she does not smoke* is also false in w. This would allow Pérez Carballo to 'collapse' the conditional 'semantic' presupposition *If Lida cares about her health, she smokes* so that its consequent (*Lida smokes*) is accommodated by the hearer. However, even though the result is correct, it is arrived at in the wrong way. That is, the application of Pérez Carballo's analysis to the type of example in (3.40a) (the same can be said of (3.40b)) reveals one of its weaknesses: Pérez Carballo appeals to Stalnaker's (1968, 1975) theory of conditionals in order to find a solution for the counterintuitive conditional presuppositions; however, Stalnaker's theory was not conceived to deal with indicative conditionals in which the truth value of the consequent is already known in the actual world, as happens with the consequent of the conditional 'semantic' presuppositions, but rather to deal

with conditional sentences in cases where the truth value of the consequent (and, generally, also the truth value of the antecedent) is unknown in the actual world.

Furthermore, there is a more fundamental flaw in Pérez Carballo's argument. Pérez Carballo argues that sentences of the form if φ, then ψ_π have semantic conditional presuppositions of the form if φ, then π. But then, if φ, then π should be entailed by the context and thus, there would be no worlds in the context where if φ, then π is false. However, in order for his analysis to work, Pérez Carballo needs to make the assumption that there are worlds in the context where π is false and thus, where if φ, then π is also false.

3.2.4.3 Potential and Actual 'Accommodations'

Singh (2008, 2009) tries to solve the proviso problem through a procedure that computes the set of 'scalar alternatives' to a proposition. From this set, two other sets are generated: the set of potential implicatures and the set of potential 'accommodations', whose members may cancel each other out.

Following Geurts (1999), Singh argues that the proviso problem is not restricted to compound sentences but it also affects belief attributions. Singh tries to give a unified account of the phenomenon in both contexts.

We have already seen that, in compound sentences that carry a presupposition in the second clause (φ and ψ_π, if φ, then ψ_π, either φ or ψ_π), the proviso problem refers to the contrast between the conditional 'semantic presupposition' $((\neg)\varphi \rightarrow \pi)$ and the intuitively inferred unconditional presupposition (π). In beliefs attributions $(B_S\psi_\pi)$[11] the proviso problem refers to the contrast between the theoretical presupposition ($B_S\pi$) and the intuitively inferred presupposition which, according to Singh, is (π & $B_S\pi$). In regard to the latter, Geurts (1999) maintains that the presupposition is just π and that $B_S\psi_\pi$ is an additional inference. Geurts argues that, when a person's beliefs are the subject of a conversation, there is a tendency to ascribe the beliefs of the interlocutors to the subject of the conversation; therefore, it is more plausible that the inference that $B_S\psi_\pi$ arises as a result of ascribing the presupposition (of the speaker) that π to the subject of the conversation than the other way round. By contrast, Heim (1992) maintains that the speaker arrives at the inference that π because s/he takes it as uncontroversial and unsurprising that $B_S\psi_\pi$.

Singh provides the example in (3.41a) (from Karttunen, 1973) in which, according to Singh, the 'semantic presupposition' in (3.41b) is 'projected' but, in addition,

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[11]$B_S\psi_\pi$ stands for *the speaker believes that ψ_π*.

the proposition in (3.41d) is inferred[12]. From the perspective of the satisfaction theory, the latter is unexpected since the presuppositions triggered by expressions embedded under *believe* (and other verbs of propositional attitude) should not escape from the *belief*-context. Recall that, according to the satisfaction theory, presuppositions must be locally satisfied. Singh emphasizes the fact that, if the proposition in (3.41b) is embedded under a factive verb such as *know*, as in (3.41c), the inference that it was raining, in (3.41d), does not arise, as Geurts (1999) had already remarked, but the presupposition that John believes it was raining is 'projected'. That is to say, whenever the purported 'presupposition' is made explicit, it is not 'strengthened' and this is not exclusive of compound sentences, but also takes place in attitudinal contexts:

(3.41)   a. John believes it has stopped raining

          b. John believes it was raining

          c. Mary knows that John believes it was raining

          d. It was raining

As was explained in section 3.2.4, if we take the compound sentence in (3.31a), repeated below as (3.42a), the unconditional presupposition (in (3.42d)), which is inferred by the hearer upon the utterance of (3.42a), does not obtain when the conditional 'presupposition' predicted by the satisfaction theory (in (3.42b)) is embedded under *know*, as in (3.42c):

(3.42)   a. If Jade flies to Amsterdam, her boyfriend will pick her up at the airport.

          b. If Jade flies to Amsterdam, she has a boyfriend.

          c. Chris knows that, if Jade flies to Amsterdam, she has a boyfriend.

          d. Jade has a boyfriend.

All the above seems to indicate that the 'inferences' accommodated by the hearer in (3.41d) and (3.42d) are not derived from (3.41b) and (3.42b) in any way but that they are, in fact, the presuppositions carried by the sentences in (3.41a) and (3.42a). As we have seen in the preceding sections, the defenders of the predictions made by the satisfaction theory met Geurts' objection with different arguments that attempt to explain how (3.42d) might be derived from (3.42b), but

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[12]Zeevat (1992) argues that both (3.41b) and (3.41d) are presuppositions of the sentence in (3.41a) in the main text.

none of these arguments would serve to explain how (3.41d) might be derived from (3.41b). Singh is aware of this problem and thus, proposes an algorithm that allows him to obtain the 'inference' that the hearer 'accommodates' from the 'semantic presupposition' that 'projects', regardless of whether we are dealing with conditional sentences of the form $\varphi \rightarrow \psi_\pi$ or with attitudinal reports of the form $B_S \psi_\pi$.

For Singh, the solution to the proviso problem lies in the development of an accurate theory of accommodation; that is to say, 'presupposition projection' is a semantic process which should not be confused with the process of accommodation. In Singh's words: "Why, when we hear two sentences that project the same presupposition, do we accommodate such different kinds of information in response to them?" (Singh 2009:2). Singh maintains that it is 'the grammar' that provides an 'accommodation module' and thus, he comes up with an algorithm that takes as input the set of what he takes to be 'potential accommodations', i.e. the presuppositions carried by what he considers the alternatives to the sentence, and yields the actual accommodated presuppositions. The idea, grounded in Gazdar (1979) and Heim (2006), is that scalar implicatures and ignorance inferences (i.e. Gazdar's (1979) clausal quantity implicatures) may override the potential presuppositions of a sentence. Singh computes the *scalar alternatives* to the proposition denoted by a sentence and, from the resulting set, he derives both the set of *potential accommodations* and the set of *potential implicatures*, which do not always coincide with the scalar implicatures in the classical sense of the term. As, according to Singh, the set of scalar alternatives is provided by 'the grammar'[13], and both the set of potential 'accommodations' and the set of potential implicatures are obtained from the former, it is 'the grammar' that eventually decides on what presuppositions are accommodated.

For simplification, I will just go into the details of Singh's algorithm when it is applied to conditional sentences of the form if φ, then $\rightarrow \psi_\pi$, in which φ does not entail π. Thus, the set of scalar alternatives *A(S)* would be as follows:

$A(S) = \{\varphi \rightarrow \psi_\pi, \varphi, \neg\varphi, \psi_\pi, \neg\psi_\pi\}$

The set of *potential implicatures* ($\mathcal{N}$) is obtained by negating all the propositions in *A(S)*:

$\mathcal{N} = \{\neg(\varphi \rightarrow \psi_p), \varphi, \neg\varphi, \psi_\pi, \neg\psi_\pi\}$

The set of *potential accommodations* ($\mathcal{H}$)[14] contains the 'projected' presupposi-

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[13]In order to obtain the set of scalar alternatives, Singh assumes Katzir's (2007) algorithm to derive the structural alternatives to a sentence.

[14]$\mathcal{H}$ stands for *hypothesis space for accommodation* (Singh, 2008).

tions (if any) of the sentences that denote the propositions in *A(S)*:

$$\mathcal{H} = \{\varphi \to \pi, \pi\}$$

The next step consists in calculating the *Maximal Consistent Inclusions*, i.e. the maximal subsets of $\mathcal{N} \cup \mathcal{H}$ whose members do not contradict the asserted content ($\varphi \to \psi_\pi$) or the predicted 'semantic presupposition' ($\varphi \to \pi$):

$$\{\varphi, \psi_\pi, \varphi \to \pi, \pi\}$$
$$\{\neg\varphi, \psi_\pi, \varphi \to \pi, \pi\}$$
$$\{\neg\varphi, \neg\psi_\pi, \varphi \to \pi, \pi\}$$

According to Singh's system, only the propositions that are in all the Maximal Consistent Inclusions become either the actual implicatures of the sentence (if they are in $\mathcal{N}$) or the actual 'accommodations' (if they are in $\mathcal{H}$). In the case at hand, the only propositions that can be found in all the Maximal Consistent Inclusions are $\varphi \to \pi$ and π. The interaction between $\mathcal{N}$ and $\mathcal{H}$ cannot be appreciated in conditional sentences; computing the Maximal Consistent Inclusions directly in $\mathcal{H}$ would have given the same result. However, the interaction between $\mathcal{N}$ and $\mathcal{H}$ is important in Singh's system when it comes to calculate the actual 'accommodations' in belief reports. Thus, we only have two *innocently includable propositions*. As both are members of $\mathcal{H}$, they are the actual 'accommodations'. This is, in principle, a bad result but Singh argues that, as π entails $\varphi \to \pi$, π is the only presupposition that is accommodated. However, if Singh's algorithm yielded the correct results, it would not have to fall back on the entailment of $\varphi \to \pi$ by π, but it would directly give π as the actual accommodation. As it stands, Singh's system does not bring any improvement over other attempts to solve the proviso problem in compound sentences.

Another problem with Singh's algorithm is that it is unable to obtain conditional presuppositions in cases where compound sentences genuinely carry conditional presuppositions since his system invariably produces both π and $\varphi \to \pi$ as the actual 'accommodations'. He argues that in those cases "we are not forced to accept the grammar's recommendation ... if upon checking world knowledge you see that there are propositions in $\mathcal{H}*$ [$\mathcal{H}*$ is the set of innocently includable propositions in $\mathcal{H}$] that would hold by virtue of deeply entrenched beliefs ... then there is a way to render the sentence felicitous without having to seriously update your beliefs. By assuming that the lawlike statements hold, no further accommodation would be necessary." (Singh 2008:161). By 'lawlike statements' Singh refers to statements such as *scuba divers have wetsuits* which, in a sentence such as that in (3.43a), lead us to accommodate the conditional presupposition in (3.43b) instead of the unconditional presupposition in (3.43c):

(3.43) a. If John is a scuba diver, he'll bring his wetsuit

      b. If John is a scuba diver, he has a wetsuit

      c. John has a wetsuit

However, in many cases, the hearer infers a conditional presupposition of the speaker without having any "deeply entreched belief", as the examples in (3.39a) and (3.39c), from section 3.2.4.2, repeated below, clearly demonstrate:

(3.44) a. If Chris is in Copenhagen, Lenny will discover that he's staying at a hotel near the Tivoli Gardens.

      b. $\rightsquigarrow$ If Chris is in Copenhagen, he's staying at a hotel near the Tivoli Gardens.

      c. If Jade is married, she will regret having cheated on her husband.

      d. $\rightsquigarrow$ If Jade is married, she has cheated on her husband.

To sum up, Singh's attempt to develop a 'system of grammatical inference' that deals with the phenomenon of accommodation entirely within the grammar, without reference to contextual information, fails. Obviously, if we consider that the consequent of a conditional sentence is a scalar alternative to the whole conditional sentence (which is dubious) and we obtain the set of potential 'accommodations' from the set of scalar alternatives, we will end up with the presupposition carried by the consequent as one of the potential 'accommodations' of the whole sentence. As, in conditionals of the form $\varphi \rightarrow \psi_\pi$, the potential implicatures in $\mathcal{N}$ cancel each other out, they cannot override any potential 'accommodation' in $\mathcal{H}$. Therefore, the potential 'accommodations' become actual 'accommodations'. Moreover, as the presupposition carried by the consequent (an actual 'accommodation') is the proposition denoted by the consequent of the conditional presupposition (another actual 'accommodation'), the former presupposition will entail the latter, coming up as the single actual 'accommodation' in a conditional sentence.

In regard to the set of scalar alternatives, Singh stipulates that the clauses of a conditional sentence and their negated counterparts are the scalar alternatives to the sentence. However, it is not clear why this should be so. The problem for Singh is that, if neither ψ_π nor $\neg\psi_\pi$ were in the set of scalar alternatives, π would not be in the set of potential 'accommodations' and, as a result, π would never arise as the presupposition that is accommodated.

3.2.4.4   Lassiter's (2011) Probabilistic Account

The most recent analysis that, to my knowledge, deals with the proviso problem is Lassiter's (2011) probabilistic account, which I will briefly review in this section.

Lassiter (2011) makes use of the notion of *probabilistic independence* between the antecedent of a conditional sentence (φ) and the presupposition (π) carried by the consequent in order to determine what is accommodated by the hearer. Lassiter defines the notion of *probabilistic independence* as follows:

(3.45) **Lassiter's (2011: 73) probabilistic independence**

φ and ψ are probabilistically independent if and only if $s(\psi) = s_{\varphi}(\psi)$.

where $s(\psi)$ represents the probability of ψ, and $s_{\varphi}(\psi)$ represents the conditional probability of ψ given φ.

According to the satisfaction theory, conditional sentences of the form if φ, then ψ_{π} have the 'semantic' conditional presupposition if φ, then π. Lassiter argues that, if φ and π are probabilistically independent, the hearer accommodates just π. If that were all, Lassiter's analysis would not differ much from Beaver's (1999, 2006) relevance-based account, reviewed in section 3.2.4.1. However, Lassiter is aware that the notion of probabilistic independence all by itself would not provide an explanation for cases like (3.28a) and (3.28b) (from section 3.2.4), repeated below as (3.46a) and (3.46c) which, according to Lassiter (and, in general, to the satisfaction theory), have the conditional 'semantic' presuppositions in (3.46b) and (3.46d):

(3.46)   a. If Lida cares about her health, she will stop smoking.

      b. If Lida cares about her health, she smokes.

      c. If Lida does not have talent for science, she will regret being enrolled in a Physics PhD program.

      d. If Lida does not have talent for science, she is enrolled in a Physics PhD program.

In (3.46b) and (3.46d), the antecedent and the consequent are not probabilistically independent, since the probability of the consequent is much higher than the conditional probability of the consequent given the antecedent. That is, in (3.46b), the probability of Lida's smoking is much higher than the conditional probability of Lida's smoking given that Lida cares about her health. In the same way, in (3.46d),

the probability of Lida's being enrolled in a Physics PhD program is much higher than the conditional probability of Lida's being enrolled in a Physics PhD program given that Lida does not have talent for science. Notwithstanding the fact that the antecedent and the consequent are not probabilistically independent, the hearer accommodates just the consequent. So, Lassiter strengthens his analysis by adding the proviso that, if $s(\pi) > s_\varphi(\pi)$, the hearer will accommodate just π. If, by contrast, $s_\varphi(\pi) > s(\pi)$, the hearer will accommodate the whole conditional presupposition if φ, then π. Thus, with respect to the sentences above, Lassiter's account correctly predicts that the hearer will accommodate just the consequent of (3.46b) and (3.46d). That is, Lassiter correctly predicts that, upon the utterance of the sentences in (3.46a) and (3.46c), the hearer accommodates the unconditional 'inferences' *Lida smokes* and *Lida is enrolled in a Physics PhD program*, respectively.

However, Lassiter's predictions about the information accommodated by the hearer are not accurate when it comes to sentences where the antecedent (φ) asymmetrically entails the presupposition (π) carried by the consequent. In Chapter 1, section 1.1, we saw that, when φ asymmetrically entails π, the sentence as a whole usually has two different interpretations; one of them is presuppositional, i.e. the sentence as a whole presupposes that π, and the other is non-presuppositional. We also saw that, in some of these cases, only the presuppositional interpretation is possible or, at least, the presuppositional interpretation is, by far, the preferred one. For instance, upon the utterance of the sentence in (3.47a) (from van der Sandt (1988, 1992)), the hearer accommodates the unconditional presupposition in (3.47c), regardless of the fact that the entailment gives rise to the trivially true conditional implication in (3.47b):

(3.47)   a. If John has grandchildren, his children must be happy.

        b. If John has grandchildren, he has children.

        c. ⇝ John has children.

In (3.47b), the conditional probability of the consequent given the antecedent is 1. Thus, it is higher than the probability of the consequent by itself, i.e. $s_\varphi(\pi) > s(\pi)$. So, Lassiter's prediction would be that the hearer does not accommodate anything since the conditional implication in (3.47b) is trivially true. However, this result is contrary to the native speaker intuition that the preferred interpretation of (3.47a) (if not the only one) is that on which the hearer accommodates (3.47c).

3.3   The Binding and Accommodation Theory

3.3.1   Presuppositional DRT

The binding and accommodation theory of presupposition (van der Sandt (1992); van der Sandt and Geurts (1991); Geurts (1999)), implemented in DRT (Discourse Representation Theory, Kamp & Reyle (1993)) is a representational account, i.e. it provides the hearer's representations of both the asserted and the presuppositional content of the utterances of a discourse. Before explaining the main tenets of the binding theory, I need to explain some basic notions of DRT.

