Prospective particles and expletive negation

A happy place for sad negations

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Roadmap

Motivation and background

What is an “expletive negation”?

Analysis

On some licensing conditions

Limits and future work

Takeaways

Motivation and background

Goals of the paper

(1) Provide an analysis of the connectives *before* and *until*, designed to facilitate their comparison and, with appropriate adjustments, to be applied cross-linguistically.

(2) Use this analysis to set the scene for a discussion of expletive negation phenomena (EN) in temporal clauses.

(3) Discuss the role of EN as implicature strengthener.

Prospective ordering: the shared core

- Both *before* and *until* temporally order the main proposition before the embedded one, thereby providing a **prospective viewpoint**.
- But: they differ in available readings and aspectual constraints on the main clause.

Readings: before

- *before* allows both **factual** and **non-factual** interpretations (Heinämäki, 1972; Ogihara, 1995).

  (1) Jules was watching TV *before* he went to bed. (factual)

  (2) Mozart died *before* he finished his requiem. (non-factual)

- Non-factual readings can also have an *apprehensive* flavor (Tahar, 2021).

  (3) I'll fix the vase before it breaks. (non-factual, apprehensive)

Readings: until

- *until* is a bit different in that, either the embedded proposition occurs (yielding a *factual* reading) or, if this is not the case, the matrix proposition must persists in the future→**futurate** readings.

  (4) John stayed at the party *until* Anna arrived. (factual)

  (5) This procedure will continue until the goal state is reached. (futurate)

- **NB**: these readings align with the *weak until* operator in LTL (Kamp, 1968):

$$\varphi \, \mathrm{U}^{w} \psi \;\equiv\; (\varphi \, \mathrm{U} \, \psi) \vee \mathrm{G}\varphi,$$

  where φ is the condition that holds up to the potential occurrence of ψ. If ψ never occurs, φ must remain true forever.

What is an “expletive negation”?

Working definition

- A sentential negator that **does not** reverse truth value (truth-conditionally inert).

(6) Anna si occuperà del pranzo a meno che (**non**) andiamo
Anna refl take.care.FUT.3SG of.the lunch unless not go.PRES.1PL
al ristorante.
to.the restaurant.
'Anna will take care of lunch unless we go to a restaurant.' (Italian)

- Cross-linguistically robust phenomena, attested in every linguistic macro-area. (Jin, 2021)

EN loci and features

- Propositional attitudes (e.g. *fear, regret, deny*)
- Comparatives
- Logical operators (*unless*, *without*)
- **Temporal connectives**: *before*, *until*

→ Generally optional (with notable exceptions).

→ It has been argued by Yoon (2011); Delfitto (2020), among others, to occur in non-veridical contexts.[1]

[1] A propositional operator F is *veridical* iff Fp entails or presupposes that p is true in some individual's model M(x); p is true in M(x) if M(x) $\subseteq p$, i.e., if all worlds in M(x) are p-worlds. If this is not the case, F is *non-veridical*. F is *antiveridical* iff Fp entails $\neg p$ in some individual's model: iff M(x) $\cap p = \varnothing$ (Giannakidou, 2014, 6).

EN theories (I)

- **Yoon (2011)**: EN = Evaluative Negation. It's a **mood marker**. → Encodes speaker's dispreference over the embedded proposition; modeled as a conventional implicature.
- **Delfitto (2019)**: EN = **implicature/presupposition cancellation**. → Logical form of negation, but targets non-at-issue content. For instance, assuming:

  (7) $[\![\text{ before }]\!] = \forall t : t < \tau . \neg B(t)$, where τ is the main-clause interval and B the property contributed by the *before*-clause.

  (8) Ho sparato prima che (?non) sparassero i nemici.
  Assertion: at all $t < \tau$, the enemies did not open fire;
  Implicature: they opened fire after τ. → EN should cancel it.

EN in temporal clauses

- **Before**
  - EN mainly in apprehensive uses. Formal studies on French (Tahar, 2021).
  - Reading: **dis-preference** toward the realisation of the embedded proposition.
- **Until**
  - Formal studies on Modern Hebrew (Margulis, 2018), EN exhaustifies a scalar implicature related to *until*. In general, EN adds a non-cancellable commentary on the at-issue content in both factual and futurate contexts (Gradimondo, subm. on Italian).

Analysis

Formal setup

- Multi-sorted predicate logic with five types: e (individuals), v (events), s (worlds), i (intervals), t (truth values).
- Model: $\mathcal{M} = \langle (\mathcal{D}_\sigma)_{\sigma \in \mathcal{T}}, I, \prec, \subseteq \rangle$ $\prec$ is a strict partial order on intervals (irreflexive, transitive, asymmetric);[2].
- Temporal primitives (Reichenbach/Klein): t_S = speech time, t_R = reference time, $\tau(e)$ = event time.
  Perfective aspect: $\tau(e) \subseteq t_R$; Imperfective aspect: $t_R \subseteq \tau(e)$.
- For intervals $t = [a, b]$, the functions *left boundary* (l_B) and *right boundary* (r_B) return the start point a and endpoint b.

