

Verbal gradability and degree arguments in verbs

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1 Introduction

Big theoretical issue: what expressions are gradable, and what are the underlying representations of gradability?

- Many adjectives are clearly gradable. Degrees are argued to be at the core of adjectival gradability (Cresswell, 1976; Kamp, 1975, and others)
- Some verbs also appear gradable or invoke scalarity. Do these verbs lexicalize degrees?

Smaller empirical issue: what is the lexical semantics of the English modifier *sorta* and why can it be used with both adjectives and verbs?

- (1) *Adjectives*
 - a. It's sort of hard to explain.
 - b. ...lot of young people think their parents are starting to seem, you know, sort of old and over the hill... (Corpus of Contemporary American English)
 - c. Gas is *sorta* expensive on the island. (Google)
- (2) *Verbs*
 - a. But I can't see how that Diaz just sorta evaporated, like some kid's bad dream. (COCA)

- b. ...running on concrete and accidentally sorta kicked the ground. (Google)

Working up to the second issue (*sorta*), I will shed some light on the first question, arguing...

- ...that *sorta* can be used as a diagnostic for the existence of a degree argument.
- ...that some verbs do in fact lexicalize degrees.

Roadmap:

- Overview of degree arguments in the adjectival and verbal domains.
- Demonstrate the behavior of *sorta* with adjectives and verbs.
- Suggest how *sorta* can be a diagnostic for degree arguments.
- Sketch out the lexical semantics of *sorta*.

2 Degree arguments...

2.1 ...in adjectives

Degrees are a way of accounting for the gradability of adjectives.

- Cresswell (1976) conceptualized degrees as equivalence classes of individuals.
- Later accounts (Kennedy, 1999, a.o.) conceive of degrees as ontological primitives.

Ontological status of degrees: still up for debate, particularly whether to treat them as points (Kennedy, 1999) or intervals (Schwarzchild & Wilkinson, 2002).

How degrees are used:

- Question of whether adjectives denote measure functions (type $\langle e, d \rangle$)...

- ...or relations between degrees and individuals (type $\langle d, et \rangle$).

I assume the latter, since it makes certain things easier.

$$(3) \quad \llbracket tall \rrbracket = \lambda d \lambda x [\mathbf{tall}(d)(x)]$$

In order to use an adjective as in (3), a morpheme POS provides existential closure over the degree argument and asserts that it meets a contextually supplied standard (Cresswell, 1976; von Stechow, 1984; Bierwisch, 1989; Kennedy, 1999).

$$(4) \quad \llbracket POS \rrbracket = \lambda G \lambda x \exists d [d \geq \mathbf{standard}(G) \wedge G(d)(x)]$$

$$(5) \quad \llbracket POS tall \rrbracket = \llbracket POS \rrbracket (\llbracket tall \rrbracket) \\ = \lambda x \exists d [d \geq \mathbf{standard}(\llbracket tall \rrbracket) \wedge \llbracket tall \rrbracket (d)(x)]$$

Big picture view: adjectives lexicalize degrees in some fashion. Degree scales are inherently part of adjectival meanings.

2.2 ...in verbs

Nature of gradability in the verbal domain is less studied.

- Do verbs lexicalize degree arguments?
- Or can verbs only become associated with degrees?
- What kinds of scales do verbs use (i.e., quantity, intensity)?

A number of people have tried to address the question of how quantity scales are represented.

- Verbs are endowed lexically with degree arguments (Piñón, 2008; Ballweg & Frosch, 1979).
- Verbs become associated with degrees, but do not themselves lexicalize degrees (Bochnak, 2011; Kennedy & Levin, 2008; Kennedy, 2012; Caudal & Nicolas, 2005; Piñón, 2005; Rett, to appear).

Overview: less consensus on whether verbs have degree arguments.

3 Behavior of *sorta*

Sorta acts as a hedge.

