

Dynamic pragmatics of *too*

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The paper presents a novel existential account of the additive particle *too*. The analysis is based on a combination of compositional DPL-style dynamic semantics and pragmatic reasoning. The existential presupposition is formalised in a dynamic semantics for *too*, while pragmatic principles control for correct resolution of the parallel reference made. The main empirical challenge addressed in the paper is the case termed world knowledge inference, when *too* is felicitous in the absence of suitable antecedents in the context. The combination of dynamic semantics for *too* and pragmatic reasoning provides coverage for such cases, which is a broader range of data than the current anaphoric approaches can deal with. The work appeals to the notion of mental representations of individuals—a twist on the familiar discourse referents.

Keywords additive particles, dynamic semantics, existential presupposition, pragmatics, presupposition

Introduction

The additive particle *too* is widely agreed upon to presuppose existence (in some form or the other) of an entity or a discourse referent (dref) that has the same property as the discourse referent associated with *too*.

According to Zeevat (1992: 399), *too* belongs to the class of parallel, or “book-keeping” presupposition triggers, along with *again*, *also*, *another* etc. These triggers presuppose non-uniqueness, repetitiveness, parallelism of the material/information in their scope with respect to some other information. Typically *too*, as other additive particles, is treated by anaphoric analyses. *Too* is a hard presupposition trigger in the terminology of Abusch (2010), because it is hardly defeasible, which means it is nearly impossible to cancel by a context. For instance, in (1) discourse context “explicitly expresses ignorance about the presupposed existential implication” (Abusch 2010: 39–40):

- (1) ??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.

In fact, *too* is hard to defeat along the lines of another hard presupposition trigger, clefting (Abusch 2010: 40):

- (2) ??I have no idea whether anyone read that letter. But if it is John who read it, let's ask him to be discreet about the content.

This indefeasibility is not at all a common feature of presupposition. For instance, the presupposition of *win* is that the winner participated in the relevant contest. It can be seen in (3a), where *win* projects the inference that John took part in the Road Race from under negation. In contrast to clefts and *too*, it is easy to defeat, as (3b) shows: explicit expression of ignorance about John's participation defeats the presupposition of his participation. Both examples are from (Abusch 2010: 39).

- (3) a. John didn't win the Road Race.
 b. I have no idea whether John ended up participating in the Road Race yesterday. But if he won it, then he has more victories than anyone else in history.

Too is reported to be very resistant to accommodation (see, among others, Schwarz 2007, Spenader 2002 and references therein), which is confirmed by Spenader's (2002) corpus study and indirectly confirmed by Schwarz's (2007) experimental results for its fellow *also* and their German counterpart *auch*.

In this paper I shall focus only on the presupposition of the additive particle *too*. Among the things *too* is widely agreed upon is that it associates with focus. The focussed element that *too* is associated with will henceforth be called its *associate*. I shall be limiting my discussion here to DP-associated uses of *too*, but the argument can as well be applied to its predicate-associated uses.

- (4) Marieka dances, and Jeroen dances too.

As I said above, *too* presupposes existence of an entity or a dref that has the same property as the one that *too* associates with. In (4) *too* associates with *Jeroen*, and the other dref with the same property dances is *Marieka*; the presupposition is satisfied. In what follows I shall call this presupposed entity/dref a (*parallel*) *dependency of too*, and say that the speaker makes *parallel reference* to that entity/dref by uttering *too* in a sentence. Occasionally I'll call the parallel dependencies of *too* either *parallel referents*, or *goals*. This paper studies some properties of the particle and gives it an analysis that captures a wider spectrum of its usage than the previous ones.

I propose a novel existential analysis of *too*, which relies heavily on pragmatics and has the following crucial components:

- DPL-style semantics for *too* that includes existential presupposition and does not rely on anaphoricity;
- pragmatic enrichment that controls correctness of parallel reference making;
- world knowledge inferences;
- mental representations of individuals (MRs) — a notion like “discourse referents” but wider in the sense that it includes objects that interlocutors have in mind, although these things don't overtly appear in the given discourse (no matter verbally or non-verbally). This notion is necessary for treating world knowledge inference cases.

The proposed analysis can be used to handle such tricky phenomena as accommodation, predicate difference, modal and quantifier subordination, and naturally treat non-referential (e.g., proportionally quantified) dependencies of *too*. These features give it advantage over existing anaphoric approaches. The main empirical challenge is presented in (5):

- (5) [Context: Ann and Jack share a stereotype that people in the Netherlands ice skate a lot, and they both know they share it. Jack tells Ann:]
I'm going to the Netherlands this Christmas. I'll be ice skating, too! *I can't wait to meet them!

In this example there is nothing that can be a reasonable “antecedent” for *too*, but nevertheless it can be used and understood as referring to the ice-skating Dutchmen. Note that these *Dutchmen* cannot serve as an antecedent for future anaphora.

In the rest of the paper I review Kripke's and Heim's anaphoric approaches to *too* (Section 1), provide my own account (Section 2) and argue for its advantages over the anaphoric ones (Section 3). I make a short summary and outline some directions for further research in the Conclusion.

1 Anaphoric approaches

1.1 Philosophy: Kripke (2009)

Philosophers since Frege (1892) have extensively written on the problem of presuppositions, but I shall only focus on recent work by Saul Kripke. He opposes the existential presupposition approach to *too* which he calls “a standard account” (and attributes it to Soames (1982)) (Kripke 2009: 372). Existential presupposition can be summarised as follows: the speaker presupposes that there exists a referent in the discourse¹ that is (a) is distinct from the associate of *too* but (b) shares with the associate of *too* some relevant property. As an argument against the existential approach, Kripke gives his famous example:

- (6) Sam is having dinner in New York tonight, too. [Kripke 2009: 373]

The example is supposed to show that the existential presupposition is trivially satisfied, because the common ground of any two “normal” conversation agents must contain information that there are many other people dining in NY, of course. But although the presupposition must have been thus satisfied, the sentence is still infelicitous and the intuition is that it is presupposition failure that makes it bad. Kripke's conclusion is that the existential approach makes incorrect predictions. Instead, he suggests that *too* is anaphoric on some parallel information in the previous context.

In fact, Kripke's contradistinction of his ideas and ideas of other scholars does not seem fair, since whoever discusses semantics of *too* beyond just mentioning it also talks about some kind of parallelism with the previous text. What is important, however, is that Kripke introduces a useful notion of *salient* or *active* context.

¹The presupposed existence of this discourse referent is what *too* has in common with the class of existential presupposition triggers, e.g., *again* or clefts.

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 . . .

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)

This seems to me to be the right intuition about the sources that people use to process *too*. This is very close to my own ideas, and in fact this paper spells out in greater detail the analysis that Kripke outlines². Nevertheless, I see this anaphoricity as a metaphor rather than anaphorocity in technical sense, and I find that linguistic anaphoric accounts of *too* don't fit all the data, in addition to different smaller troubles that I'll point out consequently. I shall review Heim's account in the following section and show what I believe to be shortcomings of such an account in Section 3.

