Degrees and Standards in the Meanings of Roots

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1 Introduction

- Change-of-state is often assumed to be scalar in nature, rooted mostly in work on adjectives (e.g. Krifka 1998, Hay et al. 1999, Kennedy and Levin 2008, Rappaport Hovav 2008, Beavers 2008, 2012a, Koontz-Garboden 2010, Beavers and Koontz-Garboden (2020)).

  (1) a. The road is wide. ≈ The road has an above standard degree of width.
  b. The road widened ≈ The road has increaed in its degree of width.

- Many theories also assume verb/adjective meanings are decomposed into an event template (e.g. built from functional heads) and an idiosyncratic root (e.g. Dowty 1979, Rappaport Hovav and Levin 1998, Marantz 1997, Ramchand 2008, Alexiadou et al. 2015):

  (2) a. The road is wide ≈ [The road is [*pos* [*adj* $\sqrt{\text{WIDE}}$]]]
  b. The road widened ≈ [The road [v_{become} $\sqrt{\text{WIDE}}$]]

- The base (e.g. the root) of adjectives is often taken to be a measure function returning a degree (Kennedy 2007), where functional heads introduce comparison to the relevant standard.

#1 We suggest based on evidence primarily from sublexical modifiers that (a) roots denote stative predicates (cf. Wellwood 2015) and (b) they contain a notion of comparison in them.

#2 Functional heads clarify the standard of comparison, but do not introduce comparison. They do, however, introduce other forms of comparison, including measures of change and quality.

#3 Data we consider reinforces that neither positive nor comparative adjectives underlie verbs.

2 Measure Functions in Adjectives and Verbs

- Adjective roots are often treated as measure functions giving degree d theme x holds of property δ at some time/state (3a). Higher heads introduce comparison (Kennedy 2007, Kennedy and Levin 2008), e.g. *pos* compares d to δ's "positive standard" ($\boldsymbol{\delta}_P$ = P's dimension):

  (3) a. $[\![\sqrt{\text{FLAT}}]\!] = \lambda x \lambda s[\mathbf{flat}'(x, s)]$ (returns degree, assuming states rather than times)
  b. $[\![adj]\!] = \lambda P[P]$
  c. $[\![pos]\!] = \lambda P \lambda x \lambda s[P(x, s) \geq \mathbf{stnd}'_{\mathbf{pos}}(\boldsymbol{\delta}_P)]$
  d. $[\![\text{flat}]\!] = [\![[\ pos\ [\ \text{adj}\ \sqrt{\text{FLAT}}\ ]\ ]]\!] = \lambda x \lambda s[\mathbf{flat}'(x, s) \geq \mathbf{stnd}'_{\mathbf{pos}}(\text{FLATNESS})]$

- Different scales yield different positive standards owing to Interpretive Economy ("Maximize the contribution of the conventional meanings of the elements of a sentence to the computation of its truth conditions") (Kennedy 2007: 36):

  (4) a. The rod is straight. (max endpoint adjective: standard is max)
  b. The towel is wet. (min endpoint adjective: standard is min)
  c. The road is wide. (open adjective: standard is from pragmatic context)

- Kennedy and Levin (2008) extend this to verb meanings. There are two conditions to be accounted for. First, the final degree must be higher than the initial degree, i.e. change occurs:

(5) a. #She straightened the rod, but it's just as straight as/curvier than before.
b. #She wet the towel, but it's just as wet/drier than before
c. #They widened the road, but it's just as wide/narrower than before.

- Second, unless context intervenes the final degree depends partly on scale type (Kennedy and Levin 2008: 168-170), though in a way distinct from how it is determined by adjectives:

(6) a. She straightened the rod. (max endpoint: final degree is max or above initial)
b. She wet the towel. (min endpoint: final degree is min or above initial)
c. They widened the road. (final degree is above initial degree)

- We call this the "verbal standard". Kennedy and Levin define the root as a measure of change function returning the degree of increase, effectively creating a minimal endpoint scale.

