

# German *erst* — a temporal addition to the ‘exclusive muddle’<sup>1</sup>

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**Abstract.** In ‘Principles of the Exclusive Muddle’, Coppock and Beaver (2014) suggest a scalar common core meaning for a plethora of exclusive particles in English, suggesting that the particles differ in (i) their semantic type, (ii) the kind of scale the focus alternatives are ranked on, and (iii) the constraints placed on the QUD. This paper contributes to this discussion by proposing an analysis of the temporal exclusive *erst* (‘not until’) in German, based on the same core meaning.

**Keywords:** focus-sensitivity, exclusive particles, aspectual particles, *not until*.

## 1. The ‘exclusive muddle’

This section presents an introduction to exclusive particles and the unified account presented in Coppock and Beaver (2014), Beaver and Clark (2008) for their meaning contribution.

### 1.1. An introduction to exclusive particles

Under an alternative semantic view of focus, focus induces alternatives (e.g. Rooth 1985, 1992, 1996). For example, the focus alternatives of (1), with focus on *Ben*, is the set of propositions of the form *Ali saw X*, for different X. The proposition expressed by (1) is itself part of the alternatives.

(1) Ali saw **Ben**<sub>F</sub>.

Alternatives: e.g. *Ali saw Ben*, *Ali saw Cem*, *Ali saw Ben and Cem*, ...

These alternatives are modelled as alternative answers to a (often implicit) *question under discussion* (QUD), e.g. *Who did Ali see?* in (1) (e.g. Roberts 1998, 2012, Büring 1997). Under the assumption that the denotation of a question is the set of its possible answers (cf. Hamblin 1973), the sentence in (1) indicates a QUD corresponding to its focus alternatives. Below, following Beaver and Clark (2008), the current QUD will sometimes be abbreviated as CQ.

Exclusive particles like English *only* interact with the focus alternatives of their *prejacent*, i.e. of the sentence without the exclusive. They contribute a truth-conditional meaning component, an assertion that all alternatives not entailed by the prejacent are false. For example, (2) asserts that any stronger focus alternatives of the prejacent, i.e. stronger alternatives of the form *Ali saw X* are false. In contrast, (3) asserts that stronger alternatives of the form *Ali X-ed Ben* are false. Example

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(3), in contrast to (2), is thus compatible with a context in which Ali also saw Cem, but not with a context in which Ali did something additional to Ben.

(2) Ali *only* saw **Ben**<sub>F</sub>.

Alternatives: e.g. *Ali saw Ben, Ali saw Cem, Ali saw Ben and Cem, ...*

(3) Ali *only* **saw**<sub>F</sub> Ben

(Alternatives e.g. *Ali saw Ben, Ali saw and greeted Ben, ...*)

Most accounts of *only* propose that **all** focus alternatives other than the prejacent are asserted to be false. This however depends on the kinds of alternatives that are assumed. If a plural focus like (4) can have singular alternatives like *Ali saw Ben*, which is true in (4), then it is preferable to assume that only those alternatives which are not entailed by the prejacent are asserted to be false.

(4) Ali *only* saw **Ben and Cem**<sub>F</sub>.

Alternatives: e.g. *Ali saw Ben, Ali saw Cem, Ali saw Ben and Cem, ...*

This assertion that the prejacent is the strongest true alternative, is called the MAX-component in Coppock and Beaver (2014). In addition, following Beaver and Clark (2008), they assume a presuppositional MIN-component: a presupposition that some alternative which is at least as strong as the prejacent is true. This MIN/MAX account is presented in the following section.

## 1.2. A MIN/MAX approach to exclusive particles

Coppock and Beaver (2014) propose that all exclusive particles in English, e.g. *only, just, merely*, etc. have a common core. First, they are all *scalar*: they require that the focus alternatives with which they interact are ranked on a salient scale of strength. Second, exclusive particles trigger the presupposition that there is a true focus alternative which is at least as strong as the prejacent, i.e. that some alternative ranked as high or higher on the scale as the prejacent is true (= the MIN-component). Third, exclusive particles contribute a truth-conditional meaning component that stronger alternatives, i.e. alternatives ranked higher on the scale, are false (= the MAX-component). As a propositional operator, *only* would have the meaning in (5) (Coppock and Beaver 2014: 24, adapted from Beaver and Clark 2008), with the MIN and MAX-components in (6).

(5)  $[[\text{only}]]^S$   
 $= \lambda p. \lambda w: \text{MIN}_S(p)(w). \text{MAX}_S(p)(w)$

(6)  $\text{MIN}_S(p) = \lambda w. \exists p' \in \text{CQ}_S[p'(w) \wedge p' \geq_S p]$   
 $\text{MAX}_S(p) = \lambda w. \forall p' \in \text{CQ}_S[p'(w) \rightarrow p \geq_S p']$

This section shows some examples and then discusses the differences between different exclusives.

For example, for (7), the focus alternatives are ranked on a scale of strength like (8). In this example, the scale is an entailment scale: alternatives ranked higher on the scale entail those alternatives which are ranked lower on the scale. Since *only* triggers the presupposition that an alternative which is ranked at least as high as the prejacent is true, lower-ranked alternatives, e.g. *One student left* in (7)–(8), are not considered as possible answers to the QUD<sup>2</sup>. This amounts to the presupposition in (7-a) for this example, that at least two students left. The sentence (7) then asserts that all alternatives stronger than the prejacent are false, paraphrased as (7-b). The prejacent is thus the strongest true answer to the QUD.

- (7) (QUD: How many students left?)  
*Only two*<sub>F</sub> students left
- a. P: At least two students left. (MIN)  
b. A: At most two students left. (MAX)
- (8)
- ~~Three students left~~  
**Two students left**  
 One student left  
 ...

For examples like (9), a scale like (10) is assumed, which is also an entailment scale (albeit partially ordered instead of totally ordered). The presupposition that there is a true alternative at least as strong as the prejacent leads to the consideration of only those alternatives which entail the prejacent. All stronger alternatives than the prejacent are asserted to be false.

