

## On the scalar representation of total and partial adjectives: Evidence from Reduplication

### The goal:

- Evidence from morphophonological processes in Czech for:
  - a *structural* difference between two classes of antonym adjectives, namely, total and partial adjectives, for example, *clean* and *dirty* (Yoon, 1996; Rotstein and Winter, 2004)
  - only total adjectives have their standard value represented in the derivation
  - the relation between partial and total adjectives defined with respect to the standard value of the total adjective represented as the lower bound of its partial counterpart (Rotstein and Winter, 2004)
- Consequences for semantic interpretation of adjectives:
  - antonym adjectives must be at least sometimes represented by *overlapping* scales (contra Kennedy and McNally 2005; Kennedy 2007)
  - they *cannot* be defined as being mirror images of each other with respect to one scale

### The bigger question:

- What part of the meaning is obtained from the context (pragmatics) and what must be represented in the grammar (semantics)?

### Outline:

1. the data
2. total versus partial adjectives and their semantics
3. the proposal
4. further evidence: context and adverbial modification by *almost*
5. conclusion

# 1 Puzzle

- Czech has a productive system of a *semantically* driven morpho-phonological reduplication (Marantz, 1982; Inkelas and Zoll, 2005)

## An example of semantically driven reduplication:

- reduplication of the imperfective verbal morpheme *-va-* (usually called habitual) encodes iterativity
- (1)
- |    |                                    |  |                             |
|----|------------------------------------|--|-----------------------------|
| a. | praco- <b>va</b> -l                |  |                             |
|    | work-IMPERF-PP.M.SG.               |  |                             |
|    | ‘he worked’                        |  | <i>Imperfective/generic</i> |
| b. | praco- <b>vá-va</b> -l             |  |                             |
|    | work-IMPERF-IMPERF-PP.M.SG.        |  |                             |
|    | ‘he used to work’                  |  | <i>iterative</i>            |
| c. | praco- <b>vá-vá-va</b> -l          |  |                             |
|    | work-IMPERF-IMPERF-IMPERF-PP.M.SG. |  |                             |
|    | ‘he used to work’                  |  | <i>iterative (emphatic)</i> |
- (2)
- |    |  |                              |                        |                           |
|----|--|------------------------------|------------------------|---------------------------|
| a. | Petr každé ráno  | čistí- <b>vá-va</b> -l       | okno.                  |                           |
|    | Petr every morning   | clean-IMPERF-IMPERF-PP.M.SG. | window                 |                           |
|    | ‘Peter used to clean the window every morning.’            |                              |                        | ✓ <i>habitual/generic</i> |
| b. | *Petr včera  | ráno                         | čistí- <b>vá-va</b> -l | okno.                     |
|    | Petr yesterday morning                                     | clean-IMPERF-IMPERF-PP.M.SG. | window                 |                           |
|    | ‘Peter used to clean the window yesterday in the morning.’ |                              |                        | * <i>episodic</i>         |

## The empirical focus of this talk:

- reduplication in adjectives
- reduplication of a degree morpheme corresponding (roughly) to English ‘very’
- the resulting meaning of the adjective may be paraphrased as ‘very, very... (clean)’, i.e., emphasizing the standard value of the adjective
- native speakers characterize the resulting interpretation as that of reaching the absolute degree of adjectiveness (for example, of cleanness)

**The crucial fact:**

- only the so-called *total* adjectives (Yoon 1996, Rotstein and Winter 2004 and Winter 2006) may undergo this process:
- (3) *čistý* ‘clean’ vs. *špinavý* ‘dirty’
- a. *čistý* → *čistounký* → *čistoulinký* → *čistoulilinký*... ✓reduplication
  - b. *špinavý* → *špinavoulinký* → \**špinavoulilinký*... \*reduplication
- (4) *zavřený* ‘closed’ vs. *otevřený* ‘open’
- a. *zavřený* → *zavřeňoulinký* → *zavřeňoulilinký* ✓reduplication
  - b. *otevřený* → *otevřeňoulinký* → \**otevřeňoulilinký*... \*reduplication
- (5) *Some further examples (source: the Czech National Corpus):*

<i>čistý (clean)</i>	<i>čistoulilinký</i>	<i>špinavý (dirty)</i>	* <i>špinavoulilinký</i>
<i>zavřený (closed)</i>	<i>zavřeňoulilinký</i>	<i>otevřený (open)</i>	* <i>otevřeňoulilinký</i>
<i>zdravý (healthy)</i>	<i>zdravoulilinký</i>	<i>nemocný (ill)</i>	* <i>nemocňoulilinký</i>
<i>rovný (straight)</i>	<i>rovňoulilinký</i>	<i>zahnutý (bent)</i>	* <i>zahňutoulilinký</i>
<i>tenký (thin)</i>	<i>tenoulilinký</i>	<i>tlustý (thick)</i>	* <i>tlustoulilinký</i>
<i>jemný (slight)</i>	<i>jemňoulilinký</i>	<i>hrubý (rough)</i>	* <i>hruboulilinký</i>
<i>chabý (faint)</i>	<i>chaboulilinký</i>	<i>pevný (solid)</i>	* <i>pevňoulilinký</i>
<i>křehký (fragile)</i>	<i>křehoulilinký</i>	<i>nerozbitný (unbreakable)</i>	???

