

Proposal. We assume that cardinal numerals in Hungarian are interpreted as predicates of type $\langle e, t \rangle$, and they give the cardinality of an entity (Landman 2003); see (9-a). In our system, the cardinality of an entity is understood as the cardinality of the set containing all the parts of the entity that are the smallest elements in the denotation of a given predicate; see (9-b).

- (9) a. $\llbracket n \rrbracket = \lambda x. |x| = n$
 b. $|x| = n \leftrightarrow |\{y : y \leq x \wedge \exists P. P(x) \wedge P(y) \wedge \neg \exists z. z < y \wedge P(z)\}| = n$

Nouns can combine with numerals directly. In a Num+NP construction, the numeral gives the cardinality of an entity in the denotation of the nominal predicate in the sense of (9-b). Num+NP constructions are semantically well-formed only if the numeral combines with a predicate that has atomic entities in its denotation, that is, when the noun has count denotation.

Based on (4)–(8), we assume that *darab*, ‘CL_{unit}’, in CL-constructions imposes a restriction on the parts of the entity to be counted by the numeral: they must be distinct in the physical sense. We capture this intuition by analyzing *darab* as a predicate modifier which takes a predicate over entities, and returns a predicate that holds of any entity that is the sum of Maximally Strongly Self-Connected (see Grimm 2012) entities with respect to the predicate; see (10).

$$(10) \llbracket \text{DARAB} \rrbracket = \llbracket \text{CL}_{unit} \rrbracket = \lambda P \lambda x. P(x) \wedge x = \bigoplus \{y : y \leq x \wedge \text{MSSC}(y, P)\}$$

By analyzing *darab* as in (10), we can capture the shift in interpretation observed in (4) and (5). The Num+NP construction is underspecified as to what kind of entities in the denotation of the NP are counted, they just need to be atomic in the sense of (9-b). That is, the entity denoted by the noun *könyv* in (4) can have informational objects or physical objects as its parts, and either of them can be counted by the numeral; see (11). In (5), however, the entity denoted by *könyv* can only have physical objects among its part, as *darab* requires the entity to consist of parts that exist in physical space, otherwise the MSSC-property cannot apply to them. As a result of that, the numeral can only count physical objects, but not informational objects; see (12).

$$(11) \llbracket (4) \rrbracket = \lambda x. *BOOK(x) \wedge |x| = 3$$

$$(12) \llbracket (5) \rrbracket = \lambda x. *BOOK(x) \wedge x = \bigoplus \{y : y \leq x \wedge \text{MSSC}(y, *BOOK)\} \wedge |x| = 3$$

Our analysis of *darab* in (10) can be straightforwardly extended to other CLs in Hungarian like *szem*, ‘CL_{small round object}’, *fej*, ‘CL_{big round object}’, etc., which select nominals based on size and shape of the entities in their denotation. These CLs can be analyzed as lexically more specified versions of *darab*, each of them adding some extra property to be fulfilled by the parts of the entity that is counted; see the lexical entry for *szem* in (13).

$$(13) \llbracket \text{CL}_{small\ round\ object} \rrbracket = \lambda P \lambda x. P(x) \wedge x = \bigoplus \{y : y \leq x \wedge \text{MSSC}(y, P) \wedge \text{SMALL}(y) \wedge \text{ROUND}(y)\}$$

By assuming that the MSSC-property is imposed by the CL, our analysis correctly predicts that the parts counted in CL-constructions cannot be kinds denoted by the noun, whereas in Num+NP constructions it is possible to count kinds or subkinds (see Schvarcz & Nemes 2019).

Moreover, we can account for the data in (7) and (8) without having to assume two different lexical entries for *fa*, lit. ‘tree’ or ‘wood’, that are mass. Our analysis predicts that when the numeral combines with a noun like *fa* directly, as in (7), then the resulting expression will be semantically well-formed only if the noun is understood as notionally count, since notionally mass nouns have no inherent atoms in their denotation. However, if *fa* occurs in a CL-construction as in (8), the numeral counts physically distinct parts denoted by the noun. These can be either individual trees (*fa_{count}*) or pieces of wood (*fa_{mass}*).

In sum, our analysis provides an alternative to mass or flexible approaches to the Hungarian nominal system by treating classifiers as operators on count nouns – underspecified with respect to their atoms – required to determine the domain of counting for the numeral. Hungarian provides evidence that the functional category of CL and a grammatical mass/count can co-occur, suggesting a much wider spectrum of countability patterns than it has often been suggested.

References

- Asher, Nicholas. 2011. *Meaning in Context. A Web of Words*. Cambridge University Press.
- Chierchia, Gennaro. 1998. Plurality of mass nouns and the notion of “semantic parameter”. In Susan Rothstein (ed.), *Events and Grammar (Studies in Linguistics and Philosophy 70)*, 53–103. Springer Netherlands.
- Chierchia, Gennaro. 2010. Mass nouns, vagueness and semantic variation. *Synthese* 174(1). 99–149.
- Csirmaz, Anikó & Éva Dékány. 2014. Hungarian is a classifier language. In Raffaele Simone & Francesca Masini (eds.), *Word Classes: Nature, Typology and Representations*, 141–160. Amsterdam: John Benjamins.
- Grimm, Scott. 2012. Degrees of countability: a mereotopological approach to the mass/count distinction. In Anca Cherches (ed.), *Proceedings of Semantics and Linguistics Theory 22*, 584–603. <http://dx.doi.org/10.3765/salt.v22i0.2633>.
- Schvarcz, Brigitta R. & Borbála Nemes. 2019. *Plurality, classifiers and kind interpretation in Hungarian*. Paper presented at SinFonIJA 12, Brno, Czech Republic.
- Schvarcz, Brigitta R. & Susan Rothstein. 2017. Hungarian classifier constructions, plurality and the mass–count distinction. In Harry van der Hulst & Anikó Lipták (eds.), *Approaches to Hungarian 15. Papers from the 2015 Leiden Conference*, 157–182. Amsterdam: John Benjamins.