- (9) (QUD: Who left?)  
*Only Ali*<sub>F</sub> left
- a. P: At least Ali left. (MIN)  
b. A: At most Ali left. (MAX)
- (10)
- ~~Ali, Ben & Cem left~~  
~~Ali & Ben left~~   ~~Ali & Cem left~~   Ben & Cem left  
**Ali left**   Ben left   Cem left

As already shown in Beaver and Clark (2008), this analysis can also account for evaluative readings of *only*, e.g. (11). In these cases, the scale involved is a rank-order scale such as (12), in which higher-ranked alternatives do not entail lower-ranked alternatives (Coppock and Beaver 2014). The ranking here is evaluative, evaluating e.g. the importance of the job. Again, the presupposition excludes all lower-ranking alternatives as candidates for the strongest true answer, and the assertion excludes all higher-ranking alternatives.

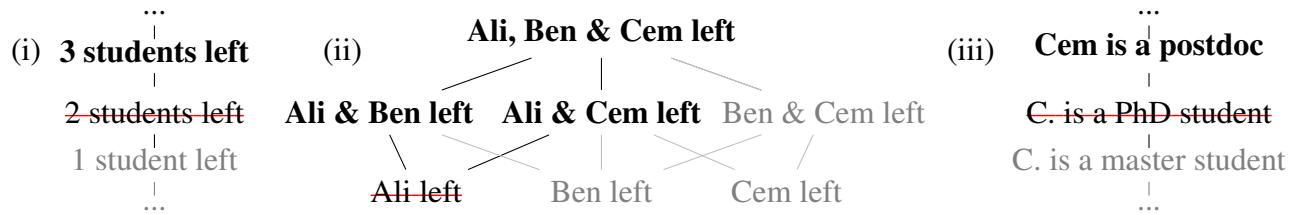
- (11) (QUD: What is Cem’s occupation?)  
 Cem is *only a PhD student*<sub>F</sub>.
- a. P: Cem is at least a PhD student. (MIN)  
b. A: Cem is at most a PhD student. (MAX)
- (12)
- ~~Cem is a postdoc~~  
**Cem is a PhD student**  
 Cem is a master student  
 ...

<sup>2</sup>In the example scales, unconsidered lower-ranking alternatives are printed in a light gray. The alternatives which are excluded due to the assertion are struck out. The remaining alternatives are printed in bold font.

Beaver and Clark (2008) show that the different kinds of scales (entailment vs. rank-order) can account for the fact that the prejacent survives negation in entailment scale examples, but not in rank-order examples. Compare (13-c) to (13-a–b): under the evaluative reading, the prejacent *Cem is a PhD student* does not survive. (13-c) could e.g. be continued with ... *he is a postdoc*.

- (13) a. It's not the case that *only two* students left → Two students left  
 b. It's not the case that *only Ali* left → Ali left  
 c. It's not the case that Cem is *only a PhD student* ⇏ Cem is a PhD student

This difference follows from the different scales: The negative assertions in (13-a–c) lead to the exclusion of the prejacent as the strongest true answer<sup>3</sup>. All remaining candidates for the strongest true answer are alternatives which are stronger than the prejacent. On entailment scales like (i) and (ii), these stronger alternatives entail the prejacent. Since one of them is presupposed to be true, and all of them entail the prejacent, the prejacent is entailed in (13-a-b). In (13-c), with the scale in (iii), the remaining alternatives do not entail the prejacent.



Coppock and Beaver (2014) note that different exclusive particles can differ in several ways: First, they differ with respect to the kinds of scales they allow (*strength ranking*). Second, they can appear in different syntactic positions and thus differ with respect to the type of their complement (*type*). Third, they impose restrictions on the kinds of QUDs that are possible (*question*). Instead of a propositional *only* shown above, Coppock and Beaver (2014: 56) therefore propose different lexical entries for different exclusives, following the lexical entry schema for exclusives in (14).

- (14)  $\lambda\alpha.\lambda\beta_1. \dots \lambda\beta_n.\lambda w :$   
 $CQ_S \subseteq \Omega \wedge$  // question parameter  
 $\Gamma(\leq_S) \wedge$  // strength ranking parameter  
 $MIN_S(\alpha(\beta_1)\dots(\beta_n))(w).MAX_S(\alpha(\beta_1)\dots(\beta_n))(w)$  // min-component, max-component

<sup>3</sup>When the MAX-component is negated, it entails that there is a true alternative in the CQ which is stronger than the prejacent. This is due to the following equivalences:

- (i)  $\neg\forall x \in A, P(x) \Leftrightarrow \exists x \in A, \neg P(x)$ , therefore:  $\neg[\forall p' \in CQ_S p'(w) \rightarrow p' \geq_S p] \Leftrightarrow \exists p' \in CQ_S \neg[p'(w) \rightarrow p' \geq_S p]$   
 (ii)  $\neg[p \rightarrow q] \Leftrightarrow p \wedge \neg q$ , therefore:  $\exists p' \in CQ_S \neg[p'(w) \rightarrow p' \geq_S p] \Leftrightarrow \exists p' \in CQ_S [p'(w) \wedge \neg[p' \geq_S p]]$

For example, *sole* imposes restrictions on the QUD and scale, according to Coppock and Beaver (2014). It is adjectival and requires that the alternatives it associates with are ranked on an entailment scale. It also requires a specialized question: it takes a property P as an argument and requires the alternatives to be possible answers to the question *Who Ps?*, see (15)–(16).

- (15) (QUD: What all is a purpose of this?)  
The *sole* purpose of this is **fun**.
- (16)
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The main proposal of this paper is that the MIN/MAX account can be extended to the German (temporal) exclusive particle *erst*. This particle contributes the same presupposed MIN component and asserted MAX component as the other exclusive particles discussed in this section. Like many other exclusive particles, it however poses certain requirements on the QUD and the scale. The following section provides an introduction to *erst* and presents and discusses the analysis.