- For maximal endpoint scales the lexical maximum can serve as the default; for all other scales the theme's initial degree is the minimum, defaulting to that. Telic readings draw out a (lexical or contextual) maximum reading, atelic readings a minimum reading:

(7) a. Kim cooled/straightened the rod in ten minutes. (telic = maximum)
b. Kim cooled/straightened the rod for ten minutes. (atelic = minimum)

- In sum, the (final) state is of holding a degree at or above some standard determined by scale type, word category, and context, with a measure function as the core, not a stative predicate.

3 A Decompositional Model

- However, in decompositional approaches roots are treated as stative predicates.

(8) a. $[\![\sqrt{\text{OPEN}}]\!] = \lambda x \lambda s[\mathbf{open}'(x, s)]$ ("A state of openness s holds of y.")
b. $[\![v_{\text{become}}]\!] = \lambda P \lambda x \lambda e \exists s[become'(s, e) \wedge P(x, s)]$
c. $[\![v_{\text{cause}}]\!] = \lambda Q \lambda y \lambda v \exists e[effector'(y, v) \wedge cause'(v, e) \wedge Q(e)]$

(9) a. The door opened. $[\![_{vP}$ the door $[_{v'}\ v_{\text{become}}$ [$\sqrt{\text{OPEN}}$]]]$]\!]$
$= \exists e \exists s[become'(s, e) \wedge \mathbf{open}'(\mathbf{door}', s)]$
b. Kim opened the door. $[\![_{vP}$ Kim $[_{v'}\ v_{\text{cause}}$ $[_{vP}$ the door $[_{v'}\ v_{\text{become}}$ [$\sqrt{\text{OPEN}}$]]]]]$]\!]$
$= \exists v \exists e[effector'(\mathbf{kim}', v) \wedge cause'(v, e) \wedge \exists s[become'(s, e) \wedge \mathbf{open}'(\mathbf{door}', s)]]$

- Standard evidence for decomposition comes from sublexical modifiers like *again*, *for an hour*, and *too* which seem to be able to pick out the state independent of the change:

(10) Kim opened the door again (and it had been open before).
$[_{vP}$ Kim $[_{v'}\ v_{\text{cause}}$ $[_{vP}$ the door $[_{v'}\ v_{\text{become}}$ [$\sqrt{\text{OPEN}}$ again]]]]]

#1 Such modifiers are assumed to apply to eventive/stative predicates, not measure functions:

(11) a. Kim loved peanuts again/smelled bad again/sneezed again/cried again.
b. $[\![\text{again}]\!] = \lambda P \lambda z \lambda e'''[P(z, e''') \wedge \partial \exists e''[e'' \ll e''' \wedge P(z, e'')]]$

- The same denotation could apply to stative roots as well, an attractive analysis of (10):

(12) $[\![$ [$\sqrt{\text{OPEN}}$ again] $]\!] := \lambda z \lambda e'''[\mathbf{open}'(z, e''') \wedge \partial \exists e''[e'' \ll e''' \wedge \mathbf{open}'(z, e'')]]$

#2 If roots are measure functions, the lowest attachment point of *again* would be above v_{become}.

- But this would only ensure a repetitive reading where there were two widening events:

  (13) Kim opened the door again (and she had done that before).
  [$_{vP}$ Kim [$_{v'}$ v_{cause} [$_{vP}$ the door [[$_{v'}$ v_{become} [$\sqrt{\text{OPEN}}$]] again]]]]

#3 We could posit a special *again* returning the degree x holds now, presupposing it held before.

  (14) **[**again**]** = $\lambda P[P]$, Presupposition: $\forall s \forall x \exists s' \ll s[P(x, s) = P(x, s')]$

- However, the current and prior degrees can differ, arguing against this alternative:

  (15) She widened the road again — it was built 20′, got narrowed to 15′, and now it's 30′.

#4 We could say the root is a stative predicate that says theme x holds some degree d on the scale in state s, and assume higher heads introduce comparison to the standard:

  (16) **[**$\sqrt{\text{OPEN}}$**]** = $\lambda x \lambda s \exists d[\mathbf{open}'(x, s) = d]$

- However, comparison itself must be under *again*. In a context where roads must be 50′ wide to be deemed wide and Kim is the one in charge of ensuring this, on a telic reading (e.g. with an *in* modifier) (17) means the road is 50′ at the end of the event.

