Decomposing derived collectives in West Slavic: Experimental evidence from Czech and Polish

Introduction. Though the heterogeneous semantic nature of collective nouns has been known for a long time and keeps posing a challenge for a proper treatment, it was commonly assumed that collectives constitute a uniform category (e.g., Landman 1989, Barker 1992, Schwarzschild 1996). However, recent findings suggest that there are different types of such expressions (Pearson 2011, Henderson 2017). In this paper, we examine 3 classes of derived collectives in Czech and Polish: i) GROUP nouns, e.g., $rytíř_{cz}$ / $rycerz_{pl}$ ('knight') $\rightarrow$ $rytířstvo_{cz}$ / $rycerstwo_{pl}$ ('group/totality of knights'), ii) BUNCH numerals, e.g., $tři_{cz}$ / $trzy_{pl}$ ('three') $\rightarrow$ $trojice_{cz}$ / $trójka_{pl}$ ('group of three'), and iii) AGGREGATE nouns, e.g., $list_{cz}$ / $liść_{pl}$ ('leaf') $\rightarrow$ $listí_{cz}$ / $listowie_{pl}$ ('foliage'). Though all 3 classes involve collective inferences, they differ in a number of other properties, e.g., bunches are count whereas groups and aggregates are not. Unlike other classes, groups seem to have a generic flavor since they can combine with kind-level predicates. On the other hand, aggregates constitute clusters, i.e., spatial groupings involving topology (Grimm 2012) whereas groups and bunches do not seem to assert spatial configurations. Our aim is to investigate to what degree different modes of group-formation relate to decomposability of particular collective nouns, i.e., to what extent one can access atomic members of a group plurality to distribute a certain property. In this regard, we focus on the interaction between collectives and so-called A-*different* expressions such as $jiný_{cz}$ / $inny_{pl}$ ('different'). Such expressions can be bound within a clause to express covariation with a plural argument but unlike, e.g., English *same* or German *verschieden* ('different'), they do not have a built-in distributive operator and do not express covariation in the absence of a distributive universal quantifier in subject position (Beck 2000, Dotlačil 2010), see (1).

(1)   a.   Each man is from a different town. $\rightarrow$ covariation (sentence-internal reading)
         b.   All the men are from a different town. $\rightarrow$ lack of covariation

Experiments. In order to test the interaction we designed analogous experiments on Czech and Polish. Both were based on a Latin Square design involving 9 items in each of the 3 classes, i.e., 27 items in total plus 27 fillers. The participants were asked to judge whether a sentence is adequate in a context supporting a strong reciprocal scenario (a truth value judgment task using a 5-point Likert scale: 1=worst, 5=best). We defined 3 conditions on each item: i) COL : the target involved GROUP, BUNCH, or AGGREGATE, ii) BP : a bare plural NP corresponding to COL, and iii) QUA : a universal distributive quantifier with a singular bare NP corresponding to COL. See (2) for an example of an $item_{cz}$; $items_{pl}$ were analogous. Given that QUA was set as the reference level (nearly total acceptability), we expected COL and BP to be judged as significantly worse than QUA. The crucial questions concerned potential differences between COL and BP as well as between particular classes of collectives, i.e., GROUP, BUNCH, and AGGREGATE.

(2)   **Context**: All the knights of the kingdom gathered to fight the final battle against the musketeers. A historian who observed the battlefield realized that none of the knights has the same armor as the others. He recorded the fact in a chronicle:

         a.   Rytířstvo má jinou   zbroj.
              $knight_{coll}$ has different armor
              '(A group/totality of) Knights have different armor.'   COL

         b.   Rytíři   mají jinou   zbroj.
              knights have different armor
              'Knights have different armor.'   BP

c. Každý rytíř   má jinou   zbroj.
   every knight has different armor
    'Every knight has different armor.' $\boxed{\text{QUA}}$

Both experiments were designed in Ibex and run online. There were 51_{cz} and 48_{pl} participants all of whom were successful with the fillers and, thus, included in the analysis.

