Class 4
Suppletion & Containment, Bracketing Paradoxes, and Level Ordering

10/19/23

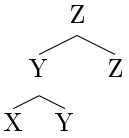
1 Suppletion and Containment

1.1 Bobaljik (2012, 2015) summary

- The central argument from Bobaljik (2012, 2015):

(1) *The Containment-Suppletion Hypothesis* (Bobaljik doesn't exactly call it this)
Given a structure like (2) where X is contained in Y and Y is contained in Z, if X suppletes in the context of Y, X suppletes in the context of Z.

(2) Containment structure:
a. Tree b. Bracketing
[[[X] Y] Z]



  - i.e., if X takes a different form in the context of Y than it does when standing alone, it will also take a different form in the context of Z.

- This hypothesis makes testable predictions about the distribution of suppletive allomorphs in paradigms involving containment:

(3) Predictions (cf. Bobaljik 2012:29, ex. (32))

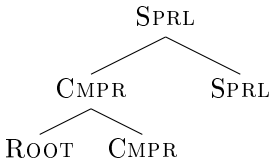
Pattern	Prediction	Description
AAA	✓	no suppletion
ABB	✓	same suppletive allomorph in the context of Y and Z
ABC	✓	different suppletive allomorphs in the context of Y and Z
ABA	✗	Y conditions a suppletive allomorph, but Z exhibits the default
AAB	?	Y exhibits the default allomorph, but Z conditions suppletion
		↪ *depends on assumptions about locality and specific structures*

- Bobaljik (2012) explores these predictions with respect to the comparative and superlative.
  → He finds them to be correct.
- Bobaljik (2015) and Smith et al. (2019) extend the analysis to other constructions.
  - These include case, number, and verbal morphology.
  - Other literature has subsequently extended *ABA to other domains (see the references in Gouskova & Bobaljik 2020).

1.2 Comparative and superlative

- Bobaljik argues that the superlative degree always morphosyntactically contains the comparative degree (4).

(4) Structure of the superlative



- He provides (at least) two arguments independent of the suppletion facts:
  1. In many languages, the affix that marks the comparative also surfaces in the superlative, alongside the superlative affix (5).

(5) Containment of the comparative morphology inside the superlative (Bobaljik 2015:5, Table 4)

Language	POS	CMPR	SPRL	Gloss
Persian	**kam**	**kam**-tar	**kam**-tar-in	'little'
Cimbrian	**šüa**	**šüan**-ar	**šüan**-ar-ste	'pretty'
Czech	**mlad**-ý	**mlad**-ší	nej-**mlad**-ší	'young'
Hungarian	**nagy**	**nagy**-obb	leg-**nagy**-obb	'big'
Latvian	**zil**-ais	**zil**-âk-ais	vis-**zil**-âk-ais	'blue'
Ubykh	**nüs°ə**	ç'a-**nüs°ə**	a-ç'a-**nüs°ə**	'pretty'

     - The superlative morpheme never(?) comes between the comparative morpheme(s) and the root, which we expect if comparative is contained inside superlative (cf. Baker 1985).

  2. The semantic denotation of the comparative is contained inside the semantic denotation of the (relative) superlative (Bobaljik 2012:96):
     - Essentially, *comparative* = '[more X than]', *(relative) superlative* = '[more X than] all (others)'
       - *Relative superlative* contrasts with *absolute superlative / elative*, meaning 'very X' (Bobaljik 2012:2).

     → Languages frequently(/obligatorily?) split the relative superlative meaning into at least two distinct morphemes, because it is "too complex" for a single morpheme.

1.3 ABB

- If the comparative conditions a suppletive allomorph distinct from the positive (the basic form of an adjective), this requires a contextual VI rule:

(6) a. ROOT ⇔ B / _CMPR]
    b. ROOT ⇔ A

- If the superlative contains the comparative (4), the context for (6a) is met also in the superlative [[**[ROOT]CMPR**]SPRL].
  → This derives the ABB pattern, which is the most common type of suppletion in Bobaljik's survey.
    - Some examples are given in (7):

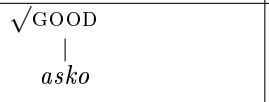
(7) Attested ABB patterns in adjective suppletion (Bobaljik 2015:3, Table 1)

Language	POS	CMPR	SPRL	Gloss
English	good	bett-er	be-st	Not applicable
	bad	worse	wor-st	Not applicable
Danish	god	bed-re	bed-st	'good'
Czech	špatn-ý	hor-ší	nej-hor-ší	'bad'
Estonian	hea	pare-m	par-im	'good'
Kildin Saami	šig'	pɛr'-am	pɛr'-mus	'good'
Basque	asko	gehi-ago	gehi-en	'many'