1.2 Formal semantics: Heim (1992)

In dynamic formal semantics, anaphoric approaches to presupposition come in two flavours — satisfaction and binding. I'll present empirical evidence against an anaphoric approach, spelling out the details, for matters of space, using the satisfaction approach³.

Satisfaction account stems from a number of works in 70's (Karttunen 1973, 1974; Karttunen and Peters 1979) and is developed in Irene Heim's work (1983, 1992). On this account, 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). To give an example of how this works in our case, consider the following sentence:

(7) Henk wrote a paper, and Rob wrote a paper too.

For Heim "*too* 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). In the example at hand we are interested in the interpretation where *too* is co-indexed with *Henk*. The focussed constituent, which is the associate of *too*, is represented by subscripted "F". Thus, LF of (7) looks like (8):

²Kripke has another line of argument, namely that *too* presupposes non-identity of two entities, but I'm not touching on this part here.

³The noted empirical problems should extend straightforwardly to the binding account (van der Sandt 1992; explicit analysis of *too* in van der Sandt and Geurts 2001), but I leave the details of this extension to future work.

(8) Henk_i wrote a paper, and Rob_F wrote a paper too_i .

The interpretation rule for *too* from Heim (1992: 189) is in (9):

(9) $\phi[\alpha_F] \text{too}_i$ presupposes $x_i \neq \alpha$ & $\phi[x_i]$

It means that a sentence ϕ , where argument α is focussed and associated with *too*, presupposes the existence of an element x distinct from α , and this x is co-indexed with *too* (which is, *too* gets its reference from x), and the sentence ϕ' formed by substituting α with x is true. Note the co-indexation, it will play a role in the discussion of accommodation in Section 3.1.1.

So for (8), the use of *too* in the second clause presupposes that someone else besides Rob wrote a paper. In Heim's context change framework the rule in (9) says the following about (8):

(10) For any context c , $c + \text{Rob}_F$ wrote a paper too_i is defined iff
 $\text{wrote_a_paper}(\text{Henk}) = \text{T}$ in every world compatible with c . Where defined,
 $c + \text{Rob}_F$ wrote a paper $\text{too}_i = \{w \in c : \text{wrote_a_paper}(\text{Rob}) = \text{T} \text{ in } w\}$.

Heim does not speak about the possibility of such anaphora to non-referential NPs. For instance, what if the sentence was like this:

(11) Many people_{*i*} are here, and Mary_F is here too_i .

(12) For any context c , $c + \text{Mary}_F$ is here too_i is defined iff $\text{here}(\text{many people}) = \text{T}$
in every world compatible with c . Where defined, $c + \text{Mary}_F$ is here too_i
 $= \{w \in c : \text{here}(\text{Mary}) = \text{T} \text{ in } w\}$.

The possible problem here is that *too* tries to get reference from a non-referential quantified DP, so when the algorithm is checking whether the context change function is defined, it could run into problems with " $\text{here}(\text{many people}) = \text{T}$ ". Should it be the same *many people* all the time, or how are they defined? Of course, this issue is also dependent on the treatment of *many x*.

2 Existential approach enriched with pragmatics

2.1 Semantics and pragmatics: Division of labour

One of the great tenets of Heim's theory is that it is a fully compositional, virtually purely semantic account. I am developing not a semantic, but rather a pragmatic account. In what concerns presuppositions, Stalnaker defends a pragmatic conception:

[P]resupposition is a propositional attitude, not a semantic relation. People, rather than sentences or propositions are said to have, or make, presuppositions in this sense. (Stalnaker 1999b: 38)

A proposition P is a pragmatic presupposition of a speaker in a given context just in case the speaker assumes or believes that P , assumes or believes that his addressee assumes or believes that P , and assumes or believes that his addressee recognizes that he is making these assumptions, or has these beliefs. (Stalnaker 1999a: 49)

I take Stalnaker's kind of approach to division of semantics and pragmatics. In this work I assume that the scope of semantics is the literal meaning of a given sentence, and that semantics thus should be able to compute the meaning of a sentence taken out of the context. Context, if any, might be used for disambiguation. The rest of the work belongs to pragmatics. Building both on the literal meaning and on the context, pragmatics attempts to determine the communicated sense, the message. If it fails to do so, the utterance turns out to be infelicitous. But importantly, felicity is not a question of semantics, and an infelicitous sentence is not necessarily semantically odd⁴.

2.2 *Mental representations of individuals*

Discourse referents (the term coined by Karttunen (1976)) serve as labels for variables that range over referents of a specific sort introduced in the given discourse. These entities are specific in that they do not necessarily refer to individuals in the world. Rather, they are characterised by their anaphoric properties — it is just those DPs that allow anaphora to them in further discourse. For our purposes, however, they are not sufficient. Their main limitation is that they are restricted by the universe of the particular discourse. To account for such data as (5; and more examples of this sort to be seen in Section 3.2), we need something that appeals to a person's broad background. I propose such a construct, which I call mental representations of individuals, that includes essentially any representations of objects (in any possible worlds) that interlocutors can have in mind. To give a few examples, MRs can include representations of individuals (e.g., *John* or *Cartesius*), definite descriptions (e.g., *my dissertation advisor*), or groups of individuals (e.g., *milkmen*)⁵.

2.3 *The proposal*

Under the present analysis the presupposition is split into two subcomponents. One is semantic, the other is pragmatic. Semantics of *too* includes an existential presupposition in a rather trivial form. I formulate it in terms of dynamic predicate logic (DPL; Groenendijk and Stokhof 1991). This framework is chosen because of the properties of its dynamic semantics. Although initially DPL was not designed to handle presuppositions, DPL does provide existential quantification and I'll show how we can encode existential presupposition by appealing to this aspect of the formalism. Moreover, the dynamicity of DPL semantics makes it possible to account for the anaphoric properties of this presupposition. Namely, it is easy to encode the intuition of existential presupposition, that there exists an MR with certain properties,

⁴For arguments against a principled division of semantic and pragmatic content see, among others, van der Sandt (1992: 336–341) and Chierchia (2004). Van der Sandt's argument is crucially built on another type of presupposition trigger — definite descriptions. I believe that here lurks a hint that different kinds of presupposition triggers may be more or less “semantic” or “pragmatic”, definite descriptions being closer to the semantic end of the scale and *too* — to the pragmatic; but I'm not developing this idea further here.

⁵I consider it a matter of future work to incorporate this proposal into the extensive recent work on reference in philosophy.

and at the same time to decide whether to pass this MR as a possible antecedent further in discourse or not (recall example (5)). The internally dynamic meaning for *too* supplies a variable in a way similar to what an existential quantifier does. This formalises the existential presupposition intuition. Crucially, *too* does not specify the reference of this new element, but only restricts it to be in the extension of a certain predicate.

The semantics I propose for *too* is in (13). Importantly, individual variables range over mental representations of individuals (MRs), not drefs.

- (13) $\llbracket P(x) \text{ too} \rrbracket = \{ \langle h, h \rangle \mid \llbracket x \rrbracket_h \in F(P) \ \& \ \exists y \neq x \ \& \ \exists k: k[y]h \ \& \ k(y) \in F(P) \}$,
 where $\llbracket x \rrbracket_h = F(x)$ if x is an individual constant, and $\llbracket x \rrbracket_h = h(x)$ if x is a variable.

