



Total vs. Partial Adjectives: Evidence from Reduplication*

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Abstract. This paper provides evidence for a structural difference between two classes of antonym adjectives, namely, total and partial adjectives, for example, *clean* and *dirty* (Yoon 1996; Rotstein & Winter 2004). Based on data from morpho-phonological processes in Czech we argue that only total adjectives have their standard value represented in the derivation. In contrast, the standard value of the partial adjectives is determined pragmatically. Furthermore, we argue that antonym adjectives must be at least sometimes represented by overlapping scales. A consequence of the proposed analysis is that an empirically adequate account of antonym adjectives must supply a part of the denotation from lexical semantics and part from the context.

1 Introduction

Czech, West Slavic, has a productive system of a *semantically* driven morpho-phonological reduplication (Marantz 1982; Inkelas & Zoll 2005). One such example comes from the morphological marking of aspect. The imperfective verbal morpheme *-va-* is often called habitual since it may encode iterativity if reduplicated, as in (1). The effect of reduplication is indeed semantic and as such has truth-conditional effects: the reduplicated form may be used in habitual or generic sentences, as seen in (2a), but it is incompatible with episodic sentences, as can be seen in (2b).

- (1) a. praco-**va**-l
work-IMPERF-PP.M.SG.
'he worked' *Imperfective/generic*
- b. praco-**vá**-**va**-l
work-IMPERF-IMPERF-PP.M.SG.
'he used to work' *iterative*
- c. praco-**vá**-**vá**-**va**-l
work-IMPERF-IMPERF-IMPERF-PP.M.SG.

* We would like to thank Chris Kennedy, Henk Zeevat and the audiences at the Szklarska Poreba 2010 workshop and the SuB conference. The authors are happy to acknowledge that MD was financially supported by GAČR (grant 405/09/0677).

- ‘he used to work’ *iterative (emphatic)*
- (2) a. Petr každé ráno čistí-**vá-va-l** okno.
Petr every morning clean-IMPERF-IMPERF-PP.M.SG. window
 ‘Peter used to clean the window every morning.’ ✓ *habitual/generic*
- b. *Petr včera ráno čistí-**vá-va-l** okno.
Petr yesterday morning clean-IMPERF-IMPERF-PP.M.SG. window
 ‘Peter used to clean the window yesterday in the morning.’ **epi-*
odic

This paper focuses on another type of semantically driven reduplication, namely, reduplication in antonym adjectives. Czech gradable antonym adjectives may contain a degree morpheme which meaning roughly corresponds to English *very*. If the degree morpheme undergoes a process of reduplication, 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 fact that interests us here is that not every gradable antonym adjective may undergo the reduplication process. Even though any gradable antonym adjective may contain a degree morpheme, the morpheme may be reduplicated only in so-called *total* adjectives, never in their *partial* counterparts, following the terminology of Yoon 1996. The contrast is shown in (3) and (4). Here, the adjectives *čistý* ‘clean’ and *zavřený* ‘closed’ provide an example of total adjectives and the adjectives *špinavý* ‘dirty’ and *otevřený* ‘open’ provide an example of partial adjectives.

- (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

For presentational purposes we demonstrate the reduplication process in stages. First, we observe that for the degree morpheme to be inserted the stem of the adjective need to be modified. The change of the stem is independently motivated by phonotactic constraints on this type of morphological formation and does not directly concern us here. Once the morpheme – in our case, an in-

fix *-li-*, meaning roughly ‘very’ – is inserted, the morpheme may be reduplicated without any further phonological or morphological change of the stem. In contrast, as the (b) examples show, even though the partial adjectives *špinavý* ‘dirty’ and *otevřený* ‘open’ may be modified by the same degree morpheme, reduplication of this morpheme is impossible. Further examples demonstrating the contrast are given in (5).

(5) *Some further examples (source: the Czech National Corpus):*

čistý (<i>clean</i>)	čist'ou lilinký
zavřený (<i>closed</i>)	zavřeňou lilinký
zdravý (<i>healthy</i>)	zdravou lilinký
rovný (<i>straight</i>)	rovnou lilinký
tenký (<i>thin</i>)	tenou lilinký
jemný (<i>slight</i>)	jemňou lilinký
chabý (<i>faint</i>)	chabou lilinký
křehký (<i>fragile</i>)	křehou lilinký
špinavý (<i>dirty</i>)	*špinavou lilinký
otevřený (<i>open</i>)	*otevřeňou lilinký
nemocný (<i>ill</i>)	*nemocňou lilinký
zahnutý (<i>bent</i>)	*zahňoutou lilinký
tlustý (<i>thick</i>)	*tlust'ou lilinký
hrubý (<i>rough</i>)	*hrubou lilinký
pevný (<i>solid</i>)	*pevňou lilinký
nerozbitný (<i>unbreakable</i>)	???

