Prospective particles and expletive negation

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This paper proposes a new analysis of the connectives *before* and *until*, suitable for describing their meaning in English and their counterparts in other languages, e.g. Italian, French and Serbo-Croatian. Based on this analysis, we discuss expletive negation phenomena (EN) occurring in these sentences, using Italian as a case study. Additionally, we address how this approach relates to existing accounts of EN and its cross-linguistic variation.

Background The connectives *before* and *until* order the embedded clause event after the main clause event, thus providing a prospective viewpoint. *Before* receives both factual and non-factual interpretations (Heinämäki, 1972; Ogihara, 1995). Tahar (2021) argues that *before* has two types of meaning under a positive matrix: consecutive (factual) (1), and apprehensive (2) (non-factual). In contrast, *until* seems to have factual readings only. In principle, if the proposition it introduces is uncertain, the matrix proposition may never end, in line with the weak-*until* operator in linear temporal logic (Kamp, 1968). We refer to these latter cases as *futurate*, dividing *until* readings as *factual* (3) and *futurate* (4).[1]

(1) Jules was watching TV *before* he went to bed.
(2) Jim must catch the Greek vase *before* it falls.
(3) John stayed at the party *until* Anna came.
(4) John will stay here *until* you talk to him.

Such prospective particles are of particular interest because they belong to the so-called EN *triggers* (Muller, 1991; Jin and Koenig, 2021), i.e. elements regarded as *inherently negative* in whose scope EN instances can occur. A negator is considered expletive if it does not reverse the truth value of the sentence in which it appears. Typological data show that EN has a wide cross-linguistic distribution (Jin, 2021), although it does not occur in English. Yoon (2011) analyzes EN as a mood marker that allows speakers to avoid commitment to the truth of their assertions, showing that its licensing occurs in non-veridical contexts (Giannakidou, 1998, 2009). In general, EN is not compulsory (Delfitto, 2020), so speakers may or may not use it.

***Before* and EN** In French, EN in *before*-clauses appears in all readings, especially apprehensive (Tahar, 2021, 2022); an illustration is given in (5). It has been argued to convey undesirability towards the embedded proposition (Tahar, 2021; Jin and Koenig, 2021; Yoon, 2011). Alternatively, EN has been analyzed as an implicature cancellation (Delfitto et al., 2019), assuming that the implicature usually correlated with *before* is that the proposition they introduce actually occurs.

(5) Jim doit attraper le vase grec avant qu' il (ne) tombe.
Jim must catch the vase greek before that it EXNEG fall-3SG.SBJV
'Jim must catch the Greek vase before it falls.' French (Tahar, 2021, 609)

***Until* and EN** It is not clear in which contexts EN is most common. In some languages (e.g. most Slavic languages), EN is obligatory because it has been grammaticalised over time due to favorable grammatical conditions (Wälchli, 2018).[2] Our focus is on languages where EN is optional (e.g. Italian, Catalan, French), and where its use adds interpretive nuances. In Italian, EN is attested in both contexts (see 6-7), while in French and Catalan it seems to occur more frequently in *futurate* ones. The main difference from occurrences of EN in the scope of *before* is that here EN is present even if the actualization of the embedded proposition is not undesired by the speaker.

[1] Apprehensive uses of *before* could be regarded as *futurate*, but we retain the traditional label for clarity.

[2] The particle used to convey the *until* meaning is the same as the one used for *while*, and the negation helps to disentangle these two readings.

(6) Sono rimasta alla festa finché (non) è arrivata Chiara.
aux.1SG stay.PTCP.PST.F.SG at.the party until neg aux.3SG arrive.PTCP.PST.F.SG Chiara
'I stayed at the party until Chiara came.' Italian (factual)

(7) Rimarrò alla festa finché (non) arriva Chiara.
stay.FUT.1SG. at.the party until neg arrive.PRES.3SG Chiara
'I will stay at the party until Chiara comes.' Italian (futurate)

In short, *before* and *until* are similar in the temporal ordering they specify and in their veridicality status, as neither entails the truth of the proposition they introduce. However, they differ in their possible readings: *until* generally lacks non-factual interpretations. Crucially, in *before*-clauses, the embedded proposition can be prevented by the actualization of the matrix event, unlike in *until* contexts.[3] This difference has largely gone unnoticed in previous EN literature, yet we argue that, alongside their similarities, it is crucial for explaining EN's use and role in these contexts. In our analysis, we propose that in both cases EN serves to strengthen a negative component of their meaning, namely a negative implicature associated with their use.

Analysis We formalize *before* and *until* meanings with a multi-sorted predicate logic, employing five primitive types, namely e for individuals, v for events, s for possible worlds, i for time intervals, and t for truth values. We define τ as a function that associates each event with the interval in which it obtains. We also define min and max as functions that, given an interval $t = [a, b]$, return respectively a and b. We use m to vary over such "boundary" functions.

In (8) is our proposal for the **semantics of *until***; P and Q are predicates provided by the matrix and embedded event, respectively; t_R stands for the reference time (RT) (Reichenbach, 1947; Klein, 1994). As with Iatridou and Zeijlstra (2021), among others, it is assumed that *until* modifies the RT. In this case, the end of the RT coincides with the first (or last) instantiation of the embedded event[4]. Since *until*-clauses attach only to a durative matrix[5], *until*-clauses require the matrix to be durative and generally have an imperfective aspect ($t_R \subseteq \tau(e)$). It follows that, if the embedded does not occur, the matrix event is always true in the future since the RT has no right boundary.