  (17) [The road was built 30′ wide. Kim made it 50′ wide in one day.]
  Kim widened the road in a single day.

- Here restitutive modification requires the contextual standard to be met twice:

  (18) [The road was built 50′ wide, but got narrowed. Kim made it 50′ in one day.]
  #[The road was built 30′ wide, but got narrowed. Kim made it 50′ in one day.]
  Kim widened the road again in a single day.

- Even on restitutive readings comparison to a standard is under *again*, and thus in the root.

#5 With a maximal scale root and a telic interpretation the default comparison on resitutive readings is to the positive standard:

  (19) She straightened the rod again in five minutes, #but it is not and never was straight.

- But with open scale roots the comparison could be to a prior degree that isn't the positive standard (cp. deadjectival verbs do not in entail "become Adj"; Kennedy and Levin 2008):

  (20) [A road is built too narrow, and somehow gets narrowed even more. So Kim restores it to its previous width, albeit still too narrow.]
  She widened the road again, but it is not and never has been wide.

- Thus the comparison under *again* is to the verbal standard, not the positive standard.

#6 Yet we cannot say the verbal standard is in the root, since the root also forms adjectives, where instead the positive standard is under *again*:

  (21) The road is wide again. ≈ The road is and was above standard width.

- So the standard in the root isn't the verbal or positive standard.

Roots introduce comparison *but no specific standard*. That comes from category, scale, and context.

4 Comparison in Adjectives and Verbs

- Could it be that the verb is somehow built on a comparative adjective (cf. Bobaljik 2012), which has a meaning similar to what we're saying should be in a root?

#1 Combining *more/-er* with an adjective expresses that the absolute property degree of the subject is greater than that of the DP argument of *than*. (Here we only look at phrasal comparatives, leaving aside clausal comparatives; see Bhatt and Takahashi 2011 on the distinction.)

(22) The river is wider than the road. ≈ The degree of width of the river is greater than the degree of width of the road.

- If change-of-state were introduced directly over this structure, the reading for *widen more* should be one where the river became wider than the road, entailing (22), contrary to fact:

(23) The river widened more than the road, but the river was not wider than the road.

#2 Instead, *more* targets a difference value of how much change occurred (Hay et al. 1999), asserting it is greater than that of the *than* DP, yielding a contradiction if this is not so:

(24) #The river widened more than the road. The river increased by $3'$ and the road by $4'$.

∴ This felicity pattern indicates that (a) change-of-state verbs are not built on comparatives semantically and (b) the introduction of a higher comparison cuts off access to the property standard associated with positive adjectives.

5 Fitting a Scalar Analysis on a Decompositional Approach

- We propose roots are stative predicates that introduce comparison but *not* a specific standard, building on and expanding the analysis of Beavers and Koontz-Garboden (2020).
- $\sqrt{\text{WIDE}}$ introduces comparison to a patient/scale-specific standard $\mathbf{d}_x^{\delta}$:

(25) $[\![\sqrt{\text{WIDE}}]\!] = \lambda x \lambda s \exists d[\mathbf{wide}'(x, s) = d \wedge d \geq \mathbf{d}_x^{\text{WIDTH}}]$

- *pos* introduces the positive standard by setting root-supplied standard equal to the positive standard (where $\mathbf{d}_x^{\boldsymbol{\delta}_P}$ for scalar stative predicate P is its standard $\mathbf{d}_x^{\delta}$):

(26) $[\![pos]\!] = \lambda P \lambda x \lambda s[P(x, s) \wedge \mathbf{d}_x^{\boldsymbol{\delta}_P} = \mathbf{stnd}'_{\mathbf{pos}}(\boldsymbol{\delta}_P)]$

- Applying (26) to *wide* and taking a patient and ∃-binding s produces the following, where the ultimate interpretation depends on how we interpret the positive standard (see e.g. (4)).

