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Too

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Abstract of the Thesis

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This thesis undertakes a new investigation in the semantics of English additive particle *too*. I discuss various properties of *too* that have been noticed by scholars in the last four decades, and present some novel data that has not been discussed yet. These data, as we shall see, pose problems for the existing accounts of *too*. A new analysis is developed here to provide solutions to a range of problems. It is rooted in Rooth's (1992) alternative semantics, following the spirit of Beck's (2006) analysis of *again*. I treat *too* as a propositional operator that relates the proposition expressed by the sentence containing it to some contextually salient proposition from a set restricted by the interpretation of focus.

The thesis of Ivan Kapitonov is approved.

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CHAPTER 1

Facts and Theories

Bugs need love too.

—A T-shirt

Additive and iterative particles, such as *too*, *also* and *again* have been since long recognised as presupposition carriers and enjoyed significant interest among philosophers and linguists. Speakers share a robust intuition about what these little particles convey, but the proper analysis of their meaning doesn't come easy. In this work, I shall focus on the English particle *too*, highlight some new data, and offer an analysis that accounts for these new data and captures the presupposition as well as the other properties of *too* that have been noticed up to date.

The particle *too* is normally used to convey some sort of parallelism, a very specific one, in fact. Let us look at an example to facilitate explanation:[1]

(1) John recorded a solo album. PAUL recorded a solo album, too.

In this example, *too* in the second sentence presupposes that there is someone else different from Paul who recorded a solo album. This presupposition is satisfied by the first sentence, which essentially conveys the suitable proposition. In general, *too* relates two propositions, and it requires that there be some parallel information in them, such as "recorded a solo album" in (1), as well as some contrasting information, such as the different agents in our example.

[1] SMALL CAPITALS in examples indicate pitch accent.

It will be handy to informally introduce some terminology here. I shall call the sentence that satisfies the presupposition of *too* its ***antecedent***. In (1), the antecedent is the sentence *John recorded a solo album*. One of the core properties of *too* is its focus sensitivity. *Too* is said to *associate* with some phonologically prominent element in the sentence that contains it, the way it does with the DP *Paul* in (1), and this element is called the ***associate*** *of too*. Association with focus will be discussed at a greater detail later (1.1.2.2), as it will play an important role throughout the paper. The element in the antecedent whose denotation is comparable to that of the associate but is distinct from it will be called the ***alternative*** *of the associate*.[2] In (1) *John* is the alternative. Also, I'll occasionally call the clause that contains *too* its ***host***, which is the second sentence in (1).

1.1 Habitat and behaviour

In this section I shall describe syntactic and semantic properties of *too* that should be accounted for within a desirable analysis.

1.1.1 Syntactic position

Too is rather restricted syntactically: it can only appear in two places in a sentence. One, the most common, is the sentence-final position (2a), the other is the so called auxiliary position (right after the subject) (2b).

(2) a. John hates Bill, and MARY hates Bill too.

b. John hates Bill, and Mary, too, hates Bill.

[2]The term 'alternative' and the current usage of 'antecedent', which I find convenient, are borrowed from Winterstein (2011). In more traditional parlance, 'antecedent' means what is termed 'alternative' here.

Too is ungrammatical elsewhere (3a)–(3d); cf., however, slightly less degraded (3e).

(3) a. *John bet too Mary $5 that it would rain tomorrow.

b. *John bet Mary, too, $5 that it would rain tomorrow.

c. *John bet Mary $5, too, that it would rain tomorrow.

d. *John gave Mary, too, the books.

e. ??John told MARY, too, that he would leave.

The two available positions differ in the interpretation options for *too*. The following subsection talks about these different possibilities.

1.1.2 Associates of *too*

Interpretation of (a sentence containing) *too* wholly depends on what *too* associates with.

1.1.2.1 Orientation on the subject

From the auxiliary position only one interpretation of *too* is possible, namely subject-oriented.[3] Thus, (2b) can only be understood as "Mary hates Bill, just as

[3]It is not just associated to the left. It is subject-oriented even if there are adjuncts to the left of the subject:

(i) Yesterday, Paul ran away from home. He ran away from home LAST MONTH, too.

(ii) Yesterday, Paul ran away from home. *Last MONTH Paul, too, ran away from home.

While it is possible in general to have iterative semantics with the additive particle *also*, which has more of syntactic freedom:

(iii) Yesterday, Paul ran away from home. LAST MONTH he also ran away from home.

John does". It is not possible to construct a grammatical sentence with *too* sitting in the auxiliary position and associated with elements other than the subject, e.g.:

(4) *John hates Bill, and John, too, hates Mary.

Here the subject in the two conjuncts is the same, and the attempt is to parallel two different objects of John's hatred. However, the ungrammaticality of the sentence shows that *too* cannot associate with material to its right.

1.1.2.2 *Too* and Focus

From the sentence-final position, on the other hand, *too* can associate with any element to its left, provided that the element is stressed (5a)–(5d). Under this condition, *too* can even associate with non-constituents (5d).

(5) a. JOHN bet Mary $5 that it would rain tomorrow, too.
b. John bet MARY $5 that it would rain tomorrow, too.
c. John bet Mary five BUCKS that it would rain tomorrow, too.
d. Euclid formulated a theorem, and he PROVED it, too.

What does "associate" mean and how do we know what the association is in each particular case? — may the reader ask. It means that a sentence with *too* receices different interpretations, depending on the pitch accent placement. Thus, we understand (5b) so that John made a bet to somebody besides Mary, while (5c) conveys the intuition that there was something in addition to those $5 that John put at stake as well. Besides the intuition, we see how focus placement affects truth conditions. Imagine, for instance, a situation where John bet Mary and Jane $5 each that it would rain the next day, and no other bets took place. In such a situation, and in some appropriate context, e.g. *John bet Jane money*

that it would rain tomorrow, (5a) or (5c) suffer presupposition failure, while (5b) is felicitous.

This phenomenon, called *association with focus* (Rooth 1992), must be accounted for within a proper theory of *too*, and indeed, it will play a crucial role when we come to our analysis of *too*.

1.1.3 Polarity

Too can only be licensed in a non-negative context, and in the scope of syntactic negation it "turns" into *either*, or else incorporates the negation morpheme and becomes *neither*. *Too* and *(n)either* never appear in one sentence, just as would be expected from allomorphs.

(6) a. John finished the thesis on time and Bill will too.
b. John didn't finish the thesis on time and neither did Bill / and Bill didn't either.
c. John didn't finish the thesis on time and *neither did Bill too / *Bill didn't either too.
d. *John didn't finish the thesis on time and Bill didn't too.
e. John didn't finish the thesis on time and Bill won't either.

(N)either requires syntactic licensing, just a downward entailing context (Ladusaw 1980) is not enough. Compare (7), where there is syntactic negation, with (8), where *too* is fine in the context of a downward entailing verb *fail* (which licenses NPIs). In the former *too* is out, in the latter *either* is out.

(7) John didn't turn in the thesis on time, and Bill didn't either / *too.

(8) John turned in the thesis late, and Bill failed to turn it on time too / *either.

Note also that *too*/*either* do not tolerate syntactic negation mismatch: both clauses have to be either positive, or negative.

(9) *John didn't turn in the thesis on time, and Bill failed to do so either / too.

I take these facts to be *too*'s purely syntactic properties that don't necessarily have to follow from its semantics.

1.1.4 Obligatoriness

Georgia Green (1968:26) noticed that *too* is obligatory when the predicate of the sentence containing *too* is interpreted as implying the predicate of the antecedent sentence, as in (10):

(10) Karl comes from Indiana, and HARRY is a Hoosier *(too).

In (10) *too* must be present, because being a Hoosier implies being from Indiana. Green calls this phenomenon "pseudo-pronominalization of predicates". It is also worth noting that *too* is obligatory in the case of VP-ellipsis:

(11) John writes poems and Mary does (so) *(too).

1.1.5 Hard trigger

The presupposition of *too* is not a defeasible one. For instance, it is not easy to cancel it in a context where the speaker explicitly states his ignorance about the

status of the alternative, as in the following example from Abusch (2010:39):

(12) ??I have no idea whether John read that proposal. But if Bill read it too, let's ask them to confer and simply give us a yes-no answer.

The effect is even more striking in short discourses where the associate of *too* and its only salient alternative are asserted to have the opposite properties, as in the following example:

(13) a. #Mary is away, and Susan is here, too.
b. #Mary is here, and Susan is away, too.

This sort of infelicity feels as something stronger than just presupposition failure.

1.1.6 Inaccessible antecedents

It was pointed out by Zeevat (1992) that *too* is able to access structurally inaccessible[4] antecedents. Characteristic examples include antecedents of conditionals (14), attitude reports (15) (Zeevat 1992:399), and also modals (16):

(14) If John has time, he will visit us tonight. Mary will come too.

(15) John believes that Mary was in Egypt. Sue was there too.

(16) A: John may well retire soon.
B: Peter is retiring, too.

Zeevat (1992) himself does not discuss the examples and only comments that "the phenomenon is quite complex and does not arise equally clearly in all cases. As soon as some semantic effect of the triggers is present their access to inaccessible

[4]In the DRT sence of accessibility.

parts disappears".

I have checked judgements on examples (14) and (15) with three native speakers of American English, and the results suggest that these examples do not present a genuine problem with inaccessibility. Speakers interpret *too* in the scope of the conditional operator and the attitude, respectively. In (14) Mary's coming is dependent on John's coming. The interpretation that Mary is not coming together with John is awkward. Thus the clause with *too* can be thought of as contained within the consequent of the conditional and so presents no problem: the antecedent is accessible for the material in the consequent.

Example (15) seemed weird to all my informants. The problem with this example is that the first sentence requires Mary not to have been in Egypt (by Gricean reasoning). *Too* in the second sentence tries to build a parallel from Sue's trip to Mary's, which must not exist. Consistently with this analysis, the only interpretation, which I got from one speaker, was that "in John's false belief state Sue was in Egypt with Mary". On this reading the host of *too* is in John's belief world, and again, there is no inaccessibility problem.

Nevertheless, examples like (16) still must be reckoned with.

1.1.7 Non-canonical antecedents

This work is empirically driven by the observation that *too* does not always require a preceding assertion or some salient extra-linguistic antecedent for licensing. Sometimes *too* can be licensed by certain inferential processes. To put it differently and perhaps more carefully, there is a difference in the licensing conditions between, say, pronominal anaphors and *too*: the latter can often be licensed where the former cannot. I shall only give a probe of these data here, and the thorough discussion will follow in the next chapter. Here I shall first cite observations from Winterstein (2011), and then present some novel data that have not been discussed

in the literature.

1.1.7.1 Not-at-issue and incompatible antecedents

It was noted by Grégoir Winterstein (2011) that *too* can have not-at-issue antecedents, and even antecedents incompatible with the host. The former include conventional implicatures (17), conversational implicatures (18) and presuppositions (19) (Winterstein 2011:324):

(17) Lemmy, that idiot, came to the party. Ritchie is an idiot, too, — he arrived completely drunk.

(18) For breakfast, Lemmy had an apple. Ritchie only had a fruit, too.

(19) Lemmy is proud to be a bass player. Ritchie plays bass, too, only he's not proud of it.