- Signals a mismatch between what the speaker said and what they might have had in mind.

Sorta can appear with both verbs (6) and adjectives (7).

(6) *With verbs*

- He sorta swam over to the boat.
- The player sorta kicked the ball.

(7) *With adjectives*

- He's sorta tall.
- Gas is sort of expensive.

Sorta has an approximative flavor to it. With verbs this can be paraphrased with circumlocutions such as *did something like*, or *close to but not quite*.

- He sorta swam over to the boat.
↪ He did something like swimming.
- The player sorta kicked the ball.
↪ The player did something close to but not quite kicking the ball.

Bolinger (1972) observes that *sorta* allows for different readings when it combines with different predicates, what he calls INTENSIFICATION and IDENTIFICATION.

Intensification: The intensifier *sorta* involves a scale inherent to the predicate.

- He is sorta tall.
- Gas is sort of expensive on the island.

Identification: The identificational *sorta* has a reading involving the suitability of the word in context.

- ...running on concrete and accidentally sorta kicked the ground.

- (12) The ones who couldn't swim at all are "sorta swimming." By that I just mean they don't have great technique but they are doing it. (Google)

Bolinger tests for the identificational *sorta* by using a follow-up clause that denies the predicate holds. This clause is acceptable with identificational *sorta* and claimed to be unacceptable with the intensifier *sorta*.

- (13) a. He sort of likes you, quite a bit, in fact.
b. *He sort of likes you – not really, he just looks that way.

Using a different follow-up can make this intuition that denial is licit with identification come out better.

- (14) a. *He kicked the ball. That is to say, he didn't really kick it.
b. He sorta kicked the ball. That is to say, he didn't really kick it.

I'm less than clear on the usefulness of Bolinger's test at the moment, since the test doesn't seem reliable across speakers.

More useful will be intuitions regarding the source of scalarity associated with *sorta*.

- Intensification: scale inherent to the lexical item (e.g., intensity scale)

- (15) He is sorta tall. (He has some height near the standard for being tall on the height scale.)

- Identification: scale external to the lexical item (e.g., appropriateness of word choice, semantic resemblance to other possible choices of word or concept)

- (16) He sorta kicked the ground. (*kick* is marked as a less than appropriate word choice)

4 Using *sorta* as a diagnostic

4.1 Intensification implies degrees

The readings Bolinger describes correlate with grammatical category.

- Intensification is easily available with adjectives.
- Identification is more available with verbs.

The intuition to pursue here is that *sorta* is sensitive to a difference in the lexical semantics of words of these categories.

- Adjectives are commonly argued to lexicalize degree scales.
- Less clear that verbs have degree arguments, and even those arguments suppose only a subset of verbs have degree arguments.
- A related question: Are there a priori reasons to think that verbs lexicalize scales corresponding to the similarity or appropriateness scale that *sorta* seems to invoke?

Conclusion: Intensifier *sorta* is sensitive to degree scales measuring intensity. A lack of an intensifier reading of *sorta* implies no degree argument present in the predicate it modifies.

4.2 Verbs with degree arguments

An objection to the argument above would be that *sorta* is simply sensitive to lexical category and not lexical semantics. However, there exist verbs for which *sorta* does allow an intensification reading.

- (17) He sorta resembles you.
(18) He sorta stinks.
(19) He sorta likes you.

Bolinger's denial test would also suggest that the intensification reading is at play here.

- (20) a. He sort of likes you, quite a bit, in fact.
b. *He sort of likes you – not really, he just looks that way.

These verbs can be graded with *more*, corroborating evidence that they have a degree argument.

- (21) He resembles you more than Richard Nixon.
(22) He stinks more than Mary.
(23) He likes you more than Betsy.

4.3 . . . and without

Piñón (2008) extends a degree-based analysis of degree achievements to incremental theme verbs such as *eat*.