(8) $[\![\text{until}]\!] = \lambda Q \lambda P \lambda e.P(e) \wedge t_R \subseteq \tau(e) \wedge [[\exists e'.Q(e') \wedge max(t_R) = m(\tau(e'))] \vee max(t_R) = +\infty]$

In our analysis, it is at-issue that *until* bounds the RT of a matrix event via the temporal trace of another event. This is the core component of both uses, factual and futurate. However, we argue that two implicatures are usually triggered[6]. The first one is particularly relevant, given the *a posteriori* perspective, in factual readings; it is a scalar implicature deriving that the temporal trace of the matrix event strictly coincides with the RT, and can be paraphrased negatively, see (9). The second one, conversely, is especially relevant in futurate ones; it is a sort of "modal" implicature stating that, for a relevant individual i (usually the agent or the speaker) and a relevant time t (before the culmination of the matrix event, i.e., $max(\tau(e))$), it does not exist a world in their relevant epistemic modal base in which the matrix event stops before the instantiation of the embedded one (towards which there is a positive epistemic bias), (10).

(9) Scalar implicature: $\tau(e) = t_R \equiv \neg\exists t.min(\tau(e')) \prec t \wedge t \subseteq \tau(e)$

(10) "Modal" implicature: $\neg\exists w.w \in \mathcal{M}_{ep}(i)(t) \wedge max(\tau(e)) \prec min(\tau(e'))$.

[3]Note that this is a generalization; languages such as Serbo-Croatian may use an *until* particle to convey an apprehensive meaning usually attested in *before*-clauses.

[4]The boundary choice depends on contextual factors we will discuss in our talk.

[5]See Karttunen, 1974; Mittwoch, 1977; and de Swart, 1996, among others, for a discussion on the topic.

[6]While a full derivation of these implicatures (especially modal ones) is beyond the scope of this abstract, in our talk we will address their compositional emergence and how EN interacts with them.

On EN As observed in (6-7), EN occurs in both factual and futurate contexts. We propose two illustrative scenarios in which a speaker might choose to use EN. In short, EN in temporal clauses functions as a tool to *strengthen* an implicature,[7] making the utterance more emphatic. **(a)** Maria and Gianni are talking. Yesterday Maria went to a party. Gianni thinks she stayed until the presents were opened and asks her about them. Maria shakes her head because she only stayed until her friend Chiara arrived (and *not a second more*), as she was very tired. She then utters (6) with EN, thereby strengthening (9). **(b)** Suppose Maria is at a party with Gianni. They discuss that Chiara may not come, or will be very late because her car has broken down. However, Maria is determined to meet her, as she owes her money. She then utters (7) with EN, clearly conveying that, *no matter the odds*, she will not leave until Chiara arrives, thus strengthening (10). EN thus acts as an implicature strengthener. Our analysis aligns with (Jin, 2021; Jin and Koenig, 2021), who hypothesize that EN originated as a speech error (later grammaticalized) triggered by a strong negative component. We recognize it may be suboptimal for the same particle to have different effects depending on context, and acknowledge that speakers may reinforce both implicatures simultaneously through a single EN instance. Nonetheless, EN's role in these clauses is always to reinforce a (negative) implicature. We envisage a formalization of EN triggering à la Lassiter (2012), employing probability measures rather than presuppositional content to explain why highlighting a negative component is useful.

We propose the **semantics for *before*** in (11). As in (8), we assume that the clause it introduces modifies the RT by providing its right boundary. Usually, the matrix displays a perfective aspect (this is especially clear in some languages like Serbo-Croatian), so we argue that the RT includes the matrix's event time. If the embedded event does not occur, the RT is undefined.

(11) $[\![\text{before}]\!] = \lambda Q \lambda P \lambda e.P(e) \wedge \tau(e) \subseteq t_R \wedge [[\exists e'.Q(e') \wedge max(t_R) = m(\tau(e'))] \vee max(t_R) = +\infty$[8]

The at-issue component is similar to the analyses in Krifka (2010) and Tahar (2021). However, we differ in implicature content: while they argue that the embedded event actualizes, we argue instead that the matrix's temporal trace marks the leftmost boundary of the reference time,[9] resulting in no overlap between the two events (see 12). Note that this implicature, triggered in consecutive (factual) contexts, is always true in non-factual ones and thus uninformative. In non-factual contexts, especially apprehensive ones, a "modal" version is triggered: for the relevant individual i at a relevant time t (within RT), there is no world in which, if the matrix event occurs, the embedded event follows — that is, the matrix event prevents it (see 13).

(12) Scalar implicature: $\tau(e) \approx min(t_R) \equiv \neg\exists t'.min(t_R) \prec t' \wedge t' \subseteq \tau(e) \wedge t' \subseteq \tau(e')$ (no overlap).

(13) "Modal" implicature: $\neg\exists w.w \in \mathcal{M}_{ep}(i)(t) \wedge [P(e)(t) \rightarrow [\exists t'.t \prec t' \wedge Q(e)(t')]$.

On EN Coherently with our previous analysis, we argue that EN can be used to strengthen one of these two negative implicatures, the first one in factual contexts[10], and the second in apprehensive ones, to highlight the speaker's negative mood towards the actualization of the embedded proposition, in line with previous literature (Yoon, 2011; Tahar, 2021).

Conclusions We presented similarities and differences between *before* and *until*, both prospective connectives associated with negative implicatures and EN. While our proposal abstracts over language-specific differences, our talk will address cross-linguistic variation and potential limits to generalization. Where EN is possible, we show that it strengthens negative implicatures, making utterances more emphatic. To our knowledge, this is the first in-depth comparison of EN in *before* and *until* clauses.

[7] Making it more difficult to cancel, as we will discuss in our talk.

[8] Meaning that it is undefined.

[9] This approximation arises because the trace is an interval while $min(t_r)$ is an instant.

[10] Even though EN in these contexts is rare and just occur in some Romance languages.

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