The antecedent and the host can sometimes be truth-conditionally incompatible. An example comes from (Winterstein 2011:326) again:

(20) A: Did Lemmy and Ritchie do well at the math exam?
B: Lemmy solved all the problems and Ritchie solved almost all of them, too.

The host of *too* in (20) implies that Ritchie did **not** solve all of the problems, and is at odds truth-conditionally with the antecedent clause, that plainly says that Lemmy solved all of them. It makes sense to think of the parallel here not being between solving all and solving not all of the problems, but rather between two good reports about the boys' performance. Notice, by the way, that the two clauses compared by *too* in fact serve as indirect answers to the question about

their performance. The reply could be paraphrased as *Lemmy did well, namely, he solved all the problems. And Ritchie did well, too, namely, he solved almost all of them.* So, both clauses in B's reply express appreciation of Lemmy's and Ritchie's performance, respectively. Moreover, if the question is directly about the amount of the problems solved, such an answer as B's in (20) becomes more degraded, but would be okay without *too*:

(21) A: Did Lemmy and Ritchie solve all the problems on the exam?
B: Lemmy solved all the problems and Ritchie solved almost all of them ($^{??}$too).

Importantly, the constrast between (20) and (21) can be thought of in terms of propositions communicated by B and related by *too*: in (20) it is the parallel between good performance of the two boys, while in (21) it is two different amounts of the solved problems, and the parallel is inappropriate.

It becomes noticeable here, and will appear on a few occasions later, that as soon as we deal with a discourse more complex than "x P-ed and y P-ed, too", it is convenient to reason in terms of propositions, rather than the parallel P's and contrasting x's and y's. These observations will allow me later on to treat *too* as a propositional operator.

1.1.7.2 Inferential antecedents

More unusual is another licensing possibility. Unlike pronouns, *too* can be licensed by inference. Let us take a more familiar example for the beginning. It's known that pronouns cannot be licensed by "subtraction" (example due to Barbara Partee (e.g., (Partee 1993:11)), term from (Kamp and Reyle 1993:307)):

(22) A: Nine of the ten marbles are in the bag.
B: ??It's under the sofa.

Although it is fairly easy to *understand* what B intends to mean, B's utterance is notoriously ungrammatical in such a context. There is no discourse referent established via inference in A's utterance, hence no appropriate antecedent for the pronoun "it".

On the other hand, *too* can live off subtraction:

(23) Only nine of the ten balls are in the bag. My CLUB is missing, too! *They're so precious to me!

Notice that (22) and (23) differ in that the latter, but not the former, contains *only*. It is necessary in (23) and arguably it takes part in supporting the presence of *too*, but importantly it does not improve (22):

(24) Only nine of the ten marbles are in the bag. ??It's under the sofa.

On the standard scalar analysis of *only* (cf. Horn (1969), Krifka (1993), a.o.), we distinguish between its presupposition and assertion. With regards to (23)/(24), they are:

(25) **Presupposition:** 9 out of the 10 balls/marbles are in the bag.
Assertion: no more than 9 balls/marbles are in the bag.

As we can see, neither the presupposition nor the assertion contain any ready-to-use discourse referent for the missing ball. However, the proposition that a ball is missing can be inferred from the utterance *9 of the 10 balls are in the bag.*

(23) illustrates two points. One is, even though there is no discourse referent to antecede *too*, the intuition is clear that it highlights the parallel between the missing ball and club. The other is, even though this intuition is clear, it is not possible to refer to these two missing things with the pronoun *they*. Thus, we conclude that the use of *too* did not create an accessible discourse referent.

As we shall see, examples of this sort present a problem for the current analyses. I shall give more examples in the next chapter, and discuss there the empirical issues and theoretical problems they raise.

1.1.7.3 Parallelism at a meta-level

Interestingly, *too* in its parallelling of information can even go beyond the content of the sentence that contains it. To begin with, consider the contrast reported by Green (1968:24):

(26) St. Louis is not in New York, and New Orleans is not on the East COAST, either.

(27) St. Louis is not in New York, and New ORLEANS is not on the East Coast either.

Green has noted that (27), but not (26), implies that New York is on the East Coast. The two sentences differ only in stress placement. The difference in the interpretation is due to the constituent that is focussed: in (26) focus can project from the direct object to the sentence level, but in (27) it is on the subject *New Orleans* and cannot project upwards[5] (because there is no rule to project

[5]Projection is a phenomenon whereby pitch accent carried by some element is marking a bigger constituent containing that element. It was described by many authors, I'll cite a set of rules from Selkirk (1996) (via Schwarzschild (1999)):
F-Assignment Rules

Basic F-Rule: An accented word is F-marked.

F-marking from a specifier to its head, or the phrase that contains it). So in (26) two whole propositions are contrasted, by virtue of focus projection, but in (27) only the subjects are, and their properties are taken to be identical, or parallel.

If we take the observation further (and adapt it for *too* to fit the present discussion more straightforwardly), we can see something that Green didn't describe: it is easy to get even truth conditional effect in minimal pair for focus placement. Imagine a teacher reviewing a student's exam graded by a TA, who mistakenly deducted some points, and saying:

(28) What's wrong? St. Barbara is in CALIFORNIA, and Baltimore is on the East COAST, too.

(29) What's wrong? St. Barbara is in CALIFORNIA, and BALTIMORE is on the East Coast too.

Assuming that it is USA geography under discussion, (28) is true, while (29) is false. Again, the difference is due to focal stress placement: in (28) it compares two propositions, but in (29) it parallels the two cities, presupposing identity of some relevant property of theirs. This is intuitive enough. So we see in an example which might seem extraordinary, that *too* in fact does it's everyday job — it highlights a parallel. Only in this case the parallel is obviously at a higher level — that of propositions. Informally, it says:

F-Projection:

a. F-marking of the *head* of a phrase licenses the F-marking of the phrase.

b. F-marking of an *internal argument* of a head licenses the F-marking of the head.

c. F-marking of the antecedent of a trace left by NP of wh-movement licenses the F-marking of the trace.

(30) In the present context, the proposition *that St. Barbara is in California* is true, and the one *that Baltimore is on the East Coast* is true as well.

We find further support for such an analysis of (28) in the following example, where the content of two clauses is clearly unrelated, but nevertheless *too* is felicitous. Imagine a student who is glad that he did the test well. He had doubts about a couple of questions, but he sees that he gave correct answers. He exclaims:

(31) I got it all right! Louisiana was purchased from the FRENCH, and Neil Armstrong was the first man on the MOON, too!

Again, in an appropriate context, such as the one above, speakers find *too* perfectly appropriate.

1.2 What's on the market

1.2.1 Existential approach: the early work of Karttunen & Co.

The earliest treatments of *too* assigned it an existential presupposition. It was designed to capture the intuition of there being some parallel referent, the alternative.

Based on Green (1968), Karttunen (1974) describes the semantic contribution of *too* as follows:

(32) Context X satisfies-the-presupposition-of "a is P too" only if either (i) X entails "b is P" for some b ($\neq$ a), or (ii) X entails "a is Q" for some Q ($\neq$ P).

This is formulated under the satisfaction approach to presupposition, which views presupposiiton as a condition that the preceding contex must meet in order to "satisfy" this presupposition.

Karttunen and Peters (1979) (K&P) go on to formalise this rather approximate intuition. They introduce two dimensions of meaning to deal with what nowadays is called non-at-issue meaning (implicatures, presuppositions, etc.). Thus, in their system an expression in the object language "is associated with two expressions of intensional logic". One of them (K&P call it 'the extension expression') is the assertive part of meaning, the other is the implicature, but it can in principle be rendered a presupposition.[6] In the formulae to follow the superscript i stands for the implicit/not-at-issue part of meaning, in our case the presupposition. The superscript e stands for the extension expression. However, we shall be mostly interested in $[\![too]\!]^i$, and leave the assertive part, $[\![too]\!]^e$, in the background: $[\![\phi\ too]\!]^e$ means whatever $[\![\phi]\!]^e$ means. K&P do not offer an explicit formulation of the presupposition for *too*, but it is possible to induce it from the examples they give, e.g., ex. (51c) on page 33. Let us first look at the example, and then I'll provide the meaning (i.e., the presupposition) for *too*.

(33) $\quad John\text{–}drinks\text{–}too^i \equiv [John\text{–}drinks^i \wedge \bigvee x\,[^*\{x\} \wedge \neg\,[^\vee x = j] \wedge drink^e_*(^\vee x)]]$[7]

In this formula, cast in the formalism of Montague grammar, $John\text{–}drinks^i$ is whatever *John drinks* (conventionally) implicates (e.g. that John is male), and the rest is the contribution of *too*. I am leaving out this general implicative part and focus on *too* proper. Abstracting on (33), we get (with trivial modifications

[6] Karttunen and Peters (1979) take the stand that *too* in fact carries a conventional implicature, but I do not follow them here. The question of which exactly sort of implicit meanings this should be is rather immaterial for the formulation of the not-at-issue semantics itself.

[7] The asterisk * here is a constant of type $s, \langle se, t\rangle$ "which represents the contextual restriction on things that are being quantified over; it picks out the set of individuals that are "under consideration" on a given occasion" (Karttunen and Peters 1979:29). We'll have to say more about it later.

of notation) the following presupposition of *too*:

(34) $^{\wedge}too^{i} =^{\wedge} \lambda\mathscr{P}\lambda Q.\mathscr{P}.^{\wedge}\lambda y. \bigvee x\,[^{*}\{x\} \wedge \neg\,[^{\vee}x =^{\vee} y] \wedge Q\,\{x\}]$

This formula speaks about a complex relationship between a property of properties of individual concepts ($\mathscr{P}$ of type $s, \langle\langle s, \langle se, t\rangle\rangle, t\rangle$) and a property of individual concepts (Q of type $s, \langle se, t\rangle$). Most importantly, it says that *too* takes two arguments, namely $\mathscr{P}$ and Q, and checks that there is an individual concept x other than the one whose properties were passed to *too*, and that the two individual concepts have different extensions, and that Q holds of that x. It should be helpful to watch the derivation of (33) from (34) to see how everything comes together and how *too* gets to operate on extensions of individual concepts. To begin with, we pass the arguments: $^{\wedge}John^{e} \equiv\ ^{\wedge}j^{*} \equiv\ ^{\wedge}\lambda P[P\{^{\wedge}j\}]$ (of type $s, \langle\langle s, \langle se, t\rangle\rangle, t\rangle$), and $\hat{x_0}\ x_0$–$drinks \equiv\ ^{\wedge}\lambda x_0[x_0$–$drinks]$ (of type $s, \langle se, t\rangle$).

(35) $too^{i}(^{\wedge}\lambda P[P\{^{\wedge}j\}],\ ^{\wedge}\lambda x_0[x_0$–$drinks]) \equiv$
$\lambda P[P\{^{\wedge}j\}].^{\wedge}\lambda y. \bigvee x\,[^{*}\{x\} \wedge \neg\,[^{\vee}x =^{\vee} y] \wedge \lambda x_0[x_0$–$drinks]\,\{x\}] \equiv$
$\lambda P[P\{^{\wedge}j\}].^{\wedge}\lambda y. \bigvee x\,[^{*}\{x\} \wedge \neg\,[^{\vee}x =^{\vee} y] \wedge drink^{e}_{*}(^{\vee}x)] \equiv$
$\bigvee x\,[^{*}\{x\} \wedge \neg\,[^{\vee}x = j] \wedge drink^{e}_{*}(^{\vee}x)]$

Thus, we have derived exactly what (33) says, except for the implicature of *John*–*drinks*, which we have set aside.

