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# Achievements and paths: Degree achievements from the Slavic perspective

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# Variable telicity

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- (1) a. John walked for/#in one hour.

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  - a. John walked for/#in one hour.
  - b. John walked to the pub in/#for one hour.

# Variable telicity

## Degree achievements

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without argument change:

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- (2) a. The tea cooled in one hour.  
b. The tea cooled for one hour.

positive  
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analyses:

1. ambiguity approach: Abusch (1986)



# Scale typology

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*bent, dirty, wet, dangerous*
4. (totally) closed scale

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*tall, rich, expensive, deep*
2. upper-bounded scale  
*straight, healthy, clean, safe*
3. lower-bounded scale  
*bent, dirty, wet, dangerous*
4. (totally) closed scale  
*full, empty, open, closed*

## DAs corresponding to scales

1. open scale: wide  $\rightarrow$  widen
2. upper-bounded: dry  $\rightarrow$  dry
3. lower-bounded: dirty  $\rightarrow$  dirty
4. closed scale: empty  $\rightarrow$  empty



## DAs and scales

- (4) The paint dried. positive
- has two corresponding translation in (pseudo)Czech: (5)
  - Kennedy and Levin (2008) can be made to work cross-linguistically if the division of telicity labor is split:
    1. algebraic properties of DAs' prefixes (and other modifiers);
    2. types of DAs' scales.
- (5) a. Paint from-dried. positive  
 b. Paint about-dried. comparative

## Kennedy&Levin (2008)

- assumption: DAs (and comparatives) denote **difference functions**
- measure the degree to which two objects are different relative to a scale

- (6) a. wide  $\langle e, d \rangle$   
 measure function returning the value on the scale
- b. wider than the road  $\langle e, d \rangle$   
 function returning the value from the subpart of the scale
- (7) a. wide: 0   $\rightarrow \infty$
- b. wider: 0 .....*wide(the\_road)*.....●   $\rightarrow \infty$

# Degree achievement analysis

## Kennedy and Levin (2008)

### (8) *Difference Function*

For any measure function  $\mathbf{m}$  from objects and times to degrees on a scale  $S$ , and for any  $d \in S$ ,  $\mathbf{m}_d^\uparrow$  is a function like  $\mathbf{m}$  except that:

- its range is  $\{d' \in S \mid d \leq d'\}$
- and for any  $x, t$  in the domain  $\mathbf{m}$ , if  $\mathbf{m}(x)(t) \leq d$  then  $\mathbf{m}_d^\uparrow(x)(t) = d$ .

Kennedy and Levin (2008, ex. 23)



## Difference function and DAs

- Kennedy and Levin (2008) analyse the DAs and comparatives by (nearly) the same function returning difference between two objects (comparative) or phases of the event (DAs)

- (9)
- a. long: positive  
 $\text{long}: 0 \longrightarrow \infty$
- b. longer than the bridge: comparative  
 $\text{long}_{\text{long}(TB)}^{\uparrow}: 0 \dots \text{long}(TB) \dots \bullet \longrightarrow \infty$
- c. lengthen the bridge: DA  
 $\text{long}_{\Delta}: 0 \cdot \mathbf{stnd}(\text{long}_{\Delta}) \cdot \bullet \longrightarrow \infty$

## Difference function and DAs

- the **std** for DAs is determined by Interpretative Economy
- for open scales it is take from the difference function ( $\Delta$ ) scale (not the regular measure function)
- and as there is only minimal degree, the open scale DAs are for Kennedy and Levin (2008) predicted to be only atelic/comparative

(10) *Interpretative Economy*

Maximize the contribution of the conventional meanings of the elements of a sentence to the computation of its truth conditions.

