

Presuppositional *Too*, Postsuppositional *Too*

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Abstract

One of the insights of dynamic semantics in its various guises (Kamp 1981, Heim 1982, Groenendijk & Stokhof 1991, Kamp & Reyle 1993 among many others) is that interpretation is sensitive to left-to-right order. Is order sensitivity, particularly the default left-to-right order of evaluation, a property of particular meanings of certain lexical items (e.g., dynamically interpreted conjunction) or is it a more general feature of meaning composition? If it is a more general feature of meaning composition, is it a processing ‘preference’ or should it be captured as a ‘harder’ constraint on the type of meanings and operations over meanings involved in natural language interpretation? This squib draws attention to the symmetrical A-TOO B-TOO construction (found in a variety of languages, e.g., Hungarian, Japanese, Romanian, Russian) in this context. It argues that any semantic analysis of its main ‘symmetrical-meaning’ characteristic should also allow for subtler interactions between this construction and items that are clearly sensitive to evaluation-order effects, e.g., anaphoric adjectives like *next* and *other*. We suggest that the notion of postsupposition embedded in a broader dynamic framework is better able to account for both the symmetric nature of this construction, its non-symmetric variant A-TOO, and its interaction with items that are evaluation-order sensitive. We briefly compare this proposal with a couple of possible alternative accounts.

1 The phenomenon

Various languages, Hungarian, Japanese, Romanian, and Russian among them, use the same morpheme in the two constructions exemplified in (1) and (2) below.

- (1) **Hungarian:** A is elszaladt. ‘A, too, ran away.’
Japanese: A-mo hashitta.
Romanian: Și A a fugit.
Russian: I A ubezhal.
- (2) **Hungarian:** A is B is elszaladt. ‘A as well as B ran away’
Japanese: A-mo B-mo hashitta.
Romanian: Și A și B au fugit.
Russian: I A i B ubezhali.

In some languages, e.g., Romanian and Russian, this morpheme is homonymous with *and*. But when the language distinguishes *and* from *too/even*, as Hungarian and Japanese do, (2) reiterates the morpheme that corresponds to *too/even*, so we will use TOO as a cross-linguistic representative of this class of particles.

Yet other languages, French among them, have a symmetric structure like the one in (2) (e.g., *Et A et B se sont enfuis*, ‘A as well as B ran away’), but French lacks the non-symmetric variant in (1) (*Et A*, ‘A, too’). We will not consider this type of languages in this paper.

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Kobuchi-Philip 2009 proposes a unified semantics for the Japanese morpheme *mo* whose basic insight is this:

- (1) above means ‘A ran away and some $C \neq A$ ran away’; a contextually salient C is needed for this example to be felicitous;
- in contrast, (2) means ‘A ran away and some $C \neq A$ ran away, and B ran away and some $D \neq B$ ran away’; but crucially, no contextually salient C and D are needed in this case, because A and B mutually satisfy the requirements imposed by each other’s *mo*’s.

We accept this insight and address a puzzle concerning the status of the ‘someone else ran away’ requirement that Kobuchi-Philip 2009 did not.

The puzzle is this. The standard analysis of *too* (Kripke 2009, Heim 1990) is that its requirement is a presupposition. This works for TOO in (1), but not in (2). Presupposition projection works left-to-right, at least when it is effortless (Chemla & Schlenker 2012, Chemla & Bott 2013). A presupposition induced by A-TOO cannot be effortlessly satisfied by B, if B is mentioned later than A. But the processing of (2) is effortless (as far as we can tell without actually running a controlled experiment). Thus: how can the same analysis of TOO work in both (1) and (2)?

2 Postsuppositional TOO in a dynamic framework

2.1 The basic proposal

The heart of the solution is to re-classify TOO’s requirement as a postsupposition. A postsupposition is a delayed update. In dynamic semantic terms, it is a test imposed on the sentence-final output context. Postsuppositions were introduced in Farkas 2002, Lauer 2009, and Brasoveanu 2013 for quite different empirical purposes (special indefinites, *-ever* relatives and modified numerals, respectively).