Also, (34) can be made more readable for the present purposes by removing all the intensional notation and leaving the main idea expressed in the first-order logic. Borrowed from K&P, the subscript i in $[\![\cdot]\!]^{i}$ indicates that this is the presupposition.

(36) $[\![too]\!]^{i} = \lambda P\lambda x.\exists y \neq x \wedge^{*}(y) \wedge P(y)$[8]

[8]We have preserved the contextual restriction function *, only now its type will have to be

What this formula says now is that, given a predicate P and an individual x, *too* presupposes that there is a contextually salient individual y that is different from x, and of whom P holds as well.

It should be noted here, that this semantics only suits the argument-associated usage of *too* and is not fitted for other uses, e.g., the predicate-associated ones. Of course, it is in principle possible to formulate another postulate for another type of usage.

1.2.2 Anaphoric dynamic approaches

1.2.2.1 Kripke's argument

Saul Kripke (2009) argued that the conditions proposed by Karttunen and Peters (1979) are not quite enough to capture the contribution of *too*. Such an existential presupposition should be trivially satisfied in many a common ground, and still *too* is notoriously bad discourse-initially, without any sufficient context to support it. Cf. his famous example:

(37) Sam is having dinner in New York tonight, too.

Noting that (37) is bad as an opening of a discourse, he argued that certain presuppositions, *too* included, should be analysed as anaphora. The insight of his work was that the information that is shared by the interlocutors should fall at least in two categories — the active and the passive context:

> The general idea is that the presupposition arises from the anaphoric requirement that when one says *too*, one refers to some parallel information that is either in another clause ... or in the context ...

et, of course.

> Let us call material that has been explicitly mentioned in the conversation, or is on people's minds and is known to be on people's minds, or is highly salient in some way, the *salient* or *active* context. The active context could include a set of questions or topics as well as assertions. The active context might be a complex sort of entity, but it will be the kind of thing that makes uses of *again* and *too* appropriate. There is also a *passive* context, which consists of general background information available to the speakers that is not taken as relevant or on their minds. (Kripke 2009:372–374)

Kripke's argument, originally produced in the early 90's, hit a cord with many scholars of presupposition and much work in this vein was produced in that period, including Rob van der Sandt's "Presupposition projection as anaphora resolution" (1992). Along this line of thinking, *too* has also received anaphoric analyses, among which are Irene Heim's (1992) and van der Sandt's and Geurts's (2001).

1.2.2.2 Heim '92

In Heim's theory a presupposition defines restrictions on the preceding context, which must be satisfied. The Context Change Potential (CCP) of a given sentence is defined only for the contexts that satisfy the presupposition of this sentence (Heim 1992:186). *Too* for Heim "is implicitly deictic or anaphoric, sort of like *in addition to x*, where the intended reference of x is disambiguated at Logical Form by means of a referential index" (op.cit.:189).

To see an example of how this works, consider the following sentence, already with the relevant co-indexing and with focus marked on the constituent which is the associate of *too*:

(38) Henk$_i$ wrote a paper, and Rob$_F$ wrote a paper too$_i$.

The interpretation rule for *too* from Heim (1992:189) is in (39):

(39) $\phi[\alpha_F]$ too_i presupposes $x_i \neq \alpha$ & $\phi[x_i]$

(39) means that a sentence S, in which an argument α is focussed and assocciated with *too*, presupposes the existence of an element x distinct from α, and this x is co-indexed with *too* (that is, *too* gets its reference from x), and the sentence S formed by substituting α with x is true.

So for (38), the use of *too* in the second clause presupposes that someone else besides Rob also wrote a paper. In Heim's context change framework the rule in (39) says the following about (38):

(40) For any context c, c + Rob_F *wrote a paper* too_i is defined iff
Henk wrote a paper in every world in c. Where defined,
c + Rob_F *wrote a paper* $too_i = \{w \in c \mid$ Rob wrote a paper in w$\}$.

This analysis works well for the sentence in (38), since by the time the second conjunct is processed, the first one has already created a *local context* where Henk wrote a paper, and so we proceed to further narrow the set of worlds to those where Rob wrote a paper.

Of course, if the context does not satisfy the presupposition of *too*, the interpretation does not necessarily crash. Accommodation can save the situation. Heim (1992) does not explicitly discuss the version of accommodation she uses, so I'll describe the version from Heim (1983b).

In her 1983 paper Heim treats it as an amendment to the context if the latter does not admit update with a given sentence. That is, if sentence S that presupposes p is uttered in context c, c must entail p for the utterance to be felicitous. In case c does not entail p, it should be amended to c & p, and then the update

with S would become possible. Heim makes a distinction between global and local accommodation, which is not relevant for our purposes, so I shan't go into these details but rather stick with the (generally preferred) global version, as described in this paragraph.

At the same time, Heim does not offer a more detailed discussion of how accommodation should proceed in a given case. Instead of ascribing Heim any particular implementations of accommodation, I'll show in the next chapter that this strategy is not a very plausible one in the case of *too*.

1.2.2.3 Van der Sandt & Geurts '01

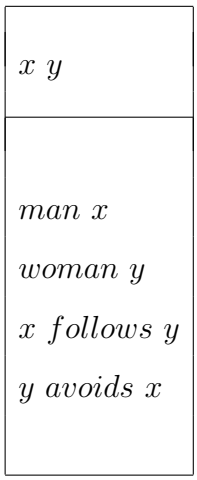
Van der Sandt and Geurts (2001) work in Discourse Representation Theory (DRT), so I'll preface their analysis of *too* with a brief note on DRT semantics.

- DRT utilizes intermediate representations to build a model of discourse
- sentences are first translated into "boxes", or discourse representation structures (DRSs)
- then, boxes are interpreted in a model

A DRS K consists of a universe and conditions:

(41) A man follows a woman. She avoids him.

(42)



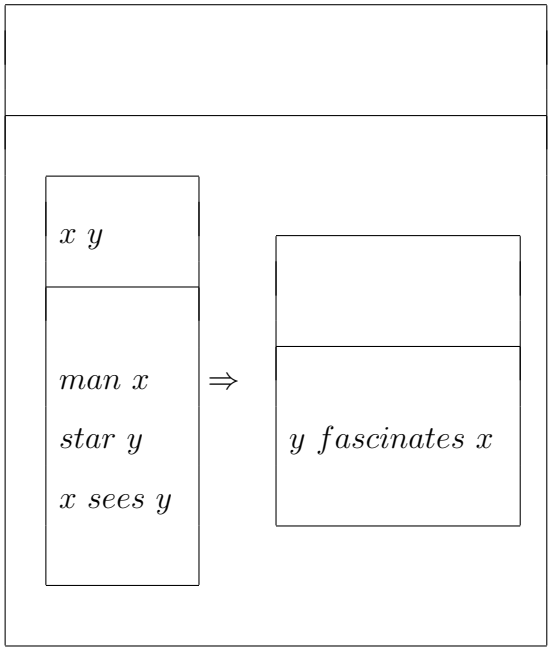
In this DRS, there are two *discourse referents* and four conditions. The same information can be rendered in linear notation:

(43) $[x\ y \mid man\ x,\ woman\ y,\ x\ follows\ y,\ y\ avoids\ x]$

Conditions can themselves consist of DRSs, called *complex* in this case:

(44) If a man sees a star, it fascinates him.

(45)



(46) $[|\ [x\ y \mid man\ x,\ star\ y,\ x\ sees\ y] \Rightarrow [y\ fascinates\ x]]$

Here, the main DRS does not have any elements in the universe, which corresponds to the fact that (44) does not introduce anything to subsequently refer to. The claim omnipresent in the dynamic literature is that (44) cannot be followed by something like *He often walks at night*. Furthermore, the main DRS has only one condition, composed of two subordinate boxes. There is much more to say about construction of DRSs, but I shall leave out futher details and refer the curious reader to the original work, e.g., Kamp and Reyle (1993), or overviews, e.g., Muskens (1996). However, I shall explain the semantics of the representation structures as we come across them in what follows.

There is some more background that needs to be added here, namely treatment of presupposition in (van der Sandt 1992). The main claim of that paper is that presuppositions are just like anaphoric pronouns, with the difference that the former (unlike the latter) have some semantic content of their own, which can support accommodation in certain cases. Importantly, presupposition triggers contain anaphoric markers. Resolution of presuppositions proceeds by way of binding or accommodation. Binding means that there is an antecedent in a position accessible to the anaphoric marker in the trigger, such that it satisfies the descriptive content of that trigger. Accommodation means that when an antecedent cannot be found, the anaphoric marker and the descriptive content are transferred to a higher DRS, as high as is possible without violations of certain technical restrictions and acceptability of the resulting semantics.

Note that, according to van der Sandt (1992:351),

> accommodation of the presuppositional material creates a discourse referent, provides it with descriptive material associated with the presuppositional expression, and thus establishes an accessible antecedent.

> If accommodation takes place at top level, this creates a discourse marker, which can subsequently function as an antecedent for pronouns or other anaphoric expressions to come.

Van der Sandt and Geurts (2001), henceforth SG, build on the framework presented in (van der Sandt 1992) to give a semantics for *too* that captures Kripke's intuition about the non-identity presupposition. In short, Kripke (2009:371) argues that the presupposition *too* evokes in (47) is not that somebody other than the boss comes, but rather that Herb is not the boss.

(47) If Herb comes to the party, THE BOSS will come, too.