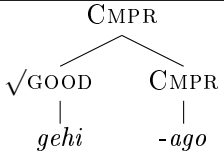
- Let's take a closer look at Basque: *asko* (A), *gehi-ago* (B), *gehi-en* (B):

(8) ABB in Basque: *asko, gehi-ago, gehi-en*

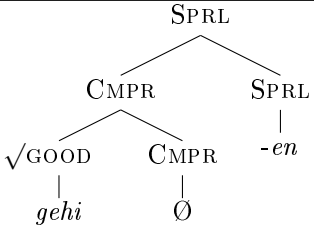
a. Positive: *asko* 'good'



b. Comparative: *gehi-ago* 'better'



c. Superlative: *gehi-en* 'best'



- To derive this ABB pattern, we need a specific rule inserting the suppletive allomorph in the context of the comparative (9a).

(9) a. √GOOD ⇔ *gehi* / _CMPR]
b. √GOOD ⇔ *asko*

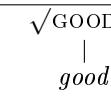
- We also need a specific rule that selects the /Ø/ allomorph of the comparative in the context of the superlative (10a).

(10) a. CMPR ⇔ Ø / _SPRL]
b. CMPR ⇔ *-ago*
c. SPRL ⇔ *-en*

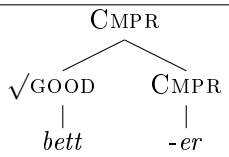
- English *good* (A) ~ *bett-er* (B) ~ *be<tt>-<e>st* (B) is parallel but a little trickier:

(11) ABB in English: *good, better, best*

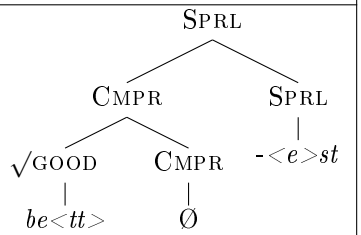
a. Positive: *good*



b. Comparative: *better*



c. Superlative: *best*



- If this worked like Basque, based on the behavior of the comparative (which has the regular comparative exponent *-er*), we should expect the superlative to be **bettest* (/bɛt-ɪst/ → *[bɛɾɪst]).

⋆ *What's going on historically?* (pieced together from https://www.etymonline.com, but there are better sources)

- Way back when, the superlative morpheme was /-st(ə)/ not /-ɪst/.

(12) a. Mod Eng *nigh* [naɪ] < Old Eng *nēah* [nɛːx]
b. Mod Eng *near* [niːr] < Old Eng *nēarra* [nɛːrə] (← /nɛːx-ra/ with pre-sonorant /x/ deletion)
c. Mod Eng *next* [nɛkst] < Old Eng *nēahsta* **[nɛːxstə]**

- Root-final /t/ deleted before the [st] cluster of the superlative suffix:

(13) a. Mod Eng *late* [leɪt] < Old Eng *læt* [læt]
b. Mod Eng *latter* [lærər] < Old Eng *lætra* [lætrə]
c. Mod Eng *last* [læst] < Old Eng *lætost* [lætəst] ∼ **[læst]** (← /læt-st/ with epenthesis or deletion)

- The same deletion rule generates *best*:

(14) a. Mod Eng NOT PRESERVED < Old Eng *bōt* [boːt] (cf. *to boot*)
b. Mod Eng *better* [bɛɾər] < Old Eng *bettra* [betrə]
c. Mod Eng *best* [bɛst] < Old Eng *beste* [bestə] (← /bet-sta/ with deletion), < earlier *betst*

→ Historically, *better* and *best* clearly have the same root.

- Can we make this work synchronically?
  - We'd have to say that there is some sort of **readjustment rule** (≈ highly morphologically-specific phonological rule) that applies in just this case, something like (15).

(15) /t/ → Ø / _SPRL / {√GOOD(, ...)}

  - ∗ On readjustment rules, see originally Halle (1990), Halle & Marantz (1993).
  - For a more recent argument in favor, see Harley & Tubino Blanco (2013).
  - For a recent historical overview and critique (in favor of stem-listing/suppletion), see Haugen (2016).
  - For an even more recent argument in favor, see Benz (2022).

- If this readjustment rule *follows* VI (which I think is standard), then we can assume a single VI rule for the comparative and superlative of √GOOD (16a).