Kennedy and Levin (2008, ex. 18)

## Similarity of DAs and comparatives

- independent support from typology

Language	Positive	Comparative	DA	Gloss
English	good	bett-er	(to) bett-er	NA
English	bad	worse	(to) wors-en	NA
German	gut	bess-er	ver-bess-er-n	'good'
Russian	plox-oj	xuž-e	u-xud-š-ať	'bad'
Finnish	hyvä	pare-mpi	para-ntaa	'good'
Georgian	cud-i	u-ar-es-i	a-u-ar-es-ebs	'bad'
(Late) Latin	bon-us	mel-ior	mel-iō-o	'good'

Table: Suppletion in DAs (Bobaljik 2015)

# Degree achievement analysis

## Kennedy and Levin (2008)

(11) *Measure of change*

For any measure function  $\mathbf{m}$ ,

$$\mathbf{m}_{\Delta}^{\ominus} = \lambda e[\mathbf{m}_{m^{\uparrow}(\Theta(e))(init(e))}(\Theta(e))(fin(e))]$$

Kennedy and Levin (2008, ex. 25)

Extended by access to arguments via theta-roles, following Henderson (2013)

# Degree achievement analysis

## Kennedy and Levin (2008)

- open scale adjective *long*: DAs with **std** at  $\text{Long}_\Delta$  scale picks up the minimum standard
- any degree increase  $>$  minimum standard makes (12-b) true  $\rightarrow$  divisivity and atelicity/comparative reading
- general prediction of Kennedy and Levin (2008): open scale based DAs  $\rightarrow$  only comparative/atelic reading

- (12)
- a. The shadow lengthened.
  - b.  $\exists e[\text{Long}_\Delta^{\theta_1}(e) \geq \mathbf{std}(\text{Long}_\Delta) \wedge \theta_1(e) = \sigma x.*\text{shadow}(x)]$

## Degree achievements

- upper-bounded As as *dark*: DA *dark* picks up the maximum standard
- the final stage of the event has to reach the maximal degree
- no sub-event has the divisivity property  $\rightarrow$  telic/positive
- general prediction: DAs based on upper-bounded scales  $\rightarrow$  telic/positive interpretation

(13) a. The sky darkened.

b.  $\exists e[\text{dark}_{\Delta}^{\theta_1}(e) \geq \mathbf{std}(\text{dark}_{\Delta}) \wedge \theta_1(e) = \sigma x.*\text{sky}(x)]$

## Compositional details

- the difference functions are of the type  $\langle e, d \rangle$
- the type shift into the property of entites,  $\mathbf{pos}_v$  is utilized
- $\mathbf{pos}_v$  works with Interpretive economy: **stnd** is (for Kennedy and Levin (2008)) given entirely by the nature of the scale

$$(14) \quad \begin{array}{l} \text{a. } \llbracket pos_v \rrbracket = \lambda g \in D_{m_\Delta} \lambda x \lambda e. g(x)(e) \geq stnd(g) \\ \text{b. } \llbracket pos_v \rrbracket (\llbracket lengthen \rrbracket) = \lambda x. \lambda e. \text{long}_\Delta(x)(e) \geq \\ \quad \mathbf{stnd}(\text{long}_\Delta) \end{array}$$

## Our claim

- Kennedy and Levin (2008) has to be enriched with more systematic account of grammatical components (of telicity)
  - in Slavic case: algebraic properties of prefixes
- prototypical Czech imperfective DAs confirm our claim about importance of grammatical signals of telicity
- we didn't focus on imperfective DAs since they are less frequent than prefixed perfective DAs (perfective RE *.+rovnat* 'straighten' yields 13946 CNC hits but the imperfective *rovnat* 'straighten' only 1469, e.g.)



## Short note about imperfective Czech DAs

- short note about imperfectives: the prototypical imperfective examples of each scale type (*hloubit* ‘deepen’, *čistit* ‘clean’, *špinit* ‘dirty’, *plnit* ‘fill’) prefer the comparative/atelic interpretation
- example: closed scale imperfective *plnit* ‘fill’ is preferentially interpreted as atelic
- more systematic data work needed though

(15) Sál se pomalu plnil                      kouřem.  
 hall SE slowly filled.IMPERF smoke.INSTR  
 ‘The hall was slowly filling with smoke.’