They account for this intuition without giving up a more traditional view on *too*. Their proposal is to split the presupposition of *too* into descriptive and anaphoric parts: in TOO($\phi(\alpha)$), there is now a descriptive part $\phi(x)$ and an anaphoric part consisting of a variable x and a condition $x \neq \alpha$. The resulting meaning thus is:

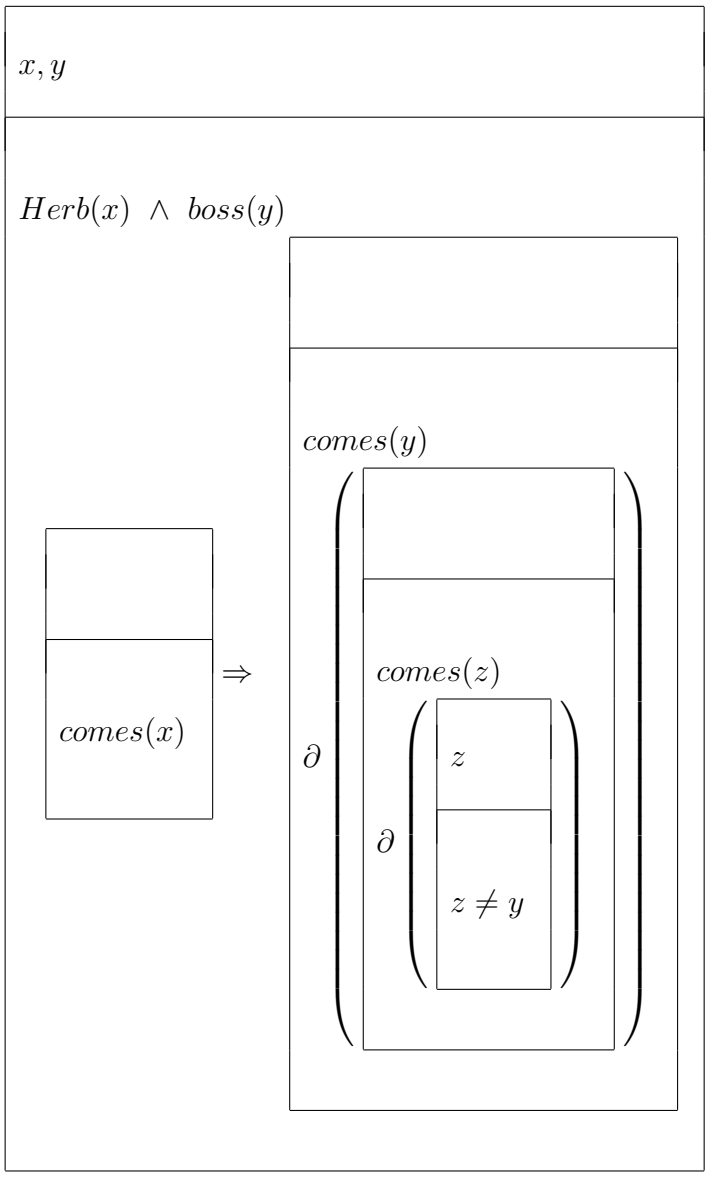
(48) $\partial\,[|\ \phi(x),\ \partial\,[x \mid x \neq \alpha]]$[9]

The formula in (48) says that *too* presupposes that some element satisfies ϕ, and also that this element is distinct from the associate of *too*. Technically this is designed so that the two presuppositions are nested in one another, which makes them resolve in turn. First is resolved the embedded presupposition that there is a variable with value different from α, then the higher presupposition that $\phi(x)$ is true.

Let us see first how it works for (47):

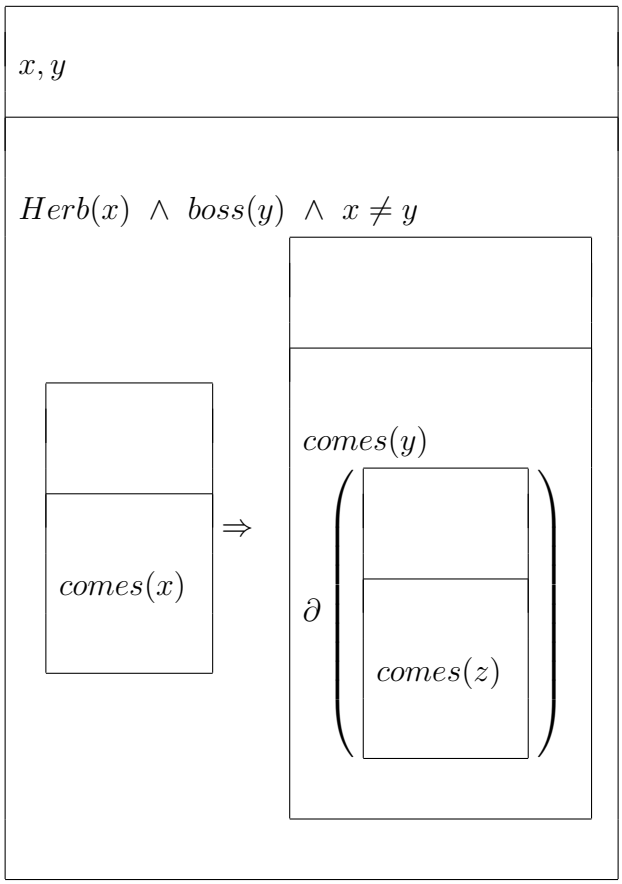
[9]The partial derivation sign "∂" was introduced by David Beaver. Written in front of a box, it marks presuppositional DRSs. Now it is widely used to mark presuppositional material outside DRT framework as well.

(49)



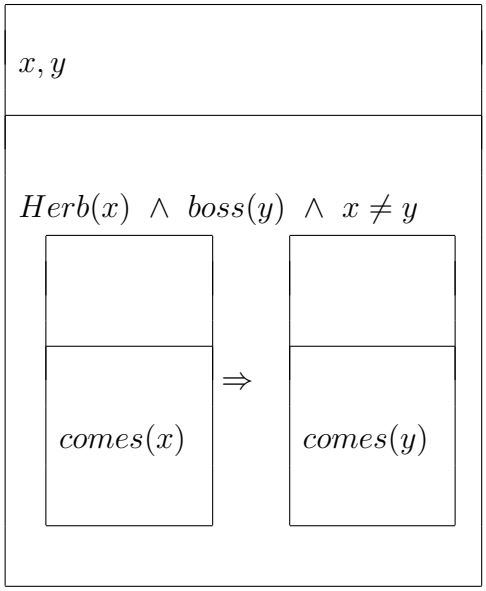
This is the initially generated structure. It says that there are two discourse referents, and the conditions are: one (x) discourse referent is Herb, the other (y) is boss. If COMES holds of x, then it holds of y, and *too* contributes a presupposition that (1) COMES holds of some z, and (2) there is a free variable z that cannot value to y. As I said above, the presupposition resolves in two steps, the most embedded presuppositional DRS first. The anaphoric pronominal marker z can be resolved to x in the upper DRS. We remove the corresponding presupposition from the representation and add the presupposed condition to the main DRS:

(50)



Then, the second presupposition, the descriptive condition, "is resolved to parallel information in the antecedent", yielding the final representation:

(51)



This final structure correctly captures the Kripkean intuition associated with (47): it says that if Herb comes, the boss also comes, and that Herb isn't the boss.

It is highly important for us here, that on their proposal it is explicit that *too* contains a pronominal element, and thus its anaphoricity is equated to that of pronouns:

> On the account we endorse, the presupposition triggered by *too* contains a pronominal element, and this explains why *too* requires an explicit antecedent. (p.4)

One of the main points of the present work is to show that it is incorrect to identify (the anaphoric requirement of) *too* as a pronominal, and also that it is empirically false that *too* requires an explicit antecedent of the sort discussed here.

This takes us to the next chapter, where I show the data on differences between *too* and the more traditional anaphors, and try the two anaphoric approaches described above against these data.

CHAPTER 2

New Facts

This chapter presents a comparison between the licensing properties of *too* and those of pronominal anaphora. More precisely, I shall focus on the antecedent (or licensing) requirements of these two types of objects. I take classic anaphoric elements to require some antecedent in the discourse or the extra-linguistic context (available for deixis). The goal is to show ultimately that *too* differs from the more traditional anaphors. There are two major claims here:

- *too* can refer to things not immediately present in the context (and not accessible to pronouns), and
- *too* does not create an antecedent for anaphors.

Recall example (23) from section 1.1.7.2 (repeated here as (52)):

(52) A: Only nine of the ten balls are in the bag. My CLUB is missing, too! *They're so precious to me!

In Heim's approach, we would want to see the following analysis of (52):

(53) For any context c, c + *my club*$_F$ *is missing too*$_i$ is defined iff
a ball is missing in every world in c. Where defined,
c + *my club is missing too*$_i$ = $\{w \in c \mid$ my club is missing in w$\}$.

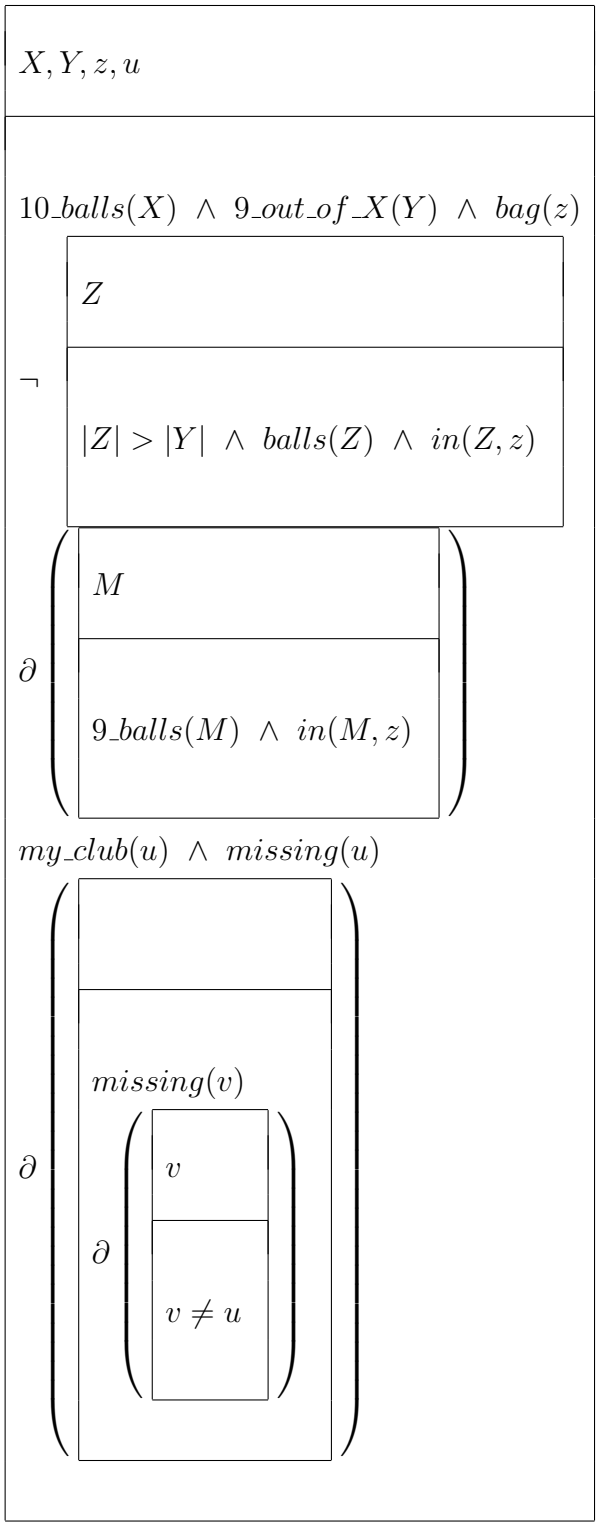
However, there are several problems here. Most notably, the context doesn't say that a ball is missing. It means that the context change potential of *My club is missing, too* is undefined, or, in other words, that the presupposition is not satisfied. Normally, we would accommodate the required presupposition to make the update possible. In Heim's system it means that we need to make the context entail that something else is missing, for *too* to be anaphoric on that.