## 2. German *erst*

In this section, the meaning contribution of *erst* is discussed: first informally in section 2.1, then in a MIN/MAX account of *erst* is presented in sections 2.2 and 2.3. The latter section explains, step by step, how the inferences discussed in 2.1 are explained under this analysis.

### 2.1. An introduction to *erst*

“*Erst*” in (17) is a temporal exclusive, similar to “not until” in English (cf. e.g. Karttunen 1974, Condoravdi 2008, Declerck 1995). This section briefly discusses the status of some inferences of (17): (i) an inference that the event in question didn’t happen earlier (*exclusive*, (18-a)), (ii) an inference that the event took place at the mentioned time (the *prejacent*, (18-b)), (iii) an inference that the event took place (which Condoravdi (2008: 635) calls *actualization*) (18-c), (iv) a *lateness* inference, expressing that the event happened unexpectedly late (18-d).

- (17) Jan ist *erst* **um 9** abgereist.  
Jan is PRT at 9 left  
“Jan didn’t leave until 9.”
- (18)
- |    |                                    |                 |
|----|------------------------------------|-----------------|
| a. | Jan didn’t leave earlier           | (exclusive)     |
| b. | Jan left at nine                   | (prejacent)     |
| c. | Jan left                           | (actualization) |
| d. | 9 O’clock is late for Jan to leave | (lateness)      |

When (17) is embedded under a non-veridical operator, such as in (19), the inferences in (18-c–d) survive (they ‘project’), whereas (18-a–b) do not survive (‘do not project’).

- (19) Ich wünschte, Jan wäre *erst um 9* abgereist.  
 I wish Jan had PRT at 9 left  
 “I wish Jan hadn’t left until 9.”

The prejacent in (18-b) can be suspended, cf. (20) (e.g. Horn 1972). Suspension of an inference is similar to cancellation: a sentence negating the inference is appended to the sentence that gives rise to the inference. In contrast to cancellation, the second clause is weakened using a modal or conditional. For example, the first clause in (20) gives rise to the inference that Jan left at 9. The next clause is a modalized denial of this inference, stating that maybe he didn’t leave before ten.

- (20) Jan ist *erst um 9* abgereist, vielleicht sogar erst um 10.  
 Jan is PRT at 9 left perhaps even PRT at 10.  
 “Jan didn’t leave until 9, perhaps even not until 10.”

On first glance, the actualization and lateness inferences seem to be presuppositions, since they project, whereas the exclusive component seems to be asserted (being non-projective, and, as will be shown in §2.3, non-suspendable). The prejacent inference is also non-projective, but suspendable. After proposing an analysis in 2.2, section 2.3 discusses how to account for these inferences.

## 2.2. A MIN/MAX analysis of *erst*

*Erst* can be added to Coppock and Beaver (2014)’s typology of exclusives. Recall that they propose that all exclusives are scalar, with a presupposed MIN component and an asserted MAX component, but that exclusives can differ with respect to the parameters *question*, *strength ranking*, and *type*.

Concerning the *question*-parameter, *erst*-sentences answer a specialized QUD asking for the endpoint of the considered interval in which the event took place, e.g. “*By when (= between  $t_{start}$  and when) did Jan leave?*”. I adopt, from De Swart (1996)’s analysis of *until*, the assumption that there is an implicit startpoint  $t_{start}$  of the interval under consideration and assume that all alternatives share this startpoint. Since the QUD asks for the endpoint of the interval within which the event took place, rather than asking for the actualization time of the event itself, the alternatives will be paraphrased as *between*-phrases (e.g. *Jan left between  $t_{start}$  and 9*).

The resulting scale is an entailment scale, i.e. the *strength ranking* is entailment, cf. (21). The fact that alternatives involving shorter intervals entail those involving longer intervals is due to the punctuality of the predicate (Grubic 2012): if the predicate were durative, e.g. *stay*, the direction of entailment would be reversed, e.g. *Jan stayed between  $t_{start}$  and 9* would entail *Jan stayed between  $t_{start}$  and 8*, but not vice-versa. I assume this to be responsible for the unacceptability of *erst um 9*

and its counterparts in other languages with durative predicates, e.g. (22)<sup>4,5</sup>.

- (21)  $\begin{array}{c} \dots \\ \text{J. left between } t_{start} \text{ and 8} \\ \text{J. left between } t_{start} \text{ and 9} \\ \text{J. left between } t_{start} \text{ and 10} \\ \dots \end{array}$       (22) #Jan blieb *erst um 9*.  
 Jan stayed PRT at 9  
 “Jan only stayed at 9”

Concerning the semantic *type*, *erst* in (17) forms a constituent with the temporal adverbial *um 9*, as can e.g. be seen by the fact that the whole *erst*-phrase can be preposed (23). I assume, following e.g. von Stechow (2009), that the temporal adverbial *um 9* (“at nine”) is a property of times (here: type  $\langle i, st \rangle$ ). It can combine with the predicate directly via predicate modification (24).

- (23) [*Erst um 9*] ist Jan abgereist.      (24) Jan ist um 9 abgereist.  
 “Jan didn’t leave until 9”      “Jan left at 9 O’clock”

The strongest true answer on the scale in (21) does not correspond to (24), however. Nine is merely the endpoint of the considered interval; its starting point is at an earlier, contextually provided starting point  $t_{start}$ . Intuitively, the presupposition and assertion of (17) should be the following:

- (25) Jan ist *erst um 9* abgereist (“Jan didn’t leave until 9.”)  
 P: there is a true answer at least as strong as ‘Jan left between  $t_{start}$  and 9’  
 A: the strongest true answer is at most as strong as ‘J. left between  $t_{start}$  and 9’

I propose that *erst* requires a temporal adverbial which already provides this extended interval as an argument, cf. (26), where  $\text{INT}[t, t']$  is the interval from the beginning of  $t$  to the end of  $t'$ <sup>6</sup>.