(27) [[The road is [*pos* [*adj* $\sqrt{\text{WIDE}}$]]]]
= $\exists s[\exists d[\mathbf{wide}'(\mathbf{road}', s) = d \wedge d \geq \mathbf{d}_{\mathbf{road}'}^{\text{WIDTH}}] \wedge \mathbf{d}_{\mathbf{road}'}^{\text{WIDTH}} = \mathbf{stnd}'_{\mathbf{pos}}(\text{WIDTH})]$
"There is a state s in which the road holds a degree d of WIDTH at or above the positive standard for WIDTH."

- Alternatively, a comparative head (e.g. μ of Kennedy and Levin 2008: 180) applies instead of *pos*, setting the standard as the degree d' of the thing(s) the patient is being compared to.

(28) $[\![\mu]\!] = \lambda P \lambda d' \lambda x \lambda s[P(x, s) \wedge \mathbf{d}_x^{\boldsymbol{\delta}_P} = d']$

- We assume *-er/more* must apply to interpret d', either through a selected *than* PP argument (which we assume only *-er/more* takes syntactically) or a contextually defined open variable $\mathbf{d_c}$ (assuming PPs return degrees based on elliptical structures; see e.g. Wellwood 2015).

(29) a. **[***-er/more*$_1$ **]** = $\lambda P \lambda x \lambda s[P(x, \mathbf{d_c}, s)]$ (fills in d' by context)

b. **[***-er/more*$_2$ **]** = $\lambda P \lambda d' \lambda x \lambda s[P(x, d', s)]$ (saturates d')

(30) a. **[[** *-er*$_1$ [μ [*adj* $\sqrt{\text{WIDE}}$]]] **]**
= $\lambda x \lambda s[\exists d[\mathbf{wide'}(x, s) = d \wedge d \geq \mathbf{d}_x^{\text{WIDTH}}] \wedge \mathbf{d}_x^{\text{WIDTH}} = \mathbf{d_c}]$

b. **[[** [*-er*$_2$ [μ [*adj* $\sqrt{\text{WIDE}}$]]] than the field **]]**
= $\lambda x \lambda s[\exists d[\mathbf{wide'}(x, s) = d \wedge d \geq \mathbf{d}_x^{\text{WIDTH}}] \wedge \mathbf{d}_x^{\text{WIDTH}} = \mathbf{width\text{-}of\text{-}field'}]$

- Roots do not take such PPs, ruling out comparative readings.

- For verbs, v_{become} ensures there is an event of change at the end of which the theme holds a degree above the root-supplied standard and at the beginning it held a degree below it, where the root-supplied standard is in turn defined as the verbal standard. Thus v_{become}:

(31) a. introduces an event e of the coming about of s,

b. takes root P and sets P's standard at or above the verbal standard,

c. sets x's $\exists$-bound initial degree d_i below the standard,

d. and introduces an open difference degree threshhold argument d_d for d_f - d_i, and

(32) **[**v_{become} **]** = $\lambda P \lambda d_d \lambda x \lambda e \exists s \exists d_f \exists d_i[[become'(e, s)] \wedge [P(x, s) \wedge \mathbf{d}_x^{\boldsymbol{\delta}_P} \geq \mathbf{stnd'_V}(\boldsymbol{\delta}_P)] \wedge [\mathbf{R'}_P(x, init(e)) = d_i \wedge \mathbf{d}_x^{\boldsymbol{\delta}_P} > d_i] \wedge [\mathbf{R'}_P(x, s) = d_f \wedge d_f \text{ - } d_i \geq d_d]]$
(where $init$ is the intial state of e and $\mathbf{R'}_P$ is P's measure function)

- Since v_{become} entails d_f is at or above the root-supplied standard and d_i is below it it follows that $\mathbf{d}_f > d_i$, i.e. a change occurred. The root-supplied standard is in turn equated with the verbal standard, giving rise to the various readings discussed above (e.g. (6)).