I think there are at least two problems here if we appeal to accommodation. First, an analysis that allows for such accommodation would rule in sentences like Kripke's (2009) (37) (= *Sam is having dinner in NY tonight, too*) discourse-initially, immediately becoming succeptible to Kripkean critique. There is no clear way to draw a line between (37), where we don't want to accommodate, and (52), where we try to accommodate to save the interpretation. We would probably have to postulate some *ad hoc* restrictions on *too*. Second, no co-indexing is present in LF before the accommodation, so there is no obvious way to derive the presupposition. That is, to accommodate the presupposition that the club is missing in addition to x, we depend on the choice of that x, which becomes circular. The most reasonable move would be to accommodate a non-specific presupposition, that is, use a non-specific x (expressed by an indefinite pronoun, for simplicity). Then the precondition in (53) should read "...iff something is missing in every world in c" (with the wide scope of *something*). Consider a context richer than two or three propositions. Would it be sufficient if we found some object unrelated to the present ball and club talk, that is indeed missing in every w in c? Say, *the planet between Earth and Mars is missing* can be entailed by the context, by virtue of the interlocutors knowledge. Would it pass as an antecedent for *too*? That's what the formalism suggests, but intuitively this is not what (23) means.

Does SG's semantics do a better job? With a reasonable simplification of the plurals , the structure that we get initially is in (54). I follow the analysis of *only*

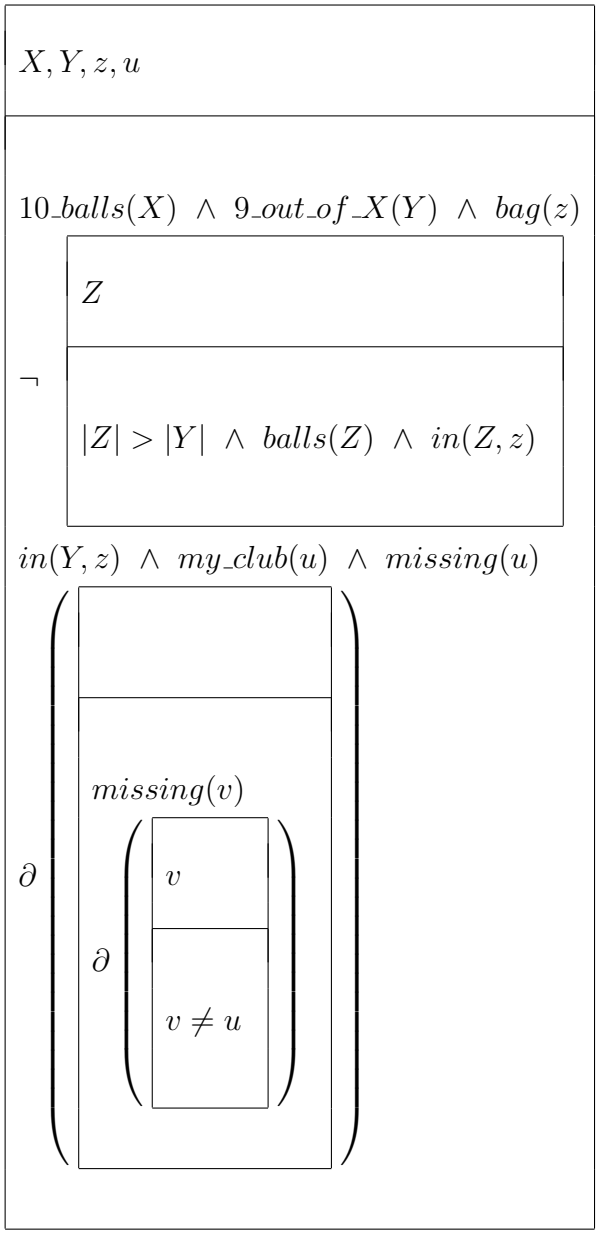
in Horn (1969) and Krifka (1993), taking the first clause in (23) to <u>assert</u> that no more than 9 balls are in the bag, and to <u>presuppose</u> that 9 balls are in the bag:

(54)



The representation structure in (54) says that for some ten balls (X), and 9 balls out of them (Y), and a bag (z), it's not the case that more than 9 balls are in the bag, and it is presupposed that 9 balls are; then, also, that a club (u) is missing, and the presupposition of *too*. Let us resolve the presupposition of *only* first. The presuppositional plural discourse referent M can be resolved to Y, and the condition that it's in the bag can be accommodated:

(55)



Normally we would proceed to resolve the next presupposition, that of *too*. However, there is no suitable way to do it. The marker v in the deepest presuppositional DRS is modelled as an anaphoric pronoun, after SG, but there is no appropriate way to proceed with the resolution of it. There are only three drefs distinct from u, all in the universe of the main DRS, and none of them is a plausible one. There is also a discourse referent in the inaccessible negated DRS, but even if it were accessible it would not help. There is nothing with a matching semantics, and we cannot resolve this presupposition. If we tried to resort to accommodation and transfer the contents of the presupposed DRS to the main DRS, we would create a new discourse referent in the main DRS for the anaphoric element v to depend on, and this would rule in pronominal anaphora. We have seen in (23) that this is not so. SG's analysis predicts either illicit accommodation or a presupposition failure for (23), neither of which agrees with the data.

Now let's see some more examples of the same sort. Consider the contrast between (56a) and (56b):

(56) a. Both my key card and the credit card can open the door, but now I can't find either of them.

b. [Context: Two people are standing in front of the door to a flat where A lives, but B has never been, and A is searching his pockets for a while, and while searching, A says:]
My CREDIT CARD can open the door, too, *but now I can't find either of them.

In (56a) *them* refers to the coordinate DP *the key and the credit card*. In (56b), on the other hand, *too* evokes the intuition that the credit card can open the door along with the key, but nevertheless it's impossible to refer to the card and the

key with the pronoun *them*.

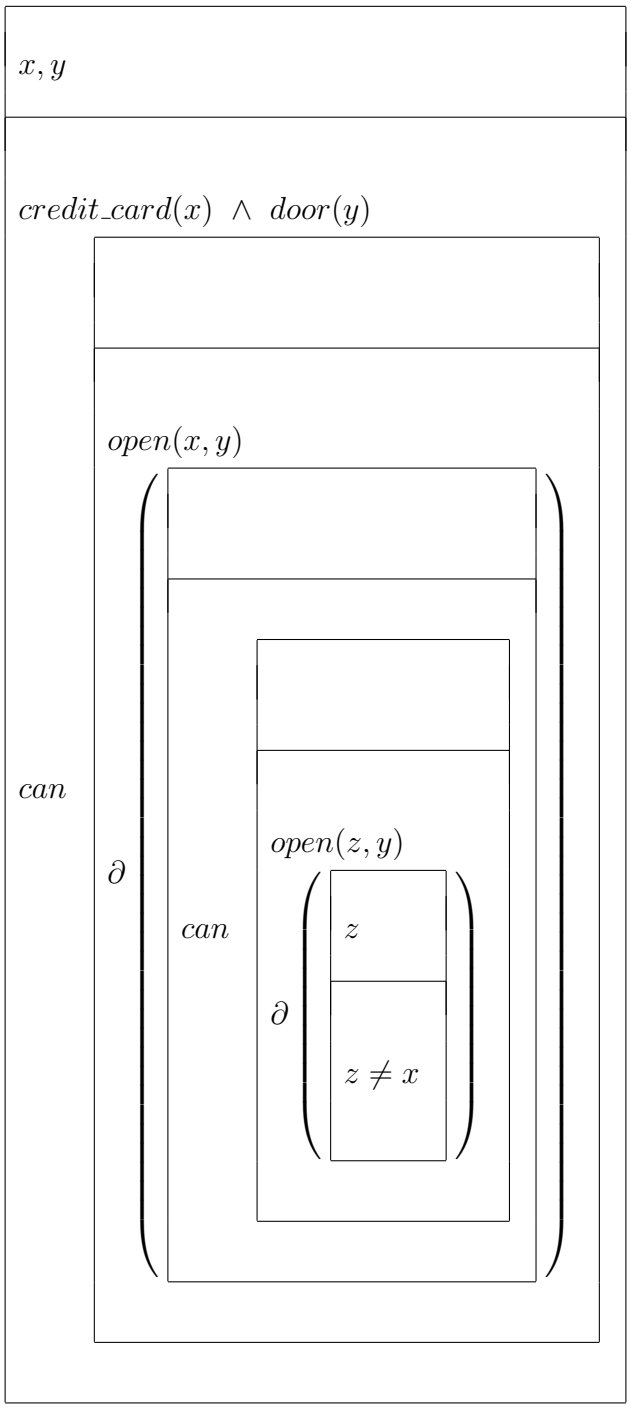
Again, let's spell out what Heim's analysis should tell us about (56b):

(57) For any context c, c + *my credit card*$_F$ *can open the door too*$_i$ is defined iff the key can open the door in every world in c. Where defined, c + *my credit card*$_F$ *can open the door too*$_i$ = $\{w \in c \mid$ the can open the door in w$\}$.

Just as in the previous case, I had to stipulate *the key* as an antecedent. It's not present in the preceding context, and it can't antecede a pronoun the way an overt antecedent can in (56a).

Let us see what SG's analysis yields for this example:

(58)



Again, in this DRS there is no plausible way to resolve the pronominal element in the most embedded DRS. The only dref that differs from x is y, but resolving z to y would get the interpretation that the credit card can open the door just as the door can, which is not a correct semantics for this example.

Compare (59a) and (59b):

(59) a. A: I hear a student of yours in Ling20 is changing her major to Linguistics?
Vania: Yes, her major is Physics, and now she wants to have a Linguistics major.
A: She should just give it up. ["it" can be "physics"]

b. A: Hey Vania, how is that student doing that you're tutoring?
Vania: You know, she likes it so much that now she wants to have a LINGUISTICS major too.
A: She should give it up. [*"it" = "the other major"]

In (59a) it is possible to interpret *it* in A's second utterance as "Physics major", the paraphrase being *She should just give up Physics*. In (59b) there is a robust intuition that Vania's utterance indicates that the student has another major, different from Linguistics. However, this understood major cannot possibly antecede *it* in A's second utterance.

I hope that the attempts of application of Heim's and SG's analyses to problematic examples above have shown that their interpretation of anaphoricity is too strong to work for this kind of data. Since (59b) makes the same point and present a similar problem, I leave it to the reader to verify that the reviewed analyses fail to account for it.

CHAPTER 3

A New Theory

In this chapter I shall present my analysis and show how it accounts for the various properties of *too* discussed in the previous chapters.

3.1 Main ingredient: Focus

Focus will play the crucial role in the semantics to be proposed. We have seen above how robust the association-with-focus effects are for computation of the meaning of sentences with *too*. I shall use the theory of focus interpretation which is developed by Mats Rooth (1992) (for an overview of several different theories of focus, see von Stechow (1991)). He adds a dedicated semantic value for focussed expressions. For instance, the focus semantic value ($[\![\cdot]\!]^f$) of a sentence is, informally, a set of propositions that is obtained from the ordinary semantic value ($[\![\cdot]\!]^o$) by substituting alternatives into the position of the focussed element (Rooth 1992:76). Thus, the focus semantic value of "JOHN *whistles*" is $\{x \textit{ whistles} \mid x \in D_e\}$, that is, the set of propositions obtained by substituting other individuals for `j` in the ordinary semantic value `whistles(j)`.