The observed restriction on reduplication is rather puzzling since it does not hold for its semantically closest variant, i.e., adverbial modification by *velmi* ‘very’, as can be seen in (6). Similarly, the closest English paraphrase (the repetition of ‘very’) is compatible with both total and partial adjectives as well, as in (7).

(6) *No restriction on adverbial modification:*

- a. velmi čistý
very clean
- b. velmi špinavý
very dirty

(7) *No restriction on English adverbial modification:*

- a. very very very clean
- b. very very very dirty

Crucially, the restriction on reduplication cannot be explained in phonological or morphological terms either because neither semantic class of the adjectives forms a phonological or morphological natural class. Furthermore, if there were any phonotactic restrictions they should be equally resolved within the morpho-phonological changes accompanying the primary modification by the degree morpheme.

The rest of the paper provides evidence that the restriction on reduplication stems from distinct semantic properties of the two classes of adjectives. Concretely, we will argue that the reduplication process refers to a meaning component that is structurally present only in total adjectives. The corresponding meaning component in partial adjectives is never present in the derivation. Instead, it is supplied by the context. Consequently, it cannot serve as an anchor for morpho-phonological processes. We will outline our semantic assumptions and present the actual proposal in section 2. Section 3 investigates English adverbial modification by *almost* and compares it with the Czech reduplication case. As we will see, there is a sharp contrast between English and Czech: while the English type of modification is sensitive to the context, this pragmatic strategy fails to rescue reduplication of Czech partial adjectives thus providing further evidence for the present proposal. Section 4 concludes.

2 Proposal

We assume scalar semantics for adjectives, i.e., the positive form of an adjective denotes a subinterval of the scale S_A where the subinterval depends on a standard value d_A in the scale and where the scale is ordered by a relation R_A defined with respect to the standard value $d_A \in S_A$ (Cresswell 1977; von Stechow 1984; Bierwisch 1989; Klein 1991). Furthermore, we assume that the standard value variable d_A is context dependent.¹ The denotation of the positive form of an adjective can be formalized as in (8) (after Rotstein & Winter 2004: ex. (18)):²

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

The complete lexical semantics of the adjective like *long* can be then formalized using λ -abstraction as follows:

$$(9) \quad \llbracket long \rrbracket = \lambda d_A \lambda x. long(x) \geq d_A$$

¹ For example, the standard value for *big* is set differently in *a big house* than in *a big mouse*.

² Notice 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.

In the function talk – the denotation of an adjective like *long* is a function from a context set degree d_A and an individual x which yields truth value 1 if and only if the degree of the length of the individual x exceeds the degree d_A .³ Degree d_A can be given explicitly (in most cases by a noun which is modified by the adjective) or implicitly. The relation \geq is supplied by an invisible operator *pos* which operates on the adjective and assigns truth value 1 only to those individuals (when the adjective is used predicatively) which exceed the average degree for the comparison class. Von Stechow (1984: R6) defines *pos* in the following way:

(10) *Positive*

Let A^0 be any adjective meaning, C be any appropriate property, x be any appropriate individual and w be any world. Then $w \in \llbracket pos \rrbracket$ iff $(\exists d)$ [d is an A^0 -degree & $d > \text{average} [A^0, C]$ & x has d in w & $w \in C(x)$].

A sentence like *Ferda is a big cat* is true in a world w iff Ferda has a degree of bigness which exceeds the average degree of bigness for cats in the world of evaluation.

Here we are concerned with two basic types of antonym adjectives: partial and total adjectives.⁴ We semantically represent total and partial adjectives by a scale and a standard value. A partial adjective indicates *some* amount of the relevant property (moisture, dirt, sickness etc.), while a total adjective indicates *no* amount of such 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). As for their semantic denotation, we follow Rotstein & Winter (2004) in formalizing total v. partial adjectives as overlapping scales, schematized in Figure 1.

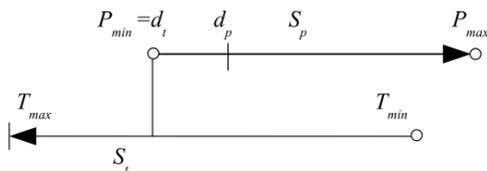


Figure 1: Total and Partial adjective scales

³ Notice that the type of the adjective is not a predicate, $\langle e, t \rangle$, but a function from degrees into a function from individuals to truth values: $\langle d, \langle e, t \rangle \rangle$.

⁴ We put aside so-called relative adjectives. In relative adjectives, no member of an antonym pair has its standard value set independently of the context (Kennedy & McNally 2005; Kennedy 2007).