[2]We assume a linear, discrete temporal structure

Semantics of until

- **Core idea:** as the main clause is expressed via an imperfective viewpoint ($t_R \subseteq \tau(e)$)[3], *until* sets the **right boundary** of the matrix reference time, identified by the embedded clause, as Iatridou and Zeijlstra (2021).
- **At-issue content:** the matrix event holds up *at least* to the embedded event.
- **Implicatures:**
  - Scalar: the matrix ends *exactly* when the embedded event occurs.
  - Modal (futurate readings): there is the possibility that the matrix will stop before the indented boundary.

[3] *Until* presupposes that the matrix's ET is **temporally modifiable**.

Lexical entry: until (truth-conditional core)

$$[\![\textbf{until}]\!]^{\mathcal{M}} =$$
$$\lambda Q \lambda P \lambda e.P(e) \ \wedge \ t_R \subseteq \tau(e) \ \wedge \ (\exists e' \, [Q(e') \wedge r_B(t_R) = b(\tau(e'))] \ \vee \ r_B(t_R) = +\infty)$$

- RT's right boundary is set by the embedded clause (factual readings) or it remains open (futurate ones).

Until: Italian + entailment

Example (Italian)
Ermanno legge **finché** *Iride apre la porta.*
'Ermanno will read until Iride opens the door.'

- $[\![$ Ermanno legge $]\!]^{\mathcal{M}} = [\![$ (1) $]\!]^{\mathcal{M}} = \mathit{read}(e) \wedge \mathit{ag}(e) = \mathit{er}$.
- $[\![$ Iride apre la porta $]\!]^{\mathcal{M}} = [\![$ (2) $]\!]^{\mathcal{M}} = \mathit{open}(e') \wedge \mathit{ag}(e') = \mathit{ir} \wedge \mathit{th}(e') = \mathit{door}$.

(9) $[\![$ Ermanno legge **finché** Iride apre la porta $]\!] = 1$ iff
$\exists e.\mathit{now} \subseteq \tau(e) \wedge t_R \subseteq \tau(e) \wedge [\![(1)]\!](e) \wedge \big(\exists e' \, [[\![(2)]\!](e') \wedge r_B(t_R) = b(\tau(e'))] \ \vee \ r_B(t_R) = +\infty\big)$.
Entailment (matrix durative + punctual/perfective embedded):
$\models_{\mathcal{M}} \exists t \, \big[t \subseteq t_R \ \wedge \ t \not\subseteq \tau(e')\big]$.

Implicatures with until

Scalar (cessation) - factual

$$\tau(e) = t_R \;\equiv\; \neg\exists t\,[\,l_B(\tau(e')) \prec t \wedge t \subseteq \tau(e)]$$

Modal (commitment) - futurate

$$\exists w\,[\,w \in \mathcal{M}_{ep}(i)(t) \;\wedge\; r_B(\tau(e)) \prec l_B(\tau(e'))\,]$$

- Both are *defeasible*; EN strengthens them (esp. optional-EN systems).

EN and scalar implicature

- **Without EN: scalar implicature is defeasible**

  (10) Ermanno ha corso finché il prof. ha fischiato, *e anche un po' dopo...*
  'Ermanno ran until the professor whistled, *and even a bit after...*'

- **With EN: implicature strengthened, non-defeasible?**

  (11) Ermanno ha corso finché il prof. **non** ha fischiato, *#e anche un po' dopo...*
  'Ermanno ran until the professor EN whistled, *# and even a bit after...*'

EN in downward-entailing contexts

- Does EN make the "no later than Q" inference **obligatory**?

Example

(i) Tutte le persone che hanno corso finché il professore ha fatto un fischio sono passate al turno successivo.

All the people who ran until the professor whistled advanced to the next round.

$\not\rightarrow$' 'All the people who ran until the professor whistled (and no later) advanced to the next round.'

(ii) Tutte le persone che hanno corso finché il professore **non** ha fatto un fischio sono passate al turno successivo.

All the people who ran until the professor whistled advanced to the next round.

$\rightarrow$' 'All the people who ran until the professor whistled (and no later) advanced to the next round.'

EN and modal implicatures (futurate)

(12) **Without EN**
Rimango alla festa finché arriva Gianni, *anche se sono davvero stanchissimo.*
$\rightarrow$ In accessible alternative worlds, the speaker may leave earlier.

(13) **With EN in a marked scenario**
Ti giuro, rimango alla festa finché ?(**non**) arriva (quel farabutto) Gianni, *anche se sono davvero stanchissimo.*
$\nrightarrow$ In accessible alternative worlds, the speaker may leave earlier; the speaker points to the ones in which they do not.