The formula in (13) says that the meaning of an atomic formula containing *too* is a set of input-output pairs of assignments with an added condition: the atomic formula is a test, just as Groenendijk and Stokhof define it, but *too* adds a variable y distinct from x , and there is assignment k that differs from h at most in the value assigned to y , and the value it assigns to y belongs to $F(P)$. In a certain sense this resembles existential quantification, with the difference that this is externally static, in the sense that it does not pass the value of y assigned by k for future anaphoric reference. The presuppositional part of the formula is the introduction of a variable y that is not explicitly present in the discourse — that is, seen or mentioned — but the use of *too* presupposes it.

I believe that in this formulation the presupposition has nothing to resist the accommodation. That is, with such a meaning for *too* the existence of some MR y , to which a parallel reference was made, is immediately accommodated by the hearer. Here the second, pragmatic subcomponent comes into play. Namely, this component is an instruction for finding out the reference of the new element. The conditions that come from computed semantics serve as input for this pragmatic algorithm, and at the end it returns a suitable object of the parallel refence. But then there arises need to establish exactly this parallel reference made by *too*. The hearer should infer that since the speaker included some additional information beyond the simple assertion about x — namely, he made a parallel reference — this information must be relevant, on the grounds of the following Gricean maxims of Quantity (14) and Relation (15):

(14) Do not make your contribution more informative than is required.

(15) Be relevant. [Grice 1996: 124]

The pragmatic reasoning is as follows. If the speaker has made this parallel reference from the associate of *too*, he must have made it for a reason. The parallelism highlighted by *too* is a part of the relevant information communicated. So far only the existence is established of another MR which is parallel to the one in focus⁶, but its identity is not established yet. Kripke has right in saying that in many cases this

⁶It is important to note that in alternative semantics focus itself generates alternatives. This is very interesting, because apparently the alternatives generated by focus do not suffice for the satisfaction of *too*. Also, these alternatives should not impact the semantics I gave for *too*, because in (13) it is important that the parallel element satisfies the same predicate: $\exists y \neq x \ \& \ k(y) \in F(P)$. I thank Natasha Abner for discussing this point.

parallel reference, if it were to a non-specific indefinite not explicit in the context, should be trivial. If someone says “I play tennis”, it is trivial that somebody else plays tennis, given our world knowledge. The difference between “I play tennis” and “I play tennis, too” is that the second utterance, but not the first one, typically underscores the parallelism of somebody else’s playing tennis. The very difference in the second sentence is that, by using *too*, the speaker has invoked a parallel referent. By this invocation and Gricean reasoning, the speaker has made that parallel referent relevant. However, the use of *too* all by itself does not point to the intended parallel reference⁷. The hearer’s task is to recover its identity (assuming the hearer cares about the information that is forwarded to him), unless the speaker has explicitly supplied the identity of the parallel referent. Essentially the hearer uses what is most accessible to him and what is relevant in the present communicative situation. In Kripke’s terms, he uses the salient context. It can be either linguistic or extra-linguistic context⁸, or his (relevant) world knowledge⁹. The semantic and the pragmatic subcomponents together constitute a single dynamic process of pragmatic presupposition making. The pragmatic component will receive some formal development in Section 3.2.

Let us see how the proposed analysis applies to example (7), repeated here as (16).

(16) Henk wrote a paper, and Rob wrote a paper too.

The clause under consideration is: *Rob wrote a paper too*. Having applied (13) to it, we get:

(17) For *too* associated with *Rob*, $\llbracket \text{Rob wrote a paper too} \rrbracket = \{ \langle h, h \rangle \mid \llbracket \text{Rob} \rrbracket_h \in F(\text{wrote_a_paper}) \ \& \ \exists y \neq \text{Rob} \ \& \ \exists k: k[y]h \ \& \ k(y) \in F(\text{wrote_a_paper}) \}$, where $\llbracket \text{Rob} \rrbracket_h = F(\text{Rob})$.

(17) says: there exists an assignment k verifying $\exists y \neq \text{Rob} \ \& \ k(y) \in F(\text{wrote_a_paper})$. The hearer searches for the identity of y and the shortest path leads him to a referent in the previous discourse: *Henk wrote a paper*. Since $\text{Henk} \neq \text{Rob} \ \& \ F(\text{Henk}) \in F(\text{wrote_a_paper})$, it is set that $y = \text{Henk}$. The more complex cases of world knowledge inference will be discussed in Section 3.2.

3 Existential analysis apology

3.1 Accommodation

In this section I offer an interpretation of infelicitous utterances of *too* which is different from the traditional difficulty-of-accommodation interpretation. I shall try to stick to the spirit of Lewis (1979), who rather informally stated the *rule of*

⁷In other words, *too* is not anaphoric in technical sense.

⁸As discussed in the Introduction (see example (1)), since *too* is not defeasible, context should not explicitly deny or express ignorance in the parallel, otherwise communication is infelicitous.

⁹I assume an accessibility hierarchy, in which linguistic and extra-linguistic contexts, which are explicit, are more accessible than the world knowledge, which is implicit. See Section 3.4, which discusses this issue at greater length.

accommodation for presupposition as one generalisation about the “kinematics” of presupposition:

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 . (Lewis 1979: 340)

Or, even more generally:

[A]ny presuppositions that are required by what is said straightway come into existence, provided that nobody objects. (Lewis 1979: 347)

3.1.1 *On accommodation*

Heim’s (1983) semantic approach to accommodation 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 should become possible (Heim 1983: 254). This strategy excludes accommodation of *too* exactly for the reason of anaphoric nature of *too* on Heim’s account. If there is nothing to co-index *too* with, that is, there is no antecedent for it, the antecedent and the co-indexing cannot be just introduced. If out of blue some new proposition p were introduced that contained a suitable antecedent, it would amount to existential quantification. In other words, a new discourse referent would be introduced, which is definitely not what can happen¹⁰. Thus, on Heim’s account accommodation of *too* appears impossible.

There is a natural intuition that utterances with *too* are not always very felicitous. For instance, Beaver (2002: 42) gives the following example:

(18) *Mary is a one-legged Albanian pole-vaulter too.*

The wide-spread interpretation of such cases is that accommodation of *too* is impossible. Beaver himself notes that such a sentence would not fit as an opening utterance of a discourse, and that it seems to require a linguistic antecedent¹¹, which means that binding is necessary and accommodation is impossible. Heim’s approach would simply state that in an empty context there is nothing yet in the context to co-index *too* with, and the sentence should be ruled out, given that accommodation is not possible for *too*, as we have seen above.

From my point of view, although the sentence is certainly inappropriate to open a discourse, the problem is not due accommodation difficulties. Rather, what makes this utterance an infelicitous start of a discourse is the impossibility of establishing the goal of this parallel reference. I mean that the hearer can easily accommodate the presupposition of another salient one-legged Albanian pole-vaulter’s existence, and infer that the speaker meant to communicate this parallelism, but then he cannot figure out who exactly the parallel is with. This utterance needs some active context that could supply an appropriate parallel referent (just to remind, formally:

¹⁰See discussion of examples (20) and (24) in Section 3.2.