# Cross-linguistic complications

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- **Slavic languages**: not ambiguous but dependent on prefixes

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  - **ambiguous** prepositions: goal/route (*up, down*)

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- majority: prefixed perfective DAs

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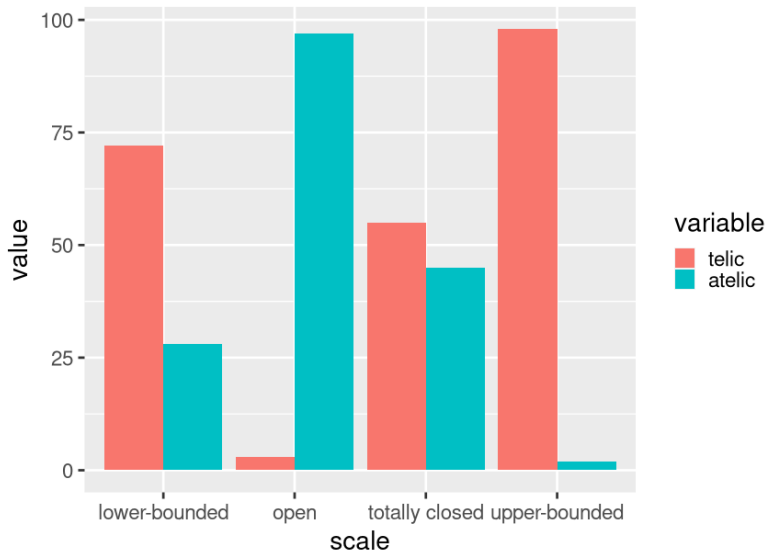
1. the boundedness properties of prefixes

# Hypothesis

The telicity status of Czech DAs can be determined by

1. the boundedness properties of prefixes
2. the scalar denotation of the adjectival root

# Results



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 $\llbracket \text{pref}_{atelic} \rrbracket = \lambda g \in D_{m_\Delta} \lambda d \lambda x \lambda e. g(x)(e) \geq \min(g)$
3. ambiguous prefixes: telic/atelic based on atomic/pluralized algebraic denotation

# Results & analysis

## Open-scale DAs

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Prediction of Kennedy and Levin (2008)

- only comparative interpretation
- except 'conventionalized' *cool*



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Prediction of Kennedy and Levin (2008)

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Czech reality

- mostly atelic or ambiguous route prefixes
- but also telic prefixes with source and goal algebraic denotation  
→ positive interpretation

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(16) a. Petr vy-hloubil jámu.

Petr from-deepened pit

'Peter dug out the pit.'

$\exists e[\text{deep}_{\Delta}^{\theta_2}(e) \geq \max(\text{deep}_{\Delta}) \wedge \theta_2(e) = \sigma x.*\text{pit}(x)]$   
 positive

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 Petr from-deepened pit  
 'Peter dug out the pit.'  
 $\exists e[\text{deep}_{\Delta}^{\theta_2}(e) \geq \max(\text{deep}_{\Delta}) \wedge \theta_2(e) = \sigma x.*\text{pit}(x)]$   
 positive
- b. Petr pro-hloubil jámu.  
 Petr through-deepened pit  
 'Peter deepened the pit.'  
 $\exists e[\text{deep}_{\Delta}^{\theta_2}(e) \geq \min(\text{deep}_{\Delta}) \wedge \theta_2(e) = \sigma x.*\text{pit}(x)]$   
 comparative

# Results & analysis

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### Open-scale DAs

- (17) Táta nechá vy-hloubit jámu pro bazén  
 dad lets from-deepen hole for swimming-pool  
 kvůli dětem.  
 because-of kids  
 'Dad will have a hole dug out for the swimming pool because  
 of the kids.' positive

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 ‘Dad will have a hole dug out for the swimming pool because  
 of the kids.’ positive
- (18) Já se jen snažím z-výšit obrat.  
 I REFL only try down-heighten sales  
 ‘I am only trying to increase the sales.’ comparative

# Results & analysis

## Upper-bounded DAs



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Prediction of Kennedy and Levin (2008)

- only positive interpretation

Czech reality

- mostly telic source/goal or ambiguous route prefixes
- rarely atelic prefixes (in pluralized algebraic meaning)
- the prefixation mostly respects the lexical semantics of the source adjective

# Results & analysis

## Upper-bounded DAs

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### Upper-bounded DAs

- (19) Uklidila a vy-rovnala mé přikrývky.  
 tidied-up and from-straightened my covers  
 ‘She tidied up and straightened my covers.’ positive