In Figure 1, S_P is a partial scale, without a fixed standard value (context-dependent). S_T is 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). Crucially, S_T and S_P are ordered inversely and S_P may partially overlap with S_T . What this means is that some amount of the relevant partial property does not exclude some amount of the complementary total property. For instance, if a coat is dirty it can mean that it is stained on sleeves but the rest of the coat is clean.

Following von Stechow (2007); Heim (2008), among others, we represent antonym adjectives as complements/negations of each other, the denotation of adjectives like *clean* and *dirty* are related by the operation of being a complement of each other's respective scales. We thus follow a linguistic tradition which treats antonyms as lexically related instead of being syntactically decomposed in syntax.⁵

More formally, 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 & Winter 2004 contra Kennedy & McNally 2005). Crucially, the scales may partially overlap and the impression of their antonymous interpretation (not clean \Vdash dirty) comes from an interaction of their interval boundaries and their standard values. As for the denotation of partial adjectives, their standard value is determined *contextually*. Consequently, the standard value of a partial adjective has *no* structural representation:

$$(11) \quad d_P \in \overline{S_P}; \overline{S_P} \dots \text{closure of the partial scale}$$

In contrast, the denotation of a total adjective defines the standard value of the total member of an adjectival pair as the lower bound of its partial counterpart:

$$(12) \quad d_T = P_{\min} \in \overline{S_T}; \overline{S_T} \dots \text{closure of the total scale}$$

With the formal semantics of antonym adjectives in place we can approach the question of the denotation of reduplication. The intuition is that reduplication corresponds to semantic modification, i.e., adjectives with reduplicated morphemes denote some interval close to the standard value. Since this is semantic modification, it depends on the type of the scale in the denotation of the adjective with which it combines. More formally, we argue that the denotation of reduplication corresponds to a limit function where the limit is defined as the standard value of the total adjective. Thus, our first step to the

⁵ Heim (2008) provides an argument that antonyms are not decomposed in syntax contra Buring (2007a,b).

formalization can be captured as follows:

$$(13) \quad \llbracket \text{-li-li-} \rrbracket \approx d_T$$

The resulting denotation corresponds to approaching the standard value of the adjective. If we apply the denotation of the reduplication to a total adjective, for example, to *čistý* ‘clean’, we get the following outcome:

$$(14) \quad \llbracket \text{čist'ou-li-li-} \dots \text{nký} \rrbracket = \lambda x \exists d [d \approx d_T \wedge \text{clean}(d)(x)]$$

The formalization captures the fact that the denotation of a total adjective is not a function from degrees and individuals to truth values, but instead it is a function from individuals to truth values. This stems from the fact that the degree d_A is not a context dependent variable,⁶ but instead the variable is existentially closed and its value approaches the standard value of its total counterpart. Consequently, the denotation of a reduplicated adjective is not dependent on a context fixation of the standard value d_A anymore.

After we further abstract over the adjective, we end up with the following denotation:

$$(15) \quad \llbracket \text{-li-li-} \dots \rrbracket = \lambda G \lambda x \exists d [d \approx d_T \wedge G(d)(x)]$$

We speculate that the reduplication takes place instead of the invisible operator *pos* which can be found in relative adjectives. There are two differences between *pos* and reduplication morpheme: First, since the reduplication morpheme replaces *pos*, it does not need any comparison class from the linguistic or extralinguistic context, consequently, a reduplicated adjective is not dependent on the context. Second, the relation between the degree and an individual is a limit function, instead of \geq .⁷ Even if both *pos* and the reduplication morpheme existentially close the degree variable, they do it in a different way – the operator *pos* makes the denotation of the adjective dependent on a comparison class C but the reduplication is not dependent on any comparison class at all.⁸

The proposed formalization makes certain predictions about interactions between different types of adjectives and reduplication. First of all, since redu-

⁶ As it is the case in the denotation of relative adjectives.

⁷ We put aside any relativization to possible worlds because we use a purely extensional framework in this paper.

⁸ We assume that different speaker standards for total adjectives come from extralinguistic factors and not from the semantics itself – e.g. if we consider the sentence *The dishes are clean*, which can be true for one speaker and false for another one depending on their personal standard, one might think that the interspeaker disagreement comes from a semantic context dependency. However, we believe this type of difference in speakers judgements come solely from extralinguistic factors and does not need to be represented in semantics proper.

plication is a morpho-phonological process, it may only apply to a material present in the derivation.⁹ What this means with respect to our data is that reduplication is possible only if the standard value is structurally represented. Consequently, we predict that 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. What this means is that there is no structural representation of the standard value. Consequently, there is no material that could be used for reduplication. Thus, we have successfully derived the contrast between partial and total adjectives with respect to reduplication.

3 Further Evidence: Context and the Standard Value

Interestingly, English adverbial modification by *almost* shows similar properties to the Czech adjectival reduplication. As can be seen in (16), *almost* usually combines with total adjectives but not with partial adjectives. This restriction is parallel to the restriction observed for the Czech reduplication paradigm and as such invites the question of whether we deal with the same phenomenon.