(16) a. √GOOD ⇔ *bet* / _CMPR]
b. √GOOD ⇔ *good*

- We will additionally need a special VI for the superlative in this context, to explain the absence of the suffix-initial vowel. (We'll also need this for the alternative immediately below.)

(17) a. SPRL ⇔ *-st* / √GOOD(...)_
b. SPRL ⇔ *-est*

  - ∗ Maybe we could do this with a (morpho)phonological deletion rule to repair that specific hiatus?
  - Based on the way that readjustment rules are usually taken to be triggered (by a subsequently merged (null) morpheme), we shouldn't be able to make this change via readjustment proper.

- I find this approach (and readjustment rules, generally) icky...though Benz's (2022) analysis of French is fairly compelling.
  - The idea is that if a readjustment rule captures systemic regularities, it allows us to avoid recurrent suppletive allomorphy, which would seem to be a good thing.

1.4 ABC

→ We might as well just continue to do this with suppletion, and assume distinct (if obviously historically related) suppletive allomorphs for the comparative and superlative:

(18) a. √GOOD ⇔ *be* / _CMPR] SPRL]
b. √GOOD ⇔ *bet* / _CMPR]
c. √GOOD ⇔ *good*

- In other words, there is an additional, more specific VI rule that includes the superlative in context (18a), which blocks insertion of the moderately specific morph (18b).
  - ∗ This does, though, require the context to include two layers of morphosyntactic structure, which might start to give us pause...but we actually already needed virtually this for the *-st* allomorph, and everything from German last week.

→ This is an ABC pattern. These aren't thick on the ground (and Bobaljik doesn't treat *good, better, best* as an instance of ABC), but they do exist:

(19) Attested ABC patterns in adjective suppletion (Bobaljik 2015:4, Table 2)

Language	POS	CMPR	SPRL	Gloss
Latin	bon-us	mel-ior	opt-imus	'good'
Welsh	da	gwell	gor-au	'good'
Old Irish	maith	ferr	dech	'good'
Middle Persian	xōb	weh/wah-īy	pahl-om/pāš-om	'good'

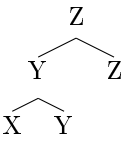
- We can simply slot the, e.g., Old Irish morphs into the frames given in (18) for English:

(20) Old Irish
a. √GOOD ⇔ *dech* / _CMPR] SPRL]
b. √GOOD ⇔ *ferr* / _CMPR]
c. √GOOD ⇔ *maith*

- The recipe for an ABC pattern for any containment relationship (22) is schematized in (21):

(21) Deriving ABC
a. X ⇔ C / _Y] Z]
b. X ⇔ B / _Y]
c. X ⇔ A

(22) Containment structure:



[[[X] Y] Z]

1.5 Fake ABA

- Bobaljik admits that this theory cannot rule out a pattern that looks like ABA:
  - The most specific rule (23a) happens to have the same exponent as the general rule (23c)
  - The intermediately specific rule has a distinct exponent (23b)

(23) (Fake) ABA
a. ROOT ⇔ **A** / _CMPR] SPRL]
b. ROOT ⇔ B / _CMPR]
c. ROOT ⇔ A

compare

(24) ABC
a. ROOT ⇔ **C** / _CMPR] SPRL]
b. ROOT ⇔ B / _CMPR]
c. ROOT ⇔ A

- Bobaljik is not concerned with this prediction: while this may be an ABA pattern in the descriptive sense, it is not an ABA pattern in the theoretical sense.

→ The A's, B's, and C's in these patterns refer to the VI *rules*, not the exponents.
  - This is an ABC pattern because there are three distinct VI rules.
  - The surface ABA distribution is accidental.

- Bobaljik hypothesizes that the general lack of ABA patterns follows from learning biases against positing homophonous VI rules of the sort in (23a) and (23c).

- However, this does vacate a lot of the predictive power of the typological generalization, because any observed ABA pattern could simply be re-cast as Fake ABA = ABC.

1.6 *ABA

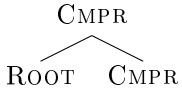
- The tools that we need in order to generate the ABB and ABC patterns (including the clarification that fake ABA is really ABC) derive the prediction that there should be no real ABA patterns.

1. If there are only two VI rules and one mentions just CMPR in the context, that specific rule will always apply in the superlative as well (ABB), blocking application of the general rule (*ABA).
2. If there are three VI rules, one specifying only CMPR and one specifying CMPR and SPRL, all three VI's will apply in the three respective contexts (ABC).