- (26) a.  $[[\text{um } 9 \text{ Uhr}]] = \lambda t. [t = 9 \text{ O'clock}]$   
 b.  $[[\text{OP}]] = \lambda R_{\langle i, st \rangle}. \lambda S_{\langle i, st \rangle}. \lambda t. \lambda w. S(t \cap \text{INT}[t_{start}, \text{END}(R)])(w)$   
 c.  $[[\text{OP um } 9 \text{ Uhr}]] = \lambda S_{\langle i, st \rangle}. \lambda t. \lambda w. S(t \cap \text{INT}[t_{start}, \text{END}(\lambda t. t = 9 \text{ O'clock})])(w)$   
 $\approx \lambda S_{\langle i, st \rangle}. \lambda t. \lambda w. S(t \cap \text{INT}[t_{start}, 9 \text{ O'clock}])(w)$

<sup>4</sup>If sentences with such predicates are interpretable at all, they get an inchoative, and thus punctual, reading, e.g. *run* in (i) is interpreted as *begin to run* (cf. also Giannakidou 2002: 5, Karttunen 1974: 289).

(i) ?Jan rannte *erst um 9* (“Jan didn’t run until 9”)

<sup>5</sup>Note however that the PP *um 9* must also be partly responsible for this requirement, since #*Jan blieb um 9* is also odd. A more thorough discussion of *erst* would have to include a discussion of other PPs which can occur with *erst*, as well as their interaction with aspect and Aktionsart, e.g. *seit* (‘since’), *nach/nachdem* (‘after’), *als/wenn* (‘when’), etc.

<sup>6</sup>The operator *END* returns the latest time point which has the property *R*:  $\text{END}(R) = \iota t [R(t) \ \& \ \forall t' [R(t') \rightarrow t' \prec t]]$ , the formula is simplified in the following, so that  $\text{INT}[t, 9 \text{ O'clock}]$  is an interval lasting up to the ‘end’ of O’clock.

Following the schema in (14), (27) is the lexical entry proposed for *erst*<sup>7</sup>: it is a modifier, modifying a temporal adverbial of type  $\langle\langle i, st \rangle, \langle i, st \rangle\rangle$ .

$$(27) \quad \begin{aligned} \llbracket \text{erst} \rrbracket^S &= \lambda P_{\langle\langle i, st \rangle, \langle i, st \rangle\rangle} \cdot \lambda Q_{\langle i, st \rangle} \cdot \lambda t \cdot \lambda w: \\ &CQ_s \subseteq ?t' [\lambda w. [Q(t \cap \text{INT}[t_{start}, t'])](w)]] && // \text{By when did Q happen?} \\ &\wedge \text{ENTAILMENT}(\geq_S) && // \text{Strength: entailment} \\ &\wedge \text{MIN}_S(P(Q)(t))(w) \cdot \text{MAX}_S(P(Q)(t))(w) && // \text{at least by P, at most by P} \end{aligned}$$

The following is the derivation of (17) using (26) and (27) (ignoring the presuppositions in (28-a)).

$$(28) \quad \begin{aligned} \text{a. } &\llbracket \text{erst OP um 9 Uhr} \rrbracket = \lambda Q_{\langle i, st \rangle} \cdot \lambda t \cdot \lambda w \cdot \text{MAX}_S(Q(t \cap \text{INT}[t_{start}, 9 \text{ O'clock}])(w)) \\ \text{b. } &\llbracket \text{erst OP um 9 Uhr} \rrbracket (\llbracket \text{Jan ist abgereist} \rrbracket)(t) \\ &= \lambda w \cdot \text{MAX}_S(\lambda w \cdot \text{Jan left at } t \cap \text{INT}[t_{start}, 9 \text{ O'clock}] \text{ in } w)(w), \text{ defined iff} \\ &\text{(i) } CQ_s \subseteq ?t' [\lambda w \cdot \text{Jan left at } t \cap \text{INT}[t_{start}, t'] \text{ in } w] \\ &\text{(ii) } \text{ENTAILMENT}(\geq_S) \\ &\text{(iii) } \lambda w \cdot \text{MIN}_S(\lambda w \cdot \text{Jan left at } t \cap \text{INT}[t_{start}, 9 \text{ O'clock}] \text{ in } w)(w) \end{aligned}$$

*Erst* is thus an exclusive which places restrictions on the QUD (“*Between  $t_{start}$  and when...?*”), the scale (entailment), and the type of its complement (e.g.  $\langle\langle i, st \rangle, \langle i, st \rangle\rangle$ ). Given these prerequisites, *erst* in (17) behaves exactly like the other exclusives described in Coppock and Beaver (2014): (i) it is *scalar*, with alternatives differing in the endpoint of the considered interval ordered on an entailment scale, (ii) it presupposes a MIN component, and (iii) asserts a MAX component.

### 2.3. Accounting for the data

This analysis explains the behaviour of the exclusive, actualization, lateness and prejacent inferences discussed in section 2.1 above and shown again in (30) (for example (29)).

$$(29) \quad \begin{array}{ll} \text{Jan ist } \textit{erst} \textbf{um 9} \text{ abgereist.} & (30) \quad \text{a. Jan didn't leave earlier} \quad (\text{exclusive}) \\ \text{Jan is PRT at 9 left} & \text{b. Jan left at nine} \quad (\text{prejacent}) \\ \text{"Jan didn't leave until 9."} & \text{c. Jan left} \quad (\text{actualization}) \\ & \text{d. 9 O'clock is late for Jan to leave} \quad (\text{lateness}) \end{array}$$

First, the fact that earlier alternatives are excluded (= the *exclusive* inference) is due to the asserted

<sup>7</sup>All permissible lexical entries for exclusives are formed from the propositional version using the Geach rule, which Coppock and Beaver (2014: 27) describe as follows: “The Geach rule converts a function  $f$  with type  $\langle a, b \rangle$  into a function  $f'$  with type  $\langle\langle c, a \rangle, \langle c, b \rangle\rangle$  of the form  $\lambda R \cdot \lambda x \cdot f(R(x))$ , where  $R$  has type  $\langle c, a \rangle$  and  $x$  has type  $c$ .” This rule is the main reason for treating the adverbial as type  $\langle\langle i, st \rangle, \langle i, st \rangle\rangle$  instead of  $\langle\langle i, t \rangle, \langle i, t \rangle\rangle$ .