In DRT, the hearer's representations are construed as Discourse Representation Structures or DRSs. A DRS has two parts: a so-called 'universe' of discourse referents[15] and a set of conditions associated with these discourse referents. Discourse referents are variable-like entities which are mapped to objects in the domain of the model by so-called *embedding* functions. In the simplest cases, the set of conditions in a DRS is a set of predicates whose arguments are the discourse referents in the universe of the DRS. In more involved cases, the conditions of a DRS may consist of DRSs themselves. Let us see some examples. The sentence in (3.48a) is construed in DRT as the DRS in (3.48b). Each indefinite noun phrase introduces a new discourse referent. So, both indefinite noun phrases: *a woman* and *a book* introduce the discourse referents x and y. Thus, the DRS in (3.48b) has a universe with two discourse referents and three atomic conditions: woman(x), book(y) and bought(x,y). The square brackets ([ ]) in the linear notation substitute for the boxes used in classical DRT to represent DRSs:

(3.48)   a. A woman bought a book.

b. [x, y: woman(x), book(y), bought(x,y)]

The construction of a DRS for a sentence like that in (3.49a) is somewhat more complicated. Just like before, in (3.49b), both indefinite noun phrases introduce the discourse referents x and y. But the pronouns *she* and *it* also introduce discourse referents: u and v. In (3.49b), u and v are underlined in order to indicate that their reference is still unresolved. That is, u and v have been introduced by pronouns; therefore, they must find suitable and accessible antecedents in order to be interpretable. The universe of the main DRS in (3.49b) has no discourse referents and just one complex condition, namely [x, y: woman(x), book(y), buys(x,y)] ⇒ [u, v: reads(u,v)], which consists of two embedded DRSs. The DRS on the left

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[15]The notion of *discourse referent* dates back to Karttunen (1969).

of the arrow corresponds to the *if*-clause of the sentence in (3.49a) and the DRS on the right of the arrow to the consequent:

(3.49)   a. If a woman buys a book, she reads it.

        b. [: [x, y: woman(x), book(y), buys(x,y)] $\Rightarrow$ [u̲, v̲: reads(u,v)]]

Both pronouns in the consequent of (3.49a) find suitable and accessible antecedents in the DRS corresponding to the *if*-clause of the sentence. The antecedents are suitable because their descriptions match the specifications of gender and number provided by the two pronouns. They are also accessible because they sit in the DRS of the *if*-clause, which is an accessible site for discourse referents in the DRS corresponding to the consequent. So, as we can see in (3.50a), x is equated with u and y is equated with v. Once the two pronouns are bound by their antecedents, they are interpretable. The resulting DRS is that in (3.50b):

(3.50)   a. [: [x, y, u, v: x = u, y = v, woman(x), book(y), buys(x,y)] $\Rightarrow$ [: reads(u,v)]]

        b. [: [x, y: woman(x), book(y), buys(x,y)] $\Rightarrow$ [: reads(x,y)]]

Before continuing, I will briefly comment on accessibility relations. A DRS K is said to be accessible to another DRS K' just in case the discourse referents of K' have access to the discourse referents of K. If a DRS K contains another DRS ¬K' as one of its conditions, K is accessible to K'. If K contains a DRS K' $\Rightarrow$ K" as one of its conditions, K is accessible to both K' and K", and K' is accessible to K". If K contains a DRS K' $\vee$ K" as one of its conditions, K is accessible to both K' and K". Finally, if K contains a DRS K' $\langle\forall x\rangle$ K" as one of its conditions, K is accessible to both K' and K", and K' is accessible to K". The accessibility relations between DRSs are semantically motivated.

Turning back to the binding theory of presupposition, one of its most prominent features is the parallel it draws between presupposition and anaphora. Such parallelism may seem surprising at first blush. Though it is true that all anaphors are presuppositional since all anaphors presuppose the existence of an antecedent to which they refer, and it is also true that anaphors are often used to refer to individuals whose existence is presupposed or to propositions which are presupposed, presuppositions (in the sense the term is usually understood) are not anaphors but previous assumptions in themselves. Furthermore, so-called presuppositional triggers are not anaphoric either. Their presence serves to indicate that a certain proposition is possibly entailed by the context, but they do not denote the proposition in question. In this connection, van der Sandt (p.c.) argues

that what he claims to be anaphoric is the induced presuppositional material, i.e. the so-called 'elementary' (van der Sandt 1988) or 'potential' (Gazdar 1979) presuppositions of a sentence, before they are resolved (bound or accommodated). Thus, the claim is not that the actual presuppositions of a sentence are anaphors. According to the binding theory, this induced presuppositional material creates a so-called 'anaphoric structure'. An anaphoric structure is a Discourse Representation Structure or DRS which has the particularity that it contains a variable which has to be bound. Anaphoric structures are usually referred to as 'presuppositional anaphors' or just 'presuppositions'. Thus, the main tenet of the binding theory is that presuppositions look for suitable antecedents in accessible positions in order to be bound and, in cases where they cannot find suitable and accessible antecedents, presuppositions are accommodated, where a crucial part of the process of accommodation is the establishment of suitable discourse referents in accessible sites. According to this theory, presuppositions can be accommodated due to their rich descriptive content, unlike what happens with ordinary anaphors, which virtually lack descriptive content.

The way in which presuppositions are bound is not very different from the way pronouns are. For binding to occur, two conditions must be met: (i) There is a preexisting discourse referent which is associated with a set of conditions that, at least partially, match the conditions with which the discourse referent introduced by the presupposition is associated; that is, there is a suitable antecedent. (ii) The preexisting discourse referent is in an accessible DRS; that is, there is an accessible antecedent. If these two conditions are met, the two discourse referents are equated and the presupposition is said to be bound. By contrast, when there is no such preexisting discourse referent, there is no equation and thus, the presupposition has to be accommodated. As far as binding is concerned, the main difference between pronouns and presuppositions is that, in the case of discourse referents introduced by pronouns, there are no associated conditions and thus, the potential antecedents only have to match the specifications of gender, number, person (in some languages, the potential antecedents must also meet semantic sortal conditions and/or honorific/politeness conditions) whereas, in the case of discourse referents introduced by presuppositions, there is a set of conditions associated with these discourse referents since presuppositions have descriptive content.

In addition, according to this theory, binding is preferred to accommodation and global accommodation is preferred to local accommodation (all other things being equal). That is to say, presuppositions prefer to be bound rather than accommodated, so they look for the closest binder in the closest accessible DRS. However, if a binder is not found in the path towards the main DRS, then the presupposition is accommodated preferably at the top level (global accommodation); if this is not possible, at the next level down (e.g. in the case of conditionals, in-

termediate accommodation in the antecedent) and, if this is not possible, at the next level down (e.g. in the case of conditionals, local accommodation in the consequent). As to why global accommodation is preferred to local accommodation, van der Sandt (1992) claims that, other things being equal, "accommodation normally takes place with respect to the context established by the previous discourse" (1992: 345).

In the remaining of this section, I will first illustrate both binding and accommodation with some examples taken from Geurts (1996). Then, I will focus on van der Sandt's (1992) explanation for sentences where the antecedent asymmetrically entails the presupposition carried by the consequent which, as was said in Chapter 1, section 1.1, and in Chapter 3, section 3.1.2, usually give rise to two different interpretations with respect to what is presupposed. Finally, I will expose the problems that the theory, in its current implementation, runs into, which are related to the asymmetric entailment of the antecedent by the presupposition carried by the consequent and the resulting conditional presuppositions.

3.3.2 Binding

In the following examples (from Geurts 1996), the letters x and z represent discourse referents and the conditions associated with the discourse referents are explicitly stated (e.g. "x is Theo's wife", "z hates sonnets"):

(3.51)   a. If Theo has a wife, then Theo's wife hates sonnets.

   b. [: [x: x is Theo's wife] ⇒ [z: z is Theo's wife, z hates sonnets]]

   c. [: [x, z: x is Theo's wife, z is Theo's wife, z=x] ⇒ [: z hates sonnets]]

   d. [: [z: z is Theo's wife] ⇒ [: z hates sonnets]]

The example above illustrates how the presupposition triggered by the definite NP *Theo's wife* in the consequent of the conditional in (3.51a) (which is underlined in the corresponding DRS in (3.51b) to mark that it is not yet resolved) finds a suitable antecedent, i.e. the discourse referent x and its associated condition "x is Theo's wife", in the DRS corresponding to the *if*-clause. The antecedent is suitable because its description matches the description provided by the presuppositional trigger *Theo's wife*; that is, both discourse referents x and z are associated with the same condition "x/z is Theo's wife". The antecedent is also accessible since it is in the DRS corresponding to the *if*-clause of the conditional and, as was said before, in DRT, discourse referents that sit in the DRS corresponding to the *if*-clause are accessible to discourse referents that sit in the DRS corresponding to

the consequent. In (3.51c), both the discourse referent z as well as its associated condition, i.e. z is Theo's wife are transferred from the DRS corresponding to the consequent to the DRS corresponding to the *if*-clause of (3.51a). Once z and its associated condition are in the same DRS as x and its associated condition, x and z can be equated since their descriptions match each other. The presupposition is then bound, as we can see in (3.51d). As a result, the sentence as a whole does not carry the presupposition that Theo has a wife.

3.3.3   Accommodation

In the next example, it is not possible to find a suitable and accessible antecedent for the presupposition that Theo has a wife, so the presupposition has to be accommodated:

(3.52)   a. If Theo's wife hates sonnets, then his manager does so too

        b. [: [z: z is Theo's wife, z hates sonnets] ⇒ [: Theo's manager hates sonnets]]

        c. [z: z is Theo's wife, [: z hates sonnets] ⇒ [: Theo's manager hates sonnets]]

In the example in (3.52a), the presupposition triggered by the definite NP *Theo's wife* (underlined in (3.52b) to mark that it is not yet resolved) may be globally accommodated in the main DRS, giving rise to an interpretation that could be paraphrased as follows: *Theo has a wife and, if she hates sonnets, then his manager does so too*, or locally accommodated in the DRS corresponding to the *if*-clause of the conditional sentence in (3.52a) in which case the resulting interpretation might be paraphrased as follows: *If Theo has a wife and she hates sonnets, then his manager does so too*. Local accommodation is theoretically possible in this case; however, as was said above, other things being equal, global accommodation is the preferred option. Thus, as we can see in (3.52c), the discourse referent z as well as its associated condition, i.e. z is Theo's wife are transferred from the DRS corresponding to the *if*-clause of (3.52a) to the main DRS, i.e. the DRS that corresponds to the global context in which the sentence is uttered. As a result, the presupposition that Theo has a wife is globally accommodated and thus, the sentence as a whole carries this presupposition.

Finally, let us look at an example for which the satisfaction theory would predict a counterintuitive conditional presupposition, which the binding theory avoids resorting once again to global accommodation:

(3.53) a. If Theo hates sonnets, then his wife does so too

  b. [: [: Theo hates sonnets] ⇒ [z: <u>z is Theo's wife</u>, z hates sonnets]]

  c. [z: z is Theo's wife, [: Theo hates sonnets] ⇒ [: z hates sonnets]]

In the example in (3.53a), the presupposition triggered by the definite NP *Theo's wife* (underlined in (3.53b) to mark that it is not yet resolved) is globally accommodated in the main DRS, giving rise to the following interpretation: *Theo has a wife and if Theo hates sonnets, then his wife does so too*. Theoretically, the presupposition might also be locally accommodated in the DRS corresponding to the *if*-clause of the conditional sentence in (3.53a), giving rise to an interpretation that could be paraphrased as follows: *If Theo has a wife and he hates sonnets, then his wife does so too*, or locally accommodated in the DRS corresponding to the consequent of the conditional in which case the resulting interpretation might be paraphrased as follows: *If Theo hates sonnets, then he has a wife and she hates sonnets too*. Note that if, in this example, the presupposition were accommodated in the DRS corresponding to the consequent, we would run into the proviso problem since we would get the material implication that, if Theo hates sonnets, he has a wife. However, as global accommodation is the preferred option, the discourse referent z as well as its associated condition, i.e. z is Theo's wife are transferred from the DRS corresponding to the consequent of (3.53a) to the main DRS, as we can see in (3.53c). Since the presupposition that Theo has a wife is globally accommodated, the sentence as a whole carries this presupposition, exactly as what happened when it was the antecedent of the sentence that carried the presupposition.

3.3.4 Presuppositional and Non-Presuppositional Interpretations

In this section, I would like to focus on the way the binding theory accounts for conditional sentences in which the antecedent asymmetrically entails the presupposition carried by the consequent. As was noticed by van der Sandt (1988) and argued in Chapter 1 section 1.1, and in Chapter 3 section 3.1.2, the fact that the first clause asymmetrically entails the presupposition is not in itself a constraint that can prevent the presupposition from projecting. Therefore, these sentences do have a presuppositional interpretation, contrary to the satisfaction theory's prediction for them. However, it often happens that an additional non-presuppositional interpretation arises. For instance, the sentence in (1.14) (from van der Sandt 1988), discussed in Chapter 1, section 1.1 and repeated below in (3.54a), has an interpretation on which the presupposition that John's wife is dead projects, and

another interpretation on which it does not. The DRS corresponding to (3.54a) before the presupposition is resolved should be as in (3.54b). I will skip the intermediate DRS in which the pronouns *he* and *she* introduce discourse referents other than x and y to be subsequently equated to x and y. Also, I will assume that the presupposition triggered by the possessive noun phrase *his wife* has been already resolved:

(3.54)   a. If John murdered his wife, he will be glad that she is dead.

        b. [x, y: x is John, y is John's wife, [: x murdered y] ⇒ [: y is dead, x is glad that y is dead]]

Van der Sandt (1992) explains the ambiguity between the two interpretations on the grounds that both binding and global accommodation are possible. Focusing on (3.54a), van der Sandt would argue that, if binding occurs, the presupposition that John's wife is dead, triggered by the factive expression *be glad that* in the consequent of (3.54a), finds a suitable and accessible antecedent in the *if*-clause of (3.54a). Thus, the presupposition is bound and the sentence has a non-presuppositional interpretation. However, it is also possible that the presupposition that John's wife is dead is globally accommodated in the main DRS and, as a result, the sentence has a presuppositional interpretation.

However, according to the binding theory, binding takes precedence over accommodation, other things being equal. Van der Sandt justifies the fact that both binding and accommodation are available in cases of asymmetric entailment like (3.54a) above by arguing that not all other things are equal in these cases. That is, though the presupposition finds an antecedent, the antecedent's descriptive content (i.e. x murdered y in (3.54b)) only partially matches the presupposition's descriptive content (i.e. y is dead in (3.54b)), thus making it possible that the presupposition is globally accommodated instead of bound by its potential antecedent.

Nevertheless, there are cases of asymmetric entailment which are problematic for the binding theory. These are cases in which only one of the two theoretically possible interpretations arises. Let us recall the examples in (3.13a) and (3.14) (from Soames 1976 and Heim 1990), discussed in section 3.1.2, repeated below. The sentence in (3.55a) only allows for a presuppositional interpretation, i.e. the presupposition that there was a payment by Sam projects, whereas the sentence in (3.55b) only allows for a non-presuppositional interpretation, i.e. the presupposition that the king has a son does not project:

(3.55)   a. If Sam paid the bill promptly, his payment is in the mail now.

> b. If the king has a son over thirty, the king's son is bald.

However, according to van der Sandt (1992), both in (3.55a) and in (3.55b), the presupposition carried by the consequent finds an antecedent in the *if*-clause whose descriptive content partially matches the presupposition's descriptive content. Thus, we have a similar situation to that in (3.54a) above; that is, van der Sandt predicts that both binding and global accommodation should be available options in the sentences above, which would give rise to a non-presuppositional interpretation as well as to a presuppositional one. However, this result is contrary to the native speaker intuition, according to which (3.55a) is interpreted as presupposing that Sam paid the bill, whereas (3.55b) is interpreted as not presupposing that the king has a son (see the discussion in section 3.1.2).

3.3.5 Conditional Presuppositions

In this section, I will tackle the issue of genuine conditional presuppositions. As happens in the case of Gazdar (see Chapter 3, section 3.1.2), where the actual presuppositions of a sentence are always a subset of the set of potential presuppositions, in the binding theory, the actual presuppositions of a sentence are always a subset of the set of presuppositions induced in each part of the sentence. Thus, the binding theory leaves no room for conditional presuppositions either. Nevertheless, the theory is able to predict them (at least, in the simplest cases). To do so, the theory only has to resort to local accommodation in the consequent, thus abandoning the assumption that, *ceteris paribus*, intermediate accommodation (i.e. accommodation in the antecedent of a conditional sentence) is preferable to local accommodation in the consequent. As we will presently see, these are cases in which there is no theory-internal reason for choosing local accommodation over intermediate accommodation. However, intermediate accommodation does not capture the interpretation of the sentence intended by the speaker.

The clearest cases in which conditional presuppositions arise are cases where the presupposition carried by the consequent asymmetrically entails the antecedent. As was explained in Chapter 1, section 1.1, the speaker's (genuine or feigned) uncertainty about the truth value of the antecedent constrains the projection of the presupposition carried by the consequent, since the antecedent is entailed by the presupposition. Thus, the presupposition is conditionalized to the truth of the antecedent. Let us recall the examples in (3.39a) and (3.39c) (from section 3.2.4.2), repeated below in (3.56a) and (3.56b):

(3.56)   a. If Chris is in Copenhagen, Lenny will discover that he's staying at a
              hotel near the Tivoli Gardens.

          b. If Jade is married, she will regret having cheated on her husband.