- this restriction is puzzling because it does not apply to its semantically closest variant, i.e., adverbial modification by *velmi* ‘very’:
- (6) *No restriction on adverbial modification:*
- a. *velmi čistý*  
very clean
  - b. *velmi špinavý*  
very dirty
- similarly, the closest English paraphrase (the repetition of ‘very’) is compatible with both total and partial adjectives as well:
- (7) *No restriction for English adverbial modification:*
- a. very very very clean
  - b. very very very dirty
- crucially, the restriction cannot be explained in phonological or morphological terms because neither semantic class of the adjectives forms a phonological or morphological natural class

## 2 The semantics of total and partial adjectives

- scalar semantics for adjectives: the positive form of an adjective denotes a subinterval of the scale  $S_A$
- the subinterval depends on a standard value  $d_A$  in the scale
- the scale is ordered by a relation  $R_A$  defined with respect to the standard value  $d_A \in S_A$
- the standard value variable  $d_A$  is context dependent (e.g., *a big house* x *a big mouse*)
- the denotation of the positive form of an adjective can be formalized as in (8) (after Rotstein and Winter 2004, ex. (18))

$$(8) \quad \llbracket A \rrbracket \stackrel{def}{=} \{x \in S_A : R_A(d_A, x)\}$$

- (Note: the denotation of an adjective in (8) must be mapped on the set of entities for the degree of *A*-ness to be included in  $\llbracket A \rrbracket$  otherwise the intersection interpretation of the *AP* within an *NP* yields a type-mismatch. For the sake of simplicity, we set this issue aside)

### Relevant types of adjectives:

- **partial:** indicate *some* amount of the relevant property (moisture, dirt, sickness etc.)
- **total:** indicate *no* amount of this property (e.g., a dirty object has some degree of dirtiness, but it is not necessarily free of cleanliness; in contrast, a clean object is free of dirtiness)
- (**relative:** no member of an antonym pair has its standard value set independently of the context; Kennedy and McNally 2005; Kennedy 2007)

### ... and their denotation:

- we follow Rotstein and Winter (2004) in formalizing total v. partial adjectives as overlapping scales:

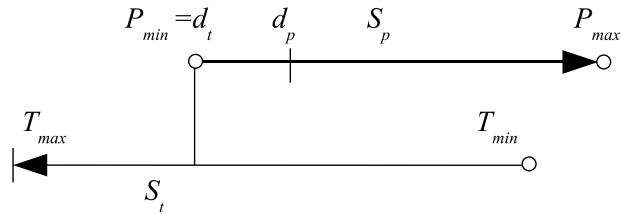


Figure 1: Total and Partial adjective scales

- $S_P$ : a partial scale, without a fixed standard value (context-dependent)
- $S_T$ : a total scale; its standard value is fixed as the lower bound of its partial counterpart (a healthy man is a man that lacks any illness)
- $S_T$  and  $S_P$  are ordered inversely
- $S_P$  may partially overlap with the  $S_T$ : some amount of the relevant partial property doesn't exclude some amount of the complementary total property
- e.g., if a coat is dirty it can mean that it is stained on sleeves but the rest of the coat is clean

### 3 Proposal

- we argue that total and partial predicates must be semantically represented by a scale and a standard value
- we define the relation between partial and total adjectives with respect to the standard value of the total adjective represented as the lower bound of its partial counterpart (following Rotstein and Winter 2004 contra Kennedy and McNally 2005)
- crucially, the scales are partially overlapping and the impression of their antonymous interpretation (not clean  $\Vdash$  dirty) comes from an interaction of their interval boundaries and the standard values

#### The denotation of partial adjectives:

- crucially, the standard value of partial adjectives is determined *contextually*
- $d_P \in \overline{S_P}; \overline{S_P} \dots$  closure of the partial scale

- Consequence: the standard value of partial adjectives has *no* structural representation

**The denotation of total adjectives:**

- the standard value of the total member of the adjectival pair is defined as the lower bound of its partial counterpart:
- $d_T = P_{min} \in \overline{S_T}; \overline{S_T} \dots$  closure of the total scale