¹¹Or an extra-linguistic one, I would add.

$\exists y \neq \text{Mary} \ \& \ \text{one-legged_Albanian_pole-vaulter}(y)$). For instance, if the interlocutors were watching Paralympic Games, and some one-legged Albanian pole-vaulter were performing, (18) would be a perfect thing to say (given that the hearer knows about Mary's existence). Thus, under my analysis, the problem with such examples is not an accommodation trouble but rather comes from inability at the pragmatic stage to successfully process the accommodated information. At the moment I have no evidence at my avail to prove it. It is only my intuition that (18) has a clear meaning, so its semantics is alright. It may or may not be felicitous, but this is not a matter of semantics at all. However, I do believe that some evidence can be obtained, perhaps experimentally.

Constituent questions seem to me to be a good analogy to the accommodation story. They have an existential presupposition, which can easily be accommodated. Imagine Q asks a question of A, and X overhears it:

(19) What did Henk submit to that conference?

Q's presupposition is that Henk submitted something, and, moreover, that A has certain knowledge about what exactly Henk submitted. X, not being the addressee, upon hearing the question can easily accommodate the presupposition that Henk submitted something. Moreover, if A did not even know that fact about Henk, he still can easily accommodate this presupposition. However, in the case A did not know about Henk's submission the communication is infelicitous, because of the second presupposition failure: A didn't have the knowledge that Q presupposed he had. It is not thus failure of accommodation: B can pretty easily accommodate the existential presupposition, he just cannot give the answer to the question.

3.1.2 *More on accommodation: Spenader (2002) and Schwarz (2007)*

Another argument against accommodation of *too* comes from a corpus study by Jennifer Spenader (2002). She analysed a number of discourses in the London-Lund Corpus of Spoken English, and among 45 occurrences of *too* only in 2 cases (4%) was the presupposition accommodated, while in 43 cases it was bound¹². In contrast, many other presupposition triggers, e.g., definites and factives, lack a binding antecedent more often (40% and 80%, resp.), which suggests that they are easily accommodated. Spenader interprets these data as supporting the view that *too* is highly resistant to accommodation. To me, the data primarily reflect the way speakers employ *too* in the spoken discourse: linguistic antecedents may well be easier to use for both interlocutors, so extra-linguistic contexts and world knowledge are seldom used. Spenader herself hypothesises as follows: "*too* doesn't accommodate well because speakers prefer to first introduce [content — *ik*] by assertion and then bind the presupposed material to it." (Spenader 2002: 124). However, I think this might not be a correct analysis of these very interesting data. First of all, one should not decide too hastily that something "doesn't accommodate well" just because in there are mostly bound occurrences in a corpus. This does not at all show that accommodation is difficult: to show this one needs an example where it is clear that presupposition was made and *failed* to accommodate. Second, although the

¹²Spenader analyses this material in the framework of van der Sandt (1992) and van der Sandt and Geurts (2001), the binding flavour of anaphoric approaches to presupposition.

data in Spenader's work tell a lot about naturally occurring speech, whichever way *too* is used in natural spoken discourse production does not mean it cannot be utilised and understood in other ways, e.g., as information to be accommodated and not bound in a strict sense. To make it a somewhat different point, this may reflect the difference in the usage of additive particles and other presupposition triggers, especially definite descriptions and factives. Definites and factives upon accommodation of their presupposition exhaust the information they convey, that is, they are self-sufficient and allow the usage of accommodation as a regular way to convey information. Say, the definite article presupposes uniqueness of the denotatum of its sister common noun. If this presupposition needs to be and is accommodated, all the relevant information is obtained: there is such and such unique *x*. It is established that the uniqueness of this denotation is relevant; nothing urges the hearer to search for further information, such as the exact reference of the definite description. But *too* is different. *Too* highlights two things: the existence of some MR and a certain relevant parallelism in the properties of this (presupposed) MR and the one *too* associates with. Again, this parallelism is considered a relevant part of the message, because in many a case parallelism with a non-specific indefinite object is trivial, and a co-operative speaker wouldn't highlight it for the sake of being relevant. But *too* does not specify the parallel referent. This is why accommodation of its presupposition alone is not sufficient. There is urge for the hearer to recover the message in full — to determine the intended reference.

I do not see Florian Schwarz's (2007) experimental findings as contradictory to my model either. Schwarz presents three experiments on processing of presupposition of German *auch* 'too' and English *also*. In one experiment, participants read morpho-syntactically ambiguous sentences and had to choose a disambiguating paraphrase after that. The experiment showed that people chose a syntactically dispreferred parse more often in the cases where this parse would satisfy the presupposition of *auch* than in a control condition (without *auch*). This experiment is interpreted as supporting the idea of integration of pragmatic analysis with syntactic parse, so that the former may immediately influence the latter. In the other two experiments, participants were involved in self-paced reading of sentences with *auch* (Experiment 2) and also (Experiment 3), which differed in whether the presupposition of the additive particle was satisfied or not. Reading times of sentences with unsatisfied presuppositions were significantly longer than those of sentences with satisfied presuppositions or of control sentences without additive particles (for the details, see the original paper). Schwarz interprets the results (especially of Experiments 2 and 3) as supporting the assumption in the literature about the difficulties in accommodation of *too* and its fellow additive particles (Schwarz 2007: 398–400). Of course, this is not the only way to interpret the data. We still do not know anything about the reality of processing modules, that is, whether interpretation happens as one indivisible complex process (for instance, Chierchia (2004) argues for spontaneous, on-line pragmatic processing of scalar implicatures), or a sequence of modular processes (e.g., syntax → semantics → pragmatics). Schwarz's paper is to a great extent devoted to investigation of this question. We even do not know if presuppositions belong solely to highly specific linguistic mechanisms of reasoning,

or they are just a component of humans' general reasoning ability and common sense (there is some neurolinguistic work that suggests high specificity of linguistic abilities and verbal thinking, e.g. Fedorenko, Hsieh, Nieto-Castañón, Whitfield-Gabrieli, and Kanwisher 2010; Monti, Parsons, and Osherson 2009). In my understanding of Schwarz's experimental results, the syntactic ambiguity experiment definitely shows that getting a plausible and consistent meaning or information update out of a sentence is more important for humans than sticking to any particular syntactic analysis. However, it does not really show anything concerning the unfolding of this understanding. To make a more substantial claim, I think, the method of eye-tracking could be employed. It presumably would show if there happens anything that resembles (syntactic) re-analysis, and if yes, when it happens. However, this is not the topic of my present paper, so I put further discussion thereof aside. Schwarz's second and third experiments may in my view be interpreted to show that while the existential presupposition can be accommodated, the parallel reference resolution failure may impede the fluency of reading or reader's understanding of the sentence.