- Verbs encode a measure function measuring how much an x of description O is affected in e , as in (24).

$$(24) \quad \llbracket eat \rrbracket = \lambda x \lambda O \lambda d \lambda e [\mathbf{eat}_\delta(x)(O)(e) = d] \quad (\text{Piñón, 2008})$$

Bochnak (2011) and Kennedy (2012): nominal argument of an incremental theme verb provides a measure function.

My judgements on *sorta* modifying incremental theme verbs are unclear.

Informal polling has suggested that intensifier readings are difficult with incremental theme verbs (25, 26), with identificational readings preferred.

- (25) She sorta wrote the letter.
 (26) He sorta mowed the lawn.

I'll tentatively conclude that *sorta* shows incremental theme verbs do not have a degree argument, but rather are associated with degrees a la Bochnak (2011); Kennedy (2012).

5 An analysis

5.1 Analytic intuition

Proposal:

- The same *sorta* for both adjectives and verbs.
- *Sorta* will be a degree word, with a typeshift necessary to account for identification sense with verbs.
- Typeshift will allow access to a degree of precision that specifies how strictly to interpret the verb.
- Degree semantics for *sorta* across categories...
- ...but different sources for scalarity with verbs and adjectives.

Borrow some of Morzycki (2011)'s alternative semantics for metalinguistic comparatives.

5.2 A semantics for imprecision

Morzycki (2011): interpretation is parameterized to a degree of precision, represented with a degree parameter on the interpretation function $\llbracket \cdot \rrbracket$.

- A denotation is represented as a set of alternatives (see also Kratzer & Shimoyama, 2002). One way of generating this set is by using a binary operator \approx (the “resembles” relation).

$$(27) \quad \alpha \approx_{d,C} \beta \text{ iff, given the ordering imposed by the context } C, \alpha \text{ resembles } \beta \text{ to (at least) the degree } d \text{ and } \alpha \text{ and } \beta \text{ are of the same type (Morzycki, 2011).}$$

Consequently, $\approx_{1,C}$ is equivalent to $=$ (assuming degrees are in the interval $[0, 1]$).

- These alternatives are an implementation of Lasnik's pragmatic halos.
 - Lasnik (1999): Natural language expressions have halos of imprecise alternatives surrounding them.
 - A word or expression is pragmatically licit just in case the more true alternative is in the halo (e.g., *It's 3pm* is ok to say at 2:58pm because 2:58pm is in the halo for 3pm).
 - Halos can shrink or expand.
- Using \approx , a denotation can be constructed out of a set of resembling objects.

$$(28) \quad \llbracket dumb \rrbracket^{d,C} = \{f_{(e,st)} : f \approx_{d,C} \mathbf{dumb}\}$$

A set of functions f that resemble **dumb** to at least degree d .

Crucially, the imprecision parameter on the interpretation function binds the degree parameter on \approx . This is how the imprecision parameter can change the size of the halo (=set of alternatives).

$$(29) \quad \begin{array}{ll} \text{a. } \llbracket dumb \rrbracket^{.9,C} = \{\mathbf{dumb}, \mathbf{dopey}, \mathbf{foolish}, \dots\} \\ \text{b. } \llbracket dumb \rrbracket^{1,C} = \{\mathbf{dumb}\} \end{array}$$

- It'll be useful to set the imprecision parameter during the derivation. But normally the imprecision parameter isn't available — it's not visible to the compositional machinery.

- The framework makes available a typeshift PREC that allows us to get at the imprecision parameter. PREC takes a type from $\langle \sigma \rangle$ to $\langle d, \sigma \rangle$ by binding the degree parameter.

$$(30) \quad \llbracket \text{PREC } \alpha \rrbracket^{d,C} = \lambda d'. \llbracket \alpha \rrbracket^{d',C}$$

What makes this framework useful is that it provides a way to get at the metalinguistic dimension of words, the choice of word in context.

5.3 Lexical semantics of *sorta*

Adopting the framework in the previous section.