Results. Figure 1 represents the acceptability ratings$_{cz}$ of the 3 classes and their conditions. Responses were modeled by the mixed-effects ordered probit regression in the R package ORDINAL. The model had 1 predictor, namely the condition QUA, and included the subject and item slope+intercept random effects. The statistical outcome is as follows. In the class BUNCH, bare plural NPs ($\beta_{cz} = -1.6289, z_{cz} = -7.626, p_{cz} < 0.001$; $\beta_{pl} = -1.8408, z_{pl} = -11.56, p_{pl} < 0.001$) and collectives ($\beta_{cz} = -1.6819, z_{cz} = -7.783, p_{cz} < 0.001$; $\beta_{pl} = -1.7601, z_{pl} = -11.03, p_{pl} < 0.001$) were judged as worse than quantifiers. There was no statistical difference between collectives and bare NPs in this class ($\beta_{cz} = 0.05298, z_{cz} = 0.267, p_{cz} = 0.789$; $\beta_{pl} = -0.0807, z_{pl} = -0.578, p_{pl} = 0.563$). In GROUP, bare plurals ($\beta_{cz} = -2.1113, z_{cz} = -10.70, p_{cz} < 0.001$; $\beta_{pl} = -2.2537, z_{pl} = -11.15, p_{pl} < 0.001$) and collectives ($\beta_{cz} = -2.8955, z_{cz} = -13.56, p_{cz} < 0.001$; $\beta_{pl} = -2.6726, z_{pl} = -12.45, p_{pl} < 0.001$) were also judged as worse than Qs, however, bare plural NPs ($\beta_{cz} = 0.7842, z_{cz} = 4.831, p_{cz} < 0.001$; $\beta_{pl} = 0.4189, z_{pl} = 2.486, p_{pl} < 0.05$) were judged better than collectives. Similar, in AGGREGATE bare plurals ($\beta_{cz} = -1.9916, z_{cz} = -8.166, p_{cz} < 0.001$; $\beta_{pl} = -2.3726, z_{pl} = -13.58, p_{pl} < 0.001$) and collectives ($\beta_{cz} = -2.7251, z_{cz} = -10.731, p_{cz} < 0.001$; $\beta_{pl} = -2.7958, z_{pl} = -15.02, p_{pl} < 0.001$) got significantly worse results than Qs and again bare plurals ranked higher than collectives on the scale ($\beta_{cz} = 0.7335, z_{cz} = 3.45, p_{cz} < 0.001$; $\beta_{pl} = 0.4232, z_{pl} = 3.054, p_{pl} < 0.01$).

Discussion. The results show that Czech and Polish BUNCH numeral phrases are easier to decompose than GROUP and AGGREGATE collectives, i.e., despite shared collective inferences there is an asymmetry in the accessibility to the members of a denoted plurality. We attribute the difference to the fact that GROUP and AGGREGATE collectives are semantically more complex, i.e., group-formation involves an additional mode such as kind inference or mereotopology whereas BUNCH numerals simply establish a membership relation between particular entities and a group they constitute. Though the p_{pl} values tend to be higher than p_{cz}, the effect is almost identical in both languages. Therefore, our findings suggest the existence of a scale of decomposability which holds in West Slavic:

(3)   GROUP ≈ AGGREGATE < BUNCH ≈ bare plural NP < distributive QP
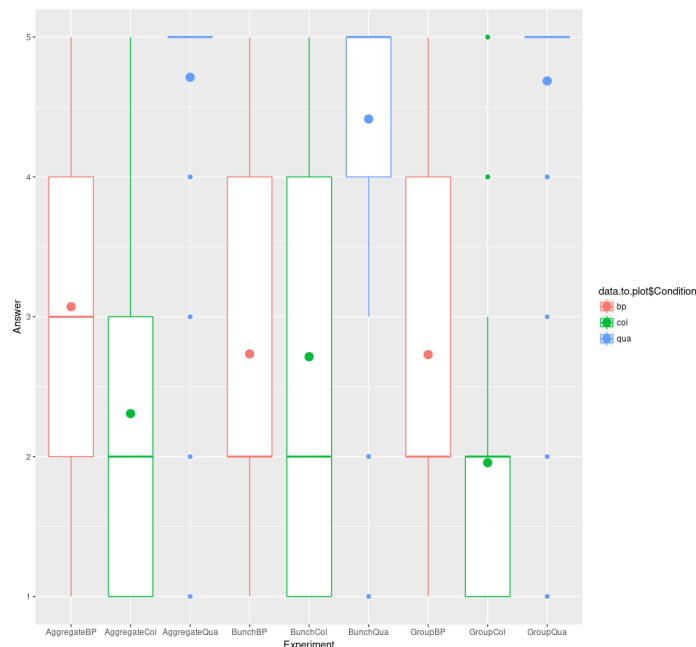
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