3.2 *Parallel reference to world knowledge*

Now let's turn to examples that I believe speak in favour of my proposal¹³. In the simplest case of searching the parallel referent, a suitable "antecedent" can be found in the preceding discourse, and the parallel reference is immediately resolved (or, on Heim's account, the presupposition is satisfied). This is what constitutes the canonical showcase in anaphoric approaches to presupposition. The same happens with an extra-linguistic "antecedent", and could be considered extra-linguistic anaphora in anaphoric approaches. However, these are not the only possible cases, and the identity of the parallel reference can, I argue, be inferred from the world knowledge. Such inference from the hearer's world knowledge has no clear place in anaphoric accounts. Recall (5), repeated here as (20), and consider (21):

- (20) [Context: Ann and Jack share a stereotype that people in the Netherlands ice skate a lot, and they both know they share it. Jack tells Ann:]
I'm going to the Netherlands this Christmas. I'll be ice skating, too! *I can't wait to meet them!
- (21) [Context: a person from Russia has recently emigrated to USA. At the farewell party, he said to his friends that he wished to forget this country and never come back. His friends speak among themselves:]
Wait and see, he'll be going to Russian groceries on Brighton Beach too. He'll be missing birches and Russian blizzards too.

The inference is rather clear: the antagonist will be going to Russian diaspora groceries just as all Russian emigrants in New York do. And he will be missing birches and blizzards, like a stereotypic Russian emigrant does. Although it is trivial that there are many other people visiting Russian groceries on Brighton Beach, and many unrelated people in the world for some reason feel nostalgic about birches

¹³I am indebted to Lyn Frazier for a very enlightening discussion of this section. Of course, any inconsistencies or mistakes are my very own fault.

and about blizzards, the sentence is quite felicitous even in the case where there is no appropriate linguistic or extra-linguistic “antecedent”, e.g. the context with no previous reference to Russian emigrants in New York. This does not fit very well with the anaphoric accounts. The parallelism cannot be construed to the speakers themselves or their immediate environment. But there is a context in a broad sense, a salient situation — immigration, and world knowledge supplies information on that topic, which may be used for parallel referring. Although there is neither a linguistic, nor an extra-linguistic antecedent present, (21) is good, because the relevant parallel reference can be established with the help of world knowledge¹⁴. Under a pragmatically-driven analysis, such as the one proposed in this paper, it is not difficult to develop an account of such cases.

World knowledge inference under my approach can be a special case of parallel reference pragmatic resolution. The latter, as discussed earlier, is essentially informed by the active context. I suggest the following rule of parallel reference:

- (22) Let non-empty non-singleton natural set $A = \{z \mid z \in F(Q)\}$ of MRs be active for both the speaker (S) and the hearer (H) [*activeness* understood here as: each of S and H knows 1) how A is defined, and 2) that the other knows how A is defined]. If there is active $x \in A$ such that $\llbracket x \rrbracket \in F(P)$, then for $y \in A$, $y \neq x$ S may utter “ $P(y)$ too”, and H can make an inference that *too* depends on x .

Indeed, world knowledge inference is a subcase in this rule. It is just those cases when there is no appropriate parallel referent either in linguistic or extra-linguistic context, but some active x is provided by the situation (e.g., some shared stereotype), and reference can be made to it — although x may never have been introduced in the current discourse context. (23) demonstrates application of this mechanism to (20):

- (23) Semantics (ignoring the tense and simplifying the indexical):

$$\llbracket Jack_F \text{ will be ice skating, too} \rrbracket = \{\langle h, h \rangle \mid F(Jack) \in F(ice_skates) \ \& \ \exists y \neq Jack \ \& \ \exists k: k[y]h \ \& \ k(y) \in F(ice_skates)\}$$

Pragmatics: H infers that S believes that H shares S’s knowledge about who else ice skates in the relevant context. Set $A = z \mid z \in F(is_in_the_Netherlands)$ is activated for both S and H by the phrase *the Netherlands*, and since Dutch ice skating is a shared stereotype, A contains active x ’s (Dutchmen) such that $\llbracket x \rrbracket \in F(ice_skates)$. Given all this and in addition the information that Jack will temporarily be included in A , Ann should make a (world knowledge) inference that Jack will be ice skating just like people in the Netherlands are. So it may be set that $y = Dutchmen$.

Notice: Because *too* is externally static, assignment k is not passed on, and Jack cannot utter “I can’t wait to meet them” where *them* is understood as those Dutchmen. This fact is in agreement with native speakers’ intuitions.

Although there is nothing in the preceding discourse that could serve as an “antecedent” for *too*, the treatment I propose still can account for examples like (21)

¹⁴Interestingly, in such cases, use of *too* is not necessary, whereas in the sentences with an accessible linguistic antecedent *too* seems obligatory. So far I don’t have anything else to say about it.

and (20). To account for such examples under an anaphoric approach, one would have to devise a tool that would bring certain MRs (or drefs) from the relevant encyclopaedic or situational knowledge into the discourse, and take care that these new elements cannot function as regular drefs w.r.t. anaphora. Such device is conceivable, but less parsimonious, and may turn out to be tricky.

Denis Paperno (p.c.) suggested that ungrammaticality of anaphoric *them* in (20) may be due the clash between the extensional predicate *meet* and its argument *the Dutchmen*, the intended antecedent, whose status here is generic. While this certainly can be a source of the problem, examples without such clash still block anaphora in the same way:

- (24) [Context: Thom, Rachel and Ivan go to a restaurant together. Ivan drinks a lot of beer and always orders beer to his meal. Rachel only seldom drinks beer. After choosing a table, Thom and Rachel sit down, Ivan goes to wash hands, and Rachel says to Thom:]
I'll have a beer, too. I'll ask Ivan/*him for advice which to order.

In this example inference is that Rachel wants to order beer *like Ivan always does*. However, MR *Ivan*, used as the parallel reference of *too*, is not a possible antecedent for *him* in the following sentence¹⁵.

(21), (20) and (24) are all seemingly good examples. But the analysis in (22) should also predict that if no active set is formed, usage of *too* is infelicitous. This prediction is borne out by the facts, compare the good examples to the next one (due to Lyn Frazier, p.c., and slightly modified):

- (25) [Context: Alice and Joanna share a stereotype that Italians only eat pasta, and they both know they share it. One day they are having lunch with their friend Saul, an American. Saul orders pasta, and Joanna tells Alice:]
#Look, Saul is eating pasta, too!

Now this utterance is infelicitous if the topic of the Italians' gustatory habits has not been raised in the previous context. This is expected if there was nothing to activate Alice's and Joanna's stereotype about Italians. Then the world knowledge inference cannot be used, because Saul in no way belongs to the relevant group, i.e. Italians¹⁶. If one undertook development of the tool for sticking in elements into the context for *too* to be anaphoric on, he'd have to distinguish between possible and impossible discourse enrichments. Besides correct predictions for (25), my account is immune to Kripke's argument concerning (6). My analysis would correctly rule (6) out in the absence of any appropriate context, and would rule it in if some (plausible) context or world knowledge were present.

¹⁵Notice here that the relevant active set is a singleton set.

¹⁶Note that if Saul was their Italian pen-friend, first time visiting them, and they took him to a restaurant after his arrival, the appropriateness of the sentence would improve dramatically.