Rooth reviewed a range of phenomena related to focus to find the common core contribution of focus. In his system, the interpretation of focus induces alternatives, that are used in an idiosyncratic manner by each individual construction or lexical item to construct the meaning. What is common to all focus-sensitive phenomena, then, is that their meanings utilise alternative sets, induced by fo-

cus (hence the name *alternative semantics*). The exact content of these (sets of) alternatives, rather than be supplied by the focus semantic value, is added and constrained by some pragmatic process. Focus itself constrains the possible form of (sets of) alternatives, by virtue of the requirement that the alternatives be a subset of the focus semantic value of the given expression. Thus, for "*he* PROVED *it, too*" (from ex. (5d) in chapter 1) focus semantic value is $\{P(euclid, theorem) \mid P \in D_{e,et}\}$.

All in all, the process of computing meaning of alternatives-based expressions may be viewed as a pragmatically specified function from the utterance context into the powerset of $[\![\alpha]\!]^f$ — so that the set of alternatives is constrained contentwise by pragmatic considerations, and formally by the type of the focussed expression.

Rooth takes the constraints contributed by focus to be an anaphoric presupposition. That is, the interpretation of focus introduces a free variable together with certain constraints on its possible value (and thus, on its antecedent). These constraints are defined in terms of the focus semantic value of the expression at the level of which focus is interpreted. Namely, in the disjunctive formulation that Rooth uses,

(60) **Set case:** $\phi \sim \Gamma$ presupposes that Γ is a subset of the focus semantic value for ϕ and contains both the ordinary semantic value of ϕ and an element distinct from the ordinary semantic value of ϕ

Individial case: $\phi \sim \gamma$ presupposes that γ is an element of the focus semantic value for ϕ distinct from the ordinary semantic value of ϕ

To sum up: Importantly, focus can be interpreted at any level above the focus-marked element, and the focus semantic value of a higher node is computed recursively from the information about the actual focus placement. Focus-sensitive

operators, such as *only, even* or *too*, need not immediately attach or move to the focussed element. They can combine with bigger constituents, and still get the necessary values to work with, since these latter are recursively passed on up the tree as the focus semantic value.

3.2 The proposal

Now that we have semantics for focus as a starting point, we can move to formulate the analysis. Before we see the semantics, it is in order to discuss some syntax.

3.2.1 Syntactic assumptions

Rooth himself does not offer any explanation as to at what level the interpretation of focus should happen, but it seems from the examples, that it usually happens at whatever node it is to be used at. What is important, in fact, is that it doesn't have to be interpreted at any particular level.

Recall that, on the one hand, we have seen that *too* cares about propositions (mostly in section 1.1.7). On the other hand, we have noticed that the most frequently attested syntactic position for *too* is the clause-final position. We need to keep these features in mind to give a syntactically plausible and semantically elegant analysis for *too*.

I am assuming here that vPs denote propositions. With this assumption, I suggest that *too* right-adjoins to vP. This will allow us to derive its periferal placement — to the right of the vP. It will also make sense for a propositional operator, because semantically *too* will combine with the proposition that the vP denotes. A schematic tree is given in figure 1.

As for the syntax of focus, I assume that there is a syntactic focus feature marking the material to be focussed. It is to be interpreted phonologically as a

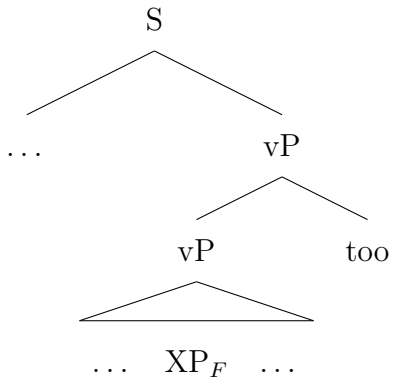


Figure 3.1: Attachment of *too*

certain accent, and semantically according to Rooth's (1992) alternative semantics. I'll customarily represent this feature as a subscript capital F.

Although I leave an in-depth investigation of the syntax proposed here for future research, there are a few facts that support my vP-adjunction hypotesis. *Too* does not interact with modality, tense, and aspect when its presupposition is computed. That is, *too* does not scope over them:

(61) (John applied for the job.) JANE might apply for the job, too.
PRESUPPOSITION: somebody else applies for the job at (a non-specific time) t
#PRESUPPOSITION: somebody else might apply for the job at (a non-specific time) t

As (61) shows, modals (*might*, in this case) do not count when the presupposition of the host of *too* is computed.

(62) (John might vote for Romney.) MITT must vote for Romney, too.
PRESUPPOSITION: somebody else probably votes for Romney[10]
#PRESUPPOSITION:somebody else must vote for Romney

[10]For the appearance of *probably*, see below in §3.3.1.

The point of (62) is that modal mismatch is possible, even with the antecedent sentence's modal being a weaker one. An antecedent that contains *might* can satisfy the presupposition of *too* in a host that contains *must*.

(63) John has filed the thesis, and JILL will do so, too.

Example (63) shows that *too* is not sensitive to tense mismatch.

(64) (John may well retire soon.) PETER is retiring, too. (≈(16))

Finally, (64) shows that aspect mismatch is also possible. Recall also from a previious discussion of this example that the presupposition is satisfied by an antecedent embedded under an epistemic modal.

On the assumption that aspect, tense and modality all project above vP, these examples show some support for the hypothesis that *too* adjoins at the level of vP. It is also interesting to note here that modal operators also do not interact with *too*, in the sense that they only operate on the assertive part of the sentence's meaning, and not on its presupposition. Thus, (61) does not presuppose that

(65) #PRESUPPOSITION: it might be that there is a proposition that somebody else applies for the job; or it might be that the other applicant is someone different from Jill.

or anything like that.

3.2.2 Semantics

With the syntactic asssumption made that *too* combines with a vP, that is, with a proposition, speaking semantically, we shall start constructing the meaning for

too. Let us take a simple example that will help develop the right semantics.

(66) MARY came, too.

The intuitions for (66) that need formalisation are quite representative of any *too*-example. We need a semantics that will account for the following facts:[11]

- assertion: *that Mary comes* is true (at some time) in the world of evaluation — $\lambda w.came(m)(w)$,
- presupposition: somebody else comes (at some time) in the world of evaluation — $\lambda w.came(x)(w) \wedge x \neq m$,
- restriction on presupposition: this somebody else is salient enough in the present context to be identifiable by the hearer — $x \in C$, where C is some set of contextually salient objects of the same type as x.

It is fairly common to formulate the semantics of *too* in terms of a predicate P and its argument x, as we have seen in section 1.2. However, it is not quite obvious where these P and x should come from, that is, how *too* is combined with them compositionally. It is neither straightforward how to reach into the syntactic tree to get P and x, nor even how to identify them in the first place. This is so because the particular choice of x is dependent on focus placement, and the cited papers don't make any reference to the syntax of focus. Since I haven't made any referece to the syntax of focus either, but rather have suggested to attach *too* to the vP level, I need to utilise whatever is available at that level, and by our assumption it is a proposition.

When *too* is combined with a vP (that contains a focussed element), it can make use of the vP's ordinary semantic value and also its focus semantic value.

[11] In view of the discussion above about independence of *too* from tense, I'll start abstracting from it now.

For (66) they are:[12]

(67) a. $[\![Mary\ come]\!]^o = \lambda w.come(m)(w)$

b. $[\![Mary_F\ come]\!]^f = \{\lambda w.come(x)(w) \mid x \in D_e\}$

It is easy to see that we can take the ordinary semantic value (67a) as the assertive part of (66). Thus we have the first of the conditions listed above.

Then, we can use the focus semantic value (67b) to get another proposition: $\lambda w.come(x)(w)$, which is a part of the sentence's presupposition. Next, we need a way to say that the free variable x in it receives a value distinct from m (Mary).

Again, we can manipulate propositions to that effect. Since the propositions in the set $[\![Mary_F\ come]\!]^f = \{\lambda w.come(x)(w) \mid x \in D_e\}$ vary only with respect to the value of x, it is possible to say $p, q \in [\![Mary_F\ come]\!]^f : p \neq q$ to ensure that the value of the variable x be different in p and q: it will be the only thing that can vary and so distinguish two propositions. So, $p \neq q$ is meant to say that they are expressed by sentences with different truth-conditions. Notice two important features:

- we didn't refer to a predicate and its argument — I'll say more about it later,
- this way, the interpretation of *too* introduces a free variable q that ranges over propositions and will serve as an anaphoric element.

Finally, we need to spell out the restrictions on the presupposition — the restrictions on the possible value of the variable q. This is the place where pragmatics kicks in to determine the set C, set of all contextually salient/relevant objects of the type of the variable, here *st*. So far I have to remain vague about

[12] I have to assume here that computation of the meaning of *too* is dependent on reconstruction of the moved elements into vP, to make association with a focussed subject possible. Also, I'm not making any distinction for nonaccusative and nonergative verbs.

the exact algorithm that determines salience and fills in C. I'm just stipulating that it is always at work and for any set D_σ its salient subset C_σ is always available.

Now that we have expressed all the necessary components of the meaning, we can give the formula as a whole:

(68) $[\![too]\!]^{w,g}(p)(\Gamma) = p(w) \wedge \partial[q(w) \wedge (p \neq q) \wedge q \in C]$

Thus, *too* adjoins to a vP and takes its ordinary semantic value — proposition p — and its focus semantic value — set of propositions Γ — as arguments. I take the fairly mainstream (semantic) view on the presupposition as definedness conditions on the context (e.g., Heim 1983a; Heim and Kratzer 1998; Beaver 2001; Kadmon 2001): a presuppositional expression can only be interpreted if the context meets these conditions, or its meaning is defined, in other words. When the meaning of an expression is not defined, then a presupposition failure occurs. So first we check whether *too* is defined at its arguments — this is the presuppositional part of the formula, introduced by the partial derivation symbol ∂. The definedness condition is as follows: there is a true proposition q in the contextually relevant subset C of Γ, such that q and p are different propositions. If defined, *too* checks whether p holds, which corresponds to the assertive part. Otherwise, we have a presupposition failure (but *too* can check the assertive part anyway).

Let us take our toy example MARY *came, too* and apply the semantics in (68) to it. We'll get:

(69) $[\![too]\!]^{w,g}(\lambda w.come(m)(w))(\{\lambda w.come(x)(w) \mid x \in D_e\}) = come(m)(w) \wedge \partial[q \wedge (\lambda w.come(m)(w) \neq q) \wedge q \in C]$, where $C \subseteq \{\lambda w.come(x)(w) \mid x \in D_e\}$

(69) looks like a desirable result—we've got all components of the meaning of (66) that we've outlined above. It says that the utterance presupposes the following:

there is a salient true proposition that someone comes (at some time), and this proposition is distinct from the proposition that Mary comes (at some time).

This analysis has many advantages, among which are the following:

- it is based on focus semantics, which is desirable given the robust association-with-focus effects,
- it is syntactically plausible, given the typical sentence-final position of *too*,
- it is cross-categorial,
- it accounts for the data problematic for the previous approaches.

I shall say a few more words about some of them.

The previous accounts of *too*, even though acknowledging the important contribution of focus to the interpretation of *too*, did not employ the full potential of alternative semantics: van der Sandt and Geurts (2001) don't use focus at all, and Heim (1992) only makes limited use of it. As we see, alternative semantics provides a powerful tool. At the end of this chapter (section 3.4) I shall overview Sigrid Beck's (2006) analysis of the additive adverb *again*, carried out in the alternative semantics framework.