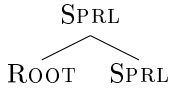
- This crucially relies on the assertion that, universally, the (relative) superlative contains the comparative.
  - If a language could building the superlative by attaching it directly to the root (i.e., without an intervening CMPR head), then this prediction would not hold:

(25) Hypothetical non-containment for superlative

a. Comparative



b. Superlative



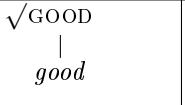
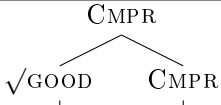
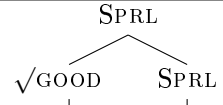
- If these were possible structures, and we had the simplified VI rules in (26) (with a specific rule only for the comparative), we could easily derive an "ABA" pattern (where the three slots continue to correspond to *positive, comparative, superlative*), as shown in (27).

(26) a. $\sqrt{\text{GOOD}} \Leftrightarrow$ *bet* / _CMPR]
  b. $\sqrt{\text{GOOD}} \Leftrightarrow$ *good*

- Rule (26a) applies only in the comparative (27b); its conditioning environment is not met in the superlative.
  - Therefore, the superlative (27c) will select the general morph (26b).

→ This would be *ABA.

(27) *ABA in non-containment *English′: *good, better,* ***goodest***

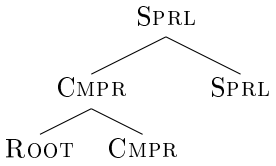
a. Positive: *good*	b. Comparative: *better*	c. Superlative: **goodest*
		

- Bobaljik's claim is that no such patterns exist, in this domain or other equivalent domains. Therefore, these domains must universally have containment structures.

1.7 AAB?

- What does this theory have to say about potential AAB patterns? It seems to predict them.
  - Take our containment structure again (28). Now apply the rule set we needed for ABC (e.g. from our ABC suppletion analysis of *good, better, best*), but get rid of the middle rule (29):

(28) Containment structure



(29) Deriving ABB

a. √GOOD ⇔ *be* / _CMPR] SPRL]
b. ~~√GOOD ⇔ *bet* / _CMPR]~~
c. √GOOD ⇔ *good*

- The doubly-specific rule in (29) is needed on independent grounds for the ABC pattern, so we shouldn't be able to rule this out as a rule set.
  - Since (29a) is too specific for the comparative, the comparative should select the general morph (29c), yielding *good, **gooder**, best* (AAB).

- Bobaljik (2012:§5.3) jumps through various hoops involving portmanteau exponence and Vocabulary Insertion into non-terminal nodes (cf. Caha 2009, Radkevich 2010, Svenonius 2012, Merchant 2015) to try to derive the absolute lack of AAB patterns in the comparative/superlative.
  - These fixes should hold across other constructions, predicting a total lack of AAB parallel to the lack of ABA.

→ But Bobaljik (2015), previewing Smith et al. (2019), shows that there are AAB patterns in other domains, especially pronouns w.r.t case and number.

- Based on this, he asserts that the solution to the distribution of AAB (none in degree adjectives, some in pronouns) is the distribution of "domain delimiting" heads (≈ phase heads?) (Bobaljik 2015:13).
  - This though makes the ABC pattern hard to get in domains where AAB is disallowed.
  - So it seems like something is wrong here...

- Zompì (2023) may have found some solutions, using a MAX/DEP system...

2 Bracketing paradoxes and Level ordering

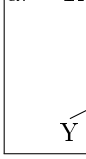
2.1 Bracketing paradoxes

- Let's start by considering again a containment structure like the one Bobaljik (2012) uses to motivate the "Containment-Suppletion Hypothesis", modified slightly as (30.i):

(30) Containment structure:

i. Parse A

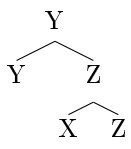
a. Tree



b. Bracketing: [[Y [X]] Z]

ii. Parse B

a. Tree



b. Bracketing: [Y [[X] Z]]

- Given the order of elements *Y-X-Z*, there is at least one additional structural parse consistent with that order (30.ii), where X combines first with Z rather than Y.

- The *a priori* availability of these distinct parses has given rise in the literature to the idea of "Bracketing Paradoxes" (31):

(31) **Bracketing paradox:**
A word where (morpho)syntactic/semantic considerations point to one constituent structure (i.e. bracketing) but (morpho)phonological considerations point towards opposite structure.