3.3 Arguments of formally different predicates

There are cases where the two parallel MRs are in extensions of different predicates. Examples are abundant, which means that it is a fairly standard and easy way to build parallels. However, this fact should be somewhat uneasy to any formal approach. On the present account, much of the work happens at the pragmatics level. This makes possible for other pragmatic factors to interact with the parallel reference determination while it is in progress. The main advantage is that the search of the goal is not restricted by formal matching of semantic “building blocks”, but inferential processes can help determine the parallel individual(s). Consider the following pair of examples:

- (26) The Emperor was the first to seize a spear and push his way into the middle of the Scythians, and then he struck down the first man he encountered. And the soldiers, too, showed themselves no less keen fighters. (adapted from The Alexiad of Anna Comnena Book VIII. War with the Scythys (1091), apud Google)
- (27) The Emperor was the first to seize a spear and push his way into the middle of the Scythians, and then he struck down the first man he encountered. And the soldiers, too, were cruel and violent and beat many brave Scythians.

The second sentence, the one containing *too*, in both examples introduces some sort of an attitude or evaluation along with paralleling the soldiers to Emperor Alexius. However, the tone and content of the continuation is very different in the two cases – while (26) praises the deeds of the Roman Emperor and soldiers, the other example (27) disapproves of their cruelty. This shows how the presupposition of *too* can influence the interpretation of the context. In (26) *too* triggers the presupposition that someone in addition to the soldiers showed himself as a keen fighter. Alongside hearer’s attempt to construe the goal of the parallel reference and as the result of it, Alexius’ pushing his way with a spear into the middle of Scythians, which is already in the context, is evaluated as brave conduct. In (27) *too* triggers the presupposition that someone besides the soldiers was cruel and violent. In this case, Alexius’ behaviour receives a negative characterisation. Formally at the point of update with the second sentence the context is completely the same in both cases, and its content is perfectly compatible and consistent with any continuation. Thus, the same context can “satisfy” rather contradictory presuppositions. On my account, the information in the context would serve as a base for different inferences, depending on the particular continuation that has the parallelism indicator *too*. Thus, with the behaviour of the emperor and the soldiers described as a parallel, killing Scythians may be understood to be meant to be brave and honourable, as in (26), or to be meant to be cruel and probably dishonourable in (27). As long as a certain evaluation of the events described in the first sentence is compatible with the hearer’s beliefs, that is “provided that nobody objects”, it is applied and the presupposition “comes into existence” (see beginning of Section 3).

In Heim’s framework, for any context c , $c + \text{the soldiers}_F, \text{too}_i, \text{were cruel}$ is defined iff the emperor was cruel in every world in c . This is not what the first sentence says, nor is it entailed logically. If my argument above is correct and

accommodation of something like *Alexius_i was cruel* is impossible for Heim, what else can be done to save the situation? For instance, we could stipulate that the requirement that the CCP function be defined drives another inferential process, which intersects *c* with all the worlds where striking down the first Scythian to be encountered is considered cruel. Note that this looks precisely like accommodation in Heim's (1983) framework— *c+p*—but this is not an actual accommodation. As a result of this intersection, *c* will necessarily entail the required cruelty of the emperor in every world. But this trick of narrowing the context down, which corresponds to the evaluation that happens under my treatment, does not seem to be in line with Heim's compositional semantic account as it stands. I think it might be possible to supplement it with some pragmatic principles that would take care of such issues.

3.4 Choice of the resolution manner: linguistic, extra-linguistic, encyclopaedic goals

After the accommodation of the existential presupposition associated with *too*, an antecedent may be found not only within the previous discourse or in salient extra-linguistic context, but also with the help of encyclopaedic or world knowledge. One interesting question in this respect is whether there is any fixed rule for antecedent finding, or at least any general principle or strategy which hearers usually follow. I believe that discourse, as information exchange, tends to be organised in a more or less effortless way. In other words, in a normal conversation participants try to be cooperative (following Grice's Cooperative Principle). For the present case it means that the speaker when uttering the word *too* and making thus a parallel reference presumes that the hearer is capable of construing the intended reference. Furthermore, I suppose that there is a scale of the referent retrieval easiness. Namely, it is easiest to retrieve the referent from the most active context, either linguistic or extra-linguistic. Encyclopaedic or world knowledge is implicit and does not belong to the discourse context, which means it cannot become active without becoming verbalised (that is, becoming linguistic context) or being made salient by other means, e.g. visualised (that is, becoming extra-linguistic context). The scale "guides" the hearer in the search of the intended reference, in the sense that the hearer first checks for appropriate candidates in the most active context, then in the less active one, then uses his world knowledge. Of course, as soon as the referent is found the search breaks. Also search breaks, but without success, if the referent is found, but the context denies or expresses doubt in the parallel construed. If the referent cannot be found, the communication is also infelicitous, and the hearer may ask of the speaker: Whadda ye mean "*too*"? In a typical conversation the most active context is the linguistic one, that is, the content of the conversation. For example, if two persons sit and talk in a room where nothing happens their extra-linguistic context may well be impoverished, but the linguistic one would be very salient. Perhaps prevalence of the active linguistic context is the most typical situation. Recall Spender's findings that *too* has occurred unbound only twice out of the total of 45 occurrences in her corpus. This may indicate that it is common to bind *too* to linguistic antecedents in a typical polylogic discourse. On the opposite, if two persons watch a sports game and barely speak, then their extra-linguistic context should be much more active

than the linguistic one. And if one of them points out at a player and exclaims: *Look, Midane fell over, too!* — he might make a parallel reference to another player who fell over just before, even without having that player in the previous discourse. Keep in mind that on the present account the semantic analysis happens prior to the pragmatic reasoning. From this it follows that semantics can impose restrictions on the interpretations, and even delimit the possibilities for parallel reference resolution. For instance, there may exist certain linguistic structures that force the choice of a linguistic antecedent. One example of such a structure might be coordination, since coordination below clause level is itself in certain sense built on parallelism. Compare Heim's (1992: 190–191) examples (28) and (29).

- (28) John doubts that Mary is here and/but believes that Susan is here too.
 (29) John doubts that Mary is here. He believes that if Susan were here too there would be dancing.

Heim says that both examples are deviant, at least she explicitly means it for a particular co-indexing, the one under which *too* is anaphoric on Mary¹⁷. However, there seems to be an asymmetry between these two examples, the second being better than the first one. In the first one VP-coordination invites to construe the parallel reference from the second conjunct, where *too* is contained, into the first one. But the first conjunct says that in the world of John's beliefs¹⁸ Mary is absent, so Susan's presence cannot be paralleled to Mary, which makes the utterance infelicitous. In (29), on the other hand, there is no such configuration. To make sure that English native speakers' intuitions support this hypothesised distinction, I have asked three people, and have got three different judgements, each telling something interesting. One of them said that both examples are fine, because an appropriate context immediately comes to mind. And Susan, according to this informant, "would be with the speakers that are discussing their present company". It means that he interpreted *too* as making reference to extra-linguistic context, due to the presence of the indexical *here*, I think. Another speaker made use of the context that I offered to facilitate a certain interpretation, namely, parallel reference to John, not to Mary. Here is the context:

- (30) Susan is a professional dancer and she loves to arrange dancing at the parties she comes to. John is a fan of this, too, but Mary disapproves of it. So when Mary is present Susan hesitates to initiate dancing.