- The identificational reading of *sorta* operates over something like a metalinguistic dimension (word choice).
- Morzycki's framework explicitly manipulates a metalinguistic dimension as well.

Recalling the analytical intuition from before, *sorta* is a degree word. *Sorta* will involve existential quantification over degrees in order to saturate the degree argument of the predicate it combines with.

Two sources for degree arguments:

- Some predicates have inherent degree arguments.
- Predicates without inherent degree arguments become gradable via the PREC typeshift.

These two sources for degree arguments correspond to the readings of *sorta*: intensifier readings are available where there are inherent degree arguments, and identificational readings where PREC is used.

- *Sorta* intensifies in a way familiar from other degree words, asserting a degree somewhere along the degree scale used by the adjective.
- For the identificational reading, *sorta* picks something from the halo of the predicate that it modifies.

Three components to the meaning of *sorta*:

- Existential quantification over degrees.

- Picking a function from a set of alternatives.
- Apply the function to an individual.

Characterizing the degree: clues due to the approximative flavor of *sorta*.

- Degree introduced by *sorta* is approximate to a contextually defined standard. E.g., *sorta tall* can be paraphrased as “close to the standard for tallness.”
- Standards are well-known from studies of adjectives Kennedy & McNally, 2005; Kennedy, 2007, and many more.
- *Sorta* also has an approximative sense with verbs: *sorta V* is close to but not quite *V*.
- Proposal: extend the concept of a standard to degrees of precision.
- The degree *sorta* introduces in the identificational sense is close to but not quite the standard degree of precision for the context.

I define a relation \leq “less than close to” that is true just in case a degree is less than but close to value of another degree.

$$(31) \quad \forall d \forall d', d \leq_{C,P} d' \text{ iff } d < d' \text{ and the value of } d \text{ is close to } d' \text{ as determined by the context } C \text{ and a gradable predicate } P.$$

I assume that the **standard** function is defined...

- ...not only over gradable adjectives (type $\langle d, et \rangle$)
- ...but also properties turned into gradable predicates by way of PREC (also type $\langle d, et \rangle$).

The introduction of a degree lower than the standard degree of precision expands the set of alternatives available (or widens the halo, in Lasnik's terms).¹

Second, due to the alternative semantics I'm using (see section 5.2), denotations are sets of functions rather than functions themselves.

- Existential quantification is necessary to pull a function from this set.

¹Siegel (2002)'s analysis of *like* is similar to my analysis of *sorta* in that it also involves widening a pragmatic halo.

- This corresponds to picking a function from the halo.
- Fits with the intuition that e.g., *sorta kick* is a predicate that approximates *kick* — a function in the halo of *kick*.
- Compositional wrinkle: the degree introduced by *sorta* needs to saturate the degree argument of the gradable predicate before a function is selected from the set.

Finally, the function is applied to the individual argument of *sorta*.

These components come together in the denotation in (32).²

$$(32) \quad \llbracket sorta \alpha \rrbracket^{d',C} = \lambda x \exists d \left[d <_{C, \llbracket \alpha \rrbracket^{d',C}} \mathbf{standard}(\llbracket \alpha \rrbracket^{d',C}) \wedge \exists f \in [\llbracket \alpha \rrbracket^{d',C}(d)] [f(x)] \right] \\ \text{where } \alpha \text{ is a gradable predicate type } \langle d, et \rangle.$$

Sorta tall would be represented as in (33) below, where (b) expands the adjective to show the set of alternatives.