The binding and accommodation theory would rule out binding in the examples
above since neither the presupposition that Chris is staying at a hotel near the
Tivoli Gardens nor the presupposition that Jade has cheated on her husband in the
consequents of (3.56a) and (3.56b), respectively, can find suitable antecedents in
their corresponding *if*-clauses. Global accommodation would also be ruled out,
though not for the reasons given above. Van der Sandt (1992) would argue that,
if the presuppositions in (3.56a) and (3.56b) were globally accommodated, the
resulting DRSs would be uninformative since there would be a subordinate DRS
(i.e. the DRS corresponding to the *if*-clause) which is entailed by a DRS which is
superordinate to it (i.e. the main DRS). This condition on "admissible resolutions"
(van der Sandt 1992: 367) is reinterpreted as *local informativity* by Beaver (2001).
So, the next best option, according to the binding theory, would be intermediate
accommodation in the DRS corresponding to the *if*-clause of the conditional sen-
tence. However, intermediate accommodation of the presupposition that Chris is
staying at a hotel near the Tivoli Gardens in (3.56a) (i.e. accommodation in the
if-clause of the sentence) would give rise to a structure such as that in (3.57b)
below. The structure in (3.57a) represents the sentence in (3.56a) before the pre-
supposition is accommodated (that is why the presupposition is underlined):

(3.57)   a. [x, y, z, u: x is Chris, y is Copenhagen, z is Lenny, u is a hotel near
              the Tivoli Gardens, [: x is in y] $\Rightarrow$ [: x is in u, z discovers that x is in u]]

          b. [x, y, z, u: x is Chris, y is Copenhagen, z is Lenny, u is a hotel near the
              Tivoli Gardens, [: x is in y, x is in u] $\Rightarrow$ [: z discovers that x is in u]]

The structure in (3.57b) can be paraphrased as in (3.58), (from the beginning of
Chapter 1, section 1), repeated below, where the presupposition in square brackets
has been accommodated in the *if*-clause of the conditional sentence:

(3.58) If (Chris is in Copenhagen and [he is staying at some cheap hotel near the
       Tivoli Gardens]), Lenny will discover this.

As was said in Chapter 1, section 1, the sentence in (3.58) is equivalent to the
sentence in (3.59):

(3.59) If Chris is in Copenhagen, then (if he is staying at some cheap hotel near
       the Tivoli Gardens, Lenny will discover this).

However, the sentence in (3.59) does not carry either the presupposition in the consequent of (3.56a) (i.e. *Chris is staying at a hotel near the Tivoli Gardens*) or the conditional presupposition *If Chris is in Copenhagen, he's staying at a hotel near the Tivoli Gardens* which is, intuitively, the presupposition carried by the sentence in (3.56a), considered as a whole. The same argument may be applied to the sentence in (3.56b) (and similar sentences).

I mentioned above that the binding theory disregards conditional presuppositions. This disregard is due to the fact that, in many cases, in order to infer a conditional presupposition, the hearer must be in possession of a relevant piece of world-knowledge (or, at least, must be able to retrieve a relevant piece of world knowledge from the sentence) to the effect that this piece of world knowledge, together with the antecedent, entails the presupposition carried by the consequent. Thus, Geurts (1996, p.c.) argues that so-called conditional presuppositions are, or follow from, pieces of world knowledge. However, note that the conditional presuppositions carried by the sentences in (3.56a) and (3.56b) do not follow from world knowledge. Though, in order to make sense of the sentence in (3.56a), the hearer needs to know that the Tivoli Gardens are in Copenhagen, the conditional presupposition that, if Chris is in Copenhagen, he is staying at a hotel near the Tivoli Gardens does not follow from the knowledge that the Tivoli Gardens are in Copenhagen. As for (3.56b), world knowledge does not play any role.

Furthermore, as was said in Chapter 1, section 1.1, the fact that the antecedent, either all by itself or together with one or more contextual premises, entails the presupposition carried by the consequent does not preclude the projection of the presupposition carried by the consequent (and the same may be said of conjunctive and disjunctive sentences). Recall the sentence in (1.21a) from Chapter 1, section 1.1, repeated below in (3.60a), in which the entailment of the presupposition in (3.60b) by the antecedent of (3.60a) does not prevent the presupposition in (3.60b) from projecting:

(3.60)   a. If Chris used to write for four different book publishers, he must
              have given up writing.
          b. ⤳ Chris used to write

In the example in (1.24a) from Chapter 1, section 1.1, repeated below in (3.61a), the world knowledge that, in order to live permanently in the States, one needs a green card, together with the antecedent of (3.61a), entails the presupposition that Jade will have to leave the States, carried by the consequent of (3.61a). But, in the same way as the entailment of the presupposition by the antecedent does not preclude the projection of the presupposition in (3.60a), the entailment of the

presupposition by the antecedent together with a piece of world knowledge should not prevent the projection of the presupposition in (3.61a). Therefore, the fact that in (3.61a) the presupposition carried by its consequent does not project but is conditionalized (as in (3.61b)) must be due to reasons other than the entailment of the presupposition by the antecedent together with the relevant piece of world knowldege:

(3.61)   a. If Jade does not have a green card, she will regret having to leave the States.

      b. ⤳ If Jade does not have a green card, she will have to leave the States.

If this entailment were responsible for the lack of projection in (3.61a), there would be no explanation as to why (3.61a) carries the unconditional presupposition in (3.62b) when it is followed by a continuation like that in (3.62a), since the entailment still holds when (3.61a) is followed by a continuation like that in (3.62a):

(3.62)   a. If Jade does not have a green card, she will regret having to leave the States. But, if she has committed a crime, she won't regret having to leave the States.

      b. ⤳ Jade has to leave the States.

The fact that (3.61a) in isolation carries the conditional presupposition in (3.61b), whereas (3.61a) followed by a continuation like that in (3.62a) carries the unconditional presupposition in (3.62b) indicates that the relevant piece of world knowledge is not what prevents the presupposition carried by the consequent of (3.61a) from projecting. That is, the relevant piece of world knowledge is not what gives rise to the conditional presupposition in (3.61b).

What the examples above demonstrate is that world knowledge and conditional presuppositions, though in many cases related to each other, are two separate phenomena. On the one hand, conditional presuppositions may arise without the intervention of any previous world knowledge, as happens in (3.56). On the other, crucial pieces of world knowledge by themselves do not preclude the projection of unconditional presuppositions, as can be seen in (3.62a).

3.3.6 Quantified Sentences

I will finish the section on the binding and accommodation theory by discussing some alleged counterexamples provided by Schlenker (2010a,b). Schlenker argues that the binding theory is unable to predict the presuppositions of quantified sentences whose nuclear scope consists of a conditional sentence without running into the proviso problem. According to Schlenker, this is due to the so-called 'trapping constraint' postulated by van der Sandt (1992). The trapping constraint says that "a presupposition that contains a bound variable cannot be accommodated outside the scope of its binder, as this would 'unbind' the variable", as Schlenker defines it (Schlenker 2010a: 4). However, we will see that that the binding theory can handle these cases without running either into the trapping constraint or the proviso problem.

The next two examples (from Schlenker) carry the presupposition that all my students are incompetent; however, Schlenker argues, the binding theory cannot predict this presupposition:

(3.63)   a. If I give an exam, each of my students will know that he is incompetent

        b. If I grade their homeworks, each of my students will know that he is incompetent

If we represent the sentence in (3.63a) in DRT, it should have the structure in (3.64a) before the presupposition (underlined in (3.64a)) is resolved, and the structure in (3.64b) after the presupposition is accommodated at the top level of the DRS corresponding to the nuclear scope of the quantifier. Quantified sentences in DRT introduce duplex conditions. In the case of the universal quantifier <Every z>, the DRS on the left of the angled brackets corresponds to the restrictor of the quantifier, whereas the DRS on the right of the angled brackets corresponds to its nuclear scope:

(3.64)   a. [x: x is the speaker, [z: z is a student] <Each z> [: [y: y is an exam, x gives y] ⇒ [: <u>z is incompetent</u>, z knows z is incompetent]]]

        b. [x: x is the speaker, [z: z is a student] <Each z> [: z is incompetent, [y: y is an exam, x gives y] ⇒ [: z knows z is incompetent]]]

Note that the sentence in (3.63a) is not a conditional sentence whose consequent is a universally quantified sentence, but rather a universally quantified sentence

whose nuclear scope consists of a conditional sentence. That is, the universal quantifier takes scope over the operator *if*. The consequent of the conditional sentence in the nuclear scope of the quantifier carries a presupposition (underlined in the representation in (3.64a)). As this presupposition cannot find a suitable antecedent in the *if*-clause, it is accommodated at the top level of the DRS corresponding to the nuclear scope of the quantifier, as we can see in (3.64b). Put another way, the nuclear scope of the quantifier consists of a conditional sentence whose consequent carries a presupposition which is 'globally' accommodated within the nuclear scope. It cannot be accommodated any higher because of the trapping constraint. But this is as it should be; the representation in (3.64b) provides an accurate interpretation of the sentence in (3.63a), which can be paraphrased as follows: *All my students are incompetent and, if I give an exam, they will know that they are incompetent*.

As for the sentence in (3.63b), if we represent it in DRT, it should have the structure in (3.65a) before the presupposition (underlined in (3.65a)) is resolved, and the structure in (3.65b) after the presupposition is accommodated at the top level of the DRS corresponding to the nuclear scope of the quantifier, just like in the preceding example:

(3.65)   a. [x: x is the speaker, [y: y is a student] <Each y> [: [z: z is a
               homework, x grades y's z] $\Rightarrow$ [: y is incompetent, y knows y is
               incompetent]]]

           b. [x: x is the speaker, [y: y is a student] <Each y> [: y is incompetent, [z:
               z is a homework, x grades y's z] $\Rightarrow$ [: y knows y is incompetent]]]

Once again, the representation in (3.65b) provides an accurate interpretation of the sentence in (3.63b) which, in this case, can be paraphrased as follows: *All my students are incompetent and, if I grade their homeworks, they will know that they are incompetent*. So, contrary to Schlenker's claim, we can see that the binding theory deals well with quantified sentences that carry presuppositions.

3.4   Chapter Summary

In this chaper, I have reviewed some the most relevant theories of presupposition in the literature. I started with the theories developed by Karttunen (1973) and Gazdar (1979), which represent two opposite views on the projection problem. I continued with a review of the satisfaction theory, in which Karttunen's (1974) analysis and its later implementation in Heim (1983) were discussed, as well as

the counterintuitive predictions derived from the requirement that presuppositions must be satisfied within their local contexts, and some of the most prominent analyses whose aim was to deal with these predictions (Beaver (1999, 2006), Pérez Carballo (2008), Singh (2008) and Lassiter (2011)). The chapter finished with a review of the binding and accommodation theory, developed by van der Sandt (1992), van der Sandt and Geurts (1991) and Geurts (1999) in which I outlined the mechanisms of binding and accommodation. I argued that the theory should reconsider the assumption that intermediate accommodation is preferable to local accommodation in order to deal well with sentences carrying genuine conditional presuppositions. I also showed that, contrary to what Schlenker (2010a, b) argues, the binding theory does not run into the proviso problem when dealing with quantified sentences whose nuclear scopes consist of conditional sentences.

As an overall conclusion, we can say that the fundamental problem that the satisfaction theory encounters is its counterintuitive predictions, which follow from the stipulation that presuppositions must be satisfied by their local contexts, and that the fundamental problem the binding theory encounters is its counterintuitive predictions in cases of sentences that carry conditional presuppositions, which also follow from a stipulation, namely the stipulation that presuppositions may be accommodated in intermediate positions, such as the antecedent of conditional sentences.

Chapter 4

Projection and Conditionalization

4.1   Introduction

In this chapter, I will present my own proposal, which is built on the idea that presuppositions project by default. However, sometimes projection must be pragmatically constrained in order to preserve the assumptions that the speaker is informative and that the speaker is consistent in his/her beliefs. As was seen in the overview of Chapter 1, these are cases in which the presupposition carried by the second clause entails the first clause (or the negation of the first clause, in disjunctive sentences) and thus, if the presupposition projected, which would mean that the speaker presupposes the crucial proposition, the speaker would be uninformative in asserting the first clause (in conjunctive sentences), or would show inconsistency in his/her beliefs by showing uncertainty about the truth value of the first clause or its negation (in conditional and disjunctive sentences).

In section 4.2, I will recall how the constraints on projection, i.e. speaker's assertion and speaker's uncertainty, operate. I will also elaborate on the conversational implicature associated with the antecedent of indicative conditionals, which is responsible for the speaker's uncertainty about the truth value of the antecedent. Thus, in cases where the presupposition carried by the consequent entails the antecedent, this conversational implicature is also responsible for the speaker's uncertainty about the truth value of the presupposition carried by the consequent. In section 4.2.1, I will focus on cases in which the sentence carries contradictory presuppositions. We will see that, in these cases, it is also the uncertainty about the truth value of the two contradictory presuppositions that constrains the projection of both of them, so that the sentence as a whole does not carry either of them. In section 4.3, I will tackle the issue of conditional presuppositions. I will

put particular emphasis on the fact that conditional presuppositions only arise in cases where the presupposition carried by the second clause should not project in order to preserve the appropriateness of the whole sentence and, therefore, conditional presuppositions, when they arise, are always inferred by the hearer, since they are not mere material implications. This is in opposition to the view defended by the satisfaction theory. On this view, the presuppositions carried by the second clause are systematically conditionalized. This is due to the requirement that presuppositions *must* be entailed by their local context, where the latter is understood as a condition on the local context, instead of being understood as a logical consequence that follows from the fact that the global context entails the presuppositions which are carried by a sentence as a whole. So, whereas the conditional presuppositions predicted by the satisfaction theory are, in most cases, material implications in which the antecedent is irrelevant to the consequent or, even worse than that, in which the antecedent makes the consequent improbable, the conditional presuppositions that my hypothesis predicts are genuinely conditional, to the effect that the consequent depends on the antecedent. Finally, in section 4.4, I will address the topic of *conditional perfection* (Geis and Zwicky, 1971), which is essential in order to understand why, in many cases, the presupposition carried by the second clause does not project, but is conditionalized, notwithstanding the fact that the presupposition does not entail the first clause (or its negation) in any obvious way; that is, the presupposition does not logically entail the first clause (or its negation), and it is not the case either that the presupposition, together with some lexical entailment or some basic piece of world knowledge, entails the first clause (or its negation).

In order to simplify the exposition, I will focus exclusively on complex sentences composed of two clauses, the second of which carries a presupposition, with the exception of some of the disjunctions dealt with in section 4.2.1.

4.2　Pragmatic Constraints on Projection

I will start by recalling the two constraints on projection we saw in (2.5) and (2.6) in Chapter 2, section 2.1:

(4.1) **Assertion constrains projection in order to preserve Informativeness**

Conjunctive sentences of the form φ and ψ_π, where π is the presupposition carried by ψ_π and $\pi \vDash \varphi$, should not presuppose that π for, if they did, the assertion of φ would be uninformative.

(4.2) **Uncertainty constrains projection in order to preserve Belief Consistency**

Conditional sentences of the form if φ, then ψ_π, where π is the presupposition carried by ψ_π and $\pi \vDash \varphi$, should not presuppose that π for, if they did, the speaker's uncertainty about the truth value of φ: $\neg\square_{Dox}\varphi$, where $\square_{Dox}$ expresses doxastic necessity, would be inconsistent with the speaker's presupposition that π: $\square_{Dox}\pi$.

Disjunctive sentences of the form either φ or ψ_π, where π is the presupposition carried by ψ_π and $\pi \vDash \neg\varphi$, should not presuppose that π for, if they did, the speaker's uncertainty about the truth value of $\neg\varphi$: $\neg\square_{Dox}\neg\varphi$, where $\square_{Dox}$ expresses doxastic necessity, would be inconsistent with the speaker's presupposition that π: $\square_{Dox}\pi$.

According to the hypothesis I defend in this thesis, if a presupposition does not project because it entails a sentence which has been previously asserted or whose truth value the speaker is uncertain about, the presupposition is conditionalized to the sentence it entails.

As was explained in Chapter 1, section 1.1, the relevant uncertainty inference in the case of disjunctions: $\neg\square_{Dox}\neg\varphi$, i.e. it is not the case that the speaker believes $\neg\varphi$, arises as a pragmatic constraint. That is, if φ is a clause of a disjunction, the context in which φ is uttered should be compatible with φ (Stalnaker 1975) (see Chapter 2, section 2.1.1). On the assumption that speakers believe (or act as if they believe) everything that is in the context, φ should be compatible with the speaker's beliefs: $\lozenge_{Dox}\varphi$, where $\lozenge_{Dox}$ expresses doxastic possibility. The latter is, in turn, equivalent to $\neg\square_{Dox}\neg\varphi$. Let us see an example. In (4.3a) below, it is compatible with the speaker's beliefs that Jade is not married. So, it is not the case that the speaker believes that Jade is married. But then, if the speaker is consistent in his/her beliefs (or, at least, wants to show consistency in his/her beliefs), s/he cannot presuppose that Jade has cheated on her husband (in (4.3b)). The truth of the latter necessitates the truth of Jade's being married. Note that I say 'necessitates'; that is, Jade's being married is not just a sufficient condition but also a necessary one for the truth of her cheating on her husband in the resulting conditional presupposition in (4.3c). In this particular example, this is obvious; however, it is not so obvious in all cases, as we will see later on in this section. Furthermore, if the negation of the first disjunct of (4.3a) were just a sufficient condition for the presupposition carried by the second disjunct, but not a necessary one, the presupposition would not entail the negation of the first disjunct and thus, the presupposition should be able to project. This is what happens in cases of asymmetric entailment of the presupposition by the negation of the first disjunct

(see Chapter 1 section 1.1 and Chapter 3 sections 3.1.1 and 3.1.2):

(4.3) a. Either Jade is not married or she will regret having cheated on her husband.

  b. $\not\rightsquigarrow$ Jade has cheated on her husband.

  c. $\rightsquigarrow$ If Jade is married, she has cheated on her husband.

