

Achievements and paths

Degree achievements from the Slavic perspective

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FDSL-14

June 4, 2021

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Introduction

Degree Achievements

- degree achievements (DA) = verbs generally based on adjectives
- denote scalar change

- (1) a. The river is **wide**.
- b. The river **widened**.

Scales (reminder)

Gradable adjectives (after Kennedy and McNally 2005; Rotstein and Winter 2004 a.o.):

1. relative adjectives (e.g., *long*, *old*, *tall*)
2. absolute adjectives

2 absolute adjectives

2.3 upper-bounded adjectives: *dry* or *clean*

2.2 lower-bounded adjectives: *wet* or *dirty*

2.1 closed-scale adjectives: *opaque* or *transparent*

Telicity: motion verbs

- (2) a. John walked for one hour. ATELIC
b. # John walked in one hour. TELIC
- (3) a. # John walked to the pub for one hour. ATELIC
b. John walked to the pub in one hour. TELIC

Telicity: degree achievements

- first observations: Dowty (1979) – DAs can be either telic or atelic (without any change of their arguments)

- (4) a. The tea cooled for one hour. *ATELIC/COMPARATIVE*
- b. The tea cooled in one hour. *TELIC/POSITIVE*

Degree achievements: approaches

- the ambiguity theory (Abusch, 1986)
- the scalar theory (Kennedy and Levin, 2008)

The ambiguity theory

- Abusch (1986): all degree achievements are ambiguous (telic and atelic)
- too strong and empirically wrong (Kearns, 2007) for absolute adjectives:

- (5) a. The room quietened in a few minutes #but it wasn't quiet.
b. The sky darkened in an hour #but it wasn't dark.
c. The fruit ripened in five days #but it wasn't ripe.

The ambiguity theory

- similar problems for relative adjectives (Kennedy and Levin, 2008)
- (6) a. The gap between the boats widened for/#in a few minutes.
- b. The recession deepened for/#in several years.

- Kennedy and Levin (2008); Kennedy (2012)
- and Svenonius and Kennedy (2006); Sawada and Grano (2011); Grano and Kennedy (2012) for extensions
- relate the nature of underlying scales with DA telicity behavior

The scalar theory

- standard theory produces generalizations like:
 1. open-scale degree achievements are by default interpreted as atelic:
 - (7) a. The gap between the boats widened for/#in a few minutes.
 - b. The recession deepened for/#in several years.

2. upper-bounded degree achievements strongly prefer telic interpretations:

- (8) a. The room quietened in a few minutes #but it wasn't quiet.
- b. The sky darkened in an hour #but it wasn't dark.
- c. The fruit ripened in five days #but it wasn't ripe.

Problems of the scalar theory

- works well for English data (at least for intuitive judgments)
- attractive linking of lexical semantics (type of the scale) and telicity behaviour of the DA
- but cannot account for cross-linguistic patterns of DA behavior
- aim of this talk: to add to the small but growing body of cross-linguistic descriptions of DA (like Kawahara 2017 a.o.)

Prototypical counterexample

- two DAs based on the adjective *horký* 'hot'
- the same scale but the prefix makes the difference

(9) o-hřát ATELIC/COMPARATIVE
around-hot
'warm (slightly)'

(10) vy-hřát TELIC/POSITIVE
from-hot
'warm (totally)'

Prototypical counterexample

The standard inference/contradiction test:

- (11) a. *Pokoj se o-hřál, ale pořád byl studený.*
room refl around-warmed.3sg but still was cold

‘The room warmed but was still cold.’

- b. *Pokoj se vy-hřál, #ale pořád byl studený.*
room refl from-warmed.3sg but still was cold

‘The room warmed #but was still cold.’

Prototypical counterexample

- similar pairs can be found for any type of scale:
 - nearly looking like a data in support of Abusch (1986)
 - but some lexicalisations feel more natural (and are more frequent)
1. upper-bounded: atelic *o-schnout* 'dry partially' vs. telic *vy-schnout* 'dry (completely)'
 2. lower-bounded: atelic *na-vlhnout* 'wet partially' vs. telic *pro-vlhnout* 'wet (completely)'
 3. totally closed: atelic *při-plnit* 'fill partially' vs. telic *vy-plnit* 'fill (completely)'

Prototypical counterexample

The scalar theory predicts (via IE in (12)) the direct link between the nature of the scale and the DA interpretation:

- Upper-bounded scales (*dry*): measure function with a maximum only telic reading is derived—no smaller increase than the maximum increase verifies them

(12) *Interpretive Economy* Kennedy and Levin (2008, ex. 18)
Maximize the contribution of the conventional meanings of the elements of a sentence to the computation of its truth conditions.

(13) The lake dried in two weeks.

Two factors

1. lexical semantics (types of scales)
2. degree modifiers (English adverbs like in (14) and Slavic prefixes)

- (14) a. The lake dried (completely).
b. The lake dried partially.