This speaker said that (29) is better in this context than (28). The third speaker didn't like (28) at all, and for (29) had a quite different interpretation, similar to one of the readings I'm getting. On this reading, neither Mary nor Susan are here in John's belief world, but John thinks that only if they **both** were present would there be dancing. The second and the third informants (but not the first one) seem to support my hypothesis about (28) and (29) acceptability asymmetry. Obviously, pragmatic judgements variation provides a promising field of further, more scrupulous research.

¹⁷Actually, more examples need to be gathered with native speakers, because these two do not constitute a minimal pair: (29) contains a conditional and (28) does not.

¹⁸See next section for an analysis of interaction of *too* with possible worlds.

3.5 Modal subordination

Just to say that an existential presupposition appears uniformly and totally unconstrained upon any occurrence of *too* would be false, of course. Indeed, *too* has a restricted distribution. What does it interact with, and how? What immediate semantic environment is it sensitive to? A major case is modal subordination. This is a restriction on distribution which is sensitive to finer semantic features than just structure in general. Importantly, this is an example of a phenomenon showing that there are certain cases where *too* really has to refer to a parallel goal in linguistic context.

3.5.1 Treating modal subordination

As (31) shows, a parallel construction with *too* is in general allowed in the consequent of a counterfactual conditional and it may establish parallelism with a referent outside the conditional:

- (31) Rob owns a hedgehog. If Henk had been a farmer, he would have owned a hedgehog, *too*. (Adapted from Beaver 2001: 98)

However, some counterfactual conditionals disallow for such parallelism:

- (32) #Rob owns a hedgehog. If he had owned a porcupine instead, Henk would have owned a hedgehog, *too*. (Adapted from Beaver 2001: 98)

Recall another problematic example from Heim 1992: 191, discussed in the previous section and repeated here as (33) with minor changes (subscripts):

- (33) #John doubts that Mary_i is here. He believes that if Susan_F were here *too*_i there would be dancing.

As Beaver (2001: 98) points out, purely structural account (like that of van der Sandt 1992) would incorrectly predict simple resolution of the presupposition in these cases. Example (31) shows that the global discourse representation structure (DRS) is accessible from the consequent DRS of a counterfactual conditional, so resolution may happen in both (32) and (33), and there is nothing in the account to prevent it.

Heim (1992) offers a very effective solution for the problem. On her account, in cases like (32) and (33) the CCP of the minimal clause containing *too* is undefined (op.cit.: 189–191). In (32) incrementation of the intermediate context (call it *c'*) with *Henk_F would have owned a hedgehog, too_i* is defined iff Rob owns a hedgehog in every world compatible with *c'*. However, the semantics of *c'* in this example guarantees that in every world compatible with *c'* Rob owns a porcupine instead of a hedgehog. Hence the anomaly. In (33) it works the same way: the intermediate context *c' + He believes that if Susan_F were here too_i* is defined iff Mary is here in all worlds doxastically accessible for John to *w* (that is, worlds compatible with John's beliefs in *w*; in the notation adopted by Heim, $\text{Dox}_J(w)$). But in $\text{Dox}_J(w)$ Mary is **not** here, hence the deviance.

My approach can deal with these facts, *too*. All that's needed is to assume that modal expressions, non-indicative moods and attitude verbs introduce possible

worlds (that is, alternative scenarios), and, further, assume anaphoricity of all verbal tenses and modal verbs on these possible worlds. Thus, we start with the initial world w^0 , relative to which the first predicate is interpreted. First modal, mood, or attitude verb creates world w^1 , which is the reference world for interpretation of any predicate in the scope of this modal or attitude verb; and so on. Worlds may be nested, of course. Shifts between worlds are pointwise, in the sense that world w^{n+1} is identical to world w^n , from which the shift was made, but for the changes explicitly introduced by the clause containing modal/mood/attitude. That is, if I utter a conditional $\phi \Rightarrow \psi$, the shifted world w' is identical to the world w up to the point that ϕ is a matter of fact in w' . *Too* is interpreted relative to the world of the minimal clause that contains it. That is, if $\phi[\alpha_F]$ *too* is interpreted relative to world w , *too* has to deal with the matter of facts as they are in w . More precisely, extensions of predicates change with world shifts, which is relevant for *too* in the scope of modals and the like. What is special about modal subordination examples like (32) and (33) above, is that they are focussed on a certain narrow situation, with few individuals in their universe. When *too* is uttered, there is not much to construe the parallel reference to, the only possible goal being, say, *Rob* in (32). A world shift can be viewed as a model shift, in a certain sense. When the model is very small — there are only a few individuals, and a few predicates, modal subordination effects are easy to get.

Let me illustrate how this works for the examples given above. In the notational convention which I follow, subscripts indicate anaphors and superscripts — antecedents. I start with (31):

- (34) Rob owns_w a hedgehog. If Henk had been_w^{w'} a farmer, he would have owned_{w'}^{w''} a hedgehog, too.

In (34) the indices mean that *owns* is interpreted relative to the actual world (that is, the world which is under consideration at the moment when a given sentence comes to update the context, be it the world where the interlocutors live, fiction world of a book, etc.); *if... had been* — is interpreted relative to w , but also introduces world w' which differs from w only in that Henk is a farmer in w' ; and *would have owned* is interpreted relative to w' and introduces w'' , which is identical to w' except for the fact that Henk has a hedgehog in w'' . *Too* is interpreted relative to world w' which is relevant in the context and is the world of the minimal clause that contains this instance of *too*. In w' , just as in w , Rob owns a hedgehog and hence *too* is appropriate. Indeed, it can build a parallel: Henk would have owned a hedgehog just as Rob does. Now let us see how this account explains deviance of (32):

- (35) #Rob owns_w a hedgehog. If he had owned_w^{w'} a porcupine instead, Henk would have owned_{w'}^{w''} a hedgehog, too.

In the second clause of this discourse, *if... had owned* is interpreted relative to w , but introduces w' , which differs from w in that Rob does not own a hedgehog but owns a porcupine. *Too* is interpreted within the next clause relative to this world w' , in which Rob does not own a hedgehog, so no parallel can be built to him from Henk's owning a hedgehog. Speaking models, discourse in (35) employs two models¹⁹, call

¹⁹In fact, three, but we need only to look at the first two.

them M and M' . The most important difference between them is extension of *own*:

- (36) a. $\llbracket \text{own} \rrbracket_M = \{r, x\}$, $\llbracket \text{hedgehog} \rrbracket_M = \{x\}$
 b. $\llbracket \text{own} \rrbracket_{M'} = \{r, y\}$, $\llbracket \text{hedgehog} \rrbracket_{M'} = \{x\}$, $\llbracket \text{porcupine} \rrbracket_{M'} = \{y\}$

The clause containing *too* is coming to update context when model M' is relevant, and in this model it is interpreted. There is nothing that can be construed as parallel to Henk, and *too* cannot escape the borders of w'/M' . We derived the observed deviance.