(33) **[[** v_{become} $\sqrt{\text{WIDE}}$ **]]** = $\lambda d_d \lambda x \lambda e \exists s \exists d_f \exists d_i[[become'(e, s) \wedge \exists d[\mathbf{wide'}(x, s) = d \wedge d \geq \mathbf{d}_x^{\text{WIDTH}}] \wedge \mathbf{d}_x^{\text{WIDTH}} \geq \mathbf{stnd'_V}(\text{WIDTH})] \wedge [\mathbf{wide'}(x, init(e)) = d_i \wedge \mathbf{d}_x^{\text{WIDTH}} > d_i] \wedge [\mathbf{wide'}(x, s) = d_f \wedge d_f \text{ - } d_i \geq d_d]]$

- *-er/more (PP)* must apply just as above to deal with the difference value, though *-er* we assume is $\emptyset$ with no PP and *more* with a PP in the verbal domain (agreeing with Wellwood 2015 that the structure of comparison is the same across categories):

(34) a. **[[** $\emptyset$*/more*$_1$ [v_{become} $\sqrt{\text{WIDE}}$]] **]**
= $\lambda x \lambda e \exists s \exists d_f \exists d_i[[become'(e, s) \wedge \exists d[\mathbf{wide'}(x, s) = d \wedge d \geq \mathbf{d}_x^{\text{WIDTH}}] \wedge \mathbf{d}_x^{\text{WIDTH}} \geq \mathbf{stnd'_V}(\text{WIDTH})] \wedge [\mathbf{wide'}(x, init(e)) = d_i \wedge \mathbf{d}_x^{\text{WIDTH}} > d_i] \wedge [\mathbf{wide'}(x, s) = d_f \wedge d_f \text{ - } d_i \geq \mathbf{d_c}]]$

b. **[[** [*more*$_2$ [v_{become} $\sqrt{\text{WIDE}}$]] than the field **]]**
= $\lambda x \lambda e \exists s \exists d_f \exists d_i[[become'(e, s) \wedge \exists d[\mathbf{wide'}(x, s) = d \wedge d \geq \mathbf{d}_x^{\text{WIDTH}}] \wedge \mathbf{d}_x^{\text{WIDTH}} \geq \mathbf{stnd'_V}(\text{WIDTH})] \wedge [\mathbf{wide'}(x, init(e)) = d_i \wedge \mathbf{d}_x^{\text{WIDTH}} > d_i] \wedge [\mathbf{wide'}(x, s) = d_f \wedge d_f \text{ - } d_i \geq \mathbf{change\text{-}in\text{-}field'}]]$

- Applied to a patient, with the event bound, produces (for the case without a *than* PP):

(35) **[[** the road [$\emptyset$/more$_1$ [v_{become} $\sqrt{\text{WIDE}}$]]] **]**
= $\exists e \exists s \exists d_f \exists d_i [[become'(e,s) \wedge \exists d[\mathbf{wide}'(\mathbf{road}', s) = d \wedge d \geq \mathbf{d}^{\text{WIDTH}}_{\mathbf{road}'}] \wedge \mathbf{d}^{\text{WIDTH}}_{\mathbf{road}'} \geq \mathbf{stnd}'_{\mathbf{V}}(\text{WIDTH})] \wedge [\mathbf{wide}'(\mathbf{road}', init(e)) = d_i \wedge \mathbf{d}^{\text{WIDTH}}_{\mathbf{road}'} > d_i] \wedge [\mathbf{wide}'(\mathbf{road}', s) = d_f \wedge d_f \text{ - } d_i \mathbf{d_c}]]$
$\approx$ "There is an event e in which the road goes from holding some degree d_i of WIDTH below the verbal standard for WIDTH to some degree d_f of WIDTH above the verbal standard, forming a difference of at least $\mathbf{d_c}$ degrees between the two degrees."

- Finally, this analysis captures the *again* facts when *again* scopes over the root:

(36) **[[** $\sqrt{\text{WIDE}}$ again] **]** = $\lambda z \lambda e''' [\exists d[\mathbf{wide}'(z, e''') = d \wedge d \geq d^{\text{WIDTH}}_z] \wedge \partial \exists s' [s' \ll s \wedge \exists d[\mathbf{wide}'(z, e'') = d \wedge d \geq d^{\text{WIDTH}}_z]]]$

- This ensures the theme now and before held a degree above the root-supplied standard, which *adj* will fill in as the positive standard and v_{become} as the verbal standard.

