

# snippets

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## #Only zero

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In a recent paper, Bylinina and Nouwen (2018) claim that sentences involving the numeral *zero* are subject to obligatory exhaustification. This claim falls out as a result of two assumptions. First, that the pluralization operator  $\times$  yields a full lattice structure, crucially including the bottom element  $\perp$ , which has cardinality 0. This falls out from the definition of  $\times$  given in (1).

$$(1) \quad \times Z = \{\sqcup X \mid X \subseteq Z\} \quad (\text{Bylinina and Nouwen 2018:8})$$

Second, that numerals give rise to an *at least* reading basically; the *exactly* reading is derived via exhaustification relative to excludable alternatives where the numeral varies. The sentence *Three philosophers attended the talk* is therefore mapped to the Logical Form in (2a). When subject to strengthening via exhaustification, the resulting Logical Form is as in (2b).

$$(2) \quad \begin{array}{l} \text{a. } \exists x(\#x=3 \ \& \ \times \text{philosopher}(x) \ \& \ \times \text{attended-the-talk}(x)) \\ \text{b. } \exists x(\#x=3 \ \& \ \times \text{philosopher}(x) \ \& \ \times \text{attended-the-talk}(x)) \ \& \\ \quad \neg \exists y(\#y>3 \ \& \ \times \text{philosopher}(y) \ \& \ \times \text{attended-the-talk}(y)) \end{array}$$

A consequence of these assumptions is that, prior to exhaustification, sentences involving the numeral *zero*, such as *Zero philosophers attended the talk* will always be tautological, as in (3a). This is because every pluralized predicate contains the bottom element  $\perp$ . In order to express a contingent statement, the sentence must be exhaustified, as in (3b).

$$(3) \quad \begin{array}{l} \text{a. } \exists x(\#x=0 \ \& \ \times \text{philosopher}(x) \ \& \ \times \text{attended-the-talk}(x)) \\ \text{b. } \exists x(\#x=0 \ \& \ \times \text{philosopher}(x) \ \& \ \times \text{attended-the-talk}(x)) \ \& \\ \quad \neg \exists y(\#y>0 \ \& \ \times \text{philosopher}(y) \ \& \ \times \text{attended-the-talk}(y)) \end{array}$$

In the literature on grammatical exhaustification (see, e.g., Chierchia 2004, Fox 2007, Magri 2009), it is something of a mantra to claim that the exhaustivity operator *exh* is the covert counterpart of the focus-sensitive operator *only*. Both *exh* and *only* compose with a prejacent  $\alpha$  and negate the excludable alternatives to  $\phi$  based on the focus-structure of  $\phi$ . For our purposes, we can take the excludable alternatives to  $\phi$  to be those sentences  $\psi$  such that  $\psi$  is logically non-weaker than  $\phi$ .

Here we make the novel observation that the numeral *zero* cannot associate with *only*, as illustrated by the infelicity of (4a). Other numerals can, however, associate with *only*, obligatorily giving rise to an *exactly* reading, as illustrated as in (4b). This is exactly what we expect if *only* and *exh* negate excludable alternatives. There are two possible ways to interpret this result. Most straightforwardly, it casts serious doubt on Bylinina and Nouwen's claim that sentences with *zero* involve obligatory exhaustification. Alternatively, we could interpret this as yet more evidence that the putative parallel between *only* and *exh* breaks down upon further investigation (see, e.g., Alxatib 2013 and Buccola 2018 for related observations), although for Bylinina and Nouwen this would still leave open the question of why *only* gives rise to an *exactly* reading with other numerals but apparently not *zero*.

- (4) a. #Only zero<sub>F</sub> philosophers attended the talk.  
b. Only three<sub>F</sub> philosophers attended the talk.

Furthermore, we observe that there is not an absolute ban on *only* associating with *zero*. This seems to be possible when *zero* doesn't pick out a scalar endpoint, such as with the scale of degrees of temperature (thanks to an anonymous reviewer for suggesting this characterization of the data). (5a) entails that there is no  $n > 0$  such that the temperature has risen to  $n$  degrees. When *zero* does pick out a scalar endpoint, however, as in (5b), the sentence is again infelicitous.

- (5) a. The water here has only ever risen to zero<sub>F</sub> degrees.  
b. #The water here has only ever risen by zero<sub>F</sub> centimetres.

It seems natural to assume that the infelicity of *only* in (4a) is a special case of the generalization that, when *zero* picks out a scalar endpoint, it may not associate with *only*; here *zero* picks out the minimum of the cardinality scale. This does not fall out straightforwardly from Bylinina and Nouwen's analysis.

## References

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