Consider, for example, modified numerals in cumulative readings:

- (3) Exactly five boys read exactly seven books (between them).

Brasoveanu 2013 proposes that on the cumulative reading, the *read* relation holds between two maximal plural individuals contributed by the subject and the object, and the cardinality conditions imposed on those individuals by *exactly five* and *exactly seven* are checked simultaneously, outside the scopes of the two maximality operators. This is made possible by assigning them the status of postsuppositions.

The notion of postsupposition makes crucial reference to order of evaluation and to interpretation contexts that are the *result* of interpreting natural language expressions, so they are naturally formalized in a dynamic framework.

For example, in Dynamic Predicate Logic (DPL, Groenendijk & Stokhof 1991), the meanings of sentences / formulas are context change potentials: binary relations over interpretation contexts, i.e., sets of $\langle \text{input context}, \text{output context} \rangle$ pairs.

An update that does not enhance the context with a new referent and merely eliminates unsuitable contexts is called a test. A postsupposition in Brasoveanu 2013 is a delayed test – delayed in the sense that it is not checked at the point where compositional semantics inserts it. Instead, it is checked in the sentence-final output context when truth conditions are determined. This has the following consequences:

- (4) a. A postsupposition is checked after at-issue updates are processed, so it is insensitive to left-to-right matters within the sentence. In particular, it can be satisfied by referents and facts that were introduced later than the inducer of the postsupposition.
- b. All postsuppositions are effectively checked at the same time, therefore they can be mutually satisfied by the hosts of each other's inducers.
- c. If at-issue updates in the sentence do not change the context in a way relevant to the postsupposition, the output and input contexts are identical in that respect. So the postsupposition must already be satisfied by the input context.

For example, the analysis of the example in (3) above proceeds as shown in (5) below. Postsuppositional updates are marked by superscripting them. The representation in (5a) is what compositional semantics delivers. The representation in (5b) is an ‘unpacked’ version in which the two maximality operators σx and σy are explicitly represented. Note that the postsupposition $|y|=7$ contributed by the direct object *exactly seven books* is in the scope of the maximality operator σx contributed by the subject *exactly five boys*. Finally, the representation in (5c) shows both postsuppositions taking widest scope outside both maximality operators. Formula (5c) is equivalent to the previous one in (5b) because of the particular interpretation associated with postsuppositional tests.

- (5) a. $\exists |x|=5[\text{BOY}(x)] \left(\exists |y|=7[\text{BOOK}(y)] (\text{READ}(x, y)) \right)$
- b. $\sigma x \left(\text{BOY}(x) \wedge \sigma y (\text{BOOK}(y) \wedge \text{READ}(x, y)) \wedge |y|=7 \right) \wedge |x|=5$
- c. $\sigma x (\text{BOY}(x) \wedge \sigma y (\text{BOOK}(y) \wedge \text{READ}(x, y))) \wedge |y|=7 \wedge |x|=5$

Our application of postsuppositions to TOO highlights further predictions of this proposal, and illustrates its more general usefulness. The idea would be to add anaphoric ‘definedness’ conditions to the DPL+postsuppositions system, in the spirit of the proposal in van der Sandt 1992 and the reformulation of this proposal in Krahmer 1998 (see in particular the discussion of Presuppositional DRT in ch. 6). Then (4a) and (4b) above continue to hold and (4c) is minimally modified as follows:

- (6) If at-issue updates in the sentence do not change the context in a way relevant to the postsupposition, the output and input contexts are identical in that respect. So a postsupposition expressing a definedness condition ends up being evaluated just like a presupposition: undefinedness results if the input context does not already satisfy it.

Let us now return to (1) and (2), and assign postsuppositional status to the ‘someone else ran away’ requirement. Consequence (6) is relevant for the plain TOO constructions in (1). Although ‘someone else ran away’ is a postsupposition, it ends up being evaluated just like a classical presupposition because it does not matter if we delay checking it until the end of the sentence.

