

Achievements and paths: Degree achievements from the Slavic perspective

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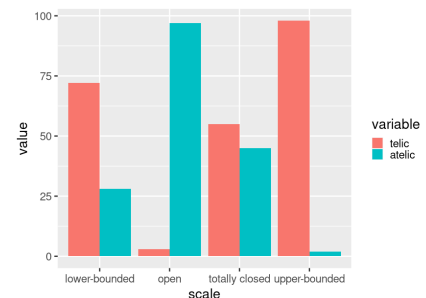
Background. Degree achievements (DAs) are especially challenging both for the compositional approaches to aspect in natural languages and to degree semantics of scalar expressions. While it is widely acknowledged (at least since Dowty 1979) that DAs like *dry* can have either “positive” (\approx telic) or “comparative” (\approx atelic) interpretation (independently of the cumulative/divisive nature of their arguments), this seems to be the case only for DAs derived from adjectives with at least partially closed scale, while it was observed that open-scale adjectives give raise to DAs with only “comparative” interpretation (e.g., *widen*, *deepen*). The most successful current approach to DAs (Kennedy and Levin 2008, KL) derives these basic facts via *Interpretive Economy* principle (IE) which dictates that the degree semantic computation takes into account the conventional meaning of the source adjectives and KL operationalize IE via **pos** null degree morpheme which picks up the standard of comparison based on the scale properties of the source adjectives. KL’s approach gets the majority of English data right, nevertheless it doesn’t scale up correctly to cross-linguistically broader data: by way of example, Japanese open-scale DAs seem to be interpreted only as “positive” (Kawahara 2017). Slavic languages add another twist to the cross-linguistic scenery: DAs with at least partially closed scale are (unlike English) not ambiguous, but their “positive/comparative” interpretation depends compositionally on the semantic properties of their prefix (or bare stem), moreover: lower-bounded Slavic DAs seem to be challenging KL’s theory which predicts them to be only “comparative”, contrary to the observed facts discussed below (empiry: Czech/Slovak corpus and native speaker judgments). Serious problems arise also for totally closed scales and open scales. In this paper, we will first present the challenging data patterns and then offer a partial extension of KL’s approach, which can deal with this kind of data.

Data. We worked mostly with Czech national corpus (Křen et al., 2015) from which we extracted (CQL/regular expression queries) the prototypical ways in which four classes of Czech DAs behave (and are prefixed). We classified the “positive”/“comparative” interpretation of DAs based on the usual tests from the DA literature: a) contradiction test: “positive” interpretation of DAs leads to a contradiction in a schematic sentence as *x DA, but it is not A-DA* (A-DA is the source adjective), in the “comparative” interpretation doesn’t (English: *The rod was widened/straightened but it wasn’t wide/#straight*); b) progressive \rightarrow perfect test: “comparative” reading allows (non-deductive) entailment from progressive to perfect, “positive” doesn’t (English: *x is cooling \rightarrow x has cooled* under “comparative reading”; for Czech data we used imperfective \rightarrow perfective test with an equivalent entailment pattern); c) differential phrase compatibility: (as with As) only “comparatively” interpreted DAs allow modification by differentials (*x widened/#straightened about 2 meters*). Based on the combination of the three tests, we discovered that (see also graph): 1) **open-scale DAs** occur mostly with atelic (or ambiguous: route) prefixes with usually locative/*down* algebraic denotation (Zwarts, 2005): *pro-dloužit* ‘through-lengthen’, *u-krátit* ‘at-shorten’, *z-výšit* ‘down-heighten’; but there were telic (which in accordance with Zwarts (2005) are in the majority of cases based on the source and target algebraic denotation) prefixed DAs leading to “positive interpretation”: verbs *vy-hloubit* ‘from-deepen’, *do-hloubit* ‘to-deepen’; 2) **upper-bounded DAs** were in the majority of cases prefixed with telic source/goal or ambiguous (route) semantics: *vy-rovnat* ‘from-straighten’, *do-schnout* ‘to-dry’; the only “comparatively” prefixed DAs were rare atelic (in pluralized algebraic meaning: Zwarts 2005) *o-schnout* ‘around-dry’ and *o-zdravit* ‘around-heal’; 3) **lower-bounded DAs:** Czech DAs of this type are in the majority of cases telic (contrary to KL’s predictions): telic *past* and ambiguous route semantics lead to “positive” interpretation: *za-špinit* ‘past-dirty’, *pro-vlhnout* ‘through-wet’; “comparative” DAs are formed with locative or ambiguous *down*

prefixation: *na-vlhnout* ‘on-wet’, *z-kalit* ‘down-muddy’; 4) **totally-closed scale DAs** behave differently from upper-bounded ones (again, contrary to KL): half of them are “positive” with telic source or ambiguous prefixes: *vy-prázdnit* ‘from-empty’, *pře-plnit* ‘over-fill’; half “comparative” with atelic *toward* prefixation: *při-plnit* ‘toward-fill’.