- Effect: EN reinforces **modal commitment**, in concord with expressives.

Semantics of before

- **Core idea:** *before* also delimits the matrix RT by the embedded clause's boundary. However, the matrix does not need to be durative/homogeneous ($\tau(e) \subseteq t_R$).
- **At-issue content:** the matrix event precedes the embedded one for at least one second.
- **Implicatures:**
  - Scalar (factual): more than one second, at least **no overlap** — matrix totally precedes embedded.
  - Modal (apprehensive): **prevention/causal** — if matrix happens, embedded won't (in relevant worlds).

Lexical entry: before (truth-conditional core)

$$[\![\textbf{before}]\!]^{\mathcal{M}} =$$

$$\lambda Q.\lambda P.\lambda e.\, P(e) \;\wedge\; \tau(e) \subseteq t_R \;\wedge\; \Big(\exists e' \,[Q(e') \wedge r_B(t_R) = r_B(\tau(e'))] \;\vee\; \max(t_R) = +\infty\Big)$$

- If the embedded event never occurs, $r_B(t_R)$ may stay undefined; matrix need not continue.

Before: Italian + entailment

Example (Italian)

Sono uscita **prima che** *Gianni arrivasse.*

'I left before Gianni arrived.'

- $[\![\ \textit{Sono uscita}\ ]\!]^{\mathcal{M}} = [\![\ (1)\ ]\!]^{\mathcal{M}} = \textit{leave}(e) \wedge \textit{ag}(e) = \textit{sp}.$
- $[\![\ \textit{Gianni arrivasse}\ ]\!]^{\mathcal{M}} = [\![\ (2)\ ]\!]^{\mathcal{M}} = \textit{arrive}(e') \wedge \textit{ag}(e') = \textit{gi}.$

(14) $[\![\ \textit{Sono uscito prima che Gianni arrivasse}\ ]\!] = 1$ iff
$\exists e.\tau(e) \prec \textit{now} \wedge \tau(e) \subseteq t_R \wedge [\![(1)]\!](e) \wedge \ (\exists e'.[[\![(2)]\!](e') \wedge r_B(t_R) = b(\tau(e'))] \ \vee \ r_B(t_R) = +\infty)$.

Entailment:

$\models_{\mathcal{M}} \exists t\ [\, t \subseteq t_R \ \wedge \ t \nsubseteq \tau(e')\,]$ (an initial subinterval where embedded is false).

Implicatures with before

Scalar (no overlap)

$$\neg\exists t' \left[\ l_B(t_R) \prec t' \ \wedge\ t' \subseteq \tau(e) \ \wedge\ t' \subseteq \tau(e')\ \right]$$

Modal (preventive/causal) — apprehensive

$$\neg\exists w \Big[w \in \mathcal{M}_{ep}(i)(t) \ \wedge\ \big(P(e)(t) \rightarrow \exists t' \left[\, t \prec t' \wedge Q(e')(t')\,\right]\big)\Big]$$

- Scalar is informative in factual uses; trivial in non-factual.
- Modal captures some causal relationship between the two events$\rightarrow$ preventive reading.

EN under before

- **Apprehensive (productive):** EN amplifies the **preventive** reading, signalling the speaker's dis-preference, as for Tahar (2021). Restriction on part of the modal base → strenghtening.

  (15) *Mettiti la giacca prima che* **(non)** *ti ammali!*
  'Put on your jacket before you get ill!'

  (16) Ia acest medicament înainte să (nu) te îmbolnăvești!
  'Take this medicine before you get sick!'

On some licensing conditions

The anti-veridical core of before and until

- Both connectives generate a **negative interval**: there is a time in which, if the matrix proposition true, the embedded one is false...*up until a point*.
- Attempting genuine negation in the embedded clause (P *until* $\neg Q$):
  - Forces $\neg Q$ to be false $\Rightarrow$ Q true$\rightarrow$ Epistemic contradiction.
  - Overt negation is thus disregarded from the at-issue and re-used for other purposes. $\nrightarrow$ EN is useless.
- The story has just begun...or else EN would be everywhere!

Limits and future work

Limits and future work

- More data (grammaticality judgements, etc).
- A better analysis :)
- Look at other contexts.

Takeaways

EN in temporal clauses: guiding ideas

- EN may **restrict possibilities** in line with distinct criteria:
  - **Scalar** reinforcement (e.g. Italian *until*).
  - **Alternative**-based restriction (e.g. *before* in French, Italian, Romanian, Catalan).
- A formalisation must capture:
  - **Possibilities** (accessible worlds, intervals).
  - **Preferences** / speaker attitudes.
- Licensing context: non-veridical space where EN may enrich interpretation without producing contradictions.

Questions?

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