**The denotation of reduplication:**

- the intuition is that reduplication corresponds to semantic modification: adjectives with reduplicated morphemes denote some interval close to the standard value
- since this is semantic modification, it depends on the type of scale in the denotation of the adjective with which it combines
- more formally, the denotation of the reduplication corresponds to a limit function where the limit is defined as the standard value of the total adjective:
- $\|-li-li-\| \approx d_T$
- the resulting denotation corresponds to approaching the standard value of the adjective

**Consequences:**

- since reduplication is a morphophonological process, it may apply only to the material present in the derivation
- in other words, reduplication is possible only if the standard value is structurally represented
- consequently, reduplication applies only to total adjectives since only total adjectives have their standard value structurally represented as some value in the closure of the total scale
- in contrast, the standard value of a partial adjective is determined contextually and may fall anywhere within the interval
- thus, there is no structural representation of the standard value
- consequently, there is no material that could be used for reduplication

## 4 Further evidence: context and the standard value

- English adverbial modification by *almost* shows similar properties to the Czech adjectival reduplication
  - *almost* usually combines with total adjectives but not with partial adjectives:
- (9) (from Rotstein and Winter 2004, ex. (9))
- a. The work is almost complete/\*incomplete.
  - b. The patient is almost dead/\*alive.
  - c. The explanation is almost clear/\*unclear.

### The semantics of *almost* in a nutshell:

- *almost* cross-categorically denotes negation of the denotation of the constituent it modifies:
- (10)
- a. John almost passed the exam  $\sim$  John didn't pass the exam
  - b. Almost every student passed the exam  $\sim$  Not every student passed the exam
  - c. John is almost healthy  $\sim$  John isn't healthy
- Rotstein and Winter (2004): the interval associated with the phrase *almost A* denotes degrees that are adjacent to the standard value of *A* and are in the opposite direction from the ordering of the scale associated with the adjective *A*
  - if the standard value of a partial adjective equals the standard value of a total adjective (just on the opposite scale), then the adjectives are complementary
  - consequently, the partial adjective cannot be modified by *almost* because there is no complement interval between  $d_P$  and 0

### The predictions:

- since the standard value of a partial adjective is not fixed in the structure but instead it is contextually dependent, we should be able to modify the standard value in a way so it would no longer be complementary to the total adjective
- more precisely, we should be able to modify the standard value so there would be an interval between  $d_P$  and 0 that could feed into the denotation of *almost*
- consequently, if such modification is possible, a partial adjective should become modifiable by *almost*

- this prediction is borne out:

- (11) (from Kennedy 2007)
- a. We need a rod that is bent in an angle of 90 degrees. Let's pick up that rod over there and bend it a little: it should be easy, as it's *almost bent* already.
  - b. We consider a glass dirty and wash it as soon as there are five spots on it. This glass is now *almost dirty* – it has four spots on it.
- (12)
- a. We need a TALL basketball player – one whose height is at least 1.95 meters. But we cannot take John, who is 1.90 meters – he's just *almost tall*.
  - b. The publisher considers a book long if it's 300 pages or more. This book is *almost long* – it's 298 pages.

- the crucial question is whether Czech adjectival reduplication of partial adjectives could be fixed by the context as well
- the prediction is that if the standard value of a partial adjective gets contextually fixed, reduplication should still fail to apply, in contrast to the English *almost*-modification facts
- the reason is that the contextual fixation happens only later in the derivation (after Spell-out), thus, it cannot affect the PF side of the derivation
- this prediction is indeed borne out:

- (13) [modeled after Rotstein and Winter (2004)]:
- a. This glass is certainly not clean, since it has several big spots on it and I am not willing to drink from it even if you insist. The glass is simply...  
\*špinavou**lilinká** 'very very dirty'
  - b. This glass is certainly not dirty, since it has absolutely no dirty spots on it. The glass is simply...  
✓čist'ou**lilinká** 'very very clean'



## 5 Conclusion

- we have argued the Czech data show a *structural* difference between partial and total adjectives (Yoon, 1996; Rotstein and Winter, 2004)
- only total adjectives have their standard value represented in the derivation, the standard value of partial adjectives is derived from the context
- consequently, antonym adjectives cannot be represented by adjacent scales but instead they must be allowed to partially overlap (in agreement with Rotstein and Winter 2004 and contra Kennedy and McNally 2005; Kennedy 2007)
- crucially, the semantics of antonym adjectives must be formalized as a combination of grammatically encoded (semantics) and contextually-determined (pragmatics) meanings
- the different representations are empirically testable

## References

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