Consequences (4a,4b) are relevant for the reiterated TOO constructions in (2). As Kobuchi-Philip 2009 proposed, A and B satisfy the requirements (now: postsuppositions) imposed by each other's TOOs. If either A or B failed to run, (2) is simply false, rather than a presupposition failure.

2.2 A sketch of the formal account

Somewhat more formally, Brasoveanu 2013 enriches the notion of interpretation context as follows. A variable assignment g (which is a DPL context) is in addition indexed with a set of postsuppositional tests ζ , represented as $g[\zeta]$. Truth is defined as follows:

- (7) A formula φ is *true* relative to an input context $g[\emptyset]$ (where $\emptyset$ is the empty set of postsuppositions) **iff** there is an output context $h[\{\psi_1, \dots, \psi_m\}]$ such that $\llbracket \varphi \rrbracket^{\langle g[\emptyset], h[\{\psi_1, \dots, \psi_m\}] \rangle} = \mathbb{T}$ and $\llbracket \psi_1 \wedge \dots \wedge \psi_m \rrbracket^{\langle h[\emptyset], h[\emptyset] \rangle} = \mathbb{T}$.

We retain this formalism and merely indicate where presupposition satisfaction should kick in. Definedness conditions that need to be satisfied for the entire update to be felicitous are underlined. We also underline variables / discourse referents that are anaphoric, i.e., that are basically placeholders and need to be resolved to actual discourse referents that are available in context. That is, underlined discourse referents and/or updates need to be submitted to the anaphora and presupposition resolution algorithm in van der Sandt 1992.

In a fuller treatment, we would probably follow Krahmer 1998:ch.6 and interpret the underlined updates before (and after) resolution as presuppositional updates in a partial dynamic system like Krahmer’s Presuppositional DRT. We will not attempt a fully fleshed out treatment here but merely indicate how the basic proposal sketched in the previous subsection could be embedded in a dynamic system that integrates Krahmer 1998 and Brasoveanu 2013.

In this spirit, the representation for (1) is (8b). The updates are glued together using a partial version of the dynamic conjunction defined in Brasoveanu 2013 (symbolized as ‘ $\wedge$ ’).

- (8) a. A-TOO B-TOO ran away.
b. $[x \mid \text{RUN}(x)] \wedge \underline{[x' \neq x, \text{RUN}(x')]}$

Before applying this analysis to (2), we have to ask what the structure of the phrase A-TOO B-TOO is. Szabolcsi 2013 analyzes it using a combination of assumptions in Winter 1995, den Dikken 2006, and Dekker 2012. Winter proposes that the semantic contribution of the word *and* does not go beyond forming pairs $\langle A, B \rangle$, which may then project pointwise in the manner of Hamblin alternatives (Hamblin 1973). Boolean $\cap$ is phonetically silent, and applies to such ordered pairs. Szabolcsi adopts the basic idea, but replaces the Boolean $\cap$ with Dekker’s order-sensitive $\cap$, and identifies the pair-forming operator with den Dikken’s syntactic J(unction) head.

Such an analysis of the Hungarian construction is straightforwardly justified by the fact that the word *és* ‘and’ can optionally occur in medial position in (2). (See a more detailed motivation in Szabolcsi 2013, Szabolcsi et al. 2014).

- (9) A is (és) B is (**Hun.**)
A TOO (and) B TOO

Therefore, the two TOOs in (2) do not serve to glue the conjuncts together, nor to perform $\cap$ on their interpretations. They merely add postsuppositions and make the construction strictly distributive.

The representation for (2/10) is provided in (11) below. Updates are again glued together by dynamic conjunction, the second instance of which corresponds to silent $\cap$. The initial formula in (11a) is the initial representation, the final formula in (11c) is the representation with definedness updates deleted, since they can be satisfied in their particular interpretation context.