- (16) (from Rotstein & 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 basic observation about *almost* is that *almost* cross-categorically denotes negation of the denotation of the constituent it modifies:

- (17)
- a. John almost passed the exam \rightsquigarrow John didn't pass the exam
 - b. Almost every student passed the exam \rightsquigarrow Not every student passed the exam
 - c. John is almost healthy \rightsquigarrow John isn't healthy

In order to account for the semantics of English *almost*, Rotstein & Winter (2004) proposed that 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 we apply this denotation to our semantics of total and partial adjectives, the in-

⁹ We believe this claim is fairly theory neutral. At least, we are not aware of any generative model of morpho-phonology where this reasoning wouldn't apply. In fact, this type of dependency can be easily reformulated in representational terms as well, yielding the same result.

compatibility of *almost* and partial adjectives can be derived in the following way. First, recall that under our semantics for total and partial adjectives, 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.

There is an interesting prediction stemming from this formalization. One of the crucial distinctions between total and partial adjectives lies in the way their standard value is represented. While the standard value of a total adjective is structurally fixed as the lower bound of its partial counterpart, the standard value of a partial adjective is not fixed in the structure but instead it is contextually dependent. What this amounts to is that in a neutral context English speakers tend to fix the standard value of a partial adjective as the minimum. However, this is not necessary. If we create an appropriate context, the standard value can be shifted further up the scale. If this happen, we create a non-empty interval between d_p and 0. Such a shift is schematically shown in Figure 2. If such an interval exists, then it should be able to feed into the denotation of *almost*. Consequently, if such modification is possible, a partial adjective should become modifiable by *almost*. This prediction is indeed borne out as observed by Kennedy (2007). Examples in (18) and (19) demonstrate the shift.

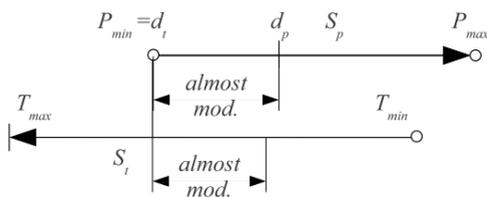


Figure 2: Modification by *almost*

- (18) (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.
- (19) (from Kennedy 2007)
- 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.

In the previous section we have proposed that the impossibility of reduplication of partial adjectives is a direct consequence of their standard value not being structurally present. We have argued that the restriction has nothing to do with the actual position of the standard value on the scale but instead it results from the lack of a structural material available for the morpho-phonological process of reduplication. Could it be the case that in fact the denotation of the process of reduplication should be stated in terms of a complement interval exactly as the denotation of English *almost*? These two hypotheses make distinct predictions. If we follow the denotation for English *almost*, we predict that exactly as in English, reduplication of partial adjectives should improve in a context that pushes the standard value of a partial adjectives further away from the minimum. In contrast, our structural hypothesis predicts that the distance between the standard value and the minimum should not make any difference: if reduplication depends on the standard value being structurally fixed, it should not matter whether or not the standard value is distinct from the minimum value. The reason is that the contextual fixation happens only later in the derivation (in the semantics/pragmatics component) and as such it cannot affect the morpho-phonological process that necessarily takes place before the pragmatic component sets the standard value. Thus, the prediction of our proposal is that even if we modify the context, reduplication of Czech partial adjectives should still fail. Interestingly, this prediction is indeed borne out, as examples in (20), modelled after Rotstein & Winter (2004), show. No matter how hard we try to modify the context, what we see is that reduplication in Czech partial adjectives, unlike *almost*-modification in English, cannot be improved.

- (20) 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**lil**inká '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'

4 Conclusion

We have examined a surprising contrast between partial and total adjectives that emerges in a semantically driven morpho-phonological process of redupli-

cation in Czech. While total adjectives can be reduplicated, partial adjectives cannot. This is unexpected because a formally distinct but semantically parallel process of adverbial modification does not show any such restriction. We have argued that the pattern can be explained if we adopt Yoon's and Rotstein & Winter's account of total and partial adjectives. According to them, there is a *structural* difference between partial and total adjectives: Only total adjectives have their standard value represented in the derivation, the standard value of partial adjectives is derived from the context. Furthermore, we have argued that antonym adjectives cannot be represented by adjacent scales but instead they must be allowed to partially overlap (in agreement with Rotstein & Winter 2004 and contra Kennedy & McNally 2005; Kennedy 2007). Crucially, we have argued that the semantics of antonym adjectives must be formalized as a combination of grammatically encoded (semantics) and contextually-determined (pragmatics) meanings. Thus, in our model, the proper formalization of these two types of adjective must be represented in two components of the grammar. As we have seen in our case study, the different representations are empirically testable.

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