

Before and after decomposing *first* and *last*

Background The literature on ordinals contains conflicting portraits of *first* and *last*. Some treat them as regular ordinals on par with *second*, *third*, etc. (Bhatt 2006; Bylinina et al. 2015), describing *first* as a suppletive form for **one-th* and *last* as a non-decomposed item with an ordinal semantics. Others posit that *first* and *last*, unlike ordinals, are superlative adjectives and contain *-est* (Barbiers 2007; Charnavel 2023). Though there has been no thorough adjudication between the two positions for English, Barbiers justifies the latter perspective for Dutch *eerst* ‘first.’ Even so, the claim that *first/last* (or other languages’ analogues) are superlatives has not been fleshed out: superlative adjectives are internally complex, but no work known to me has argued in-depth for or formalized a superlative decomposition of *first/last*.

Barbiers and Charnavel note that *first* and *eerst* were once related to *fore* and the obsolete *eer* ‘early,’ but they do not show that these decompositions are active in the current language or give a formal analysis.

Main claims This work takes up the mantle of Barbiers and Charnavel, giving several arguments that *first* and *last* are superlatives (some inspired by Barbiers, some new) before arguing for and formalizing a novel decomposition: *first* and *last* are the superlatives of *before* and *after*. Though Charnavel mentions that *first* and *fore* are related, no work I know of posits a relation between *first/last* and *before/after*.

First/last are superlatives To argue that *first* and *last* are the superlatives of *before* and *after*, one must first establish that *first* and *last* are indeed superlatives. To do so, I discuss four respects in which they behave like superlatives and unlike ordinals. My first two arguments, inspired by Barbiers (2007), involve plurality and modifier choice. For a plural superlative sentence like (1a) to be true, A and B need not have arrived at the same time. However, a plural ordinal sentence like (1b) is true and felicitous only if A and B arrived at the same time (and after ten other trains). Plurals with *first* and *last* act like plural superlatives rather than plural ordinals: (1c) does not entail that A and B arrived at the same time. Turning to modifier choice: superlatives and *first/last* can occur with *very* and *absolute*, while ordinals cannot.

- (1) a. A and B were the earliest trains to arrive. (2) a. The very/absolute best thing she said to me...
 b. A and B were the eleventh trains to arrive. b. #The very/absolute third thing she said to me...
 c. A and B were the first/last trains to arrive. c. The very/absolute first/last thing she said to me...

My next two arguments are novel. The first involves the ordinal superlative construction (3a), where ordinals modify superlatives (Bylinina et al. 2015). Ordinals cannot modify other ordinals in this construction (3a). However, ordinals can modify *last* (*n-th* (to) *last*); ordinals can modify *first* too if *n-th-to-first* is the non-default way of treating *n-th* (3b). My other novel argument involves an ambiguity that superlative DPs with *possible* exhibit: (4a) can be used to talk about a “possible train,” but it can also mean “Meg took the nicest train possible for her to take” (Romero 2013). Ordinals with *possible* lack the latter reading: while (4b) can be used to talk about a “possible train,” it cannot express the meaning “Meg took the fourth train possible for her to take.” DPs with *first/last* and *possible* license the reading that superlatives have and ordinals lack: (4c) can mean “Meg took the first/last train possible for her to take.”

- (3) a. Caleb took the second earliest train/*second third train. (4) a. Meg took the nicest possible train.
 b. A: I can’t believe Emma came second (to) last. b. Meg took the fourth possible train.
 B: Your list is upside-down! She came second-to-first. c. Meg took the first/last possible train.

Before:First::After:Last Having argued that *first/last* are superlatives, I offer four arguments that they are superlatives of *before/after*. First, superlatives can be paraphrased as universally-quantified comparatives; both temporal (5b) and non-temporal uses of *first/last* (5c) can be paraphrased as *before/after all others*.

- (5) a. the best cup = the cup better than all others b. the first/last battle = the battle before/after all others
 c. the first/last 2-digit number = the 2-digit number that is/comes before all others/after all others

Second, *first* and *before* share a link to *fore*; other languages’ terms for *before/first* or *after/last* show overt resemblances too (Italian *prima* ‘before,’ *prima/-o* ‘first’; Hebrew *axrej* ‘after,’ *axaron* ‘last’; Mandarin *zui* ‘after,’ *zuihou* ‘last’, lit. ‘most after’). Third, *after*-sentences show an ambiguity that *before*-sentences do not (Beaver & Condoravdi 2003); *last* and *first* also show this asymmetry. Suppose that Ben and Fred sang from 6pm-9pm, and consider three scenarios for when Sal sang (Scen. A, 4-5pm; Scen. B, 7-8pm; Scen. C, 10-11pm). (6a-b) are true only if Sal sang before Ben (and Fred) started singing (Scen. A). But (6c-d) can be true if Sal sang after Ben/Fred started singing (Scen. B) or if Sal sang after they finished (Scen. C). Finally, *before/after* exhibit a veridicality asymmetry (Beaver&Condoravdi 2003) that *first/last* do too. (7) shows the asymmetry for *before/after*: (7b), unlike (7a), entails that Mozart finished. (8) shows the kind of veridicality contrast for *first* vs. *last* correctly predicted by my hypothesis that *first/last* are superlatives of *before/after*. Under my hypothesis, the first sentences in (8a) and (8b) are equivalent to *Sal*

sang before anyone else and *Sal sang after everyone else*. So (8b) is contradictory and (8a) isn't because *after everyone else sang* entails that everyone else sang, but *before anyone else sang* can be non-veridical.

- (6) a. Sal sang before Ben sang. (7) a. Mozart died before he finished the Requiem.
 b. Sal sang first. b. Mozart died after he finished the Requiem.
 c. Sal sang after Ben sang. (8) Sal, Meg, and Bill are taking turns singing.
 d. Sal sang last. a. Sal sang first. But no one else ended up singing because of a tornado.
 b. Sal sang last. #But no one else ended up singing...