We tested both factors in an experiment.

Perfective Slavic DAs and the experiment

The importance of perfective Slavic DAs

A full account would have to integrate grammatical aspect and compare imperfective DAs with perfective DAs

- but we started with perfective DAs since they seem to be central

	transitive Vs	intransitives A	intransitives B	Σ
imperfective Vs	18 775	14 688	36 219	69 682
perfective Vs	14 676	3 722	14 220	32 618
	<i>číst</i> 'read'	<i>spát</i> 'sleep'	<i>pracovat</i> 'work'	

Figure 1: Imperfective/Perfective Vs in ČNK

The importance of perfective Slavic DAs

But with DAs the ratio is just the opposite

	relative DAs	absolute DAs A	absolute DAs B	Σ
imperfective Vs	916	200	1	1 117
perfective Vs	3 147	1 606	784	5 537
	<i>hřát</i> 'warm'	<i>schnout</i> 'dry'	<i>prázdnit</i> 'empty'	

Figure 2: Imperfective/Perfective DAs in ČNK

Simple Fisher's test

```
> verb1 <- c(69682,32618); verb2 <- c(1117,5537)
> verbs <- rbind(verb1,verb2); fisher.test(verbs)
```

Fisher's Exact Test for Count Data

```
data: verbs
p-value < 2.2e-16
alternative hypothesis: true odds ratio is not equal to 1
95 percent confidence interval:
 9.913521 11.318619
sample estimates:
odds ratio
10.58939
```


Fisher's test:

- DAs are 10.6 time more probable as perfective verbs than non-DA verbs
- this seems different from English degree modifiers which look more optional or not that much frequent
- second, both atelic and telic perfective DAs behave as regular perfectives
- another important reason against reducing telicity to perfectivity

```
> verb1 <- c(512274,248007); verb2 <- c(5952,27372)
> SK_verbs <- rbind(verb1,verb2); fisher.test(SK_verbs)
```

Fisher's Exact Test for Count Data

```
data: SK_verbs
p-value < 2.2e-16
alternative hypothesis: true odds ratio is not equal to 1
95 percent confidence interval:
 9.233084 9.776289
sample estimates:
odds ratio
 9.499029
```

Russian proportions

```
> verb1 <- c(340894,119907); verb2 <- c(6669,25587)
> RU_verbs <- rbind(verb1,verb2); fisher.test(verbs)
```

Fisher's Exact Test for Count Data

```
data: RU_verbs
p-value < 2.2e-16
alternative hypothesis: true odds ratio is not equal to 1
95 percent confidence interval:
 10.61115 11.21673
sample estimates:
odds ratio
 10.90656
```

Joint work with Maria Onoeva



Design

- 165 native speakers of Russian finished the experiment (L-Rex)
- 3 excluded for poor score in fillers: data from 162 subjects
- 2 x 2 design, 4 conditions
- coherence acceptability task
- subjects evaluated how justified is is a reasoning from indirect speech containing a DA to a sentence containing an adjective in a positive form

One slide about the conditions

prefix × DAClass:

1. absolute vs. relative scale
2. telic (total) vs. atelic (partial) prefix
 - absolute + atelic *pod-*, *po-*
 - absolute + telic *vy-*, *na-*
 - relative + atelic *po-*, *pod-*
 - relative + telic *raz-*, *s-*, *u-*

Example item

- (15) a. *Detektiv Smit s mesta prestuplenija soobshchil*
Detective Smith from scene-gen crime-gen report-pst
svojemu kollege detektivu Džonsonu, čto
his-dat colleague-dat detective-dat Johnson-dat that
rubaška na sušilke **vy-soxla/pod-soxla.**
shirt on drying-rack-prep from-dry/under-dry-pst.

'Detective Smith reported to his colleague detective Johnson from a crime scene that a shirt dried on a drying rack.'

- b. *Detektiv Džonson rešil, čto rubaška byla suxaja.*
Detective Johnson conclude-pst that shirt be-pst dry.

'Detective Johnson concluded that the shirt was dry.'

Descriptive stats

```
> ddply(items_only, .(condition), summarise, Means = mean(rating1, na.rm
```

	condition	Means
1	item_abs_atelic	3.009259
2	item_abs_telic	3.962963
3	item_rel_atelic	2.799383
4	item_rel_telic	2.901235

```
> ddply(items_only, .(condition), summarise, Medians = median(rating1, na
```

	condition	Medians
1	item_abs_atelic	3
2	item_abs_telic	4
3	item_rel_atelic	3
4	item_rel_telic	3