By contrast, the relevant uncertainty inference in the case of conditionals, i.e. $\neg\Box_{Dox}\varphi$, arises as a conversational implicature. Specifically, it arises as a scalar implicature (Horn 1972). Scalar implicatures are a particular type of quantity implicatures, which arise on the basis of so-called 'Horn scales'. Horn scales are sequences of expressions ordered according to their logical strength, for example, $\langle\varphi, \text{possibly } \varphi\rangle$, to the effect that, if a speaker asserts a sentence that contains a weaker expression, his/her audience infers that s/he has not asserted a sentence that contains the relevant stronger expression because s/he is not in a position to do so. Thus, the speaker's audience infers that it is not the case that the speaker believes the proposition expressed by the sentence that contains the stronger expression. In the same way as happens with the clauses of a disjunction taken separately, the context in which the antecedent of an indicative conditional, φ, is uttered should be compatible with φ (Stalnaker 1975) (see Chapter 2, section 2.1.1). Once again, on the assumption that speakers believe (or act as if they believe) everything that is in the context, φ should be compatible with the speaker's beliefs: $\Diamond_{Dox}\varphi$, where $\Diamond_{Dox}$ expresses doxastic possibility. That is, a speaker who utters *if* φ ... makes the supposition that φ and thus, φ should be compatible with his/her beliefs. However, s/he does not assert that φ. $\Diamond_{Dox}\varphi$ and φ form a Horn scale: $\langle\varphi, \Diamond_{Dox}\varphi\rangle$. Thus, it seems natural for the hearer to infer that it is not the case that the speaker believes that φ: $\neg\Box_{Dox}\varphi$ which, in turn, is equivalent to $\Diamond_{Dox}\neg\varphi$, i.e. $\neg\varphi$ is compatible with the speaker's beliefs.

Let us see an example. In (4.4a) below, the speaker makes the supposition that Jade is married. Thus, it is compatible with the speaker's beliefs that Jade is married. However, the speaker does not assert that Jade is married and thus conversationally implicates that it is not the case that s/he believes that Jade is married, which amounts to conversationally implicating that it is compatible with his/her beliefs that Jade is not married. But then, if the speaker is consistent in his/her beliefs, s/he cannot presuppose that Jade has cheated on her husband (in (4.4b)). As in the case of (4.3) above, a conditional presupposition obtains (in (4.4c)):

(4.4) a. If Jade is married, she will regret having cheated on her husband.

  b. $\not\rightsquigarrow$ Jade has cheated on her husband.

    c. ⇝ If Jade is married, she has cheated on her husband.

As a matter of fact, the conversational implicature associated with the antecedent of indicative conditionals is cancelled when the conditional sentence is preceded by the assertion of its antecedent. Thus, in the dialogue in (4.5), speaker B does not conversationally implicate that it is compatible with his/her beliefs that Jade is not married:

(4.5) Speaker A: Jade is married.
        Speaker B: If Jade is married, she will regret having cheated on her husband.

Gazdar (1979) argues that clausal implicatures are also associated with the clauses of conjuntions of the form possibly φ and possibly ψ_π. Thus, if π entails φ, π should not project in this type of conjunction either. In the example in (4.6a) below, the speaker conversationally implicates that it is not the case that s/he believes that Jade is married; therefore, it is compatible with the speaker's beliefs that Jade is not married. But then, the speaker cannot presuppose that Jade has cheated on her husband (in (4.6b)) and thus, this presupposition is conditionalized, as in (4.6c):

(4.6)   a. Possibly/perhaps/maybe Jade is married and possibly/perhaps/maybe she will regret having cheated on her husband.

        b. ⇸ Jade has cheated on her husband.

        c. ⇝ If Jade is married, she has cheated on her husband.

However, contrary to what happens to the conversational implicature associated with the antecedent of conditional sentences, the conversational implicature associated with operators such as *possible, perhaps, maybe*, etc. seems to be uncancellable[1]. Let us take the case of conjunctive sentences of the form φ and possibly φ. These sentences are pragmatically anomalous, as we can see in the example in (4.7):

(4.7) # Chris has arrived and possibly/ perhaps/ maybe Chris has arrived.

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[1]The idea that *possibly* φ generates the conversational quantity implicature that it is not the case that the speaker believes that φ is already in Karttunen (1972) and it is also defended by Horn (2000). That is, if a speaker says that *possibly* φ, this indicates that s/he is not in a position to make the stronger statement that φ.

If the speaker of (4.7) above were just uninformative (or underinformative) by uttering the second clause after having uttered the first one, the sentence in (4.7) above should have the same sort of infelicity as the sentence in (4.8) below:

(4.8) # Chris has arrived and Chris has arrived.

However, whereas the speaker of (4.8) is perceived as redundant, the speaker of (4.7) is perceived as incoherent. Nonetheless, $(\varphi \wedge \Diamond\varphi)$ is consistent, and so is $\mathsf{Bel}_S(\varphi \wedge \Diamond\varphi)$, where $\mathsf{Bel}_S\varphi$ stands for *the speaker believes that* φ. Therefore, the infelicity of (4.7) must be due to the fact that the speaker, by uttering the second conjunct of (4.7), conversationally implicates that it is compatible with his/her beliefs that Chris has not arrived (i.e. $\Diamond_{Dox}\neg\varphi$), which is inconsistent with his/her belief that Chris has arrived; that is, $\mathsf{Bel}_S(\varphi \wedge \Diamond_{Dox}\neg\varphi)$ is inconsistent (recall the discussion in Chapter 3, section 3.1.2). Still, the question remains as to why the assertion of φ is unable to cancel the conversational implicature that $\Diamond_{Dox}\neg\varphi$.

The main point of this section has been to argue that it is the fact that a presupposition entails a preceding sentence/clause, and not the other way round, that creates the type of context that precludes the projection of the presupposition. I have not been concerned with cases in which the first clause carries a presupposition since, in most of these cases, the presupposition projects. However, in the next section we will see that, in disjunctive sentences, this is not always the case.

4.2.1 Contradictory Presuppositions

In this section, I will discuss two types of disjunctive sentence in which either the first disjunct carries a presupposition that entails the negation of the second disjunct, or the two disjuncts carry presuppositions which entail the negation of each other. In neither case do the presuppositions project. We will see that, in these cases too, it is the constraint in (4.2) from section 4.2 that precludes projection.

Let us start with disjunctive sentences whose first clause carries a presupposition that entails the negation of the second clause and, as a result, the sentence as a whole does not carry the presupposition of its first clause:

(4.9) Either Chris has given up writing or he didn't use to write.

In (4.9) above, the constraint on projection is exactly the same as in disjunctive sentences in which the second disjunct carries a presupposition. Since it is compatible with the speaker's beliefs that Chris did not use to write, i.e. $\Diamond_{Dox}\varphi$, where

φ is the second disjunct, it is not the case that the speaker believes that Chris used to write, i.e. $\neg\square_{Dox}\neg\varphi$. The first disjunct carries the presupposition that Chris used to write; let us call this presupposition π. π and $\neg\varphi$ symmetrically entail each other. Thus, we have $\neg\square_{Dox}\pi$, i.e. it is not the case that the speaker believes that π. Therefore, the presupposition that π (i.e. Chris used to write) should not project in order to preserve the assumption that the speaker is consistent in his/her beliefs.

Let us turn now to sentences carrying contradictory presuppositions, in the sense that each presupposition entails the negation of the other. This type of sentence was first noted by Wilson (1975) and Hausser (1976) and discussed later in Gazdar (1979). Let us see an example. Suppose that the speaker of (4.10a), which may also be expressed as in (4.10b), knows that the chief of state of a certain country attended a certain conference. As the speaker is not familiar with the country in question, s/he is not sure whether the chief of state is a president or a king. In spite of the presence of the two definite descriptions (i.e. *the president* and *the king*), the sentence does not carry either the presupposition in (4.10c) or that in (4.10d):

(4.10) a. Either the president or the king attended the conference.

  b. Either the president attended the conference or the king attended the conference.

  c. ↛ There is a president.

  d. ↛ There is a king.

Note that the speaker is not uncertain about the fact that the chief of state attended the conference, but rather about whether the chief of state was a president or a king. What seems to be happening in this type of disjunction with contradictory presuppositions, each of which is carried by a different clause, is that disjunction operates not on the clauses but on the presuppositions carried by the clauses, to the effect that the characteristic inferences of uncertainty, which in disjunctions without contradictory presuppositions are associated with the truth value of the clauses, are associated here with the truth value of the potential presuppositions of the sentence.

So, if we represent this type of disjunction as either φ_{χ} or ψ_{π}, where χ and π are the presuppositions carried by φ and ψ, respectively, and disjunction operates on the potential presuppositions, both χ and π should be compatible with the context. Thus, on the assumption that speakers believe (or act as if they believe) what they know is in the context, we would have $\lozenge_{Dox}\chi$ and $\lozenge_{Dox}\pi$.

These two inferences are equivalent to $\neg\square_{Dox}\neg\chi$ and $\neg\square_{Dox}\neg\pi$. Since χ and π entail the negation of each other, the latter inferences are equivalent to $\neg\square_{Dox}\pi$

and $\neg\Box_{Dox}\chi$, i.e. it is not the case that the speaker believes that π, and it is not the case that the speaker believes that χ, respectively. However, if χ and π were presupposed, they would be true in all the worlds of the context set and thus, on the assumption that speakers believe (or act as if they believe) what they know is in the context, we would have $\Box_{Dox}\chi$ and $\Box_{Dox}\pi$. But this is in contradiction with the uncertainty inferences that $\neg\Box_{Dox}\chi$ and $\neg\Box_{Dox}\pi$. Therefore, neither χ nor π can project.

Gazdar (1979) argues that the cancellation approach provides an explanation for these cases, since the contradictory potential presuppositions cancel each other out. However, this explanation is not satisfactory since, in order to ensure that the contradictory presuppositions cancel each other out, it is crucial to make them contextually (and thus, doxastically) possible but not necessary. Otherwise, the question would remain as to what could prevent one of the presuppositions from projecting, whereas the other is cancelled.

Continuing with my hypothesis, if a presupposition does not project because it entails a sentence whose truth value the speaker is uncertain about, the presupposition is conditionalized to the sentence it entails. Thus, in cases of contradictory presuppositions too, the two potential presuppositions χ and π are conditionalized to the sentences they entail and whose truth values the speaker is uncertain about, namely $\neg\pi$ and $\neg\chi$. As the resulting conditional presuppositions: if $\neg\pi$, then χ and if $\neg\chi$, then π are trivially true, since $\neg\pi$ and χ, and $\neg\chi$ and π symmetrically entail each other, the sentence as a whole is not perceived as carrying either of them. In the example in (4.10a), these conditional presuppositions would be as in (4.11a) and (4.11b) below. As they are trivial, the sentence in (4.10a) is not perceived as having them:

(4.11)   a. $\rightsquigarrow$ If there is not a king, there is a president.

         b. $\rightsquigarrow$ If there is not a president, there is a king.

So, in the same way as uncertainty constrains projection in conditional sentences that carry a presupposition in the consequent and this presupposition entails the antecedent, and in disjunctive sentences that carry a presupposition in the second disjunct and this presupposition entails the negation of the first disjunct (or the other way round in 'bathroom sentences'), uncertainty constrains projection in disjunctive sentences with contradictory presuppositions that mutually entail the negation of each other.

4.3 Conditional Presuppositions

In this section, I will give a full account of the phenomenon of conditionalization of presuppositions in complex sentences in cases in which projection is pragmatically constrained.

In the literature, Karttunen (1973) is the first author who, to my knowledge, provides several examples of sentences that, according to the hypothesis I defended in Chapter 1, section 1.1, carry conditional presuppositions. Let us recall the compound sentences in (3.8) (from Karttunen (1973)) that we saw in Chapter 3, section 3.1.1, repeated below:

(4.12)   a. Geraldine is a Mormon and she has given up wearing her holy underwear.

      b. If Geraldine is a Mormon, she has given up wearing her holy underwear.

      c. Either Geraldine isn't a Mormon or she has given up wearing her holy underwear.

      d. Geraldine has worn holy underwear.

      e. Mormons wear holy underwear.

Nevertheless, Karttunen does not consider the possibility that the compound sentences in (4.12) may have conditional presuppositions. As was explained in Chapter 3, section 3.1.1, he argues that, depending on whether the generalization in (4.12e) is taken to be a fact or not, the compound sentences above will not have the presupposition in (4.12d) or they will. That is, if (4.12e) is considered to be a fact, then (4.12e) together with the first clause (or the negation of the first clause in the disjunction) of the compound sentences in (4.12) will entail the presupposition in (4.12d) and thus, the compound sentences as a whole will not have this presupposition.

Karttunen (1973) also provides the examples in (4.13), which, he explains, were pointed out to him by George Lakoff. Karttunen also says that the first example of this kind was attributed to James McCawley. Following Beaver (2001), I will call these sentences *McCawley* sentences:

(4.13)   a. If Nixon appoints J. Edgar Hoover to the Cabinet, he will regret having appointing a homosexual.

      b. Nixon will appoint J. Edgar Hoover to the Cabinet and he will regret having appointing a homosexual.

    c. Either Nixon does not appoint J. Edgar Hoover to the Cabinet or he will regret having appointing a homosexual.

    d. Nixon will have appointed a homosexual.

    e. J. Edgar Hoover is a homosexual.

Once again, Karttunen does not consider the possibility that the sentences above may have conditional presuppositions. According to Karttunen, depending on whether (4.13e) is regarded as a fact or not, the compound sentences in (4.13) above will not 'inherit' the presupposition in (4.13d) or they will. That is, if (4.13e) is considered to be a fact, (4.13e) together with the first clause (or the negation of the first clause) of the compound sentences in (4.13) will entail the presupposition in (4.13d), so that the compound sentences as a whole will not have this presupposition.

Unlike Karttunen, I maintain that the compound sentences in (4.12) and (4.13) have the conditional presuppositions in (4.14a) and (4.14b). Beaver (2001) also argues that the sentences in (4.12) and (4.13) have conditional presuppositions. However, as we will shortly see, my hypothesis differs from Beaver's account:

(4.14)   a. If Geraldine is a Mormon, she has worn holy underwear.

       b. If Nixon appoints J. Edgar Hoover to the Cabinet, he will have appointed a homosexual.

The conditional presuppositions in (4.14a) and (4.14b) above are not trivial, and this is because the relevant contextual premise which is required so that the antecedent, together with this contextual premise, may entail the consequent (which is the presupposition carried by the consequent of the conditional sentence) is not trivial. That is, neither the fact in (4.12e) nor the fact in (4.13e) is trivial. Furthermore, it often happens that the hearer is not aware of these additional contextual premises and, nevertheless, is able to infer them and thus, to infer the relevant conditional presuppositions. However, as was discussed in Chapter 3, section 3.3.5, the fact that the first clause of the sentence (or its negation), together with a (non-trivial) contextual premise, entails the presupposition carried by the second clause is not sufficient to prevent the presupposition carried by the second clause (in the examples above, (4.12d) and (4.13d)) from projecting. As will be shortly explained, it is only in cases in which the hearer infers that the presupposition also entails the first clause (or its negation) that the presupposition is conditionalized.

With respect to the way in which someone who is not aware in advance of the relevant contextual premise is, nevertheless, able to infer it, I defend the idea

that basic encyclopedic knowledge of the world is usually enough for a hearer to infer the relevant generalization or contextual premise. That is, the hearer does not need to know the crucial premise but needs to be in possession of a certain world knowledge. For instance, in (4.12), the hearer does not need to know that Mormons wear holy underwear, but s/he has to know that religious people regard certain objects as holy in order to infer the generalization that Mormons wear holy underwear and thus, in order to infer the conditional presupposition (in (4.14a)), which follows from the generalization.

However, the case in (4.13) is different. Even though the hearer may be completely unaware of the fact (if this is a fact) that J. Edgar Hoover was a homosexual, the hearer can draw the information that the speaker believes or acts as if s/he believes this information though, in this case, there is no basic encyclopedic knowledge of the world that helps him/her draw this inference, unlike what happened in the case of the Mormons. I argue that, in these other cases (there are many similar examples in the literature), the inference is drawn as a way of preserving a one-to-one mapping between each component of the first clause of the compound sentence and each component of the presupposition carried by the second clause. The one-to-one mapping presumably maximizes sentence-internal coherence. However, I reiterate that the entailment of the presupposition by the first clause (or the negation of the first clause) all by itself or together with some contextual premise would not suffice to preclude the projection of the presupposition.

