

A mereotopological account of Ukrainian singulatives

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Introduction. Singulatives are derived unit nouns, i.e., expressions designating a singular object individuated from a plurality perceived as a homogeneous collection of entities. Singulative morphology is attested cross-linguistically, e.g., in Brittonic Celtic, Semitic, Cushitic, Nilo-Saharan as well as East Slavic (Wierzbicka 1988, Corbett 2000, Dimmendaal 2000, Acquaviva 2015). Recent research on the structural and semantic properties of the suffix *-in-* in Russian reveals the theoretical relevance of Slavic data (Kagan & Nurmio forthcoming, Kagan et al. forthcoming). Inspired by that work, in this paper we will examine Ukrainian word formations such as (1)–(2) and propose a mereotopological analysis on which the singulative morpheme *-yna* is an atomizer of sorts (Scontras 2014). Specifically, it selects for an aggregate predicate, i.e., a property of entities prototypically conceptualized as clusters, and turns it into a predicate of discrete singular integrated wholes.

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| <p>(1) pisok ⇒ pišč-yna
 sand sand-SGV
 ‘sand’ ⇒ ‘a grain of sand’</p> | <p>(2) hrad ⇒ hrad-yna
 hail hail-SGV
 ‘hail’ ⇒ ‘a hailstone’</p> |
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Data. Based on a sample of 44 frequent Ukrainian singulatives derived with the suffix *-yna*, we formulate the following generalizations. The suffix *-yna* always attaches to an uncountable concrete noun to form a countable concrete unit noun, which can pluralize and combine with cardinal numerals (3)–(4). The base is typically an aggregate noun, i.e., an expression designating entities naturally perceived as forming cohesive collections. These include granulars such as names of seeds, clustered plants, ‘sand’, ‘hail’, ‘snow’, ‘sugar’ etc., object mass nouns designating artifacts like clothing, jewelry, dishes, garbage etc. and animate collectives of the ‘cattle’ type. With the sole exception of ‘ice’, singulatives are never formed from solid homogeneous substance mass nouns; neither from prototypical liquid mass nouns, though they are occasionally derived from terms like ‘rain’ and ‘dew’, which typically designate collections of drops rather than a homogeneous body of substance (the only possible exception is ‘blood’ though even in this case the most relevant conceptualization seems to be that of dripping blood drops). In several food terms like ‘carrot’ and ‘cabbage’, the base is ambiguous between the count and the mass sense. We argue that in such cases the singulative is always derived from the mass sense, which gives rise to triplets like *kartopl’a* ‘(a) potato(es)’ ~ *kartopl’i* ‘potatoes’ ~ *kartoplyna* ‘a potato’. In addition, the singulative can be also formed from a derived spatial collective (Wągiel 2021), which results in a few series such as *pero* ‘a feather’ ~ *pera* ‘feathers’ ~ *pirja* ‘feathers as a mass’ ~ *pirjina* ‘a feather’.

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| <p>(3) *dvi trav-y ~ dvi trav-yn-y
 two grass-PL two grass-SGV-PL
 ‘*two grasses’ ~ ‘two grass blades’</p> | <p>(4) *dvi odež-i ~ dvi odež-yn-y
 two clothing-PL two clothing-SGV-PL
 ‘*two clothings’ ~ ‘two items of clothing’</p> |
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	GRANULAR	OBJECT MASS	AMBIGUOUS	LIQUID	PL TANTUM
BASE	<i>žyto</i> ‘rye’	<i>posud</i> ‘dishes’	<i>cybul’a</i> ‘onion(s)’	<i>rosa</i> ‘dew’	<i>koral</i> ‘coral beads’
SINGULATIVE	<i>žytyna</i> ‘a grain of rye’	<i>posudyna</i> ‘a dish’	<i>cybulyna</i> ‘an onion’	<i>rosyna</i> ‘a dew drop’	<i>koralyna</i> ‘a coral bead’

Analysis. In order to account for structured parthood, we follow Grimm (2012) and adopt mereotopology, a theory of wholes extending standard mereology with topological notions (Casati & Varzi

1999). In mereotopology, CONNECTEDNESS (C) allows for capturing a configuration in which two entities share a boundary. Given C, it is possible to define more complex mereotopological notions to capture subtle distinctions between different spatial configurations. For instance, an entity is SELF-CONNECTED (SC) iff any two parts that form the whole of that entity are connected to each other (5) (O stands for overlap). A stronger notion of STRONGLY SELF-CONNECTED (SSC) captures entities whose interiors are also self-connected (6). Finally, an entity is MAXIMALLY STRONGLY SELF-CONNECTED (MSSC) if (i) every part of the entity is connected to (overlaps) the whole (strongly self-connected) and (ii) anything else which overlaps it and is strongly self-connected is once again part of it (maximality). The notion of MSSC allows for distinguishing between integrated wholes from other mereological objects such as scattered entities and arbitrary sums.