MAX-component, which excludes stronger alternatives. In the case of *erst*, all stronger alternatives involve temporal intervals with an earlier endpoint. That weaker alternatives, i.e. alternatives with a later endpoint, are not considered is due to the presupposed MIN-component. This is exactly the same as with *only*, where weaker alternatives are also not considered, and stronger alternatives are asserted to be false, compare (31)–(32).

- |  |   |
|--|---|
| <p>(31)</p> <div style="text-align: center;"> <math>\dots</math><br/> <math>\vdots</math><br/> <del>J. left between <math>t_{start}</math> and 8</del><br/> <b>J. left between <math>t_{start}</math> and 9</b><br/> J. left between <math>t_{start}</math> and 10<br/> <math>\vdots</math><br/> <math>\dots</math> </div> | <p>(32)</p> <div style="text-align: center;"> <math>\dots</math><br/> <math>\vdots</math><br/> <del>Three students left</del><br/> <b>Two students left</b><br/> One student left<br/> <math>\vdots</math><br/> <math>\dots</math> </div> |
|--|---|

That the *actualization* inference, e.g. the inference of (29) that *Jan left*, survives negation is due to the fact that all considered alternatives entail that Jan left. Since it is presupposed that there is a true alternative at least as strong as *Jan left between  $t_{start}$  and 9*, one of these alternatives has to be true. Therefore, it has to be true that Jan left.

Beaver and Clark (2008: 251) suggest in their informal description of the meaning contribution of *only* that its discourse function is to indicate counter-expectation, cf. (33). They call this the *mirative* meaning component. It is a projective meaning component expressing that the answer is unexpectedly weak, i.e. that a stronger answer was expected to be true. For example, *Only two students left* expresses that more students were expected to leave (cf. also Zeevat 2009).

- (33) Discourse function [of exclusives]: To make a comment on the [current QUD (CQ)], a comment which weakens a salient or natural expectation. To achieve this function, the prejacent must be weaker than the expected answer to the CQ on a salient scale.

This meaning component is not represented in their formal description of *only* (Beaver and Clark 2008: 261), nor in Coppock & Beaver’s variant (Coppock and Beaver 2014: 24), except possibly via the fact that the prejacent, being the weakest considered answer, is at the borderline of the considered answers. In Grubic (2015: §7.4.2), I propose that there is independent evidence that speakers keep track of hearer-expectations concerning the relative probability of the different answers to the current QUD, and that it would be beneficial to represent the mirative component separately from the MIN-component. Whatever the right analysis for the mirative meaning component of *only* sentences is, the *lateness* meaning component of *erst* sentences should receive the same analysis, cf. (34). This is a projective meaning component expressing that the actualization time of the event was unexpectedly late. Since ‘earlier’ alternatives are stronger, this amounts to an expectation that a stronger alternative is true, just as in the case of *only* in (35).

- (34) Jan ist *erst* um **neun**<sub>F</sub> abgereist.  
 “Jan didn’t leave until nine.”  
 → Jan was expected to leave earlier.
- (35) *Only two*<sub>F</sub> students left.  
 → More students were expected to leave

The suspendability of the prejacent, e.g. *Jan left at 9*, is due to the interaction of the MIN and MAX component. The suspension example was (20), repeated here as (36). Recall that, in the account here, ‘later’ alternatives are weaker and are thus excluded via the MIN-presupposition. In (36), these previously discarded weaker alternatives are reconsidered. This reconsideration is also possible with *only*, cf. (37), as discussed in Beaver and Clark (2008: §9.6–§9.10).

- (36) Jan ist *erst* **um 9** abgereist, vielleicht sogar erst um 10.  
 Jan is PRT at 9 left perhaps even PRT at 10.  
 “Jan didn’t leave until 9, perhaps even not until 10.”
- (37) *Only two*<sub>F</sub> students left, perhaps even only one<sub>F</sub> (student left).

Condoravdi (2008: 647f) suggests for similar English examples that the fact that this is felicitous suggests that the prejacent is a conversational implicature. Note, however, that cancellation is not possible in these cases (cf. Beaver and Clark 2008: 228 for the same observation for English *only*).

- (38) Jan ist *erst* **um 9** abgereist, #ja sogar erst um 10.  
 Jan is PRT at 9 left yes even PRT at 10.  
 “Jan didn’t leave until 9, in fact, even not until 10.”
- (39) *Only two*<sub>F</sub> students left, #in fact, only one<sub>F</sub> student left.

The prejacent is not an implicature. It is entailed by the MIN-presupposition, rejecting later alternatives, together with the MAX-assertion, rejecting earlier alternatives. The suspension in (36) is in fact a suspension of the MIN component, a reconsideration of the QUD, taking weaker, previously unconsidered alternatives into account<sup>8</sup>. The MAX-assertion is not suspendable, cf. (40)–(41).

- (40) #Jan ist *erst* **um 9** abgereist, vielleicht sogar (schon) um 8.  
 Jan is PRT at 9 left perhaps even already at 8.  
 “Jan didn’t leave until 9, perhaps even (already) at 8.”
- (41) *Only two*<sub>F</sub> students left, # perhaps even three<sub>F</sub> (students left).

<sup>8</sup>Coppock and Beaver (2014: 18), citing Horn (1970, 2011), note that presuppositions can be suspended if this makes the claim more universal.

To sum up, this section showed parallels between inferences discussed in the literature for *erst* and those discussed for *only*. First, both have an exclusive meaning component, which, I argue, also excludes *stronger* alternatives in the case of *erst*. Second, the explanation for why the *actualization* inference in *erst* sentences survives embedding under negation is the same as the explanation for prejacent projection in entailment scale *only* sentences: all considered alternatives entail it. Third, both *only* and *erst* have a meaning component indicating that the true alternative is ‘surprisingly weak’ (the *mirative* and *lateness* component, respectively). And fourth, in both cases, the prejacent can be suspended, which was explained as a reconsideration of the QUD.