## Results & analysis

### Upper-bounded DAs

- (19) Uklidila a vy-rovnala mé přikrývky.  
 tidied-up and from-straightened my covers  
 ‘She tidied up and straightened my covers.’ positive
- (20) ...kořeny se o-zdraví a květiny lépe porostou.  
 roots REFL around-heal and flowers better grow  
 ‘...the roots will be healthier and the flower will grow better.’  
 comparative

# Results & analysis

## Lower-bounded DAs

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### Lower-bounded DAs

Prediction of Kennedy and Levin (2008)

- only comparative interpretation

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## Lower-bounded DAs

Prediction of Kennedy and Levin (2008)

- only comparative interpretation

Czech reality

- mostly telic *past* and ambiguous route prefixes
- but also atelic or ambiguous *down* prefixes
- max interpretation not from the lexical semantics of the source adjective but from the mapping of the completely affected object



# Results & analysis

## Lower-bounded DAs

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### Lower-bounded DAs

- (21) Čidla a radary se zašpiní a může nastat  
sensors and radars REFL past-dirty and can come  
problém.  
problem

‘The sensors and radars get dirty, and a problem can arise.’

positive

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### Lower-bounded DAs

- (21) Čidla a radary se za-špiní a může nastat  
 sensors and radars REFL past-dirty and can come  
 problém.  
 problem  
 ‘The sensors and radars get dirty, and a problem can arise.’  
 positive
- (22) Když si vzpomněla, kde je a kdo je,  
 when REFL remembered where is and who is  
 z-kalila její spokojenost vina.  
 down-muddied her satisfaction guilt  
 ‘When she remembered where she is and who she is, the  
 guilt spoiled her satisfaction.’  
 comparative

# Results & analysis

## Totally closed DAs

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Prediction of Kennedy and Levin (2008)

- behave identically to upper-bounded DAs

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Prediction of Kennedy and Levin (2008)

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Czech reality

- different from upper-bounded DAs
- half of them: telic source or ambiguous prefixes
- another half: atelic *toward*
- lexical scale supplies min and max → easily used by  $\llbracket \text{pref}_{atel} \rrbracket$  and  $\llbracket \text{pref}_{tel} \rrbracket$

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## Totally closed DAs

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### Totally closed DAs

- (23) Dopil, pak si znovu nalil a pomalu šálek  
 drank-up then REFL again poured and slowly cup  
 vy-prázdnil.  
 from-emptied  
 'He drank up, poured himself another cup and slowly  
 emptied it.' positive

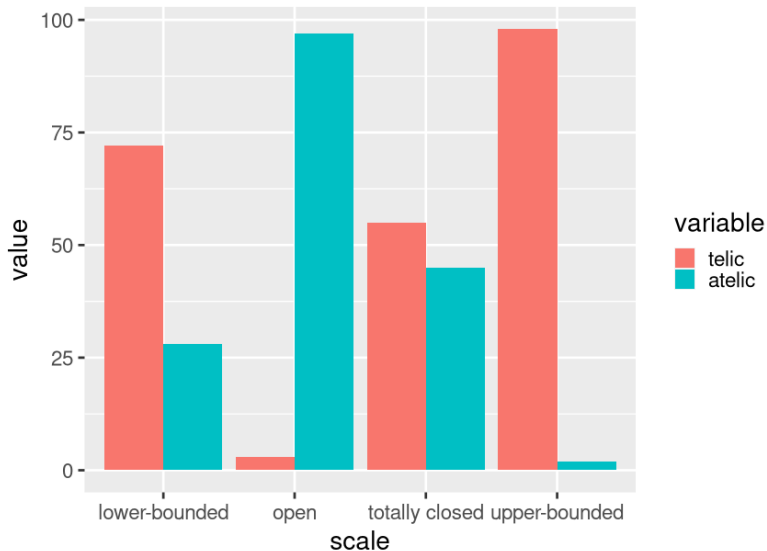


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 'He drank up, poured himself another cup and slowly  
 emptied it.' positive
- (24) I snaha připlnit stranickou kasu je mu spíše  
 also effort toward-fill party cash-box is him rather  
 sympatická.  
 sympathetic  
 'Also, the effort to fill the party cash box is rather  
 sympathetic to him.' comparative

# Results



Thank you for your attention!

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