- (10) A-TOO B-TOO ran.
(11) a. $[x \mid \text{RUN}(x)] \wedge \underline{[x' \neq x, \text{RUN}(x')]} \wedge [y \mid \text{RUN}(y)] \wedge \underline{[y' \neq y, \text{RUN}(y')]}$
b. $[x \mid \text{RUN}(x)] \wedge [y \mid \text{RUN}(y)] \wedge \underline{[x' \neq x, \text{RUN}(x')]} \wedge \underline{[y' \neq y, \text{RUN}(y')]}$
c. $[x \mid \text{RUN}(x)] \wedge [y \mid \text{RUN}(y)]$

The crucial part is the transition from (11a) to (11b), which can happen because the definedness requirement $\underline{[x' \neq x, \text{RUN}(x')]}$ is marked as postsuppositional, so its interpretation is delayed until after all the at-issue updates. When interpreted there, it can be satisfied by resolving x' to y . The other definedness requirement $\underline{[y' \neq y, \text{RUN}(y')]}$ is similarly satisfied by resolving y' to x .

3 Predictions of the postsuppositional analysis

Although the analysis proposed above is merely a sketch, it makes several clear predictions that follow (i) from the fact that it formalizes the meaning of single and reiterated TOO by means of postsuppositions, and more generally (ii) from the fact that it makes use of a dynamic system.

3.1 Asymmetric TOO postsuppositions

First, we do not predict that examples such as (12) below will replicate the effect in (2), and correctly so:

- (12) A-TOO saw B-TOO.

Here the first TOO delays the definedness condition that someone other than A saw B, and the second TOO delays the definedness condition that A saw someone other than B. These conditions are not satisfied sentence-internally, so both emerge as presuppositions imposed on the input context. Automatic, mutual satisfaction of postsuppositions obtains in (2) because the same predicate floats up from both TOOs.

3.2 Interaction with negation

The postsuppositions of A-TOO B-TOO resemble the cardinality conditions of modified numerals in another respect: they are trapped within the scope of negation (see Brasoveanu 2013:185 for discussion).

- (13) It is not true that he invited at least five people.
‘not more than four’
- (14) Nem hívta meg Jánost is, Marit is. (**Hun.**)
Nu e adevărat că a invitat și pe Ion și pe Maria. (**Rom.**)
‘It is not true that he invited John as well as Mary = He did not invite both’

3.3 Anaphora in the host of postsuppositional *too*

An important assumption in Brasoveanu 2013 is that updates are dynamically conjoined, notwithstanding the delay involved in checking postsuppositional tests. This predicts that anaphoric elements in the hosts of TOOs remain fully sensitive to the left-to-right evaluation order imposed by conjunction. The Hungarian and Romanian examples below with anaphoric *next* bear this out: sentences (16a,16b) have a reading (indicated below) that sentences (15a,15b) do not.

- (15) a. #(*Az első vásárló elégedett volt, de*)
#(*the first customer satisfied was, but*)

- a következő vásárló is (és) Mari is panaszkodott. (**Hun.**)
the next customer too (and) Mari too complained
‘Both the next customer and Mary complained’ (requires mention of a first customer)
- b. #(Primul client a fost satisfăcut, dar)
#(first-the customer has been satisfied, but)
și următorul client și Maria s-au plîns. (**Rom.**)
too next-the customer too Maria SE-have complained
‘Both the next customer and Mary complained’ (requires mention of a first customer)
- (16) a. ✓Mari is (és) a következő vásárló is panaszkodott. (**Hun.**)
✓Mari too and the next customer too complained
‘Both Mary and the next customer (=the one after Mary) complained’
- b. ✓Și Maria și următorul client s-au plîns. (**Rom.**)
✓Too Maria too next-the customer SE-have complained
‘Both Mary and the next customer (=the one after Mary) complained’

The same contrasts hold if ‘next’ is replaced by ‘other’, showing that the crucial property is not dependent on the presence of a temporal ordering.