### 3. Discussion

In this section, the MIN/MAX-account proposed here is compared to earlier analyses of *erst* and *not...until* and some further *erst* data is discussed.

#### 3.1. Comparison to earlier analyses

The current account is very similar to the proposals of Karttunen (1974) and Condoravdi (2008) for *not...until* in English, cf. (42)–(43)<sup>9</sup>, where A is the event, T is the time indicated by the *until*-phrase, and I is an interval containing T.

(42)	Karttunen’s <i>not...until</i> :	(43)	Condoravdi’s <i>not...until</i> :
	P: (A AT T) ∨ (A BEFORE T)		P: A at some point in I
	A: NOT(A BEFORE T)		A: NOT(A BEFORE T)
	→ A AT T		Implicature: NOT(A AFTER T)

Both assume that *until* is lexically ambiguous between a durative and a punctual *until*, cf. (44), refuting earlier analyses stating that this ambiguity is due to scope (e.g. Mittwoch 1977). The reading obtained with punctual *until* (44-a), which is an NPI, corresponds to the *erst* reading discussed above<sup>10</sup>. The two kinds of *until* differ with respect to the kinds of predicates they can occur with (punctual or durative). They also differ, as (44) shows, with respect to the status of the inference that a change occurred at the time mentioned: while (44-b) merely conversationally implicates that Jan left at 9, this inference is stronger in (44-a) (Karttunen 1974: 290).

(44)	a. Jan didn’t leave <b>until</b> 9 (# in fact, he didn’t leave until 10).	( <i>punctual until</i> )
	b. Jan stayed <b>until</b> 9 (in fact, he stayed until 10)	( <i>durative until</i> )

<sup>9</sup>Karttunen (1974: 286) attributes the idea that punctual *until* has the same truth conditions as *before* to Lindholm (1969).

<sup>10</sup>Other languages with different lexical items for durative and punctual *until* include Finnish (Karttunen 1974), Greek, Icelandic, Czech, and Dutch (according to Giannakidou 2002), cf. Giannakidou (2002, 2003), Condoravdi (2008) for a discussion of the Greek counterparts.

The current proposal is very similar to Karttunen’s proposal in that it presupposes that the event took place at T or before T and asserts that it didn’t take place before T. However, Karttunen does not discuss *not...until* as focus-sensitive and scalar. Condoravdi amends this, proposing an account in which the alternatives are ordered on a scale, with the ‘latest’ alternative being the strongest, cf. (45) (differing from the scale assumed here, cf.(46)). The assertion (‘NOT(A BEFORE T)’), excludes weaker, ‘earlier’ alternatives, while the exclusion of stronger alternatives is an implicature.

- |  |   |
|--|---|
| <p>(45)</p> <p style="text-align: center;"> <math>\dots</math><br/> <math>\downarrow</math><br/> J. didn’t leave between <math>t_{start}</math> and 10<br/> <b>J. didn’t leave between <math>t_{start}</math> and 9</b><br/> <del>J. didn’t leave between <math>t_{start}</math> and 8</del><br/> <math>\vdots</math><br/> <math>\dots</math> </p> | <p>(46)</p> <p style="text-align: center;"> <math>\dots</math><br/> <del>J. left between <math>t_{start}</math> and 8</del><br/> <b>J. left between <math>t_{start}</math> and 9</b><br/> J. left between <math>t_{start}</math> and 10<br/> <math>\vdots</math><br/> <math>\dots</math> </p> |
|--|---|

Condoravdi presents this proposal because she analyses the suspension data shown above as an indication that the exclusion of later alternatives is a conversational implicature. As discussed above, this is rejected here, because it cannot be cancelled. Instead, the current account returns to Karttunen’s analysis of this exclusion as a presupposition: it is the MIN component of Beaver and Clark (2008), Coppock and Beaver (2014). The current proposal is thus similar to Condoravdi’s proposal for *not...until* in acknowledging the focus-sensitivity and scalarity of *erst*. It differs in the scale assumed, i.e. essentially in the role negation plays for the scale.

Karttunen and Condoravdi both also present a proposal for *erst*: Karttunen (1974: 294) suggests that it has the same presupposition as *not...until*, but asserts its prejacent, cf. (47). This proposal however cannot account for the suspendability of the prejacent. Condoravdi (2008: 647) also proposes that *erst* has the same presupposition as *not...until*, but a different assertion, cf. (48), with the scale in (49), which unfortunately predicts the same implicature as her *not...until* account.

- |   |  |
|---|--|
| <p>(47) Karttunen’s <i>erst</i>:</p> <p>P: (A AT T) <math>\vee</math> (A BEFORE T)<br/> A: A AT T<br/> <math>\rightarrow</math> NOT(A BEFORE T)</p> | <p>(48) Condoravdi’s <i>erst</i>:</p> <p>P: A at some point in I<br/> A: A AT T <math>\vee</math> A AFTER T<br/> Implicature: NOT(A AFTER T)</p> |
|---|--|

- (49)
- $\dots$   
 $\downarrow$   
J. left between 10 and  $t_{end}$   
**J. left between 9 and  $t_{end}$**   
~~J. left between 8 and  $t_{end}$~~   
 $\vdots$   
 $\dots$

The current account has the advantage that it provides a unified analysis of exclusive *only* and *erst*, as e.g. advocated by Declerck (1995), while retaining Beaver and Clark (2008)’s elegant analysis of exclusives. The following section presents some further similarities between *erst* and *only*.

### 3.2. Further similarities between *erst* and *only*

**Obligatory association with focus** Beaver and Clark (2008) propose a typology of focus-sensitive operators, in which operators differ in whether they semantically associate with focus, or pragmatically, i.e. essentially, whether they are always required to associate with focus. One test for this is association with weak, unfocusable pronouns (Beaver and Clark 2008: 149ff.): *Always*, although it is focus-sensitive, can associate with such particles (e.g. *it* in (50-b)), but *only* cannot (50-a).