As for the crucial premise in (4.13e) (and similar premises in other *McCawley* sentences), Gazdar (1979) argues that the indefinite noun phrase in the presupposition (in the example, *a homosexual*) is anaphoric to the proper name in the antecedent (in the example, *J. Edgar Hoover*) and thus, the sentence does not carry the presupposition in (4.13d). Gazdar does not say anything about conditional presuppositions. However, since, according to Gazdar, the indefinite is anaphoric to the proper name, the conditional presupposition in (4.14b) would be trivial. Beaver (2001) objects to Gazdar's view on the grounds that, if the indefinite were anaphoric to the proper name, the sentence in (4.13a) might be paraphrased as follows: *If Nixon appoints J. Edgar Hoover to the Cabinet, he will regret having done so.* Beaver argues that the hearer first infers the conditional presupposition in (4.14b) and then s/he infers that, given (4.14b), it is most probable that (4.13e).

Unlike Gazdar, I defend that the link between *J. Edgar Hoover* and *a homosexual* is not anaphoric but just co-referential. By 'co-referential', I mean that *a homosexual* just happens to pick out the individual referred to by *J. Edgar Hoover*, even though on a formal analysis their referential indices would be different. Otherwise, as Beaver argues, the sentence might be paraphrased in a way which does

not correspond to the meaning intended by the speaker. However, contrary to what Beaver maintains, I defend that it is the inference of the link between the proper name in the antecedent and the indefinite noun phrase in the presupposition of the consequent that makes it possible for the hearer to infer the conditional presupposition, instead of the other way round. That is, Beaver argues that the hearer infers first that, if Nixon appoints J. Edgar Hoover to the Cabinet, he will have appointed a homosexual, and only then does s/he infer that the probability is high that J. Edgar Hoover is a homosexual, since this would make the implication true. By contrast, I argue that the hearer infers that the speaker believes (or acts as if s/he believes) that J. Edgar Hoover is a homosexual and that it follows from it that, if Nixon appoints J. Edgar Hoover to the Cabinet, he will have appointed a homosexual. Proof of it is that in the absence of conditionality, the hearer infers the same sort of link as that in (4.13e). For instance, it is most probable that, upon the utterance of (4.15a), the hearer will infer (4.15b):

(4.15)   a. On June 23rd that year, Jade met Chris. Never before had she met a spy.

         b. ⤳ Chris is a spy

Beaver (1999, 2001) is the first author who, to my knowledge, put forward a hypothesis as to why, after the utterance of compound sentences that carry a presupposition in the second clause, sometimes the hearer accommodates a conditional presupposition. Beaver follows Karttunen (1974) and Heim (1983b) and thus, according to him, presuppositions must be satisfied within their local contexts. Therefore, for Beaver, every compound sentence whose second clause carries a presupposition has a conditional 'semantic' presupposition which may be trivial or non-trivial. However, in most cases, the material implications predicted by the satisfaction theory are not accommodated as a whole by the hearer, but rather the hearer accommodates just the consequent. Therefore, an additional explanation is required in order to account for cases in which the hearer accommodates a whole conditional presupposition. As we saw in Chapter 3, section 3.2.4.1, Beaver argues that, in these cases, the antecedent of the conditional 'semantic' presupposition is relevant to the consequent and that is the reason why the whole conditional 'semantic' presupposition is accommodated. Other researchers, notably Lassiter (2011) (see Chapter 3, section 3.2.4.4), have built on Beaver's account, providing more refined analyses for the phenomenon of conditional presuppositions.

Also, it is worth mentioning that the 'reality' of conditional presuppositions has even been tested by experimental methods (Chemla & Schlenker 2011) with the trigger *aussi* (*too*) in French. Most of the sentences used in this experiment were

similar to that in (4.16a). The participants in the experiment were asked whether they drew inferences similar to that in (4.16b). A significant number of them answered that they did:

(4.16)   a. If Chris buys the house instead of renting it, Lenny will make an intelligent choice too.

   b. ⤳ Chris' buying the house instead of renting it will be an intelligent choice.

That is, the inference was not just that someone other than Lenny will make an intelligent choice, i.e. the presupposition carried by the consequent of (4.16a) due to the presence of the trigger *too* (this would have amounted to not inferring any substantial presupposition since many people other than Lenny will make intelligent choices), but that, if Chris buys the house instead of renting it, someone other than Lenny (namely Chris) will have made an intelligent choice. Thus, the hearers inferred the relevant conditional presuppositions.

My goal in the remainder of this chapter is not to demonstrate the reality of conditional presuppositions. This has already been demonstrated by examples in which the presupposition carried by the second clause entails the first clause (or the negation of the first clause). In these cases, either world knowledge is not involved, (4.17a), or it is not involved in any way in which it might be responsible for the resulting conditional presupposition, (4.17b). In these examples and their disjunctive and conjunctive correlates (and many other similar sentences), the conditionalization of the presupposition carried by the consequent is motivated by the reasonable assumptions that the speaker is informative and consistent in his/her beliefs:

(4.17)   a. If Jade is married, she will regret having cheated on her husband.

   b. If Chris is in Copenhagen, Lenny will discover that he's staying at a hotel near the Tivoli Gardens.

Rather, my goal is to argue that, in cases in which conditional presuppositions seem to derive solely from world knowledge, as happens in most of the examples provided by the literature (Geurts (1996), Beaver (1999, 2001), Schlenker (2010a, b), Lassiter (2011)), world knowledge is not ultimately responsible for the phenomenon of conditionalization. The conditionalization is motivated in these cases by the same assumptions that motivate it in cases where the presupposition carried by the second clause asymmetrically entails the first clause (or its negation). Specifically, I argue that, in cases where the first clause (or its negation),

together with one or more contextual premises, entails the presupposition, the resulting conditional implication is perfected into a biconditional implication, thus preventing the presupposition from projecting for the reason that, if the presupposition projected, the speaker's assertion of the first clause (in conjunctions) would be uninformative and the speaker's uncertainty about the truth value of the first clause or its negation (in conditional and disjunctions) would be unjustified on the assumption that the speaker is consistent in his/her beliefs. That is, the presupposition should not project for exactly the same reasons why it should not project in cases of symmetric entailment (see the examples in (1.9) and (1.11) from Chapter 1, section 1.1).

Let us see some examples. On the preferred interpretation, the sentences in (4.18a) and (4.18c) below carry conditional presuppositions. This is because the hearer infers that π does not hold unconditionally (where π is the presupposition carried by the second clause), but that the truth of π depends on the truth of φ (where φ is the antecedent of the sentence):

(4.18)   a. If Jade does not have a green card, she will regret having to leave the States.

           b. $\rightsquigarrow$ If Jade does not have a green card, she will have to leave the States.

           c. If Lida is French, she has stopped celebrating the 14th of July.

           d. $\rightsquigarrow$ If Lida is French, she used to celebrate the 14th of July.

Of course, the sentences in (4.18a) and (4.18c) above have alternative interpretations on which the presuppositions carried by the consequent project. However, in 'normal' contexts, these interpretations are ruled out. That is, we may interpret theses sentences as presupposing that Jade has to leave the States and asserting that, if she does not have a green card, she will regret this, and as presupposing that Lida used to celebrate the 14th of July and asserting that, if she is French, she does not celebrate the 14th of July. However, given the contextual premises that, in order to live permanently in the States, someone who is not a US citizen needs a green card, and that the 14th of July is a national holiday in France, these interpretations are marginal. As was said above, the hearer does not need to know these contextual premises in advance; s/he can infer them basing him/herself on less specific knowledge of the world. In the case of (4.18a), it would be enough to know that, in order to live permanently in certain countries and depending on where you come from, a permit is required. In (4.18b), it would be enough to know that countries celebrate certain days as national holidays.

Above, I said that the sentences in (4.18a) and (4.18c) carry conditional presuppositions because the hearer infers that the truth of π depends on the truth of φ. This indicates that the hearer infers that φ (or, in disjunctions, the negation of φ) is not just a sufficient condition for π but also a necessary one. This is crucial for the conditionalization to obtain. For, suppose that the hearer inferred that φ (together with one or more contextual premises) is just a sufficient condition for π or, what amounts to the same thing, that φ (together with one or more contextual premises) entails π. This in itself would not be strong enough for preventing π from projecting. Recall the examples in (1.13a) and (1.13b) from Chapter 1, section 1.1, repeated below, in which, notwithstanding the entailment of π by φ, π projects:

(4.19)   a. If Chris is staying at a hotel near the Tivoli Gardens, Lenny will discover that he's in Copenhagen.

       b. Either Chris is not staying at a hotel near the Tivoli Gardens or Lenny will discover that he's in Copenhagen.

       c. ⤳ Chris is in Copenhagen.

Therefore, it must be the case that the hearer infers not only that if φ, then π but also, in addition to this, s/he infers either that, if π, then φ or that π, only if φ or that, if not φ, not π. So, φ is promoted from mere sufficient condition for π to sufficient and necessary condition for π. That is, any of the inferences if π, then φ, π, only if φ and if not φ, not π, together with the former inference if φ, then π are equivalent to iff φ, then π. So, independently of whether it is inferred that if π, then φ, that π, only if φ, or that, if not φ, not π, the conditional implication if φ, then π is perfected into a biconditional. This phenomenon by which a sufficient condition tends to be interpreted as the only sufficient condition and thus, as the necessary condition is known as *conditional perfection* and will be explained in much more detail in the next section. Whereas the inference if φ, then π is not defeasible since it is grounded in the hearer's encyclopedic knowledge of the world, the inference that perfects the conditional implication into a biconditional (i.e. if π, then φ, π, only if φ or if not φ, not π) is defeasible. However, in the absence of a continuation of the sentence that defeats it by way of indicating that there are other sufficient conditions for π, so that, even if φ does not hold, π holds, provided that some other sufficient condition holds, the inference that perfects the conditional implication prevails.

Unlike what happens with the inference if φ, then π which, as was argued before, does not suffice to prevent π from projecting, the inference iff φ, then π does. Even if the hearer has not initially inferred if π, then φ, but has perfected the conditional implication if φ, then π by way of inferring either π, only if φ or if

not φ, not π, the hearer eventually arrives at iff φ, then π. From iff φ, then π, it follows that, if π, then φ. But then, if π projected, on the assumption that the speaker is consistent in his/her beliefs, the speaker's uncertainty about the truth value of φ (in the conditional sentence if φ, then ψ_π) would be unjustified. The same argument applies to disjunctive sentences and, substituting assertion for uncertainty, in conjunctive sentences, as we will see later on. That is, the kind of conditional perfection I am appealing to concerns the conditional implication that results from the entailment between φ and π and thus, is not exclusive to conditional sentences but arises also in disjunctive and conjunctive sentences.

Let us see an example. In the sentence in (4.18a), the hearer infers not only that, if Jade does not have a green card, she will have to leave the States but, also, that the only possible reason why Jade should have to leave the States is that she does not have a green card. That is, the hearer infers that, if Jade has to leave the States, (it is because) she does not have a green card. So, the presupposition carried by the second clause of (4.18a), i.e. Jade has to leave the States, should not project for, if it did, it would follow from it that Jade does not have a green card (given that the hearer has inferred that, if Jade has to leave the States, (it is because) she does not have a green card). But then, on the assumption that the speaker is consistent in his/her beliefs, the speaker's uncertainty about the truth value of the antecedent of (4.18a), i.e. Jade does not have a green card, would be unjustified.

However, if the sentence in (4.18a) is followed by a continuation like (1.27a) from Chapter 1, section 1.1, repeated below as (4.20a), the inference that φ (i.e. the antecedent of the first conditional) is the only sufficient condition for π (i.e. the presupposition carried by the consequent of both sentences) does not arise. That is, the hearer does not infer that Jade's not having a green card is the only possible reason why she should have to leave the States. So, the conditional implication if φ, then π is not perfected into a biconditional. Therefore, it is not inferred that π entails φ and thus, π, i.e. the presupposition that she has to leave the States, projects (as in (4.20b)):

(4.20)   a. If Jade does not have a green card, she will regret having to leave the States. But, if she has committed a crime, she won't regret having to leave the States.

         b. ⤳ Jade has to leave the States.

Note that, upon the utterance of the continuation in (4.20a), the inference that, if Jade does not have a green card, she has to leave the States, still holds. More generally, the inference that $\forall x(\neg Gx \rightarrow \Box_{Deo}Lx)$, where Gx stands for *x has a green card*, Lx stands for *x leaves the States* and $\Box_{Deo}$ expresses deontic necessity, still

holds. As was argued above, this inference is not defeasible since it is grounded in world knowledge.

In the same way as above, upon the utterance of the sentence in (4.18c), repeated below as (4.21a), the hearer infers not only that, if Lida is French, she used to celebrate the 14th of July but, also, that the only possible reason why Lida used to celebrate the 14th of July is that she is French. That is, the hearer infers that, if Lida used to celebrate the 14th of July, (it is because) she is French. Thus, the presupposition carried by the second clause of (4.21a), i.e. Lida used to celebrate the 14th of July, should not project for, if it did, it would follow from it that Lida is French (given that the hearer has inferred that, if Lida used to celebrate the 14th of July, (it is because) she is French). But then, on the assumption that the speaker is consistent in his/her beliefs, the speaker's uncertainty about the truth value of the antecedent of (4.21a), i.e. Lida is French, would be unjustified:

(4.21)   a. If Lida is French, she has stopped celebrating the 14th of July.

        b. ⤳ If Lida is French, she used to celebrate the 14th of July.

However, if the sentence in (4.21a) is followed by a continuation like (4.22a), the inference that φ (i.e. the antecedent of the first conditional) is the only sufficient condition for π (i.e. the presupposition carried by the consequent of both sentences) does not arise. That is, the hearer does not infer that Lida's being French is the only possible reason why she used to celebrate the 14th of July. So, the conditional implication if φ, then π is not perfected into a biconditional. Therefore, it is not inferred that π entails φ and thus, π, i.e. the presupposition that Lida used to celebrate the 14th of July, projects (as in (4.22b)):

(4.22)   a. If Lida is French, she has stopped celebrating the 14th of July. But, if her birthday is on the 14th of July, she has not (stopped celebrating the 14th of July).

        b. ⤳ Lida used to celebrate the 14th of July.

Also, in the same way as above, upon the utterance of the continuation in (4.22a), the inference that, if Lida is French, she used to celebrate the 14th of July, still holds. More generally, the inference that $\forall x(Fx \rightarrow \exists t\, C(x,t))$, where Fx stands for *x is French*, Cx stands for *x celebrates the 14th of July* and t is a time interval, still holds. This might be paraphrased as *for everyone who is French there is a time (in his/her life) at which s/he celebrates the 14th of July*. As was argued above, this inference is not defeasible since it is grounded in world knowledge.

As I said above, the kind of conditional perfection I am appealing to here concerns the conditional implication that results from the entailment between the first clause (or its negation) and the presupposition carried by the second clause and thus, it is not exclusive to conditional sentences but also arises in disjunctive and conjunctive sentences. Thus, in the disjunctions and conjunctions in the examples in (4.23) and (4.24) below, the hearer perfects the conditional implications in (4.23c) and (4.24c) into biconditionals, thus preventing the presupposition carried by the second clause from projecting, so that the presupposition is conditionalized. That is, the conditional implications in (4.23c) and (4.24c) become the conditional presuppositions carried by the compound sentences in (4.23) and (4.24) because the presupposition carried by the second clause should not project:

(4.23)   a. Either Jade has a green card or she will regret having to leave the States.

         b. Jade does not have a green card and will regret having to leave the States.

         c. ⤳ If Jade does not have a green card, she will have to leave the States.

(4.24)   a. Either Lida is not French or she has stopped celebrating the 14th of July.

         b. Lida is French and has stopped celebrating the 14th of July.

         c. ⤳ If Lida is French, she used to celebrate the 14th of July.

The presupposition carried by the second clause should not project in order to preserve the assumption that the speaker is consistent in his/her beliefs, in the case of the disjunctions, and the assumption that the speaker is informative, in the case of the conjunctions. The first case has already been explained. So, let us see what would happen if the presupposition projected in the conjunctive sentences in (4.23b) and (4.24b). Let us take the conjunction in (4.23b). The argument can be reproduced for (4.24b). The presupposition carried by the second conjunct of (4.23b), i.e. Jade has to leave the States, should not project for, if it did, it would follow from it that Jade does not have a green card (given that the hearer has inferred that, if Jade has to leave the States, (it is because) she does not have a green card). But then, on the assumption that the speaker is informative, the speaker's assertion of the first conjunct of (4.23b), i.e. Jade does not have a green card, would be redundant.

Put another way, as was discussed in Chapter 1, section 1.1, the assertion of the first clause of (4.23b) in a context that entailed that Jade will have to leave the

States (because she does not have a green card) would be redundant. By contrast, it is informative to assert the first clause of (4.23b) in a context that entails (4.23c). If the interlocutors presuppose (4.23c), the hearer infers that Jade will have to leave the States just after the speaker asserts that Jade does not have a green card. That is why the sentence in (4.23b) (and similar sentences) are often perceived as presupposing the presupposition carried by the second clause.