- (17) a. #(Egy vásárló elégedett volt, de)
#(one customer satisfied was, but)
a másik vásárló is (és) Mari is panaszkodott. (**Hun.**)
the other customer too (and) Mari too complained
‘Both the other customer and Mary complained’ (requires mention of a customer who cannot be Mary; Mary need not be a customer)
- b. #(Un client a fost satisfăcut, dar)
#(one customer has been satisfied, but)
și celălalt client și Maria s-au plîns. (**Rom.**)
too other customer too Maria SE-have complained
‘Both the other customer and Mary complained’ (requires mention of a customer who cannot be Mary; Mary need not be a customer)
- (18) a. ✓Mari is (és) a másik vásárló is panaszkodott. (**Hun.**)
✓Mari too and the other customer too complained
‘Both Mary and the other customer complained = Mary was a customer, she complained, and the customer distinct from Mary complained’
- b. ✓Și Maria și celălalt client s-au plîns. (**Rom.**)
✓Too Maria too next-the customer SE-have complained
‘Both Mary and the other customer complained = Mary was a customer, she complained, and the customer distinct from Mary complained’

These data indicate that the semantic contribution of the host of TOO must be separated from the postsupposition of TOO. In all these examples, the host of TOO contributes a non-postsuppositional anaphoric / definedness requirement that needs to be satisfied at that very point in the semantic evaluation process.

This state of affairs seems to require a semantic theory that is sensitive to left-to-right evaluation order, e.g., dynamic semantics, and at the same time distinguishes among the ways

in which various meaning ingredients are sensitive to evaluation order (e.g., it allows for both postsuppositions and presuppositions / definedness requirements).

We leave it as an open question whether the different types of sensitivity to left-to-right evaluation order exhibited by different items should be captured in the semantics proper (as we suggest here) or it is better thought of as a consequence of the fundamentally incremental, left-to-right nature of the human language processor.

The existence of cataphora, which shows that the processor can postpone the resolution of anaphoric items in certain cases, seems to suggest that a purely processing-based theory would not capture the intricate interactions between reiterated TOO and its host NPs: if anaphora resolution can be temporarily postponed, it's not clear why the resolution of *next* / *other* couldn't be postponed in the Hungarian and Romanian examples above.

On the other hand, a semantic theory that classifies certain contributions as non-delayable presuppositions / definedness conditions and others as delayable is able to capture these interactions. The question for such a semantic theory is how language learners are actually able to acquire the subtle distinctions between these different types of contents.

4 Is TOO strictly speaking anaphoric?

According to the (now) standard analysis (Heim 1990, Kripke 2009), the presupposition of TOO is anaphoric to a contextually salient individual, not a mere existential claim that could be accommodated.

- (19) # Tonight John, too, has dinner in New York.

Asher & Lascarides 1998 argue that the meaning contribution of TOO is somewhat different: TOO requires a Parallelism discourse relation to be established. They agree however that this Parallelism requirement cannot be completely accommodated. The following examples support the claim that *too* is not anaphoric, and suggest that some degree of accommodation may be possible.

- (20) Little girl regularly complains to her mother that she stands out among her friends by not having a Barbie doll. Mother eventually relents, they go and purchase a Barbie.
Mother says to little girl:
Now YOU have a Barbie too!

Mother's sentence means, perfectly felicitously, 'like everybody else among your friends,' although no particular friends have been made salient in any usual way. For example, the sentence could not be rephrased as, *Now you, in addition to them, have a Barbie*. But the Barbie-owning crowd is contextually relevant; the little girl just joined their ranks. In contrast, the dining crowd of New Yorkers in (19) is not only not salient enough to support anaphora, it is not even relevant – at least not in the above presentation. We find the same effect within the scope of a universal quantifier:

- (21) **A:** I see that you have submitted abstracts to phonology conferences, semantics conferences, historical conferences... Do they all pass muster?
B: Don't worry, I seek out expert advice.
A: Always talk to your advisor too!

A's response means, 'every time you submit an abstract, talk to your advisor in addition to whatever expert or experts you consult.' Again, the last sentence could not be rephrased as, *Always talk to your advisor, in addition to them*.

There is a way to formalize this modification that does not contradict the implicit assumption we made before that TOO is anaphoric. We change the kind of referent TOO is anaphoric to: TOO retrieves the contextually relevant set of alternatives and requires (i) that the current alternative is part of that set, and also (ii) that it is not the only alternative in that set.