The property of being cross-categorial is rather unique and favourable. Indeed, scholars of *too* have usually formulated semantics for the term-associated uses (LARRY *studies semantics, too*), but not, say verb-associated uses (*Larry* ENJOYS *it, too*). Thus, although in principle it is possible to account for non-term-associated *too* in other approaches, too, it hasn't been done. The present analysis, on the other hand, is quite unspecific as to what type of semantic object *too* associates with, because it is formulated in terms of propositions and sets of their alternatives. Therefore, the present analysis offers a general enough semantics for *too* to account for a range of its uses, while keeping it simple and fully compositional.

And for a demonstration of how the analysis proposed in this paper deals with various prolematic examples, I invite the reader to the following section.

3.3 Many properties, one semantics

I shall go through various data from chapters 1 and 2 to show how the analysis just presented accounts for all the important features of *too* as well as the novel problematic data.

3.3.1 Old data

Syntactic placement and association. I have extensively discussed in the previous section how syntactic placement and association with focus are accounted for, since these facts underlie my analysis, so I'll only briefly mention them here.

The typical clause-final position of *too* results from it adjoining the sentences maximal projection, say, CP. The appearance of *too* in auxiliary position is a reflex of some process in PF, possibly related to realisation of stress in a sentence. There is no need to assume complex syntactic combinations of *too* with its associate to keep sematics compositional. The association effects come from focus semantics: different focus placement results in different focus semantic values, and this is the kind of object *too* works with. Thus, it can sit at the edge, and still have access to structural detail buried deeper in the tree.

Inaccessible antecedents. When I was discussing inaccessible antecedents, I concluded that a proper theory of *too* must account for examples like (16), repeated here as (70):

(70) A: John may well retire soon.
B: Peter is retiring, too.

I should add here that we also must account for the contrast of this example with the following one ((12) in section 1.1.5):

(71) ??I have no idea whether John read that proposal. But if Bill read it too, let's ask them to confer and simply give us a yes-no answer.

If we apply the analysis just developed and look for a true and relevant proposition in the set $\{x \textit{ is retiring} \mid x \in D_e\}$, to give a value to the proposition variable q, we don't find any. The context only supplies a suitable proposition embedded under a modal operator. This fact, I think, requires us to relax the requirement that q be true. We need to be able to deal with antecedents embedded under some epistemic modality. A natural question is, what sort of modality can it be? English speakers report the intuition of a strong contrast between the following two discourses:

(72) ??It is possible that NASA will send a mission to Venus. They are sending a mission to Mercury, too.

(73) It is likely that NASA will send a mission to Venus. They are sending a mission to Mercury, too.

Example (72) is significantly worse than (73), because the former does not have an adequate level of certainty of the antecedent proposition. I take this to signal that *too* requires some higher level of the proposition on the epistemic scale than mere *possibility*. Rather, it should be considered *likely* enough by the interlocutor(s) in the present context. How do we model this? I shall identify this with a probabilistic epistemic modal, similar to *likely* as analysed by Dan Lassiter (2011). In his dissertation, Lassiter associates all adjectival epistemic modals with a single fully closed ratio scale $S_{epistemic} = \langle \Phi, \succcurlyeq_{epistemic}, \circ, \bot, \top \rangle$. On his proposal, *possible*

refers to the minimum point of the scale, *certain* — to the maximum point, and *likely* and *probable* pick out a vague threshold θ_{likely} somewhere in the middle of that scale. The more precise semantics is as follows:[13]

(74) $[\![\phi \; is \; \textbf{pos} \; likely/probable]\!]^{\mathcal{M},w,g} = 1$ iff $\phi \succcurlyeq_{epistemic} \theta_{likely}$[14]

That is, a proposition is *likely* iff it is above some contextually set threshold θ_{likely} on the epistemic scale. For the discussion of how contextual alternatives influence the choice of the threshold, see Lassiter (2011:ch.4). Lassiter also argues that epistemic auxiliaries must be analysed after a similar fashion, and in particular the semantics he gives for *should* and *ought* closely mimics that for *likely* and *probably*, so we can safely treat them on par. Now we can incorporate the semantics in (74) to modify the semantics for *too*:

(75) $[\![too]\!]^{w,g}(p)(\Gamma) = p \wedge \partial[q \succcurlyeq_{epistemic} \theta_{likely} \wedge (p \neq q) \wedge q \in C]$

Thus, instead of requiring the antecedent proposition q to be true, we allow it to be counted as *likely*, that is, above the contextual threshold for likeliness on the epistemic scale of propositions.

With such a move, (70) will be analysed as follows. The formula for *too* (75) tells us that *Peter is retiring, too* presupposes that there is a relevant *and likely* proposition in $\{x \; is \; retiring \mid x \in D_e\}$. The suitable proposition *John will retire* is embedded under a modal *might well*. Given the two contextually relevant alternatives (retire / not retire), θ_{likely} presumably is a value significantly higher than 0.5. Intuitively, *might well* fits such a definition of likelihood, so the

[13]For technical details of Lassiter's proposal, see chapters 2-4 of his dissertation (Lassiter 2011)

[14]**pos** is a type-shifting operaton that gives the positive form of an adjective, borrowed from Kennedy (2007) as cited by Lassiter (2011:9):
$[\![pos]\!]^{\mathcal{M},w,g} = \lambda A_{\langle e,d\rangle} \lambda x_e [A(x) > \theta_A]$, where θ_A is a free variable.

presupposition is satisfied.

As we shall see in just a moment, this move will help us explain indefeasibility of the presupposition of *too*, and account for the contrast between (70) and (71).

Hard trigger. Example (71) demonstrates that the presupposition of *too* cannot easily be defeated. Indeed, if we require the parallel proposition q to be considered likely, then the sentences where speaker expresses ignorance about q are ruled out, since the propositions they express intuitively fail to rank above the likelihood threshold. Consider (71): the ignorance that speaker expresses about the proposition *John read that proposal* means that its probability is set to 0.5 exactly. On the other hand, given that there are just two alternatives, θ_{likely} is presumably set to be a value significantly higher than 0.5, just as it was with (70). The condition that *John read that proposal* = q $\succcurlyeq_{epistemic}$ θ_{likely} doesn't hold, hence the infelicity of *too* in this example and the indefeasibility effect.

3.3.2 New data

Let us look at the examples from chapter 2 first. For the sake of simplicity of presentation and readability, I shall continue using the requirement that q hold true, and pretend we didn't make the move towards modality just above—but keep in mind that it should always be there, as in (75).

Take (23), to begin with (repeated as (76)):

(76) Only nine of the ten balls are in the bag. My CLUB is missing, too! *They're so precious to me!

The semantics in (68) yields:

(77) $[\![too]\!]^{w,g}(\lambda w.missing(my\ club)(w))(\{\lambda w.missing(x)(w) \mid x \in D_e\}) =$
$missing(my\ club)(w) \wedge \partial[q \wedge (\lambda w.missing(my\ club)(w) \neq q) \wedge q \in C]$,
where $C \subseteq \{\lambda w.missing(x)(w) \mid x \in D_e\}$

Now there is space for pragmatic work: some algorithm must deliver a salient subset of $\{x\ is\_missing \mid x \in D_e\}$. It is plausible to suppose that, given the context, it returns $\{$*my club is missing*; *a ball is missing*$\}$. That is, *My* CLUB *is missing, too!* presupposes that *a ball is missing* is true (at some time) in the present context.[15] The precise and formal mechanics of that pragmatic algorithm, though interesting, falls out of scope of the present paper.

Importantly, not only have we derived the desired result for this sentence, together with how it is licensed in the given context, but we also can see why subsequent anaphora does not become possible. Although we have referred to the proposition *a ball is missing*, we did not place it into the context. It never was equated to an assertion in the process of meaning construction, nor was any specific reference made to an idividual in the extension of $\mathbf{ball}'$. We have only operated on propositions, so no new referents are extractable in principle, hence the impossibility to use an anaphoric pronoun referring to the alternative of the associate of *too*.

In what follows, a more concise way of discussing examples will be for me to show the contextually restricted subset C of the proposition set, and how the propositional variable q gets a suitable value.

Now let us see for a difference how the proposed analysis deals with non-argument associated uses of *too*, something that not every account can readily boast. Take example (5d), repeated here as (78):

[15] Notice how close we came to what Heim (1992) would want to say about this example. Only now we've derived it in a more legitimate way.

(78) Euclid formulated a theorem, and he PROVED it, too.

Provisionally resolving *he* to Euclid (e) and *it* to the theorem (take a referential index i for it), and applying semantics for *too* (68) to the example, we get:

(79) $[\![too]\!]^{w,g}(\lambda w.prove(e,i)(w))(\{\lambda w.P(e,i)(w) \mid P \in D_{e,et}\})^{16} =$
$prove(e,i)(w) \wedge \partial\,[q \wedge (\lambda w.prove(e,i)(w) \neq q) \wedge q \in C]$,
where $C \subseteq \{\lambda w.P(e,i)(w) \mid P \in D_{e,et}\}$

So, (79) says that the presupposition of (78) is: there is a salient true proposition in $\{\lambda w.P(e,i)(w) \mid P \in D_{e,et}\}$ such that it is different from the proposition that Euclid proves the theorem. It seems reasonable to assume that C contains at least the proposition that Euclid formulates the theorem, which can serve as a perfect antecedent for the host of *too*.

There is a plenty of "out-of-the-blue" uses of *too*. Consider, for instance, the sentence in the epigraph of this work:

(80) Bugs need love too.

It comes from a T-shirt that Klaus Abels wore during École Automne Linguistique in 2009. Above the inscription there were depicted several colourful bugs. Although no focal stress was marked, I knew right away what the T-shirt was saying:[17] "Bugs need love, *just as other creatures do*". I didn't need even a simple pre-text, nor any non-trivial actions on Klaus's side, to figure out the message. I could just use a very simple world knowledge inference to satisfy the presupposition.

To make this example work in Heim's or SG's models, maintaining the par-

[16]For expository simplicity, I assume a simple extensional type for the transitive verbs here.
[17]It wasn't solely my intuition, other participants of the school shared it, too.

allelism between *too* and anaphoric pronouns, we would depend on a separately motivated analysis for out-of-the-blue pronouns. On the account developed here, on the other hand, there is a ready and natural way to analyse examples like (80):

(81) $[\![too]\!]^{w,g}(\lambda w.need\_love(b)(w))(\{\lambda w.need\_love(x)(w) \mid x \in D_e\}) =$
$need\_love(b)(w) \wedge \partial\,[q \wedge (\lambda w.need\_love(b)(w) \neq q] \wedge q \in C,$
where $C \subseteq \{\lambda w.need\_love(x)(w) \mid x \in D_e\}$.

The result in (81) is the presupposition that there is a salient proposition in $\{\lambda w.need\_love(x)(w) \mid x \in D_e\}$ which is not about the bugs. I shall take the freedom to stipulate that the relevant proposition here is something close to *all living things need love*. Obviously, this is the place in the present theory that leaves us wanting for some explanation. I think that the explanation lies in the nature and precise mechanics of the pragmatic machinery that delivers set C—and so is the matter of future investigation. I shall say a few more words about this in the next chapter. To conclude this chapter, I would like to give an overview of some work related to my own.