Results & discussion. Following KL we analyze the core meaning of DAs as a difference function (m_{Δ}) which measures (on an appropriate scale) how much an object changes as a result of an event. The difference measure function yields a lower-bounded scale and it has to be type-shifted into the type of events. KL claim that there are two such type-shifters: i) the verbal positive form \mathbf{pos}_v ($\llbracket pos_v \rrbracket = \lambda g \in D_{m_{\Delta}} \lambda x \lambda e. g(x)(e) \geq stnd(g)$) which via IE produces “comparative” reading for open scales and “positive” reading for at least partially closed scales; ii) verbal degree morpheme μ_v which combines with differentials Based on the data discussed above we claim that even if in languages like English the pragmatic/contextual information is the main factor in the interpretation of DAs (as reflected via $stnd(g)$ in \mathbf{pos}_v), at least for Slavic languages we have to propose semantically much loaded type-shifters which are morphosyntactically realized as prefixes. Based on the DA pattern and the independent algebraic properties of prefixes/prepositions (following Matushansky 2002 a.o. we believe in the syntactic and semantic identity of prefixes and prepositions) – see Zwarts (2005) – we claim that there are (at least) two additional difference-function type-shifters. First, for telic prefixes we propose the type-shifting “positive” semantics: $\llbracket pref_{tel} \rrbracket = \lambda g \in D_{m_{\Delta}} \lambda d \lambda x \lambda e. g(x)(e) = max(g)$ (following KL’s approach to telic modifiers); second, atelic prefixes for which we propose the “comparative” semantics: $\llbracket pref_{atelic} \rrbracket = \lambda g \in D_{m_{\Delta}} \lambda d \lambda x \lambda e. g(x)(e) \geq min(g)$ (ambiguous prefixes can pick up telic/atelic reading depending on their atomic/pluralized algebraic denotation). **I) open-scale DA:** for such, KL predict only “comparative” reading (with the only exception: ‘conventionalized’ *cool*). Both the prediction and the exception are wrong: Czech open-scale DAs can be telic (not only in the case of *cool*), example with the applicaiton of $\llbracket pref_{atelic} \rrbracket / \llbracket pref_{tel} \rrbracket$ in (1a/b).

- (1) a. Petr vy-/do-hloubil jámu.
 Petr from-/to-deepened pit
 $\lambda e. deep_{\Delta}(\text{the pit})(e) = max(deep_{\Delta})$
- b. Petr pro-hloubil jámu.
 Petr through-deepened pit
 $\lambda e. deep_{\Delta}(\text{the pit})(e) \geq min(deep_{\Delta})$



II) upper-bounded DA this kind of DAs is where KL do get even the Czech data mostly right – upper-bounded Czech

DAs are mostly prefixed with telic prefixes and only sporadically we found atelic prefixation which leads to “comparative” reading; we believe that the prefixation here mostly respects the lexical semantics of the source adjectives. **III) Totally closed scales:** KL claim that DAs of totally closed scale type should behave identically to upper-bounded scale DAs. That clearly cannot be true for Slavic data, and we think that our enriched inventory of type-shifters predicts exactly the equilibrium of “comparative”/“positive” reading reported above: if the lexical scale supplies both minimum and maximum, they can be easily used by atelic/telic prefixes in the same proportion. **IV) Lower-bounded DAs:** KL predict only “comparative” reading, which is exactly the opposite of the distribution we observed (“positively” interpreted DAs like *pro-vlhnout* outnumber the “comparatively” interpreted DAs like *z-vlhnout*). Here again, the more ‘constructivist’ behavior of Czech (compared to English DAs) is easily explainable by the above introduced two types of telicizing/atelicizing type shifters. We hypothesize that the max interpretation is not computed from the lexical semantics of the source adjective but comes from the mapping of the completely affected object → max degree.