- (50) a. \*People who grow rice *only* eat **it**.  
b. People who grow rice *always* eat **it**.

*Erst* seems to pattern like *only* and German *nur* (= ‘only’) in this respect: it can associate with a strong, stressable pronoun *das*, but not with the unstressable pronoun *es*, cf. (51) (cf. also Krifka (1998) for the use of the same test with additive particles in German)<sup>11</sup>.

- (51) You were watching a really sad movie and were trying not to cry in front of your friends. What was your reaction to the death of the main character?  
a. Das/Es hat mich zum Weinen gebracht.  
“That/it made me cry”  
b. *Erst* das/\*es hat mich zum Weinen gebracht.  
“I didn’t cry until that/\*it”  
c. *Nur* das/\*es hat mich zum Weinen gebracht.  
“Only that/\*it made me cry.”

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<sup>11</sup>It is not entirely clear whether *erst* and *nur* (= “only”) can associate with extracted constituents in German, which is a further test for the requirement to associate with focus. While the (a) sentence in (i) is odd, just as Beaver and Clark (2008: 175) predict, (b) is much better. The same holds for the *erst* sentences in (ii).

- (i) a. \***Blumen** denke ich dass Jan *nur* mitgebracht hat  
flowers think I that Jan only brought has  
b. ?**Blumen** denke ich hat Jan *nur* mitgebracht  
flowers think I has Jan only brought  
“I think Jan has only brought FLOWERS.”
- (ii) a. \***Um 8 Uhr** denke ich dass Jan *erst* die Hausaufgaben macht.  
at 8 O’clock think I that Jan ERST the homework does  
b. ?**Um 8 Uhr** denke ich macht Jan *erst* die Hausaufgaben.  
at 8 O’clock think I does Jan ERST the homework  
“I think Jan won’t do the homework until 8 O’CLOCK.”

**Co-occurrence with *at most* and *at the earliest*** Another parallelity between *only* and *erst* is the possibility of co-occurring with *at most* and *at the earliest*, but not with *at least* and *at the latest*<sup>12</sup>.

- (52) a. *Only at most/#least two<sub>F</sub>* students left.  
 b. Jan ist *erst frühestens/#spätestens um neun<sub>F</sub>* abgereist.  
 ‘Jan didn’t leave until 9 at the earliest / #at the latest’

Stronger alternatives involve a higher number of students in (52-a) and ‘earlier’ alternatives (52-b). Since the function of these statements is to exclude stronger alternatives, it is thus intuitively clear why *at least* and *at the latest*, which would include these stronger alternatives, are infelicitous<sup>13</sup>.

**Negative and positive polarity** The MIN/MAX-account predicts that *erst* can license NPIs within the backgrounded part of the utterance, since *only* can, cf. (53-a) (from Beaver and Clark 2008: 187). The web example (53-b), with the NPI *einen Finger rühren*<sup>14</sup> shows that this is the case.

- (53) a. [Faeries are] vicious, greedy buggers who’d *only lift a finger* to save their best friend if they thought they’d profit from it.  
 b. Der (Zahn-) Arzt **rührt** \*(*erst*) **einen Finger**, wenn die Leistung bezahlt ist  
 “The dentist/doctor doesn’t lift a finger until the service is paid”

The MIN/MAX account does not predict that *erst* itself is a PPI, which was suggested e.g. in Karttunen (1974: 294), Giannakidou (2002: 11), and Condoravdi (2008: 633). Karttunen provides (54-a), which he claims to be infelicitous<sup>15</sup>. However, such examples are produced, e.g. (54-b)<sup>16</sup>.

- (54) a. \*Die Prinzessin wachte **nicht** *erst* um 9 Uhr auf.  
 “It is not the case that the princess didn’t wake up until 9”  
 b. Somit kam ich **nicht** *erst* um 17 Uhr in Köln an ( sondern schon um 15 Uhr)  
 “Therefore I didn’t only arrive in Köln at 5 p.m. (but already at 3 O’clock)”

<sup>12</sup>*Not...until* patterns like *erst* in this respect, as discussed e.g. in Karttunen (1974: 287).

<sup>13</sup>The formal analysis of these kinds of examples is left for further research. A puzzle for the MIN/MAX approach to *only* is why, if *at most* is in the scope of *only*, the scale is not reversed, leading to a different reading.

<sup>14</sup>From <http://www.forum-sicherheitspolitik.org/viewtopic.php?f=42&t=2026>. Other examples with e.g. the NPIs *brauchen*, *einen Mucks machen*, i.a. were found, but were omitted for reason of space. See also Declerck (1995: 67), who provides an example showing that *not...until* can license NPIs.

<sup>15</sup>I as a native speaker consider this example to be felicitous (to the extent that the preterite is felicitous).

<sup>16</sup>From <http://www.yasminarosawoelkchen.de/2013/08/mein-1-mal-koln-gamescom.html>. Again, other examples are omitted for reasons of space.

Condoravdi provides the example in (55-a), which is truly infelicitous. This infelicity is however due to the fact that the predicate needs to be negative but punctual, which it isn't, cf. (55-b), where an inchoative reading is coerced for the stative predicate *nicht anwesend sein* ("to not be present").

- (55) a. \*Die Bombe ist *erst* gestern **nicht** explodiert.  
 "The bomb didn't not explode until yesterday"  
 b. (We expected Peter to start skipping school on Monday, but...)  
 (?)Peter war erst am Dienstag nicht anwesend.  
 "It was not until Tuesday that Peter started skipping school" (lit. 'was not present')

I want to propose that the negation takes scope above *erst* in (54), but below *erst* in (55). Preliminary evidence for this comes from the respective order of *erst* and the negation<sup>17</sup>. More importantly, however, the relative scope of the negation and *erst* can account for the readings these sentences have: When the negation takes scope below *erst*, as in (55-b), all alternatives ranked on the scale are negative, cf. (56). *Erst* has its usual effect of negating 'earlier' alternatives. This is parallel to e.g. *Only Peter wasn't present*, which negates that there were more people not being present.