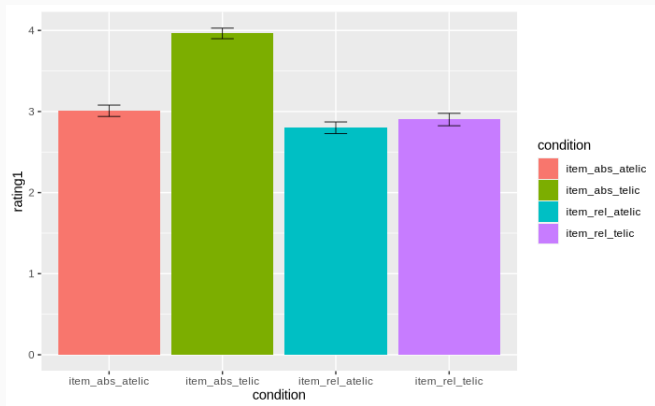


Figure 3: Error bar graph of the acceptability

Mixed model

```
> m5 <- lmer(as.numeric(rating1) ~ DAClass * prefix + (1|participant) + (1/item), da  
> summary(m5)
```

```
Linear mixed model fit by REML. t-tests use Satterthwaite's method [  
lmerModLmerTest]
```

```
Formula: as.numeric(rating1) ~ DAClass * prefix + (1 | participant) +  
        (1 | item)
```

```
Data: items_only
```

[...]

Fixed effects:

	Estimate	Std. Error	df	t value	Pr(> t)
(Intercept)	2.96587	0.21794	3.61537	13.609	0.000309
DAClassrelative	-0.20988	0.09056	1127.99869	-2.318	0.020650
prefixtelic	1.04047	0.09097	1128.48443	11.437	< 2e-16
DAClassrelative:prefixtelic	-0.85185	0.12807	1127.99869	-6.652	4.51e-11

Summary of the experiment

- we found a strong positive effect of the telic prefix (prefix): t-value 11.437, $p < 0.001$
- we found a negative effect of relative DAClass: t-value -2.318 , $p < 0.05$
- and a negative interaction effect of DAClassrelative by prefixtelic

- the prefixes change the interpretation of both relative and absolute DAs
- but for the absolute DAs the effect is much stronger (the negative interaction)
- even in the context strongly suggesting the evaluative interpretation the relative DAs with atelic prefixes are relatively well accepted
 - but the interpretation seems to arise from the interaction of both factors, not from the relative/absolute distinction alone

First steps to Analysis

The experiment shows:

1. the nature of the scale (DAClass) plays a role but not that important as
2. `prefix`: the effect of `prefix` was approximately 6 times stronger on the interpretation

Conservative interpretation

Kennedy and Levin (2008) acknowledge that degree modifiers (adverbs in English) can completely override the default interpretation:

- DA *fill* is base on the totally closed scale but
- but can be interpreted as telic or atelic depending on the degree modifier: (16)

- (16)
- | | | |
|----|--|--------|
| a. | The tub filled in 5 minutes. | telic |
| b. | The tub filled completely in 5 minutes. | telic |
| c. | The tub filled partially ??in 5 minutes. | atelic |

Conservative interpretation

Without a degree modifier the DA is interpreted via lexical semantics:

- **stnd** in (17) is the upper bounded max since *dry* is upper bounded scale
- but with degree modifiers the POS in (17a) is overridden (Kennedy and Levin 2008 after Piñón 2005): (17b)/(17c)

(17) The shirt dried.

$$\exists e[\text{dry}_{\Delta}^{\theta_1}(e) \geq \mathbf{stnd}(\text{dry}_{\Delta}) \wedge \theta_1(e) = \sigma x.*\text{shirt}(x)]$$

a. $\llbracket \mathbf{pos} \rrbracket = \lambda G.\lambda x.\exists d[\mathbf{stnd}(G, d, C) \wedge G(x, d)]$

b. $\llbracket \textit{completely} \rrbracket = \lambda g \in Dm_{\Delta}\lambda d\lambda x\lambda e.g(x)(e) = \max(g)$

c. $\llbracket \textit{partially} \rrbracket = \lambda g \in Dm_{\Delta}\lambda d\lambda x\lambda e.\min(g) > g(x)(e) \geq \textit{small}(g)$

Conservative interpretation

Slavic prefixes on DAs signal positive/comparative DA interpretation and interact with the scale

Promising directions:

- empirical work (maximality/non-maximality across Slavic prefixes on DA verbs)
- examples of the stable (Czech, Slovak, Russian)
comparative/non-maximal prefixes are *po-* and *o-*:
 - *o-* signals non-maximality (unlike other perfectivizing prefixes) with accomplishments as well: (18)
 - non-maximality connected to imperfectives

(18) *Petr o-jedl chleba, ale půlku nechal.*
Petr o-eat bread but half left

Non-culminating accomplishments: Martin (2019); Martin et al. (2020)

Promising research questions

1. Why do absolute and relative DA show different sensitivity to prefixes?
2. Are the prefixes with comparative DA interpretation the same as those signaling non-maximality with non-culminating accomplishments?
3. Is the non-maximality of imperfectives and comparative DAs the same?

Thanks for the attention!

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