6 Scales and Comparison in Causative Heads

- So far, v_{become} introduces comparison between difference values via an open difference variable, but also disallows targeting the absolute degree of the root, which is inaccessible.
- It turns out v_{cause} also seems to introduce comparison of degrees of prototypicality or quality, modelable on a scale following Kennedy and McNally (2010) and Bochnak (2010, 2013).
- Consider the following context and associated sentence:

(37) [You and I both have glasses of water; mine is an insulated cup and yours is a regular glass cup. I stick mine in the microwave, and then I stick yours in the microwave one minute later, and they finish microwaving at the same time. When I take both out, mine is cooler than yours because of the insulated cup.]

a. I heated up my drink more than yours, but your drink didn't heat up more than mine.

b. I heated up my drink more than yours, but my cup went up by 3°C and yours went up by 4°C.

- This seeming contradiction would only be possible if the causative *heat* introduces a property distinct from the difference value introduced by the inchoative.
- This is the 'goodness' of the heating, e.g. how long or how effective the event is, and *more* is asserting a greater-than ordering between the prototypicality of two events.
- This could be accommodated with an analysis of v_{cause} as follows that applies a state of the larger event having a certain quality compared to a comparison d':

(38) **[**v_{cause} **]** = $\lambda P \lambda d' \lambda y \lambda v \exists e[\mathit{effector}'(y, v) \wedge cause'(v, e) \wedge P(e) \wedge \exists d \exists s[\mathbf{quality}'(v \oplus e, s) = d \wedge d \geq d']]$

- Comparative heads as above can introduce a *than* PP targeting quality degrees to which individuals underwent changes or eliminate the argument for contextual interpretation.

- Importantly, introducing a comparison between degrees of prototypicality does not render the difference degree opaque to modification, and as such can still be targeted by *than* PPs:

  (39) [You and I both have pots of water, but the water in my pot is 10°C and the water in yours is 20°C. We put both in ovens heated to 90°C, and after an hour we check and the water in both is 90°C.]
  I heated up my water more than yours, because mine warmed up by 80°C and yours warmed up by 70°C.

- Here there's not obviously a prototypicality difference, but there's still a difference in difference degrees. So causatives allow both difference degree and quality comparison — exactly as expected since the causative embeds the inchoative on a decompositional analysis.

- Thus, among the three possible types of comparison – absolute property, difference degree, and quality – only the latter two, the verbal comparisons, can exist within the same structure and thus are mutually exclusive with the adjectival comparison.

- This suggests that nothing like a (comparative) adjective is in the structure.

7 Subject-oriented Comparison

- Borer (1991) and Kastner (2018) provide an argument for the adjectival nature of comparison. They show an asymmetry in the interpretation of *like* modifiers in deadjectival verbs.

- *Like* PPs can compare properties with adjectives or manners with activities:

  (40) a. John runs like a dog.
  b. His muscles are hard like cement.

- Inchoatives allow both manner and property comparison, but causatives just manner:

  (41) a. John reddened like a tomato.
  (means: John became red to the degree a tomato is red.)
  (also means: John became red the same way a tomato becomes red.)
  b. John reddened his face like a tomato.
  (means: John made his face red the same way a tomato becomes red.)
  (cannot mean: John made his face red to the degree a tomato is red.)

- Because (40b) has the property reading, Borer and Kastner claim it underlies all cases where the property reading is available. Thus the inchoative is deadjectival but not the causative.

- However, the facts in (41) can be successfully captured with an analysis of *like* as just a quality-modifying term. Quality scales in Kennedy and McNally (2010) were introduced to distinguish between chromatic and intensity readings of color terms like *red*.

  – Chromatic readings (e.g. *red* vs. *green*) are instances of predicating over a quality scale, as the redness of the entity is being measured relative to a prototypical concept of red.
  – Intensity readings (e.g. *more red* vs. *less red*) are instances of predicating over a property scale, e.g. measuring how much of the color the entity has.