3.4 Focus at work *again*

English *again*, a so-called iterative adverb, resembles *too* in certain aspects, and differs from it in others. It is similar to *too* in the character of its presupposition—a repetition, or iteration of some event or state, or, in other words, the existence of another (previous) instance of an event or state. Kripke (2009) discusses anaphoricity of *again* alongside that of *too*. Unlike *too*, *again* gives rise to an ambiguity between the two readings: the repetitive and the restitutive one. Consider the following example:

(82) I lost my golf club again.

On the repetitive reading of (82), the presupposition is that there was a previous time when I lost my golf club. On the restitutive reading of (82), it presupposes that there was a previous time when I did not possess the club. Moreover, the ambiguity disappears in favour of the repetitive reading when *again* is stressed.

Beck (2006), in her analysis of *again* (building on and formalising Klein (2001)), proposes to derive the anaphoricity of *again* as well as the arising ambiguity from focus semantics. For her,

(83) $[\![again]\!](t')(p)(t)(w) = 1$ if $p(t)(w)$ & $p(t')(w)$ & $t' < t$
$= 0$ if $\neg p(t)(w)$ & $p(t')(w)$ & $t' < t$
undefined otherwise

The variable t' in (83) is an anaphoric element. The idea is that focus produces alternative sets after the classic Roothian (1992) fashion with one additional twist. Beck allows the time variables to vary within the focus alternatives in order to get the temporal flow. Thus, "they were in Austin at time t1" counts as an alternative to "they were in Austin at time t2". For instance, the focus value for *In 1999, they were in* AUSTIN *again* is the set of propositions $\{$*they were in P at t* $\mid P \in D_{\langle e,\langle\tau,\langle s,t\rangle\rangle\rangle}, t \in T\}$, i.e., {In 1998 they were in Austin, In 1998 they were in Boston, In 1999 they were in Stuttgart, ...}. Then the context supplies a suitable proposition that is in the set of focus alternatives — in our example it could be *In 1998 they were in Austin*.

Thus, in my analysis of *too* its claimed anaphoricity receives an interpretation of the same sort as that of *again* in Beck's analysis: there is a certain relation holding between propositions (rather than a straightforward modelling the presupposition trigger as an anaphoric pronoun, looking for an antecedent in the preceding sentences).

Presence or absence of the repetitive/restitutive ambiguity is accounted for, in Beck's analysis, via difference of focus placement: focussed temporal expression and focussed adverb result in different sets of alternatives, which influences the choice of readings.

CHAPTER 4

Discussion

This chapter both discusses some aspects of the present work in a broader context and gives some directions for the future research.

4.1 Syntactic speculations

We have already seen that *too* can associate with any object that bears pitch accent, the characteristic of focus, while sitting in the clause-final position. Assuming that focus in a sentence can be interpreted at any level above the marked element, we interpret it at the highest level and obtain the desired result. However, we have also seen that sometimes *too* can appear in auxiliary position, only able to associate with the subject or shifted stressed material to the left (section 1.1.2.1). I take this to be a reflex of phonology, whereby *too* is adjoined and interpreted clause-finally, but then moves to be pronounced next to its stressed associate in phonological form. This might be related to the fact that both the associate and *too* are stressed, and when they occur next to each other, stress doesn't have to be distributed over two positions in the utterance. This cannot be pure phonology and nothing else, though, because it does not move to other places (cf. section 1.1.1). I cannot offer an explanation to this restriction so far and hope that further research can answer this question. However, there is some further evidence for the claim that phonology participates in the surface position of *too*. In the text of (Karttunen and Peters 1979) we find the following sentence

(page 11):

(84) It exhibits another feature too that one would expect of a generalized conversational implicature, namely nondetachability.

The sentence in (84) is meant to say that in addition to having some other feature characteristic of generalised CIs, *too* also exhibits nondetachability. Remarkably, *too* sits between the relative clause and its head, a direct object in this sentence, — which is neither of the two syntactic positions for *too* identified in section 1.1.1. Apparently, in (84) the heavy relative clause dislocated to the right, letting *too* sit next to its associate *another feature*. Otherwise, it could be thought of as *too* moving leftwards, of course.

4.2 On obtaining C

Perhaps the most powerful and at the same time most vulnerable feature of the proposed analysis is the unspecified pragmatic tool that dynamically determines the salient entities and propositions given the context of communication. It makes the analysis powerful because it allows such things as, say, inferential antecedents. And it makes the analysis vulnerable because the mechanics of this tool is not studied, and its user may be accused of handwaving.

Nevertheless, I believe that there are various constraints on the power of the inferential tool. These constraints do not have one unique source, nor do they lie in the realm of linguistics alone. Rather, they should be sough in such domains as attention and memory capacity, reasoning, psycholinguistics, Relevance theory (e.g., Sperber and Wilson 1986), etc., as well as in linguistic structures proper.

Example (80), which turned out difficult to pin down exactly, suggests that still there is some way of resolving presuppositions even without a context that

highlights some things, makes them more salient. Perhaps this way is conditioned by personal background, experience, or world knowledge. The reader may compare her own intuitions about (80) with those reported here—I wouldn't be surprised if different readers get somewhat different interpretations of that example and its presupposition. It may be that in such cases the relevant information, crucial for understanding the message, is supplied by some sort of a knowledge base (of the hearer) according to precise principles (cf. AI work on interpretation as abduction; Hobbs et al. 1993).

My hope is that future research in linguistic pragmatics will contribute to understanding the machinery that subserves far more complex forms of communication than interpreting literary meanings.

4.3 Parallelism

It is the most characteristic feature of *too* that it conveys parallelism, and we have talked about it a lot, and it has had an important place in our analysis. It is worth pointing out in this regard that there are various possible ways to capture the intuition, and that the property of being parallel plays a very important role in different linguistic phenomena, e.g., ellipsis (Kehler 2000; Kehler and Büring 2008), coordination (Paperno 2012), and even anaphora resolution (Kehler et al. 2008).

One way of formalising this property and utilising it for discourse analysis is the framework of coherence relations (Mann and Thompson 1987; Hobbs 1990; Asher and Lascarides 2003). Basically, it tries to determine possible relations between larger chunks of language, such as utterances, how they make the discourse coherent, and how they can be used to account for aspects of language use beyond the sentential level.

The relation Parallel is defined as follows in (Hobbs 1990; from Andrew

Kehler):

(85) Infer $p(a_1, a_2, \ldots)$ from the assertion of S_1 and $p(b_1, b_2, \ldots)$ from the assertion of S_2, for a common p and similar a_i and b_i.

Notably, I didn't have to use anything like this relation to state the parallelism of the proposition expressed by the host sentence and the antecedent proposition. The desired effect naturally follows from the use of focus semantics: both the proposition p that *too* takes and the presupposed proposition q belong to the set of propositions obtained as the focus semantic value of the sentence that *too* adjoins to. This results in both a certain similarity ("a common p") and a certain contrast in elements of the same type ("similar a_i and b_i"), determined by focus placement and interpretation.

Alternatively, parallelism can be expressed in terms of the Question Under Discussion (QUD) framework (Roberts 1998; Büring 2003; some informational coherence results above have been recast in QUD, e.g., ellipsis (Kehler and Büring 2008) and anaphora (Kehler 2009)). In this framework we would say that highly parallel utterances provide (partial) answers to a common QUD (see also Kehler and Büring 2008). The congruence is controlled for by the requirement that every such answer belongs to the set denoted by the question. It is easy to notice that this is very close to the ideas underlying my analysis of *too*. As a propspective of future work, it will be interesting to reformulate the present analysis in terms of QUD framework. There is an additional reason to it: there are grounds to think that *too* associates with contrastive topic (cf. the proposal in (Krifka 1998)). On the one hand, Daniel Büring (2003) argued for a distinctive semantics for contrastive topic, that relies on QUD. On the other hand, to carry this work out seriously, one would need to run phonetic experiments to investigate possible intonation patterns in sentences with *too*.

4.4 Existential revival?

In this section I want to go back to discuss Karttunen and Peters (1979) and the existential approach a little bit more. Recall that I promised to return to K&P's constant * of type $s, \langle se, t\rangle$. This little thing did a very important job for them, indeed, its importance must have been overlooked by Kripke as he argued against their analysis from trivial satisfaction. The asterisk constant is that function that delivers a set of contextually salient things, a set of "active" objects to quantify over. The meaning for *too* requires that the existentially-quantified-over, the presupposed parallel x be in that set of active, or salient things. The asterisk, in fact, immunizes K&P's account from Kripke's critique: their analysis of the example about Sam's New York dining would predict a presupposition failure, i.e. they **can** account for its discourse-initial infelicity. It is so because discouse initially * would not supply any salient individuals, and the part of the condition

$$\bigvee x\,[^*\{x\}]$$

would invariably return 0 for any x.

What is it then that prevents us from just pointing out this detail and embracing K&P's venerable, albeit rejected, analysis? My reason against this is the inferential antecedents data. Under K&P's analysis it is not immediately clear how we can account for the fact that *too* does not create an antecedent, when used inferentially, i.e. without a preceding antecedent expression and in such a context where pronominal anaphora is not licensed. The formula that we've seen in (34) in section 1.2.1 (repeated below as (86)) has a potential of introducing a discourse referent corresponding to the existentially quantified in x:

(86) $\quad ^\wedge too^i \equiv ^\wedge \lambda\mathscr{P}\lambda Q.\mathscr{P}.^\wedge\lambda y.\bigvee x\,[^*\{x\} \wedge \neg\,[^\vee x =^\vee y] \wedge Q\{x\}]$

Indeed, this is the same complaint that we had against accommodation in SG's

theory, as discussed on page 31. I do not intend to conclude that it is impossible to rule out this undesired feature of K&P's analysis. All I want to say is that as of now I do not see a natural way to do so. This means that further research in this direction might yield interesting results. I believe it is worth looking into the tools developed in dynamic approaches, such as Dynamic Predicate Logic (DPL; Groenendijk and Stokhof 1991). The problem of change in information states of interlocutors, and in particular, (im)possibilities of subsequent anaphoric reference, has been central to dynamic approaches to meaning. DPL, for instance, has a distinction between internal and external dynamicity that might be of help for the present goals. However, there still will be problems to solve. For instance, such an analysis does not address focus sensitivity of *too*, and has to say something coherent about the syntax that underlies such a semantics, in order to be compositional.

Conclusion

This thesis has brought together a number of observations about *too* that often had been investigated separately from each other. In addition to that, I have presented novel data that challenged the existing accounts of *too*. I have shown that to give an appropriate analysis for this additive particle, we need a reconsideration of Kripke's insight about its anaphoricity. Namely, the interpretation of *too*'s anaphoric requirement a la Heim (1992) or van der Sandt and Geurts (2001) as an individual- or predicate-level anaphoric pronoun is too limited. Instead, I have proposed an analysis rooted in alternative semantics Rooth (1992), treating *too* as a propositional operator. This analysis, taking association-with-focus into account and relying heavily on pragmatic machinery, is able to account for a range of well-known features of *too*, as well as for the challenging novel data.

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