

### *Before without After: (Non)veridicality and disjunction*

**Core issues and previous analyses:** Connectives meaning BEFORE<sup>1</sup> pose a number of puzzles that render most of its current treatments insufficient or problematic. The basic puzzles are the following: (a) BEFORE appears to have veridical, antiveridical, and nonveridical uses (or, factual, non-factual, and non-committal; (Heinämäki, 1974)); (b) it licenses weak NPIs (like **anything** in [3]); (c) it generally blocks strong NPIs [4]; (d) it can co-occur with the subjunctive, and has the *anti*-PAST restriction in its argument, as opposed to its alleged dual AFTER (see (Giannakidou, 1998) for Modern Greek, and [6] for Albanian).

- (1) Ariadne ate the salad *before* she had dessert.  $\Rightarrow$  Ariadne had dessert. (veridical)
- (2) The police defused the bomb *before* it exploded.  $\Rightarrow$  The bomb did **not** explode. (antiveridical)
- (3) Ariadne left the country *before* **anything** happened  $\nRightarrow$  Anything did (not) happen. (nonveridical)
- (4) \*Ariadne lived in Paris *before* she came to Greece **either/in** years.

In [5] we see that unlike English, Modern Greek and Albanian BEFORE cannot combine with a past tense. With BEFORE, only non-PAST is used, which is an anaphoric tense (Giannakidou, 2009). AFTER has no such temporal restriction [6, 7].

- (5) a. I Ariádni mílise prin (na) fígi / \*éfige.  
the.F.1SG Ariadne spoke before leave.PERF.NONPAST / left  
'Ariadne spoke before leaving.' (Modern Greek)
- b. Ariadni foli para se të iki / \*iku.  
Ariadne.DEF spoke before than SUBJ leave.SUBJ / left  
'Ariadne spoke before leaving.' (Albanian)
- (6) Ariadni foli mbasi iku.  
Ariadne.DEF spoke after left.3SG  
'Ariadne spoke after leaving.' (Albanian)
- (7) I Ariádni mílise afú (\*na) éfige.  
the.F.1SG Ariadne spoke after left  
'Ariadne spoke after she left.' (Modern Greek)

Therefore, if we just look at Modern Greek and Albanian, it cannot be concluded that BEFORE and AFTER are duals, based on the morphology of the temporal clause's verb (see (Del Prete, 2008) for motivations for non-dual analysis in Italian).

Most current analyses focus on English *before*, and are unable to capture all the core facts above. (Sánchez-Valencia et al., 1993), building on (Landman, 1991; Anscombe, 1964), and (Heinämäki, 1974), propose an analysis that renders *before* nonveridical and, under a linear-time model, also anti-additive. This is restrictive because *before* can be veridical [1], hence not necessarily anti-additive (Zwarts, 1995). Another problem for the anti-additivity is that *before* does not appear to license strong NPIs that are normally licensed by anti-additive operators: compare **either/in years** in [4], with that in [8] below where it is fine.

- (8) Nobody saw Bill **either/in** years .

(Condoravdi, 2010) weakens the monotonicity and claims that the *before* argument is Strawson Downward Entailing (SDE). However, SDE is too weak for NPI licensing, and we are not even sure that it plays a role (Giannakidou, 2006). Moreover, the account in (Condoravdi, 2010) suffers from unnecessary stipulations pointed out in (Krifka, 2010). First, there is no empirical motivation for the operator EARLIEST. Second, similarly to (Giannakidou, 2006), (Krifka, 2010) criticizes SDE in connection to cases like [9] :

- (9) Mozart died before he finished his requiem.

<sup>1</sup>Capitalized connectives indicate the crosslinguistic instantiations

“It follows that Mozart died before he finished his requiem for jazz combo, even though worlds in which Mozart actually finished a requiem for jazz combo are highly likely” (Krifka, 2010, p. 917). This means that for the antiveridical case there is no need to restrict DE to SDE. Krifka’s semantics, finally, renders BEFORE equivalent to negation, but this again faces the problem of veridical uses and predicts routinely strong NPIs, contrary to fact.

$$\llbracket A \text{ before } B \rrbracket = 1 \iff \exists t \left[ \llbracket A \rrbracket(t) \wedge \left( \neg \exists t'' \left[ t \leq t'' \wedge \llbracket B \rrbracket(t'') \right] \right) \right] \quad (\text{Krifka (2010)})$$