Therefore, the process whereby conditional presuppositions arise is the same in cases where the presupposition carried by the second clause, together with a lexical entailment, asymmetrically entails the first clause (or its negation), as happens in (4.25a), in cases where the presupposition carried by the second clause, together with a piece of world knowledge, asymmetrically entails the first clause (or its negation), as happens in (4.25b), and in cases where the hearer infers that the presupposition carried by the second clause entails the first clause (or its negation), as happens in (4.25c), though this inference does not follow from the sentence but constitutes an instance of conditional perfection:

(4.25)   a. If Jade is married, she will regret having cheated on her husband.

   b. If Chris is in Copenhagen, Lenny will discover that he's staying at a hotel near the Tivoli Gardens.

   c. If Lida is French, she has stopped celebrating the 14th of July.

In the next section, I will address the topic of conditional perfection focusing on the nature of the inference and the different analyses that, in the literature, have provided explanations for its derivation.

4.4   Conditional Perfection

The name 'conditional perfection' was coined by Geis and Zwicky (1971) for the phenomenon by which sentences of the form if A, then B tend to be interpreted as implying the truth of if not A, then not B. However, as van der Auwera (1997a) and Horn (2000) explain, the phenomenon had already been observed by Ducrot (1969), who did not put a name to it. According to Geis and Zwicky, conditional perfection arises as an 'invited inference' in cases when conditional sentences are used to make predictions, promises, threats, law-like statements, commands, and also in the case of a special kind of counterfactual statements. Let us see some examples (from Geis and Zwicky (1971))[2]:

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[2]I will use the arrow '–>' to indicate that what follows the arrow is inferred, though it does not follow from the sentence immediately above

(4.26)   a. If John leans out of that window any further, he'll fall. (Prediction)

      b. –> If John does not lean out of that window any further, he won't fall.

      c. If you mow the lawn, I'll give you five dollars. (Promise)

      d. –> If you don't mow the lawn, I won't give you five dollars.

      e. If you disturb me tonight, I won't let you go to the movies tomorrow. (Threat)

      f. –> If you don't disturb me tonight, I'll let you go to the movies tomorrow.

      g. If you heat iron in a fire, it turns red. (Law-like statement)

      h. –> If you don't heat iron in a fire, it doesn't turn red.

      i. If you see a white panther, shout "Wasserstoff" three times. (Command)

      j. –> If you don't see a white panther, don't shout "Wasserstoff" three times.

      k. If Chicago is in Indiana, I'm the Queen of Rumania. ('Counterfactual' statement)

      l. –> If Chicago is not in Indiana, I'm not the Queen of Rumania.

However, Geis and Zwicky do not provide an explanation as to why, in many cases, conditional sentences are perfected into biconditionals. As for the nature of the inference, they argue that it is an implicature, but not a (Gricean) conversational implicature, and that, though the inference arises when conditionals are used to perform certain speech acts, the inference is not derivable from the nature of the speech act itself.

By contrast, van der Auwera (1997b) and Horn (2000) provide analyses that explain the phenomenon. As to the nature of conditional perfection, both van der Auwera and Horn agree that it is a conversational implicature. However, they disagree with respect to the the way in which it is generated.

According to van der Auwera (1997b), conditional perfection is derived as a scalar (quantity) implicature. As was explained in section 4.2, scalar implicatures arise on the basis of Horn scales, i.e. sequences of expressions ordered according to their logical strength. Van der Auwera argues that, in the case of conditional perfection, the relevant scale would be $\langle$(if p, q and if r, q and if s, q), (if p, q and if r, q), (if p, q)$\rangle$. The hearer reasons as follows: Since the speaker asserts if p, q, this means that s/he is not in a position to assert if p, q and if r, q, let alone if p, q and if r, q and if s, q or any other stronger alternative. So, it is not the case that the speaker

believes if p, q and if r, q or any other stronger alternative, which means that it is not the case that the speaker believes that there are sufficient conditions for q other than p. Therefore, in van der Auwera's account, it is Grice's first submaxim of Quantity: "Make your contribution as informative as is required (for the current purposes of the exchange)" (1975: 45) that is involved in the generation of the implicature.

Horn (2000) criticizes van der Auwera's account on the grounds that, if van der Auwera's proposed scale, i.e. ⟨(if p, q and if r, q and if s, q), (if p, q and if r, q), (if p, q)⟩, were the relevant one, it would be more straightforward to choose the following scale: ⟨iff p, q, if p, q⟩. But, of course, the latter scale would induce the scalar implicature that it is not the case that the speaker believes that iff p, q, which is the opposite result to that intended.

Furthermore, Horn argues that, in well-formed Horn scales, the logically stronger expressions must be at least as lexicalized as the weaker ones, no longer than the weaker ones and not more marked than the weaker ones. Otherwise, the hearer could not be sure that the reason why the speaker has not asserted the sentence that contains the stronger expression is that s/he does not believe the sentence that contains the stronger expression. The speaker might not have asserted this sentence just in order to avoid a less lexicalized expresssion, a more marked expression or to be briefer. Therefore, neither ⟨(if p, q and if r, q and if s, q), (if p, q and if r, q), (if p, q)⟩ nor ⟨iff p, q, if p, q⟩ qualifies as a scale that might induce a Q-based implicature for the reasons just given. In the case of ⟨iff p, q, if p, q⟩, these reasons add to the fact that this scale would induce the opposite implicature to that intended, as was said above.

According to Horn, conditional perfection does not arise as a quantity-based implicature, i.e. Q-based implicature, but as a relevance-based implicature, i.e. R-based implicature (Horn 1984, 2000, 2004). Horn (1984) argues that R-based implicatures are motivated by Grice's maxim of Relevance: "Be relevant", second submaxim of Quantity: "Do not make your contribution more informative than is required" and the last two submaxims of Manner: "Be brief. (Avoid unnecessary prolixity)" and "Be orderly" (1975: 45-46), as well as the 'Principle of Least Effort' and the 'Principle of Sufficient Effort' (Zipf 1949). The idea is that, if the assertion of a sentence that contains a logically weaker expression is likely to lead the hearer to infer the corresponding sentence that contains the stronger expression, and the stronger expression is less lexicalized, longer or more marked than the weaker one, the maxims and principles mentioned above will lead the speaker to assert the sentence that contains the weaker expression, on the expectation that the hearer will infer that the stronger expression is conversationally implicated. In the case of conditional perfection, the speaker asserts if p, q but conversationally

implicates iff p, q.

According to Horn (1984), Grice's Maxims can be boiled down to the following two principles (1984: 13):

(4.27) The Q Principle (Hearer-based):
   MAKE YOUR CONTRIBUTION SUFFICIENT (cf. Quantity$_1$)
   SAY AS MUCH AS YOU CAN (given R)
   Lower-bounding principle, inducing upper-bounding implicata

(4.28) The R Principle[3] (Speaker-based):
   MAKE YOUR CONTRIBUTION NECESSARY (cf. Relation, Quantity$_2$, Manner)
   SAY NO MORE THAN YOU MUST (given Q)
   Upper-bounding principle, inducing lower-bounding implicata[4]

Horn (2000) argues that conditional perfection is not always attainable and, in particular, conditional sentences where the antecedent is presupposed by the consequent (e.g. (4.29a) and (4.29b)) or where the antecedent entails the consequent (e.g. (4.30a) and (4.30b)) are incompatible with conditional perfection. The examples are from Horn (2000):

(4.29)   a. If there's a King of France, he's bald.

           b. If Jack has a wife, she's miserable.

(4.30)   a. If that's a cat, it's a mammal.

           b. If she's a phonologist, she's a linguist.

Note that, in the examples in (4.30a) and (4.30b), the antecedent all by itself does not entail the consequent but requires an additional premise in the form of a lexical entailment, i.e. *All cats are mammals* and *All phonologists are linguists*, respectively. However, this additional premise is trivial for someone who knows the meanings of the words *cat* and *mammal*, *phonologist* and *linguist*, which makes

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[3]Horn's R Principle shares some properties with Atlas and Levinson's (1981) *inference to the best interpretation* and with Levinson's (1983) *Principle of Informativeness*: "Read as much into an utterance as is consistent with what you know about the world" (1983: 146-7).

[4]If I understand Horn correctly, since it is the 'Principle of Least Effort' that motivates the R Principle, the implicatures would be at the lower bound of the relevant scale, whereas the expressions that induce them would be at the upper bound.

the conditional sentences in (4.30a) and (4.30b) also trivial. If we compare the examples in (4.30a) and (4.30b) above with the examples in (4.18b) and (4.18d), from section 4.3, repeated below as (4.31a) and (4.31c), we can see that, in the latter examples, the antecedent all by itself does not entail the consequent either, but requires an additional contextual premise which, in this case, is provided by the hearer's encyclopedic knowledge of the world. However, as was argued in section 4.3, in these cases, the additional contextual premise is not trivial. As was said in section 4.3, someone who hears the sentence in (4.31a) might not know that, in order to live permanently in the States, a non-US citizen needs a green card, but basic knowledge of the world will lead him/her to infer this premise. In the same way, someone who hears the sentence in (4.31c) might not know that the French celebrate the 14th of July, but basic knowledge of the world will lead him/her to infer this premise. The fact that, in these cases, the hearer may not know the additional contextual premise in advance indicates that the premise in question is not trivial and thus, the conditionals in (4.31a) and (4.31c) are not trivial either. The triviality of (4.30a) and (4.30b) versus the non-triviality of (4.31a) and (4.31c) seems to be crucial as far as the inference of conditional perfection is concerned. Arguably, if a speaker asserts a trivially true conditional sentence, the speaker's assertion, by virtue of its own triviality, is not amenable to suggest anything beyond what is said. Thus, as Horn argues, conditional perfection is incompatible with (4.30a) and (4.30b); however, as we can see in (4.31b) and (4.31d), conditional perfection is inferred upon the utterance of the sentences in (4.31a) and (4.31c):

(4.31)   a. If Jade does not have a green card, she will have to leave the States.

   b. –> If Jade has a green card, she won't have to leave the States./ –> If Jade has to leave the States, she does not have a green card.

   c. If Lida is French, she used to celebrate the 14th of July.

   d. –> If Lida isn't French, she didn't celebrate the 14th of July./ –> If Lida used to celebrate the 14th of July, she is French.

Furthermore, in Chapter 1 section 1.1 and in Chapter 3 section 3.1.2, I argued that, in cases where the first clause (or the negation of the first clause) entails the presupposition carried by the second clause, the preferred interpretation is that on which the presupposition projects, since projection is constrained in cases where the presupposition entails the first clause (or its negation), but not the other way round. However, I also argued that these sentences have an additional interpretation on which the presupposition does not project, and that this interpretation arises because the hearer infers that the entailment goes both ways. That is, the

conditional implication that follows from the entailment is perfected into a biconditional, thus creating the constraint that prevents the projection of the presupposition. However, in these cases, the resulting conditional implication is trivial and thus, according to what was said above, in principle, it should not trigger the inference of conditional perfection. The explanation for why, in these cases, the conditional implication does trigger the inference of conditional perfection must lie in the fact that the trivial conditional implication is not asserted, but just follows from the non-trivial compound sentence, which is asserted. Let us see some examples.

In Chapter 1, section 1.1, we saw that van der Sandt's (1988) example in (1.14), repeated below as (4.32a), has an interpretation on which the presupposition that John's wife is dead does not project. I argued that, in order for this interpretation to arise, the hearer should perfect the conditional implication in (4.32b) (which follows from the sentence in (4.32a)) into a biconditional implication (as in (4.32c)). In this example, the antecedent, together with a lexical entailment (i.e. $\forall x(Mx \rightarrow Dx)$, where Mx stands for *x is murdered* and Dx stands for *x is dead*), entails the consequent, exactly like what happens in Horn's examples in (4.30a) and (4.30b). However, (4.32b) is not asserted but follows from (4.32a). If the hearer infers conditional perfection (as in (4.32c)), the presupposition in (4.32d) should not project since, from (4.32c) and (4.32d) taken together, it follows that John murdered his wife; but then, the speaker's uncertainty about the truth value of the antecedent of (4.32a) would be unjustified, on the assumption that the speaker is consistent in his/her beliefs:

(4.32) a. If John murdered his wife, he will be glad that she is dead.

 b. If John murdered his wife, she is dead.

 c. $\rightarrow$ If John's wife is dead, he murdered her.

 d. $\nrightarrow$ John's wife is dead.

Also, if the sentence in (4.32a) is followed by a continuation like that in (1.16a) from Chapter 1, section 1.1 (from van der Sandt 1988, 1992), repeated below as (4.33a), the inference in (4.32c) above is cancelled (in (4.33b)), which reinforces the view that (4.32c) above is conversationally implicated. If the inference is cancelled, the presupposition can project (in (4.33c)):

(4.33) a. If John murdered his wife, he will be glad that she is dead. But, if she took those pills herself, he won't be glad that she is dead.

 b. -/-> If John's wife is dead, he murdered her.

     c. ⤳ John's wife is dead.

The same argument may be applied to the example in (4.34a) (also from van der Sandt 1988). The sentence in (4.34a) gives rise to the conditional implication in (4.34b). The antecedent of (4.34b) logically entails its consequent but, once again, it seems possible to infer conditional perfection (in (4.34c)). Thus, the presupposition that someone solved the problem does not project (in (4.34d)):

(4.34)   a. If the problem was solved at the conference, it was Julius who solved it.

        b. If the problem was solved at the conference, the problem was solved.

        c. –> If the problem was solved, it was solved at the conference.

        d. ⤴̸ Someone solved the problem.

However, if the sentence in (4.34a) is followed by a continuation like that in (4.35a), the inference in (4.34c) is cancelled (in (4.35b)), which reinforces the view that (4.34c) is conversationally implicated. If the inference is cancelled, the presupposition in (4.35c) projects:

(4.35)   a. If the problem was solved at the conference, it was Julius who solved it. But, if it was solved in the university, it was Jade who solved it.

        b. -/-> If the problem was solved, it was solved at the conference.

        c. ⤳ Someone solved the problem.

The conclusion I draw from the data above is that, if a trivially true conditional sentence is asserted, the inference of conditional perfection does not arise. However, if the relevant conditional is just implicated, notwithstanding its triviality, it may be perfected into a biconditional. In sentences where the first clause (or its negation) entails the presupposition carried by the second clause, this results in an interpretation of the sentence on which the presupposition should not project.

As was said in Chapter 1, section 1.1, van der Sandt (1988) argues that, in order for the sentences in (4.32a) and (4.34a) to get a non-presuppositional interpretation, the inferences in (4.32c) and (4.34c) must be added to the context. If (4.32c) and (4.34c) were additional contextual premises, they should be uncancellable. However, we have seen that both (4.32c) and (4.34c) are easily cancellable when

the sentences in (4.32a) and (4.34a) are followed by continuations like those in (4.33a) and (4.35a).

However, not in all cases of entailment of the presupposition by the first clause is this second interpretation available. In the example in (3.13a) from Chapter 3, section 3.1.2, repeated below, it is impossible (or, at least, very difficult) to infer conditional perfection from the resulting conditional implication in (4.36b), which I indicate in (4.36c). As a result, the presupposition that Sam paid (or that there was a payment by Sam) projects (in (4.36d)):

(4.36)   a. If Sam paid the bill promptly, his payment is in the mail now.

        b. If Sam paid the bill promptly, Sam paid.

        c. -/-> If Sam paid, he paid promptly.

        d. ⤳ There was a payment by Sam.

And the same might be argued of van der Sandt's (1988, 1992) example in (3.47a) from Chapter 3, section 3.2.4.4, repeated below:

(4.37)   a. If John has grandchildren, his children must be happy.

        b. If John has grandchildren, he has children.

        c. -/-> If John has children, he has grandchildren.

        d. ⤳ John has children.

In (4.32a), given a certain context (e.g. John's wife is not sick, she lives in a safe neighbourhood, no accident has been recorded, John is a violent man, etc.) it is plausible to infer that the only possible reason why John's wife is dead is that John murdered her. Similarly, in (4.34a), also given a certain context (e.g. an important conference is being held at the time the sentence is uttered), it is plausible to infer that the only possible place where the problem was solved was at the conference. By contrast, in (4.36a), paying a bill promptly is never going to be a necessary condition for paying a bill, and, in (4.37a), having grandchildren is never going to be a necessary condition for having children, given what we know about the world.

4.5   Chapter Summary

I started this chapter by presenting the pragmatic constraints that block the projection of presuppositions in compound sentences. I argued that, ultimately, the

constraints on assertion and the uncertainty inferences operate in order to preserve the assumption that the speaker is informative and the assumption that the speaker is consistent in his/her beliefs, which are the basis of any communicative exchange. As a result, the presuppositions of some compound sentences are conditionalized, giving rise to what is known as 'conditional presuppositions'.

I continued by explaining how, in conditional sentences where the presupposition carried by the second clause entails the antecedent, the speaker's uncertainty about the truth value of the presupposition and thus, of the antecedent, is conversationally implicated whereas, in disjunctive sentences where the presupposition carried by the second clause entails the negation of the first disjunct, the speaker's uncertainty about the truth value of the presupposition and thus, of the negation of the first disjunct results from the compatibility of the context with the first disjunct. I also dealt with the topic of contradictory presuppositions and showed that the constraints that block the projection of both presuppositions in these cases are the same constraints that block the projection of the presupposition in disjunctive sentences.