- (56)
- |  |
|--|
| ...  |
| <del>Peter started to not be present between <math>t_{start}</math> and Monday</del> |
|  |
| <b>Peter started to not be present between <math>t_{start}</math> and Tuesday</b>    |
|  |
| Peter started to not be present between $t_{start}$ and Wednesday                    |
|  |
| ...  |

When the negation scopes above *erst*, the alternatives are positive, cf. (57) for example (54-b). Due to the negation, the 1770-alternative is excluded as a candidate for the strongest true answer, leaving stronger, 'earlier' alternatives as remaining candidates (for parallel *only* examples, cf. §1.2).

<sup>17</sup>The scope of the German counterpart of durative *until*, *bis*, and negation is reflected in the word order. Condoravdi (2008: 634) proposes that a sentence like *Peter wasn't angry until yesterday* has two readings, a "throughout-not" reading, where the until phrase takes scope over the negation, and a "not-throughout" reading, where the negation takes higher scope. The former is expressed in German by (i), with the negation following the *bis* phrase, the latter by (ii), with the negation preceding the *bis* phrase.

- (i) Peter war **bis** **gestern** nicht wütend  
 Peter was until<sub>dur</sub> yesterday not angry  
 "Until yesterday, Peter didn't get angry" (throughout-not: UNTIL > NEG)
- (ii) Peter war nicht **bis** **gestern** wütend  
 Peter was not until<sub>dur</sub> yesterday angry  
 "Peter didn't remain angry until yesterday" (not-throughout: NEG > UNTIL)

- (57)
- |   |  |  |
|---|--|--|
| ...   |  |  |
| I arrived between $t_{start}$ and 4                       |  |  |
| <del>I arrived between <math>t_{start}</math> and 5</del> |  |  |
| I arrived between $t_{start}$ and 6                       |  |  |
| ...   |  |  |
| ...   |  |  |

This section discussed some similarities between *erst* and *only*: (i) obligatory association with focus, disallowing association with weak pronouns, (ii) co-occurrence with *at most/at the earliest*, which strengthen the assertion that stronger alternatives are excluded, (iii) NPI licensing.

#### 4. Summary and outlook

German *erst*, a temporal exclusive, was analysed using the MIN/MAX-account of Beaver and Clark (2008), Coppock and Beaver (2014): (i) it is scalar, i.e. the focus alternatives are ranked on a scale of strength, (ii) it has a presupposition leading to the exclusion of weaker alternatives (MIN), and (iii) an assertion leading to the exclusion of stronger alternatives (MAX). It differs from other exclusives in the properties predicted by Coppock and Beaver (2014): it takes an argument of type  $\langle\langle i, st \rangle, \langle i, st \rangle\rangle$ , requires a specialized QUD asking for the endpoint of an interval, and an entailment scale. In contrast to the similar accounts of Karttunen (1974), Condoravdi (2008), the proposal presented here thus provides a unified account for *erst* and other exclusive particles.

This paper however only discusses cases in which *erst* corresponds to *not...until* in English. There are numerous other examples in which *erst* can be used, which should be addressed in further work, e.g. the examples in (58)–(59), in which *erst* also excludes ‘earlier’ alternatives.

- |  |  |
|--|--|
| <p>(58) (We thought Paul had been sick longer, but...)</p> <p>Paul ist <i>erst</i> <b>seit</b> <b>Dienstag</b> krank.</p> <p>Paul is PRT since Tuesday sick</p> <p>“Paul has only been sick since Tuesday”</p> | <p>(59) (I asked several people, but...)</p> <p>Erst <b>Bea</b> hat geantwortet</p> <p>PRT Bea has answered</p> <p>≈ “Bea was the first to answer”</p> <p>(‘earlier’ people didn’t!)</p> |
|--|--|

In example (58) is an instance of *erst* combining with a *seit*-PP (“since”). In these cases, the predicate must be durative, and stronger/‘earlier’ alternatives involve earlier *starting times* of the considered interval, cf. (60). The punctual/durative requirement and whether the endpoint or starting point of the interval is evaluated as ‘late’ thus depends on the PP argument. The cooccurrence of *erst* with different PP arguments should therefore be further explored (cf. also footnote 5).

The alternatives in example (59) involve potential answerers ordered by time, e.g. the (tentative) scale in (61), where Ali’s potential answering time precedes Bea’s, and Bea’s precedes Cem’s. It is excluded that earlier potential answerers actually answered, nothing is said about later answers.



- (60) ~~P. is sick between Monday and t<sub>end</sub>~~  
**P. is sick between Tuesday and t<sub>end</sub>**  
P. is sick between Wednesday and t<sub>end</sub>  
...  
(61) ~~Somebody answered between t<sub>start</sub> and Ali~~  
**Somebody answered between t<sub>start</sub> and Bea**  
Somebody answered between t<sub>start</sub> and Cem  
...

While the scale and the effect of the MIN/MAX components are similar to the examples discussed in the preceding sections above, further work should elucidate how *erst* introduces this temporal interpretation, i.e. how the scale comes about.

Finally, future work should discuss the relation of the kind of *erst* involving “lateness” and another instance of *erst* involving “earliness” (cf. e.g. Löbner 1989, König 1991, and Krifka 2000, Karttunen 1974: 296 describes the same two readings for *vasta* in Finnish). For example, in (62), *erst* contributes the evaluation that it is earlier than expected. Under the current account, *erst* in (62) would have the usual *min/max* meaning components, and the scale would be like (63).

- (62) Es ist erst 9 Uhr.  
“‘It is only 9 O’clock.”  
P: It is at least 9 O’clock  
A: It is at most 9 O’clock  
(63) ~~It is 10 O’clock~~  
**It is 9 O’clock**  
It is 8 O’clock  
...

It remains to be explained why both of these readings are expressed using *erst*, i.e. whether the common core of the different uses of *erst* is temporality, or whether further factors play a role.

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