Last but not least I'll show how this account can deal with Heim's example (33) above:

- (37) #John doubts_w^{w'} that Mary is_w here. He believes_w^{w'} that if Susan were_w^{w''} here too there would be_{w'}^{w'''} dancing.

In the first clause there is an matrix attitude verb *doubts*, which introduces the world of John's beliefs (w'). This world serves for the interpretation of the following embedded verb *is*. Semantics of the verb 'doubt' provides such a context that in all worlds compatible with John's beliefs Mary is not here. The same world w' is activated in the next sentence, where the matrix verb *believes* elaborates on John's beliefs. The if-clause of the embedded conditional, where *too* is contained, is interpreted relative to w' (and in addition introduces w''). What *too* is trying to do is establish a parallel from Susan's presence to Mary's presence. Since Mary is absent in world w' , the discourse is deviant.

Such an approach captures an important property of *too* w.r.t. modal subordination: the direction of shifts asymmetry. *Too* can refer back from a "modal world" clause to an "actual world" clause, but not vice versa. Compare (38) and (39):

- (38) John is coming_w to the party. Imagine_w^{w'} Mary comes_w too. There'll be_w a fight!
 (39) #Imagine_w^{w'} John comes_w to the party. I know_w that Mary is coming_w too. There'll be_w a fight!

The explanation of this asymmetry is in the context change sensitivity of *too*. In (38) imaginary world w' inherits from w John's coming to the party, which allows for drawing the parallel from Mary to John. In (39), on the contrary, John's coming is relevant in the context only in the scope of the modal antecedent *imagine*.

Finally, I want to return briefly to examples of type (32). The analysis provided here makes a prediction about richer contexts in such examples. The prediction is that if there were other introduced MRs, the sentence would significantly improve. Consider the following example:

- (40) Some linguists, among them Rob, own pet hedgehogs. Henk hates to do exactly what Rob does, but if Rob had owned a porcupine instead, Henk would have owned a hedgehog, too.

My prediction about this example is that it should be a felicitous use of *too*, since there are other non-specific, but salient in virtue of mentioning linguists, who can serve as the parallel reference for Henk even when Rob is excluded in the conditional. This sentence needs yet to be tested against intuitions of at least several English native speakers to see if the prediction is borne out.

3.5.2 Counterexamples or experimental proof?

A few seeming counterexamples come from Zeevat (1992: 399). Consider examples (41)–(43), where modal subordination effect is not observed and *too* in an actual world clause seems to make reference to individuals in modal shifted clauses. In structural terms, the presupposition is bound from or resolved into an inaccessible position.

- (41) If John has time, he will visit us tonight. Mary will come too.
 (42) If John will come tonight, we must warn Fred. Mary will come too.
 (43) John believes that Mary was in Egypt. Sue was there too.

Zeevat 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 parts disappears” (ibid.). The examples as they stand present at the first sight a problem for any account. However, two American English native speakers confirmed my intuitions that these examples mean something else and are compatible with the above analysis of modal subordination effects. In (41) Mary’s coming is in fact in the scope of the conditional, in other words, it means that 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* is contained within the consequent of the conditional and presents no problem. On my account, it would look like this:

- (44) If John has_w^w time, he will visit_w us tonight. Mary will come_w too.

As for (42), I have collected three interpretations. One is a reason interpretation, which means that John’s coming is a matter of fact, not a hypothesis. On this reading the example may be paraphrased as “Since John will come tonight. . .”. Here are the world-shifting indices:

- (45) If John will come_w tonight, we must_w^w warn_w Fred. Mary will_w come too.

Note that *will come* in the antecedent does not introduce new worlds. Since it is not a conditional, it shouldn’t necessarily be inaccessible, in terms of binding account. Actually, I’m not aware of any work that spelled out structural representation of reason subordinate clauses and I do not know what properties could be predicted on the structure basis. Note also, that for instance binding is as impeded in reason clauses as it is in conditionals:

- (46) ^{*/?}Since he_i will come tonight, we must greet John_i.

Interestingly, one speaker noted that on this interpretation Mary cannot be understood to accompany John. I do not have a ready answer for the puzzle why this reading, although admitting the parallel reference from Mary to John, requires them to come separately. It is likely to be related to some properties of reason if-clauses which need further investigation.

Another interpretation is a conditional where Mary’s coming is dependent on John’s — if John comes, Mary comes with him. This resembles the interpretation of (41).

The third interpretation is that Mary is coming “as part of an anti-John squad to help Fred”. This response is very interesting because it supports my view on accommodation of *too*. There is no explicit material in the context which says about any “anti-John squad”, but the impossibility of referring back to John in a shifted conditional world forces the hearer, upon the accommodation of the presupposition, to make such an inference, be it hypothetical.

Example (43) seems 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). And the second sentence tries to build a parallel from Sue’s trip to Mary’s, which must not to exist. Consistently with this analysis, the only interpretation I got from one speaker was that “in John’s false belief state Sue was in Egypt with Mary”. On this reading the clause containing *too* is in John’s belief world:

(47) John believes_w^{w'} that Mary was_{w'} in Egypt. Sue was_{w'} there too.

I want to underscore that the hearer’s attempt to interpret *too* highlights the rules she has to obey. *Too* needs a parallel referent which must be in the same world-of-evaluation, and the possible adjustment to save the interpretation here is straightforward: interpret the clause containing *too* in the world where you see options for such reference.

To conclude this section, I want to point out that the degree of variation of judgements for (42) is interesting, because it shows how variable pragmatic judgements can be across subjects. Variation of pragmatic judgements could be an interesting topic of research on its own.

Conclusion

I proposed an account that combines compositional dynamic semantics for the additive particle *too* and pragmatic principles that serve for parallel reference resolution. A number of arguments speak in favour of maintaining the existential presupposition over the anaphoric treatment of the particle. My main arguments are empirically-driven and come from the world knowledge inference uses of *too*, that is, when it is felicitous in the absence of suitable linguistic or extra-linguistic antecedents in the context. Another advantage of the strong pragmatic component in my analysis is the natural treatment of sentences where the focussed argument (the one associated with *too*) and the parallel referent are arguments of different predicates, which requires work of additional inferential processes.

There is still much work to do. Several issues still need to be tested with English native speakers. Syntactic behaviour of *too* and its interaction with the particle’s semantics and pragmatics promises to be one interesting topic of further research. Variation of pragmatic judgements is interesting all by itself, and also for particular elements, like the presupposition of *too*. My account of modal subordination can, I believe, be significantly improved if fleshed out more thoroughly in the light of the modern analysis of parallel worlds (e.g., work of Matthew Stone). This paper reviews neither the binding approach nor application of alternative semantics (i.e., work by Manfred Krifka) to *too*. A fascinating topic for research would be comparison of the

fine-grained semantics/pragmatics of the analogous additive particles in different languages. The little particle can still provide numerous interesting puzzles.

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