$$(5) \quad \text{SC}(x) \stackrel{\text{def}}{=} \forall y \forall z [\forall w [O(w, x) \leftrightarrow (O(w, y) \vee O(w, z))] \rightarrow C(y, z)]$$

$$(6) \quad \text{SSC}(x) \stackrel{\text{def}}{=} \text{SC}(x) \wedge \text{SC}(\text{INT}(x))$$

$$(7) \quad \text{MSSC}(P)(x) \stackrel{\text{def}}{=} P(x) \wedge \text{SSC}(x) \wedge \forall y [P(y) \wedge \text{SSC}(y) \wedge O(y, x) \rightarrow y \sqsubseteq x]$$

Furthermore, inspired by Grimm (2012) we propose a revised formulation of the property TRANSITIVELY CONNECTED (TC) (8), which determines whether two objects are connected through a series of mediating entities. In addition, TC allows for defining the concept of CLUSTER (CLSTR) (9) (again, a revised definition). An entity x is a cluster relative to a connection relation C and a property P iff x is a sum of entities falling under the same property which are all transitively connected relative to some subset of a sequence Z under the same property and connection relation.

$$(8) \quad \text{For a finite sequence } Z = \langle z_1, \dots, z_n \rangle, \text{TC}(x, y, P, C, Z) \text{ holds iff } z_1 = x, z_n = y, C(z_i, z_{i+1}) \text{ holds for } 1 \leq i < n \text{ and } P(z_i) \text{ holds for } 1 \leq i \leq n.$$

$$(9) \quad \text{CLSTR}_C(P)(x) \stackrel{\text{def}}{=} \exists Z [x = \sqcup Z \wedge \forall z \forall z' \in Z \exists Y \subseteq Z [\text{TC}(z, z', P, C, Y)]]$$

Definitions (5)–(9) allow us to distinguish between predicates of integrated objects (MSSC entities) (10), plurals captured via Link’s (1983) *-operator and aggregate predicates, which prototypically denote properties of clusters, but are also true of MSSC objects and arbitrary sums thereof (11).

$$(10) \quad \text{OBJ}(P) \stackrel{\text{def}}{=} \forall x [P(x) \rightarrow \text{MSSC}(P)(x)]$$

$$(11) \quad \text{AGGR}(P) \stackrel{\text{def}}{=} \forall x [P(x) \rightarrow \text{CLSTR}(P)(x) \vee *P(x) \vee \text{MSSC}(P)(x)]$$

Let us now propose the semantics for Ukrainian singulatives. First of all, following Grimm (2012) we assume that in Ukrainian granular nouns corresponding to ‘sand’ and ‘hail’ denote, similarly as in English, aggregate predicates (12). The suffix *-yna* denotes a predicate modifier that takes an aggregate predicate and yields a predicate of MSSC objects (13). Thus, when it combines with (12), we obtain the truth conditions in (14), specifically the singulative *hradyna* designates separate hailstones. This accounts for the effect of the singulative designating a unit within an aggregate.

$$(12) \quad \llbracket \text{hrad} \rrbracket = \lambda x [\text{CLSTR}(\text{HAIL})(x) \vee * \text{HAIL}(x) \vee \text{MSSC}(\text{HAIL})(x)]$$

$$(13) \quad \llbracket \text{-yna} \rrbracket = \lambda P : \text{AGGR}(P) \lambda x \exists y [P(y) \wedge x \sqsubseteq y \wedge \text{MSSC}(P)(x)]$$

$$(14) \quad \llbracket \text{hradyna} \rrbracket = \llbracket \text{-yna} \rrbracket (\llbracket \text{hrad} \rrbracket) = \lambda x \exists y [\llbracket \text{hrad} \rrbracket (y) \wedge x \sqsubseteq y \wedge \text{MSSC}(\llbracket \text{hrad} \rrbracket)(x)]$$

Conclusion. The proposed analysis has a number of advantages. First, it captures the intuitions concerning individuation and the structured part-whole relationship between singulatives and mass predicates they are derived from. Second, it accounts naturally for the distributional properties of Ukrainian singulatives, i.e., the fact that they are formed from predicates of entities conceptualized as clusters and are never formed from abstract nouns receive a straightforward explanation. Finally, it provides another argument for the application of mereotopology in nominal semantics.

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