Approximation of complex numerals using *some*

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Complex cardinal numbers (e.g., *six hundred forty-two*, *twenty-five*) are sometimes argued to be syntactically complex (Ionin & Matushansky, 2006; Zweig, 2005, a.o.). In this talk I investigate the interaction between the structure of cardinals and a use of *some* as an approximator. I show that *some* is constrained by syntax, and propose a compositional semantics for constructions where *some* is used as an approximator, using the tools of alternative semantics (Hamblin, 1973; Kratzer & Shimoyama, 2002).

Some can be used for approximate interpretation with cardinal numbers as in (1). The interpretation is one in which there is an indeterminate number somewhere close to and above the number modified by *some*. However, not all cardinals can be modified with *some*, demonstrated in (2). I argue this is constrained by syntax: numbers can be modified by *some* only if they can form a complex cardinal with a number numerically lower than the one being modified. *Thirty* can be modified by *some* because it supports *thirty-five* (and the like), while *ten* and numbers lower than *ten* cannot be modified as they do not form complex cardinals with smaller numbers in English.

(1) a. Thirty-some people came to the party.

b. Two hundred-some soldiers were wounded in an explosion.

(2) a. *five-some people

b. *ten-some people

I propose that a covert wh-word fills the syntactic position filled by the following number, shown as WH in (3). For example, WH would fill the ones-position in *20-some*. The covert wh-word introduces a set of alternatives, where each alternative is a number that could fill that particular syntactic position, as in (4). Corroborating evidence for a covert wh-word comes from a similar construction in Japanese, where *nani* "what" can abstract over syntactic positions in a complex cardinal number (see (5)).

(3) [[[twenty WH] -some] people]

(4) $[\![\text{WH}]\!]^c = \{1, 2, 3, \ldots, 9\}$

(5) Juu-nan-nin-ka-ga kita.
Ten-what-CL(people)-KA-NOM came
'10 plus *x* people came.' (Japanese)

For simplicity in analyzing this construction's semantics, I assume a domain of numbers D_n. Addition is defined for elements in D_n. A typeshift PRED maps elements of D_n to $D_{\langle et \rangle}$ (see (6)).

(6) $\forall n \in D_n, \text{PRED}(n) = \lambda x.{}^{\cup}n(x)$
'The property of having a cardinality of *n*'

The alternatives from WH combine pointwise with the remaining numbers via a rule of Pointwise Addition (see (7)). (8) shows the result of combining $[\![\text{WH}]\!]$ pointwise with $[\![\textit{twenty}]\!]$. *Some* binds this set of alternatives and selects a single alternative by way of a choice function (see (9)). PRED then applies to convert the number to a property, at which point it can combine with the denotation of the noun via predicate modification (as in (10)).

(7) Pointwise Addition
Where $[\![A]\!]$ and $[\![B]\!]$ are sets of numbers, $[\![C]\!] = \{c : \exists a \in [\![A]\!] \wedge \exists b \in [\![B]\!] \wedge c = a + b\}$

(8) $[\![\textit{twenty}\ \text{WH}]\!]^c = \{20 + 1, 20 + 2, 20 + 3, \ldots, 20 + 9\}$

(9) $[\![\alpha\text{-}\textit{some}]\!]^c = f_c([\![\alpha]\!]^c)$, where f_c is a contextually defined choice function.

(10) a. $[\![\textit{[twenty}\ \textsc{wh}\textit{]}\ \text{-}\textit{some}]\!]^c = f_c([\![\textit{twenty}\ \textsc{wh}]\!]^c)$

b. $[\![\textit{[[twenty}\ \textsc{wh}\textit{]}\ \text{-}\textit{some] people}]\!]^c$
$= \mathbf{PM}([\![\textit{people}]\!]^c, \mathrm{PRED}([\![\textit{[twenty}\ \textsc{wh}\textit{]}\ \text{-}\textit{some}]\!]^c))$
$= \lambda x.\mathbf{people}(x) \wedge \mathrm{PRED}([\![\textit{[twenty}\ \textsc{wh}\textit{]}\ \text{-}\textit{some}]\!]^c)(x)$

The proposal here gains additional cross-linguistic support from Japanese in (5), where the expanding alternatives from the wh-word are closed off by the focus particle *-ka* (cf. Kratzer & Shimoyama, 2002), analogous to the role played by *some*. This analysis of *some* as an approximator is a case study in the interaction between alternatives and syntactic structure, and provides additional support for theories where cardinal numbers are compositionally derived.

References

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