$$(33) \quad \text{a. } \llbracket sorta tall \rrbracket^{d',C} = \lambda x \exists d \left[\begin{array}{l} d <_{C, \llbracket tall \rrbracket^{d',C}} \mathbf{standard}(\llbracket tall \rrbracket^{d',C}) \wedge \\ \exists f \in [\llbracket tall \rrbracket^{d',C}(d)] [f(x)] \end{array} \right] \\ \text{b. } \llbracket sorta tall \rrbracket^{d',C} = \lambda x \exists d \left[\begin{array}{l} d <_{C, \llbracket tall \rrbracket^{d',C}} \mathbf{standard}(\llbracket tall \rrbracket^{d',C}) \wedge \\ \exists f \in \{ \lambda x [\mathbf{tall}(d)(x)] \} [f(x)] \end{array} \right]$$

(34) demonstrates *sorta* with a verb typeshifted with *PREC*. For readability, I've suppressed the parameters on $<$.

$$(34) \quad \text{a. } \llbracket sorta_{PREC} swim \rrbracket^{d',C} \\ = \lambda x \exists d \left[\begin{array}{l} d < \mathbf{standard}(\llbracket_{PREC} swim \rrbracket^{d',C}) \wedge \\ \exists f \in [\llbracket_{PREC} swim \rrbracket^{d',C}(d)] [f(x)] \end{array} \right] \\ = \lambda x \exists d \left[\begin{array}{l} d < \mathbf{standard}(\llbracket_{PREC} swim \rrbracket^{d',C}) \wedge \\ \exists f \in \{ f_{(e,t)} : f \approx_{d,C} \mathbf{swim} \} [f(x)] \end{array} \right] \\ = \lambda x \exists d \left[\begin{array}{l} d < \mathbf{standard}(\llbracket_{PREC} swim \rrbracket^{d',C}) \wedge \\ \exists f \in \left\{ \begin{array}{l} \mathbf{swim}, \\ \mathbf{float}, \\ \mathbf{wade}, \\ \dots \end{array} \right\} [f(x)] \end{array} \right]$$

²The denotation here is not defined in a particularly compositional way. See Rawlins (2008) for discussion on how to implement a Hamblin semantics in a more compositional way.

For verbs with degree arguments, we might assume that they also encode measure functions in a way similar to adjectives.

$$(35) \quad \llbracket stink \rrbracket = \{ \lambda d \lambda x [\mathbf{stink}(d)(x)] \}$$

The discussion here makes *sorta* a cousin to *POS*: rather than asserting that an individual meets the standard, it asserts that the individual comes close to meeting the standard.

$$(36) \quad \llbracket POS \rrbracket = \lambda G \lambda x \exists d [d \geq \mathbf{standard}(G) \wedge G(d)(x)]$$

Summary:

- *Sorta* is a degree word that introduces a degree lower than a standard.
- For gradable adjectives, this is the standard familiar from work by Kennedy (1999, a.o.).
- For verbs without degree arguments, the *PREC* typeshift is used to turn the verb into a gradable predicate.
- The degree asserted here is lower than the standard degree of precision.
- Using a degree lower than the standard degree of precision widens the pragmatic halo.
- The intensifier reading with *sorta* is a degree reading.
- The identificational sense with *sorta* involves the *PREC* typeshift to widen the pragmatic halo.

6 Conclusion

Two main goals here:

- Argue that *sorta* can be a diagnostic as to the existence of degree arguments in verbs.
- Sketch a semantics for *sorta* to account for the intensifier and identificational readings.

On degree arguments:

- Verbs in general likely do not have degree arguments, although the picture is less than clear with incremental theme verbs.
- Suggests that stative verbs (such as *stink* and *resemble*) do have degree arguments.

On the lexical semantics of *sorta*:

- *Sorta* existentially quantifies over degrees, and uses a degree that's close to but does not meet a standard.
- With a non-gradable predicate, the standard is the standard degree of precision required to use the predicate in the context.
- Denotations are parameterized to degrees of precision, which *sorta* has access to via a typeshift.
- Using a degree lower than the standard degree of precision has the effect of widening the halo.

Zooming back out to see the big picture:

- Clearer sense of what predicates are inherently gradable.
- The beginnings of a theory of how a predicate can become gradable.

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