

## Semantics of distributivity in Czech Sign Language

M. Dočekal, I. Kupčíková, O. Klofáč, H. Strachoňová and M. Tylová (Masaryk Univ., CZ)

**Background.** Various types of distance distributive (DD) items across natural languages received attention in recent linguistic works (Champollion 2012, Link 1983, Landman 2000, a.o.). As for Sign Languages (SL), the DD research is presented (among other topics) in Quer (2012), Kimmelman (2015), Kimmelman (2017) & Kuhn (2017) a.o. Following this work we focus on a specific type of reduplication in SL (reduplication on R-loci) which is claimed to be a marker of distributive quantification (i.e. by Kimmelman 2015): a "distributive reduplication" from now on. By bringing new data from Czech Sign Language (CSL) we propose a new compositional semantics for DD structures.

**Distributivity in CSL.** To gather the judgments we directed a data survey in form of a truth-judgment task. Two native speakers of CSL (3rd generation Deaf) commented on the video-situation pairings and judged grammaticality/appropriateness of CSL sentences. **Observations:** a) In accordance with the patterns known from spoken languages (Landman 2000) and SL as well (Kimmelman 2015, 2017), the most salient interpretation of a sentence with plurality denoting subject and object is cumulative – (1), formally in (1-a): a plural event of bathing with a plural agent  $a \sqcup b \sqcup c$  and a plural patient  $k \sqcup l$  of the event; weak-truth conditions, non-scopal reading. b) First example of a **distributive reading** is the case of individual distributivity. (2), formally in (2-a): there is an event  $e$  which consists of plurality of its subevents ( $e'$ ) where each  $e'$  has atomic Agent from  $e$  assigned to a plurality of Patients consisting of 2 dogs (cumulative interpretation of (2) rejected by the informants). In (2-a) we use Champollion's (2012) modification of Link's (1983) distributivity operator – D:  $\llbracket D_\theta \rrbracket = \lambda V \lambda e [e \in^* \lambda e' [V(e') \wedge Atom(\theta(e'))]]$ . Figure 1 shows distributive reduplication of the sign TWO modifying Patient share in (2) (anaphorically related to the Agent key). We follow Dotlačil (2012) a.o. in treating the DD as inherently anaphoric to the sorting key and Schlenker et al. (2013) by understanding R-loci as positions that can realize discourse referents/logical variables. The obligatory distributed Agens marked by R-loci can be seen in (2-a). **Occasional reading.** The crucial example comes in (3). The sentence was judged ambiguous between the individual distributive reading (like in (2-a)) and an occasional reading by both informants. The occasional reading is formalized in (3-a): the formalization requires one group-level atomic Agent (the three daughters) to be an agent of consecutive subevents ( $e'$ ) where the same group-level agent was connected to Patients consisting of plurality of 2 dogs being bathed. And as such (3) was judged true in an exemplifying situation where all three daughters collectively bathed dogs two by two (the occasional reading was rejected for (2)). Distributive reduplication of the signs TWO and BATH in (3) is shown in detail in Figure 2. We analyze Agens modifying pronouns with incorporated numerals in (3) as introducing split key antecedents (following Schlenker et al., 2013) which are further anaphorically picked up by the DD. Notice in (3-a) that we interpret both occurrences of distributive reduplication in the formula: the first requires distribution over time traces, the second over Agent (collective) which results in the occasion reading (linearization in SL is reversed). DD on R-loci marks anaphoricity of D on verb's  $\tau$  which results in the occasion interpretation (time trace of the event is the key). The atomicity of the occasional reading requires time trace atomicity of the subevents ( $e'$ ). As both Ds are non-scopal, they result in "conjunction" distributivity in (3-a). We assume that there's a possibility of redundant distribution over the same  $\Theta$ -role which would yield truth-condition in effect same as (2-a) – individual distributive reading – and explain the ambiguity of (3)  $\leftrightarrow$  both

distributive reduplication (numeral + verb) take place at the same R-loci (indexes IJK).

**Discussion and consequences.** The analysis presented above shows that the distributive reduplication in CSL can be understood as a realization of the most general distributivity operator (Schwarzschild’s Part with the cover domain), like Champollion’s (2012) D but being anaphoric to the distributive key (either  $\theta$ -role  $\rightarrow$  individual or  $\tau \rightarrow$  occasional DD). The multiple DD marking is not a syntactic agreement, as proposed in some previous approaches but non-scopal anaphoric D operator. Both individual and occasional readings were attested for (3). We suggest that the interpretation of both reduplications in (3) leads to the occasional reading (as in (3-a)); the vacuous/redundant distributivity over the same  $\Theta$ -role in (3) results in an individual distributive reading.

- (1) DAUGHTER IX<sub>PL</sub> MY DOG IX<sub>PL</sub> BATH<sub>++</sub> [CSL]  
 ‘My daughters bathed the dogs.’  
 a.  $\exists e[*BATH(e) \wedge *Ag(e, a \sqcup b \sqcup c) \wedge *Pat(e, k \sqcup l) \wedge *Daughter(a \sqcup b \sqcup c) \wedge *Dog(k \sqcup l)]$
- (2) DAUGHTER 3<sub>IJK</sub>THEY MY DOG TWO<sub>IJK-DISTR-++</sub> BATH [CSL]  
 ‘My three daughters bathed two dogs each.’  
 a.  $\exists e[*Ag(e, a \sqcup b \sqcup c) \wedge e \in * \lambda e'[*BATH(e') \wedge *2Dogs(*Pat(e')) \wedge Atom(Ag(e'))]]$
- (3) DAUGHTER THEY-THREE MY DOG TWO<sub>IJK-DISTR-++</sub> BATH<sub>IJK-DISTR-++</sub> [CSL]  
 ‘My three daughters bathed two dogs.’  
 a.  $\exists e[Ag(e, \uparrow (a \sqcup b \sqcup c)) \wedge e \in * \lambda e'[*BATH(e') \wedge *2Dogs(*Pat(e')) \wedge BATH(\tau(e')) \wedge Atom(Ag(e'))]]$



Figure 1: Distributive reduplication of TWO and one instance of BATH



Figure 2: Distributive reduplication of both: TWO and BATH

Glosses: pronouns ... IX (index), reduplication (with a total of 3 signs) ... ++; the difference between a simple reduplication and a distributive reduplication ... DISTR (for the latter).

**Selected Reference.** Dotlačil, J. 2012. "Binominal each as an anaphoric determiner", *SuB* 16 • Champollion, L. 2012. "Each vs. Jewels" In *Logic, Language and Meaning*, 251–260. Springer • Kimmelman, V. 2015. "Quantifiers in RSL" *Donvm Semanticvm*, 121. • ———. 2017. "Quantifiers in Russian Sign Language." In *Handbook of Quantifiers in NL*, 803–855. Springer • Kuhn, J. 2017. "Dependent indefinites" *JoS* 34 • Landman, F. 2000. *Events and Plurality*. Dordrecht: Kluwer Academic Publishers. • Link, G. 1983. "The Logical Analysis of Plurals and Mass Terms" In *Meaning, Use and the Interpretation of Language*, edited by Bäurle et al, 303–323. Berlin: Walter de Gruyter. • Quer, J. 2012. "Quantificational Strategies across Language Modalities." *Logic, Language and Meaning*, 82–91. • Schlenker, P., Lamberton, J. and M. Santoro. "Iconic Variables", *L&P* 36(2): 91-149.