- The reading for *redden* in (41a) is actually a chromatic reading, not an intensity reading, as *tomato* provides a chromatic standard for redness against which John is being compared. That is, the paraphrase is 'John reddened to the particular hue of red a tomato has.'
- Thus it is felicitous to assert chromatic equivalency with *like* and deny intensity equivalency:

  (42) John reddened like a tomato, but his face was still less red than (a nice, ripe) one.

- This effect can be seen with non-color terms, e.g. *harden* equivalent to *hard* in (40b).

  (43) His muscles hardened like cement, but were still less hard than some (cement).

- Thus, *like* can be given a denotation such as in (44), where it independently compares the quality of the subject in the relevant state to that of its argument.

  (44) $\textbf{[}\textit{like}\textbf{]} = \lambda x \lambda P \lambda y \lambda e[P(y,e) \wedge \exists s \exists s' \exists e'[participant'(e',x) \wedge \mathbf{quality}'(e,s) \geq \mathbf{quality}'(e',s')]]$

- *Like* mandatorily attaches high, after comparative morphology but before the surface subject, and thus asserts the prototypicality of the event the surface subject is a participant of.
  - In an inchoative with just v_{become} this is the patient, and thus the prototypicality is of the change-of-state event. Because this is tied intrinsically to the state, both manner quality and property quality readings are possible.
  - In an causative with v_{cause} this is an agent, and because v_{cause} is already asserts something about the quality of the causing event, **quality** in like is similarly constrained in its dimension of measurement. As such, property quality readings are excluded.
- In either case, the presence or absence of a property reading comes from the subject-orientedness of the modifier; it has no bearing on the question of whether there's an adjective in the structure of the causative or inchoative.

8 Root Licensed Degree Modification?

- Our claim so far is that roots introduce comparison, while functional heads introduce standards and provide access to degrees for comparative expression. However, resultatives may indicate a possible case of root-licensed degree expression:

  (45) Mary opened the door wide.

- Here *wide* indicates the final degree, which is supposedly in the root meaning.
- It is beyond our scope to provide an account of resultatives, not least because they are known to come in a wide range of types that may not all be the same construction (see e.g. Wechsler 1997, Rappaport Hovav and Levin 2001, Goldberg and Jackendoff 2004, Kratzer 2004) and are subject to a variety of scalar semantic and aspectual constraints on possible combinations (see e.g. Wechsler 2005, Beavers 2008) (see Beavers 2012b for an overview).
- However, it is unlikely that roots are providing access to the final degree here *per se*:
  - Overt degree phrases are possible with some adjectives, but the reading is a current degree with positive adjectives but a difference with comparatives:

(46) a. The rod is 10′ long ≈ The rod has a length of 10′

b. The rod is 10′ longer ≈ The rod is longer (than something) by 10′

– This suggests that access to degrees is governed by functional heads, not roots.

– Resultative modifiers are quite unique and specific to verbal constructions, allowing AdjP, PP, and NP result states that rarely occur absent verbal structure context:

(47)

resultative	**deverbal adjective**	**simple adjective**
sharpen x to a point	x is sharpened to a point	*x is sharp to a point
lengthen x to 10′	x is lengthened to 10′	*x is long to 10′
smooth x flat	x is smoothed flat	*x is smooth flat
break x open	x is broken open	N/A
open x wide	x is opened wide	x is open wide

- Whatever resultatives are, they are clearly only productively licensed in verbal contexts, and thus verbal templatic structure must play a role, licensing access to the root's final degree.

9 Conclusion

- A scalar analysis of change is possible in a decompositional approach, but classic aspects of decompositional such as sublexical scope give us insights into how best to integrate scales.
- Roots introduce absolute degree comparison, but standards and degree accessibility come from functional heads (see also Bochnak et al. 2020). Different templatic levels introduce different notions of scalarity, including difference degrees for v_{become} and quality for v_{cause}.
- An alternative might decompose the semantics of our ultimate root forms into smaller heads (perhaps like Wellwood 2015) below category heads, but the results would be equivalent.
- Analyses that build truly adjectival meaning into verbs though seem not to be correct — rather, a more stripped down core is shared between adjectives and verbs, which are thus derived equipollently despite their surface morphology.

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