5 Open questions and new questions

The application of postsuppositions to TOO, in addition to special indefinites, free relatives and modified numerals, will allow us to investigate postsuppositions further, in particular their interaction with anaphora and presuppositional updates.

Formally, the challenge is to integrate postsuppositions and definedness conditions (be they anaphoric and presuppositional) within a formal system with a properly defined semantics. We suggested that integrating the postsuppositional DPL system of Brasoveanu 2013 and the Presuppositional DRT of Krahmer 1998 would be a good way to proceed, but this is left for a future occasion.

But such an integration raises broader conceptual issues. Our analysis of the reiterated TOO construction is reminiscent of presupposition projection. For example, the possessive *John's sons* presupposes that John has sons; in (22a) and (23a), this presupposition is resolved within the sentence:

- (22) a. John has sons, and John's sons are bald.
b. # John's sons are bald, and John has sons.
- (23) a. If John has sons, then John's sons are bald.
b. ?? John's sons are bald, if John has sons.

Chemla & Schlenker 2012 argue that symmetrical readings are possible, albeit degraded, in environments involving the connectives *if*, *or* and *unless*. We need a theory that explains both the commonalities and the differences in how the postsuppositions of TOO and the presuppositions of possessives – or *next* / *other* – are resolved.

More generally, the fact that delaying makes an update insensitive to evaluation order within the sentence highlights the question of what updates can be delayed. Order-sensitivity, i.e., non-delayed evaluation in the local context, can be stipulated. The open issue is to identify in a principled way what updates fall on each side of the dividing line.

Finally, our analysis happily predicts that the delayed test contributed by A-TOO can be satisfied by the B of the linearly following B-TOO, but it does not predict that B must bear TOO under these circumstances:

- (24) # A-TOO ran away, (and) B ran away.

Our account is not satisfactory in this respect. But a processing account along the lines of Chemla & Schlenker 2012 would not predict the infelicity of (24) either, since the first clause does not make the second redundant.

S. Charlow (p.c.) points out that symmetrical TOO–TOO bears an intriguing similarity to symmetrical contrast, discussed in Rooth 1992, and exemplified below:

- (25) ✓ An AMERICAN farmer says to a CANADIAN farmer ...

In Rooth’s account, $\lambda x. \textit{Canadian}(x) \wedge \textit{farmer}(x)$ is a property referent that ‘floats up’, much like the referents contributed by proper names do in classical Discourse Representation Theory (DRT, Kamp 1981, Kamp & Reyle 1993). It can therefore bind the variable introduced by the $\sim$ associated with *AMERICAN farmer*, irrespective of the fact that it linearly follows that variable (see Rooth 1992:87, fn. 8). Rooth 1992:110 also points out that “contrastive foci are optional [...] particularly the first, anticipatory one.”

(26) ✓ An American farmer says to a CANADIAN farmer ...

Interestingly, however, the second focus accent is not optional. In (27), we need the context to supply a suitable element in the focus-set of *AMERICAN farmer* – focusless *Canadian farmer* to its right will not do:

(27) An AMERICAN farmer says to a Canadian farmer ...

This is even more interesting in view of the fact that focus on *AMERICAN* is capable of anticipating the subsequent focus on *CANADIAN* that occurs across a sentence boundary in (28) below:

(28) ✓ Here’s what happened last night. An AMERICAN farmer was drinking in a pub. A CANADIAN farmer went up to him. They got into a fight.

To summarize, contrastive focus examples exhibit the same linear order patterns as TOO examples. But just as our proposal did not explain (24), Rooth 1992 does not explain (27). The reason is that the ability of *a Canadian farmer* in (25) to contribute a name-like property referent $\lambda x. \textit{Canadian}(x) \wedge \textit{farmer}(x)$ is not contingent on the presence of focus on *Canadian*.

We conclude that a critical piece of the puzzle is still missing, both from our proposal and from others that could deal with (reiterated) TOO in their own ways.

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