The remainder of the chapter was focused on conditional presuppositions. I started by providing a brief overview of the literature on the subject, and continued by explaining the generation of conditional presuppositions. I argued that, contrary to what is defended by the satisfaction theorists, conditional presuppositions arise simply because the projection of the presupposition carried by the second clause is constrained for the reasons given above. However, whereas the constraints on projection are obvious in cases where the presupposition carried by the second clause asymmetrically entails the first clause (or the negation of the first clause), they are not so obvious when it is the first clause (or its negation) that, together with one or more additional contextual premises, entails the presupposition. I argued that, in these cases, the speaker conversationally implicates conditional perfection, to the effect that the hearer infers that the conditional implication that follows from the sentence is perfected into a biconditional implication. Once the hearer infers that the entailment goes both ways and thus, infers that the presupposition also entails the first clause (or its negation), the constraints on projection become operative again. I reviewed the main analyses that, in the literature (van der Auwera 1997b, Horn 2000), provide explanations for the phenomenon of conditional perfection, and I showed how conditional perfection is responsible for the projection of non-trivial conditional presuppositions.

Finally, I addressed cases where the first clause (or its negation) asymmetrically entails the presupposition carried by the second clause, so that the relevant sentences generally have two different interpretations, on one of which the presupposition does not project. I argued that, in these cases too, conditional perfection is

responsible for the lack of projection.

Chapter 5

Further Issues

5.1 Introduction

In this chapter, I will deal with some additional issues, some of which might seem problematic for the notion of 'presupposition' I defend in this thesis. I will first address the issue of projection and conditionalization of focal presuppositions in compound sentences in order to show that focal presuppositions behave very much like any other presupposition. Secondly, I will tackle the subject of definite and possessive noun phrases following an indefinite noun phrase within the same stretch of discourse. Following Kamp (1981), Heim (1982), van der Sandt (1992) and Roberts (2003), I will argue that, in these cases, the presuppositional content of the sentence contains free variables that need to find an antecedent before they get an interpretation. That is, in this type of sentence or small discourse, definites and possessives behave anaphorically, thus requiring the previous introduction of a referent.

5.2 Focal Presuppositions

The partition of the information structure of the sentence in focus and focal presupposition is well established in the literature (Halliday 1967, Chomsky 1971, Jackendoff 1972, Prince 1986, Geurts and van der Sandt 2004, among others). This partition may be syntactically marked, as in the case of cleft-constructions (*it*-clefts and *wh*-clefts) or prosodically marked by stress. In this section, I will address cases where focal presuppositions are triggered by sentence constituents prosodically marked by stress. In particular, I will analyse sentences that would

be infelicitous in the absence of focal stress but that become fully acceptable if one of their constituents is focused. Let us see some examples. The sentence in (5.1a) is modelled after Heim's (1990) sentence in (3.16a) from Chapter 3, section 3.1.2, repeated below in (5.1b):

(5.1)   a. # If Shane has siblings, he looks after his younger brother.

         b. # If John has children, he will bring along his 4-year old daughter.

In (5.1a) and (5.1b) above, the presupposition carried by the consequent entails the antecedent. Therefore, on the assumption that the speaker is consistent in his/her beliefs, the presupposition should not project. However, even if the presupposition does not project, the sentences above are anomalous, and this is because the conditional presuppositions they carry, in (5.2a) and (5.2b) below, are themselves anomalous, as Heim (1990) notices with respect to her example in (5.1b). That is, if the speaker is uncertain about whether Shane has siblings, the question arises how s/he knows that Shane has a younger brother in case he has siblings. Similarly, if the speaker is uncertain about whether John has children, the question arises how s/he knows that John has a 4-year old daughter in case he has children:

(5.2)   a. # If Shane has siblings, he has a younger brother.

         b. # If John has children, he has a 4-year old daughter.

Now, if we compare the sentences in (5.1a) and (5.1b) above with their prosodically marked counterparts below, it is not difficult to find contexts in which the latter sentences would be acceptable. For instance, with respect to (5.3a), suppose the speaker is in charge of a group of children and s/he knows that just one of them has siblings and that the one who has siblings looks after his/her younger brother, but the speaker has forgotten who among them has siblings. In this context, the sentence in (5.3a) below would be perfectly acceptable. A similar context to that just described can be found in which the sentence in (5.3b) would be acceptable:

(5.3)   a. If Shane has siblings, HE[1] looks after his younger brother.

         b. If John has children, HE will bring along his 4-year old daughter.

Focusing on (5.3a), this sentence carries the focal presupposition in (5.4a), which is induced by the prosodically marked pronoun *he* in the consequent of (5.3a). The

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[1] I will use small capitals to indicate focal stress.

focal presupposition in (5.4a) holds unconditionally regardless of the speaker's uncertainty about whether Shane has siblings. Since (5.4a) does not entail the antecedent of (5.3a), the speaker of (5.3a) can presuppose (5.4a) at the same time as s/he shows uncertainty about the truth value of the antecedent (5.3a). In doing so, the speaker shows consistency in his/her beliefs. Furthermore, the sentence in (5.3a) also carries the conditional presupposition in (5.4b). The unconditional presupposition in (5.4c), induced by the presuppositional trigger *his younger brother* in the consequent of (5.3a), should not project for, if it did, the speaker would show inconsistency in his/her beliefs in presupposing (5.4c) at the same time as s/he shows uncertainty about the truth value of the antecedent of (5.3a), since the latter is entailed by the presupposition in (5.4c). Thus, the presupposition in (5.4c) is conditionalized to the antecedent of (5.3a) giving rise to the conditional presupposition in (5.4b):

(5.4) a. ⇝ Someone (among the group of children) looks after his younger brother.

    b. ⇝ If Shane has siblings, HE has a younger brother.

    c. ↝̸ SHANE has a younger brother.

There are cases in which a focal presupposition carried by the consequent of a conditional sentence does not project but is conditionalized to the antecedent of the sentence and thus, the sentence as a whole carries a focal conditional presupposition. For instance, the example in (3.25a) from Chapter 3, section 3.2.4, repeated below as (5.5a), carries the presupposition in (5.5b) since the speaker's uncertainty about the truth value of the antecedent (*Jade flies to Amsterdam*) does not prevent the presupposition in (5.5b) from projecting:

(5.5) a. If Jade flies to Amsterdam, her boyfriend will pick her up at the airport.

    b. ⇝ Jade has a boyfriend.

However, in (5.6a), the focal presupposition in (5.6c), induced by the prosodically marked constituent HER BOYFRIEND, does not project but is conditionalized to the antecedent of the sentence, as in (5.6b):

(5.6) a. If Jade flies to Amsterdam, HER BOYFRIEND will pick her up at the airport.

    b. ⇝ If Jade flies to Amsterdam, someone will pick her up at the airport.

     c. ↛ Someone will pick up Jade at the airport.

This is because the speaker's uncertainty about whether Jade flies to Amsterdam, prevents the focal presupposition from projecting. As the focal presupposition in (5.6c) together with the contextual premise that, under normal circumstances, if someone is picked up at an airport, this person has flown to that airport ($\forall x \forall y((Hx \land Ay \land P(x,y)) \rightarrow F(x,y))$, where Hx stands for *x is human*, Ay stands for *y is an airport*, P(x,y) stands for *x is picked up at y* and F(x,y) stands for *x has flown to y*), entails the antecedent of (5.6a), the speaker would show inconsistency in his/her beliefs in presupposing (5.6c) while showing uncertainty about the truth value of the antecedent of (5.6a). Note that (5.6a) will be normally uttered as a reply to the question *If Jade goes to Amsterdam, who will pick her up at the airport?*, which also carries the focal conditional presupposition in (5.6b) above.

Recapitulating so far, the projection and conditionalization of focal presuppositions carried by the consequent of conditional sentences follow the same principles as the projection or conditionalization of non-focal presuppositions. If the speaker shows uncertainty about the truth value of a sentence entailed by the focal presupposition, the projection of the focal presupposition would jeopardize the assumption that the speaker is consistent in his/her beliefs. Thus, the presupposition does not project but is conditionalized to the antecedent of the conditional sentence giving rise to a focal conditional presupposition.

Let us turn now to conjunctive sentences. The sentences in (5.7a) and (5.7b) below are the conjunctive counterparts to the conditional sentences in (5.1a) and (5.1b) above. In these sentences, the presupposition carried by the second clause (i.e. *Shane has a younger brother* and *John has a 4-year old daughter*, respectively) entails the first clause. Thus, in order for the speaker's assertion of the first clause to be informative, the presupposition should not project. Nonetheless, even if the presupposition carried by the second clause does not project and is thus conditionalized to the first clause of (5.7a) and (5.7b), respectively, the resulting conditional presuppositions in (5.2a) and (5.2b), repeated below in (5.8a) and (5.8b), are anomalous:

(5.7)   a. # Shane has siblings and looks after his younger brother.

        b. # John has children and will bring along his 4-year old daughter.

(5.8)   a. # If Shane has siblings, he has a younger brother.

        b. # If John has children, he has a 4-year old daughter.

However, the prosodically marked counterparts to the sentences in (5.7a) and (5.7b), i.e. (5.9a) and (5.9b) below, are felicitous:

(5.9) a. Shane has siblings and (thus), HE looks after his younger brother.

  b. John has children and (thus), HE will bring along his 4-year old daughter.

Focusing on the sentence in (5.9a) above, as we did with its conditional counterpart in (5.3a), it is not difficult to find a context in which the sentence would be perfectly acceptable. Just as we did before, let us suppose that the speaker is in charge of a group of children and s/he knows that just one of them has siblings and that the one who has siblings looks after his/her younger brother. The speaker, who had forgotten who (among the group of chidren) had siblings, remembers that Shane has siblings and thus, that it is him who looks after his younger brother. In this context, the sentence in (5.9a) carries the same presuppositions as its conditional counterpart in (5.3a) above, i.e. the focal presupposition in (5.10a) and the conditional presupposition in (5.10b):

(5.10) a. ⤳ Someone (among the group of children) looks after his younger brother.

  b. ⤳ If Shane has siblings, HE has a younger brother.

  c. ⤴̸ SHANE has a younger brother.

The focal presupposition in (5.10a), carried by the second clause of (5.9a), does not entail the first clause of (5.9a). Therefore, the speaker can presuppose (5.10a) at the same time as s/he informatively asserts the first clause of (5.9a). By contrast, the speaker cannot presuppose (5.10c), i.e. the presupposition triggered by the definite noun phrase *his younger brother* in the second clause of (5.9a) at the same time as s/he informatively asserts the first clause of (5.9a), since the latter is entailed by the presupposition in (5.10c). Thus, the presupposition in (5.10c) is conditionalized to the first clause of (5.9a) giving rise to the conditional presupposition in (5.10b).

Thus, in conjunctive sentences too, the projection and conditionalization of focal presuppositions carried by the second clause follows the same principles as the projection or conditionalization of non-focal presuppositions. As far as the first clause is not entailed by the focal presupposition, the presupposition can project since this does not prevent the assertion of the first clause from being informative.

By contrast, in cases where, if the focal presupposition projected, the speaker's assertion of the first clause would be uninformative, the projection of the focal presupposition would be constrained. However, it is difficult to find natural sounding examples that illustrate the latter case, as would be, for instance, the conjunctive counterpart to the conditional sentence in (5.6a).

5.3   Possessive and Definite Noun Phrases

In the first part of this section, I will focus the discussion on the presuppositional content of possessive noun phrases that follow an indefinite noun phrase within the same stretch of discourse, so that the indefinite serves as an antecedent to the possessive noun phrase. I will argue that, in these cases, possessive noun phrases do not trigger presuppositions since the presuppositional content of the sentence or small discourse (considered as a whole) contains free variables that need to find an antecedent in order to get an interpretation. In the second part, I will deal with definite noun phrases for which a discourse referent previously established within the same stretch of discourse may serve as an antecedent to the definite. However, in order for the hearer to infer the link between the definite and its antecedent, s/he has to be in possession of a certain world knowledge. These cases fall into the category of *bridging inferences* (Clark 1975) and resemble the case of possessive noun phrases following indefinites in that the presuppositional content of the sentence or small discourse (considered as a whole) also contains free variables.

5.3.1   Possessives

In all the cases of presupposition we have seen so far, the presuppositional content of the sentence contains discourse referents that bind all the variables in its scope, whereas its asserted content contains pronouns which are encoded as free variables that find their antecedents in the presuppositional content (see Chapter 2, section 2.1.2). Recall that the main reason for adopting this kind of analysis is that the asserted content does not replicate the presuppositional content, thus avoiding the binding problem (Karttunen and Peters, 1979).

However, in cases in which a possessive noun phrase follows an indefinite within the same stretch of discourse, the presuppositional content of the sentence contains a free variable itself. Let us see some examples:

(5.11)   a. A man was fixing his car.

b. I met a man on the road. He was fixing his car.

According to the notion of presupposition defended in this thesis, it would be indefensible to argue that the sentence in (5.11a) and the small discourse in (5.11b), considered as a whole, carry the presupposition that a man had a car, even if, by means of linking the asserted content to the presuppositional content, the binding problem did not arise. That is, a speaker who utters (5.11a) or (5.11b) should not presuppose that a man had a car since, in both (5.11a) and (5.11b), the indefinite noun phrase *a man* introduces a new discourse referent which, following Prince (1981, 1992), is not only discourse-new but also hearer-new. If the speaker presupposed that a man had a car, s/he would be acting as if s/he assumes or believes that a man had a car and, what is crucial, as if s/he assumes or believes that his/her interlocutor assumes or believes that a man had a car. However, if that were the case, the discourse referent introduced by *a man* would be in the context by the time the speaker utters (5.11a) and (5.11b) and thus, the use of the indefinite noun phrase *a man* in (5.11a) and (5.11b) would be not only redundant but also misleading, since it would lead the hearer to infer that that the speaker refers to two different men, one of which had a car and the other was fixing his car.

In order to account for these cases, I will adopt van der Sandt's (1992) analysis of possessive noun phrases. In the following, I will focus on the example in (5.11a). However, the arguments I will present also apply to the small discourse in (5.11b). Van der Sandt (1992) would give the sentence in (5.11a) (repeated below) the representation in DRT in (5.12b) before the presuppositional material is resolved:

(5.12)   a. A man was fixing his car.

b. [x: man(x), fix(x,y), [y: car(y), poss(z,y), [z_{masc}:]]]

c. [x, z: man(x), fix(x,y), z=x, [y: car(y), poss(z,y)]]

d. [x: man(x), fix(x,y), [y: car(y), poss(x,y)]]

e. [x, y: man(x), car(y), fix(x,y), poss(x,y)]

The main DRS in (5.12b) embeds an anaphoric structure, i.e. a subordinate DRS which only contains presuppositional material that is not yet resolved. In linear notation, unresolved presuppositional material is underlined. In turn, this subordinate DRS embeds another anaphoric structure with just a variable, i.e. z_{masc} and no conditions. The variable z_{masc} in the most embedded DRS of (5.12b) finds an antecedent in the main DRS, i.e. the discourse referent x and thus, is bound by it, which is represented by the equation z=x in (5.12c). The rest of the presuppositional material, i.e. the conditions car(y) and poss(x,y) in (5.12d) cannot

find an antecedent and thus, are accommodated in the main DRS, which means that the two conditions car(y) and poss(x,y), together with the discourse referent y, are transferred to the main DRS. In the DRS in (5.12e) all the presuppositional material has been resolved.

The presuppositional content of (5.11a), i.e. [y: car(y), poss(z,y), [z_{masc}:]] in (5.11b) above) contains a free variable (i.e. z) which is bound by a discourse referent, i.e. x that has been introduced by the indefinite noun phrase *a man*, which is part of the asserted content. The presuppositional content cannot project due to the trapping constraint, i.e. if the presuppositional content of a sentence contains a free variable, the presuppositional content cannot be resolved out of the scope of its binder (see Chapter 3, section 3.3.6). The latter reflects that fact that the speaker of (5.11a) does not presuppose any relation of possession between a man and a car for, though the speaker acts as if s/he assumes or believes that there is a relation of possession between a man and a car before the sentence is uttered, s/he does not act as if s/he assumes or believes that his/her interlocutor assumes or believes a relation of possession between a man and a car before the sentence is uttered. Thus, the sentence in (5.11a) does not carry the presupposition that a man had a car or any other presupposition.

As was said in Chapter 3, section 3.3.1, van der Sandt (1992) treats all cases of presupposition as if they were anaphors. However, Zeevat (1992) considers that some presuppositions behave more like anaphors than others. Thus, Zeevat differentiates between what he calls 'resolution triggers' whose paradigmatic example is that of definite noun phrases (possessive noun phrases are included in this category) and lexical triggers that induce presuppositions which are conditions that the contexts of utterance must meet (factive verbs and emotive factive verbs like *regret* are examples of this kind of trigger). Zeevat argues that presuppositional triggers such as *too*, *also*, *another* and *again* may constitute a third class, whose function would be that of keeping track of similar objects in the storage of information. According to Zeevat, van der Sandt's (1992) analysis would account for the first class of triggers, whereas Heim's (1983b) approach would do for the second class.