**Our Proposal:** We propose here a new semantics for the meaning of BEFORE:

$$\llbracket A \text{ BEFORE } B \rrbracket = 1 \iff \exists t \left[ \llbracket A \rrbracket(t) \wedge \left[ \left( \exists t'' \left[ t \leq t'' \wedge \llbracket B \rrbracket(t'') \right] \right) \vee \left( \forall t' \left[ \neg \llbracket B \rrbracket(t') \right] \right) \right] \right]$$

This semantics introduces disjunction, in contrast to (Krifka, 2010). The existence of an  $A$  time  $t$  (of the main clause) is (at least) an entailment, but disjunction introduces uncertainty (or ignorance) about whether there is a  $B$  time (of the BEFORE clause). The truth condition of BEFORE combines a positive and a negative disjunct: it says that either there is a time  $t''$  following time  $t$  when  $B$  is true, or there is no time  $t'$  at which  $B$  is true. Disjunction is nonveridical (Zwarts, 1995; Giannakidou, 1998), hence this semantics derives nonveridicality for BEFORE, and predicts weak NPIs. It also derives the fact that  $[A \text{ BEFORE } B]$  as a whole does not entail a  $B$  time.

Furthermore, it makes two additional predictions. First, if the negative disjunct is true, strong NPIs can be licensed, as shown in the following example:

- (10) O Iordánis péthane *prin* di KANENA egóni tou.  
 DEF.1SG.M. Jordan died before see.PERF.NONPAST any.NPI grandchild his  
 ‘Jordan died before seeing any of his grandchildren.’ (Modern Greek)

Because the main clause predicate contains *péthane* ‘died’, the speaker takes the negative disjunct to be true, thus licensing the strong NPI. Inference to the negative disjunct is licensed by a lexical cue, i.e. the fact that the main clause contains ‘died’. In the absence of such lexical (or generally contextual) cues, the speaker will tend to interpret the  $B$  argument positively, i.e. she will try to accommodate the positive disjunct. The reason for doing so is that a cooperative speaker/hearer will understand BEFORE as a relation between two times. Since the  $A$  time exists, this will create a strong tendency to also want the  $B$  time to exist and this is why the speaker works towards positive resolution and in favor of the first disjunct. The veridicality of BEFORE, in our semantics, is thus derived as a conversational implicature. It is also important to note that many languages from different families (e.g. Cantonese, French, Catalan, Polish (Yoon, 2011)) employ the so-called expletive negation in the BEFORE clause as a signal of the presence of the second disjunct. Crucially, however, unlike in the analysis of (Krifka, 2010), negation of the  $B$  time is not entailed, so the negation is truly expletive, a reflex of the negative disjunct.

Second, because there is uncertainty as to whether there is a  $t''$  time for  $B$ ,  $[A \text{ BEFORE } B]$  is no longer a relation between two times, strictly speaking. In this sense, BEFORE is no longer the dual of AFTER. This explains why BEFORE has the *anti*-PAST restriction [5], and AFTER does not. This is a welcome result, as it explains the crosslinguistic observation we made at the beginning. The *anti*-PAST restriction can be taken to reflect the uncertainty about the  $B$  time suggested in the semantics we propose.

**Conclusions:** Unlike its predecessors, this proposal succeeds in capturing the core properties of BEFORE illustrated in [1] - [5], and allows a number of crosslinguistic generalizations (*anti*-PAST, expletive negation) that cannot even be stated in the previous accounts (which only addressed English *before*). Finally, our semantics distinguishes clausal from nominal BEFORE [11]:

- (11) John left *before* noon/Bill.

Nominal BEFORE is arguably a distinct meaning, and it can be shown to behave like a comparative—see (Del Prete, 2008) for an analysis along these lines.

**Selected Bibliography:** • Anscombe 1964. Before and After • Condoravdi 2010. NPI licensing in temporal clauses • Del Prete 2008. A non-uniform semantic analysis of the Italian temporal connectives *prima* and *dopo* • Giannakidou 1998. *Polarity sensitivity as (non)veridical dependency* • Giannakidou 2006. Only, emotive factive verbs, and the dual nature of polarity dependency • Giannakidou 2009. The dependency of the subjunctive revisited: temporal semantics and polarity • Heinämäki 1974. Semantics of english temporal connectives • Landman 1991. *Structures for semantics* • Sánchez-Valencia et al. 1993. Polarity and the flow of time • Yoon 2011. ‘Not’ in the mood: the syntax, semantics and pragmatics of evaluative negation • Zwarts 1995. Nonveridical contexts