Analysis, take 1 There are two ways to formalize my hypothesis. The first opts for a standard superlative semantics (Heim 1999), which dictates that *first* and *last*, if superlatives, contain *-est* + gradable predicate. Since *before/after* are not gradable predicates, the only way in Heim's system to encode a tight relation between *before/first* or *after/last* is to say that *before/first* and *after/last* are comparative-superlative pairs for the same positive. For example, *before* and *first* might be *fore+-er* and *fore+-est*. While appealing at first, this analysis has trouble accounting for ways in which *before/after* differ from comparatives. To take a few examples (Penka & von Stechow 2011): (I) comparatives and *before* readily license NPIs, while *after* does not; (II) *before/after* do not take PP complements, while comparatives can take (surface) PP complements (*Tom lived in the UK longer than/*before/*after in the US*). (III) DP complements of *before/after* act like DPs when it comes to binding and quantifier scope, while the same tests suggest that "DP complements" of comparatives are part of an elided clause. (I-III) do not falsify the idea that *before/after* contain *-er*, but they put enough pressure on the account that I focus on an alternative for now.

Analysis, take 2 The other way to formalize my hypothesis opts for a non-decomposed *before/after*. By not treating *before/after* as comparatives with *-er*, this analysis avoids the issues with "take 1." If *before/after* are not decomposed, the only way to say that *first/last* are superlatives of *before/after* is use an entry for *-est* that can be the sister of *before/after*. Coppock's (2016) Bobaljik (2012)-inspired *-est* (9) is such an entry; it takes a relation (phrasal comparative, e.g.) and adds universal quantification (*R than all others*).

(9) $[-est] = \lambda R_{\langle e,et \rangle}. \lambda C_{\langle e,t \rangle}. \lambda x. x \in C \text{ and } \forall y[[y \in C \text{ and } y \neq x] \rightarrow R(y)(x) = 1]$

Let us see how a theory where *first* = *before* + (9) and *last* = *after* + (9) can capture basic uses of *first/last*. I focus on temporal uses of *first/last* here because current theories of *before/after* only capture temporal uses of *before/after* and not non-temporal ones (e.g. "*a* is before *c* in the alphabet"). I expect that once the *before* and *after* literature progresses to a unified theory of temporal and non-temporal *before/after*, a unified theory of temporal and non-temporal *first/last* with my decomposition will follow. With that in mind, I treat temporal *first/last* as containing Penka & von Stechow's (2011) entry for phrasal *before/after*. In [Sal [sang [before/after Ben]]], (10) takes *Ben*, the intension of *sing*, and *Sal* and is true iff there is a Sal-singing time *t* that is before/after the point when Ben started to sing (i.e. *earliest*($\lambda t. \text{Ben sang at } t$)).

(10) $[[\text{before/after}]] = \lambda y. \lambda P_{\langle s,et \rangle}. \lambda x. \exists t [P(t)(x) = 1 \text{ and } t \langle / \rangle \text{earliest}(\lambda t. P(t)(y) = 1)]$

(11) shows the LF and truth-conditions for *Sal sang before-est* (6b)/*Sal sang after-est* (6d). *-est* starts as the sister of *before/after*, but the types clash and *-est* moves locally to where it can be interpreted.

(11) $[[\text{Sal } [C \text{ } [-est \text{ } [\lambda y \text{ } [\text{before/after } y]]]]]] = 1 \text{ iff } \text{Sal} \in C \text{ and } \forall y[[y \in C \text{ and } y \neq x] \rightarrow \exists t [\text{Sal sang at } t \text{ and } t \langle / \rangle \text{earliest}(\lambda t. y \text{ danced at } t)]]$

If $C = \{\text{Sal, Ben, Fred}\}$ and Ben/Fred sang from 6-9pm, we get that (6b) is true iff Sal sang pre-6pm (Scen. A), and (6d) is true iff he sang post-6pm (Scen. B/C). So we capture *first/last*'s ambiguity asymmetry. We can capture the veridicality facts with an extra modal layer (Beaver & Condoravdi 2003). This analysis extends to adjectival temporal *first/last*; for example, *Sal is the first/last individual who sang* has LF (12).

(12) $[[\text{Sal is the } [C \text{ } [-est \text{ } [\lambda y \text{ } [[\text{before/after } y]][\text{individual who sang}]]]]]]$, when defined, = 1 iff (11) = 1

Future directions include: (I) extending the theory to more data, e.g. the focus-sensitivity of *first/last* (Bhatt 2006); (II) developing constraints on how (9) moves, since no proponent of (9) known to me posits *-est*-movement; (III) finding out whether the "take 1" analysis can overcome its *prima facie* pitfalls.

References •Barbiers, S. 2007. Indefinite numerals *one* and *many* and the cause of ordinal suppletion. *Lingua* 117:859-880. •Beaver, D., & Condoravdi, C. A uniform analysis of *before* and *after*. *SALT* 13, 37-54. •Bhatt, R. 2006. *Covert modality in non-finite contexts*. •Bylinina, L., Ivlieva, N., Podobryaev, A., & Sudo, Y. 2015. A non-superlative semantics for ordinals. *NELS* 45. •Charnavel, I. 2023. Appealing to superlative clauses. Unige ms. •Coppock, E. 2016. Superlative modifiers as modified superlatives. *SALT* 26, 1-15. •Heim, I. 1999. Notes on superlatives. MIT ms. •Penka, D., & von Stechow, A. 2011. Phrasal complements of *before* and *after*. *CSSL* 9. •Romero, M. 2013. Modal superlatives. *NLS* 21:79-110.