However, on the view defended in this dissertation, one and the same trigger may behave differently depending on the stretch of discouse in which it appears. For instance, the fact that *his car* in (5.11a) is unable to trigger a proposition is not due to any particularity of the class of triggers *possessive noun phrases*, but rather is due to the particularity that presuppositional content triggered by *his car* in (5.11a) contains a pronoun which has to be bound. If, instead of an indefinite, the sentence in (5.11a) contained, for example, a proper name, the possessive would trigger a proposition. Thus, *John was fixing his car* presupposes that John has a car. And

the same might be argued for the small discourse in (5.11b). The first sentence of (5.11b) expresses a proposition. However, neither the presuppositional content of the second sentence, i.e. [$\underline{y}$: $\underline{car(y)}$, $\underline{poss(z,y)}$, [z_{masc}:]] all by itself, nor its asserted content, i.e. fix(x,y) all by itself, are closed expressions. By contrast, if the first sentence of (5.11b) contained a proper name, instead of an indefinite, the possessive in the second sentence would trigger a proposition. Thus, the small discourse *I met John on the road. He was fixing his car.*, considered as a whole, presupposes that John has a car. The difference between *a man* and *John* is that, whereas the discourse referent introduced by the former is discourse-new and hearer-new, the discourse referent introduced by the latter is discourse-new but hearer-old, so that the context that precedes the utterance of *John was fixing his car* and *I met John on the road. He was fixing his car.* already contains a discourse referent for *John*.

Examples such as (5.11a) are comparable with cases such as (5.13) below, in which the presupposition carried by the second conjunct entails the first one and thus, if the presupposition projected, the assertion of the first conjunct would be uninformative:

(5.13) Chris has a house and his house is huge.

On the one hand, in (5.11a) and (5.11b), the indefinite's introduction of a new discourse referent is comparable with the assertion of the existence of an individual which is assigned to the discourse referent. On the other, the pronoun *his* in *his car* presupposes the existence of an antecedent which has to be human, male and adult. Thus, in a parallel way to that in which, in (5.13), the projection of the presupposition triggered by *his house* (i.e. *Chris has a house*) is constrained since, otherwise, it would make the assertion of the first conjunct uninformative, in (5.11a) and (5.11b), the projection of the presuppositional content triggered by *his car* is also constrained since, otherwise, it would make the indefinite's introduction of a discourse-new, hearer-new discourse referent uninformative. Therefore, the constraint that blocks projection is virtually the same in both cases.

5.3.2 Definites

The phenomenon known as *bridging*, first analysed by Clark (1975) (also studied by Zeevat 1992, Bos 1995, Asher and Lascarides 1998, Piwek and Krahmer 2000, among others) consists in inferring that there is a link ('a bridge') between two discourse referents which, were it not for the hearer's knowledge of the world, would not be interpreted as being linked to each other. Most examples of bridging inferences consist in a sequence of two sentences, in the first of which a discourse

referent is established that serves as an antecedent to a definite noun phrase oc-
curring in the second sentence. Let us see some examples of bridging inferences:

(5.14)   a. I bought a house last month. The roof needs repairs.

           b. There was a wedding in the neighbourhood. The bride looked
               worried.

           c. I went for a walk last night. The fresh air made me feel better.

The small discourses in (5.14a), (5.14b) and (5.14c), considered as a whole, do
not presuppose that there was a roof, a bride or fresh air. However, if we consider
just the second sentence of each small discourse, the definite noun phrases *the
roof*, *the bride* and *the fresh air* do trigger the relevant presuppositions. Thus,
what prevents these presuppositions from projecting is the indefinites *a house*, *a
wedding* and *a walk* in the first sentence of each small discourse. That is, *the roof*
in (5.14a) is interpreted as the roof of the house I bought last month, *the bride*
in (5.14b) as the bride of the wedding in the neighbourhood, and *the fresh air* in
(5.14c) as the fresh air I took while I was having a walk. Thus, it is inferred that
the definite noun phrase in the second sentence is dependent on the indefinite noun
phrase in the first sentence. Therefore, the context that precedes the utterance of
the first sentence in each small discourse should not entail that there was a roof,
a bride, or fresh air. If it did, the introduction of new discourse referents by the
indefinites *a house*, *a wedding* and *a walk* in the first sentence would be redundant.

Thus, we have a very similar situation to the one that we encountered in the pre-
ceding section where the possessive noun phrase contained a variable that was
bound by a discourse referent previously introduced by an indefinite noun phrase.
The presuppositional and asserted content of the sentence in (5.14a) may be rep-
resented in DRT as in (5.15b) below. I will leave out the adverbial *last month*:

(5.15)   a. I bought a house last month. The roof needs repairs.

           b. [x, y: speaker(x), house(y), bought(x,y), needs-repairs(z), [$\underline{z}$: roof(z,u),
               [$\underline{u}$:]]]

           c. [x, y, u: speaker(x), house(y), bought(x,y), needs-repairs(z), u=y, [$\underline{z}$:
               roof(z,u)]]

           d. [x, y: speaker(x), house(y), bought(x,y), needs-repairs(z), [$\underline{z}$:
               roof(z,y)]]

           e. [x, y, z: speaker(x), house(y), roof(z,y), bought(x,y), needs-repairs(z)]

The main DRS in (5.15b) embeds an anaphoric structure which contains presuppositional material that is not yet resolved. In linear notation, this unresolved presuppositional material is underlined. The variable u in the anaphoric structure finds an antecedent in the main DRS, i.e. the discourse referent y and thus, is bound by it, which is represented by the equation u=y in (5.15c). The rest of the presuppositional material, i.e. [z: roof(z,y)] in (5.15d) cannot find an antecedent and thus, is accommodated in the main DRS, which means that the condition roof(z,y), together with the discourse referent z, are transferred to the main DRS. In the DRS in (5.15e) all the presuppositional material has been resolved.

In the same way as happened with the possessive noun phrases in the preceding section, the presuppositional content of (5.15a), i.e. [z: roof(z,u)] contains a free variable (i.e. u) which is bound by a discourse referent, i.e. y that has been previously introduced by the indefinite *a house* which is part of the asserted content. Once again, the presuppositional content of the small discourse in (5.15a) does not project due to the trapping constraint. Put another way, the speaker of (5.15a) does not presuppose that the house s/he bought has a roof for, though the speaker believes (or acts as if s/he believes) that the house s/he bought has a roof before the first sentence of the small discourse is uttered, s/he does not act as if s/he believes that his/her interlocutor has this belief before the first sentence of the small discourse (i.e. *I bought a house last month*) is uttered. Therefore, the sentence in (5.15a) does not carry the presupposition that there is a roof or any other presupposition in relation to a roof.

We can compare the examples in (5.14) with the examples in (5.16) below. The small discourses in (5.16), considered as a whole, do not presuppose anything in relation to a house, a wedding or a walk. If the presupposition carried by the second sentence in each small discourse projected, the indefinite's introduction of a discourse-new, hearer-new discourse referent in the first sentence of each small discourse would be redundant:

(5.16) a. I bought a house last month. The house needs repairs.

  b. There was a wedding in the neighbourhood. The wedding was boring.

  c. I went for a walk last night. The walk made me feel better.

The sentence in (5.16a) may be represented in DRT as in (5.17b) below, before the presuppositional material is resolved:

(5.17) a. I bought a house last month. The house needs repairs.

  b. [x, y: speaker(x), house(y), bought(x,y), needs-repairs(z), [z: house(z)]]

    c. [x, y, z: speaker(x), house(y), bought(x,y), needs-repairs(z), z=y,
       house(z)]

    d. [x, y: speaker(x), house(y), bought(x,y), needs-repairs(y)]

The main DRS in (5.15b) embeds an anaphoric structure which contains presup-positional material that is not yet resolved and thus, is underlined. The variable z in the anaphoric structure finds an antecedent in the main DRS, i.e. the discouse referent y previously introduced by the indefinite *a house* in the first sentence of the small discourse and thus, is bound by it, which is represented by the equation z=y in (5.17c). In the DRS in (5.15d) all the presuppositional material has been resolved.

More generally, cases such as (5.14a) and (5.16a) are also comparable with ex-amples of conjunctive sentences such as (5.18) below, where the presupposition carried by the second conjunct entails the first clause and thus, if the presupposi-tion projected, the assertion of the first clause would be uninformative:

(5.18) England has a queen and the queen of England is rich.

On the one hand, the indefinite in the first sentence of (5.14a) and (5.16a) (i.e. *a house*) introduces a new discourse referent, which is comparable with the asser-tion of the existence of an individual which is assigned to the discourse referent. On the other, the definite in the second sentence of (5.14a) and (5.16a) (i.e. *the roof* and *the house*, respectively) presupposes the existence of an antecedent with which the variable in the definite (or one of the variables in the definite, as hap-pens in (5.14a)) is identified. Thus, in a parallel way to that in which, in (5.18), the projection of the presupposition carried by the second clause (i.e. *there is a queen of England*) is blocked since, if it were not blocked, it would make the assertion of the first conjunct uninformative, in examples such as (5.14a) and (5.16a), the projection of the presuppositional content triggered by the definite in the second sentence is also constrained since, otherwise, it would make the indefinite's in-troduction of a discourse-new, hearer-new discourse referent in the first sentence uninformative.

Finally, in the following examples, it is inferred that the link between the individ-ual referred to by the proper name or definite noun phrase in the first sentence, and the individual referred to by the definite noun phrase in the second sentence is co-referential:

(5.19)   a. Last night, John Smith was interviewed at the BBC. The 42-year-old American writer said he was happy to be in London.

      b. Do you remember the guy we met at the airport? The bastard stole
         my wallet.

Unlike what happened in (5.14a) and (5.16a), both *John Smith* in (5.19a) and *the guy we met at the airport* in (5.19b) introduce discourse-new but hearer-old discourse referents[2]. Thus, if the definites in the second sentence of (5.19a) and (5.19b) triggered some presuppositional content, there would be no reason why this presuppositional content should contain any free variable. However, my hypothesis is that neither the definite *the 42-year-old American writer* nor the epithet *the bastard* triggers any presupposition. In the case of *the 42-year-old American writer* in (5.19a), the speaker is providing hearer-new information about John Smith, instead of presenting this information as given. As for the epithet *the bastard* in (5.19b), the speaker is expressing his/her own feelings about a certain individual, and the way the speaker feels about this individual is also presented as new to the hearer.

5.4 Chapter Summary

In the first section of this chapter, I dealt with focal presuppositions. The discussion centered around conditional and conjunctive sentences which carry two presuppositions in the second clause, one of which is triggered by a focused constitutent and the other by a definite description. We saw that, depending on the entailment or lack of entailment of the first clause by these presuppositions, the latter project or are conditionalized, but this is regardless of the focal or non-focal nature of the presupposition itself. In the second section, I addressed cases of possessive and definite noun phrases following an indefinite noun phrase within the same stretch of discourse. The presuppositional content of these sentences and small discourses contains a variable which is bound by a discourse referent which has been previously introduced by an indefinite that is part of the asserted content. Thus, following van der Sandt (1992), if the presuppositional content projected out of the scope of the binder that binds the variable contained in the presuppositional content, the trapping constraint would be violated.

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[2]This is regardless of whether the hearer knows who John Smith is in advance. If it happens to be the case that the hearer does not know John Smith, s/he will accommodate the discourse referent introduced by the proper name in the main context. By 'hearer-old', it is meant that the relevant discourse referent is presented as old to the hearer.

Chapter 6

Conclusions

In this thesis, I argue that Stalnaker's (1973, 1974, 1978) notion of *speaker presupposition* can be extended to the presuppositions which are induced by the so-called 'presuppositional triggers'. Furthermore, if the notion of 'presupposition' is understood as a previous commitment of the speaker to the truth of a proposition, it follows that the presuppositions of a sentence (or a discourse or conversation) should be regarded as the conditions that the sentence (or the discourse or conversation) imposes on its context of utterance. It should be stressed that, if we want to know what is presupposed by a discourse segment, we have to look at the context that precedes the utterance of the discourse segment. This is not to deny that the context is in constant change. However, presuppositions, understood as previous commitments of the speaker to the truth of certain propositions, are already present in the context that precedes the utterance of the discourse segment under consideration.

In relation to the latter point, I maintain that the process of accommodation on the part of the hearer consists in the realization that certain propositions are true in the so-called 'common ground', rather than in the addition of these propositions to the context in which the discourse segment is uttered. Presuppositions, when they are accommodated, differ from other inferences drawn by the hearer in that they are not presented by the speaker as new information, but as information which is already known to all the interlocutors. Thus, there is a sense of pretence both in the speaker's presenting as given information which s/he knows is new to the hearer, and in the hearer's willingness to accept as given information which s/he knows that the speaker knows is new to him/her. Thus, Stalnaker's insight that presupposing is acting as if one assumes or believes a certain proposition and as if one assumes or believes that his/her interlocutors assume or believe that proposition is accurate.

One of the consequences of adopting this notion of 'presupposition' is that presupposition projection can be explained in a straightforward way. To say that a presupposition projects amounts to saying that the speaker is committed to the truth of that proposition which, in turn, amounts to saying that the context in which the sentence (or discourse segment) that contains the relevant presuppositional trigger is uttered entails that proposition. In principle, if a speaker utters a sentence that contains a presuppositional trigger, it is because s/he is committed to the truth of the proposition that is induced by the trigger and, in the particular case of compound and complex sentences, this is regardless of whether the presuppositional trigger is in the first clause of the sentence or in some other clause. This means that presuppositions project by default. However, there are cases in which the previous discourse itself serves as an indication that, notwithstanding the presence of a presuppositional trigger, the speaker does not presuppose the crucial proposition. These are cases in which the presupposition entails part of the previous discourse segment. In compound sentences composed of two clauses the second of which carries a presupposition, the relevant previous discourse is the first clause – however, we also saw examples of disjunctive sentences where it is the second clause that serves as an indication that the speaker does not presuppose the potential presupposition carried by the first clause. If the first clause (or, in disjunctions, the negation of the first clause) is entailed by the presupposition carried by the second clause and thus, is logically weaker than the presupposition carried by the second clause, the presupposition should not project. As was argued in Chapter 4, this is because, if the presupposition projected, the speaker's assertion of the first clause in conjunctions would be uninformative, and the speaker's uncertainty about the truth value of the first clause or its negation, in conditionals and disjunctions, would show that the speaker is inconsistent in his/her beliefs.

Thus, it is in order to preserve the assumptions that the speaker is informative and that the speaker is consistent in his/her beliefs (or, at least, acts as if s/he were consistent in his/her beliefs) that presupposition projection is constrained. In these cases, we do not know whether the presupposition carried by the second clause is the case, but we know that, if the first sentence (or its negation) is the case, the presupposition is the case. Thus, the presupposition is conditionalized to the first sentence (or its negation) in the sense that the first sentence (or its negation) is a sufficient condition for the presupposition. However, since what constrains the projection of the presupposition is that the presupposition entails the first sentence (or its negation), the first sentence (or its negation) is also a necessary condition for the presupposition. Thus, the resulting conditional presupposition is a biconditional presupposition.

Furthermore, contrary to what is argued by the so-called 'satisfaction theory', the fact that the first clause (or its negation) entails the presupposition carried by the

second clause should not be an impediment to the projection of the presupposition. That is, if the presupposition is logically weaker than the first clause (or its negation), there is no reason why it should not project, since its projection would not make the speaker's assertion of the first clause uninformative nor would the speaker's uncertainty about the truth value of the first clause show that the speaker is inconsistent in his/her beliefs.

In Chapter 4, I also analysed cases in which the presupposition carried by the second clause, all by itself, does not entail the first clause (or its negation) and, nonetheless, the presupposition is conditionalized to the first clause (or its negation). In these cases, the first clause (or its negation) together with a contextual premise (in many cases, in the form of a generalization) entails the presupposition carried by the second clause. However, if that were all, there would be no reason why the presupposition should not project. These cases have the particularity that, if the sentence that contains the presuppositional trigger is followed by another sentence that provides a different sufficient condition for the consequent of the conditional presupposition, the conditionalization of the presupposition is cancelled. This seems to be a clear indication that the hearer is interpreting the antecedent of the conditional presupposition as the only sufficient condition for its consequent. Since the antecedent of the conditional presupposition is the first clause of the sentence (or the negation of the first clause, in disjunctions), and the consequent of the conditional presupposition is the presupposition carried by the second clause of the sentence, this means that the hearer is interpreting the first clause of the sentence (or its negation) as the necessary and sufficient condition for the presupposition. Thus, in these cases too, we end up with a double implication. However, what in these cases transforms the conditional implication into a biconditional implication, thus forcing the presupposition to be conditionalized, is a defeasible inference. I defend the hypothesis that this defeasible inference is conversationally implicated. Specifically, I argue that conditional perfection is conversationally implicated.

In the last chapter, I deal with a different kind of presuppositional content, i.e. presuppositional content that contains pronouns that need to find an antecedent in order to get an interpretation. In cases where possessive and definite noun phrases follow an indefinite noun phrase within the same stretch of discourse, the presuppositional content induced by the possessive or the definite contains a variable that needs to be bound by a discourse referent previously introduced by the indefinite noun phrase. Thus, van der Sandt's (1992) trapping constraint prevents the presuppositional content from projecting out of the scope of the binder of this variable. However, there are also cases where a definite noun phrase follows another definite noun phrase within the same stretch of discourse, so that both definites are co-referential. I argue that, in the latter cases, the second definite

provides information which is presented as new to the hearer, thus not triggering any presupposition. However, this tentative hypothesis raises the question as to why a presuppositional trigger is used, if there is no presuppositional content whatsoever. I leave this question for further research.

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