  - The concept was first introduced as such by Allen (1978) and Pesetsky (1979).
  - See Newell (2019, 2021) for a recent historical survey and a new type of analysis.

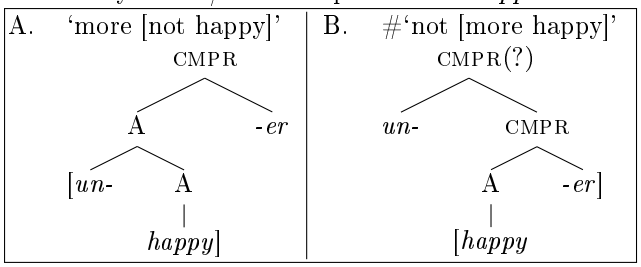
⋆ Today I'll focus on three types of bracketing paradoxes that have been claimed to exist in English.

- As Newell alludes to, it's not at all clear that "bracketing paradoxes" form a natural class of phenomena.
  → So we shouldn't necessarily expect that they should all have the same kind of solution.
- She also points out that some/all of these are only paradoxes given other theoretical assumptions.
  → Therefore, one way to dispense with the "paradoxes" is to adjust our basic assumptions, rather than come up with special mechanisms to shoehorn them into the theory.

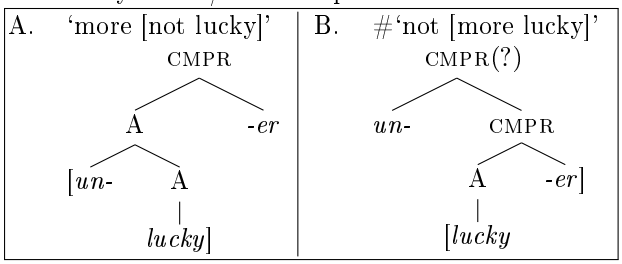
2.2 Negative comparatives: *un-ADJ-er*

- The first thing that always comes to mind when talking about bracketing paradoxes are words containing both the negative prefix *un-* and the comparative suffix *-er*, e.g. *unhappier* (32) and *unluckier* (33).
  - cf. two papers from the 1990's: Sproat (1992) *Unhappier Is Not a "Bracketing Paradox"* vs. Kang (1993) *Unhappier Is Really a "Bracketing Paradox"*

(32) Possible syntactic/semantic parses of *unhappier*



(33) Possible syntactic/semantic parses of *unluckier*



- These words always mean 'more [not ADJ]' (Parse A), never 'not [more ADJ]' (Parse B).

→ The structure in Parse A accords not only with the semantics but also with the syntactic selectional restrictions of the morphemes.
  - This *un-* prefix selects adjectives and creates an adjective.
  - The comparative suffix *-er* selects adjectives and creates a comparative adjective.

- Parse A works no matter what we assume about the category derived by *-er*, but Parse B will only work if the thing derived by *-er* is a standard-issue adjective (which it probably isn't).

2.2.1 So what's the problem?

- The received wisdom is that there are phonological restrictions on what types of bases can make a synthetic comparative, i.e. suffix *-er*.
  - ○ See Bauer, Lieber, & Plag (2013:Ch. 6.6), following Aronoff (1976:92), Rowicka (1988), and others.
  - ∗ But see Graziano-King & Cairns (2005) for a claim that what is actually important is frequency and semantic type.

- What is (claimed to be) relevant here: you can't add *-er* to a base containing more than two syllables:

(34) Base types for synthetic vs. periphrastic comparatives

Base type	Example Base	Synthetic	Periphrastic
$\leq 2\sigma$	*stupid*	✓*stupid-er*	?*more stupid*
$>2\sigma$	*intelligent*	**intelligent-er*	✓*more intelligent*

- This condition is not fully sufficient (there's many more factors determining whether $\leq 2\sigma$-bases take *-er*), but the ban on longer bases is largely correct.

⋆ So, here's the (alleged) problem:
  - ○ If we take Parse A, the base that *-er* is attaching to is $>2\sigma$, i.e. *unhappy* [ʌn.hæ.pi] or *unlucky* [ʌn.lʌ.ki], and thus should not allow *-er* suffixation.
  - ○ But if we took Parse B, where *-er* attaches to the adjective, then the base would be $\leq 2\sigma$, i.e. *happy* [hæ.pi] or *lucky* [lʌ.ki], and thus should allow *-er* suffixation.

→ The logic of the paradox: the semantics and the morphosyntactic selectional requirements favor Parse A, but the morphological or morphophonological selection requirements favor Parse B.

2.2.2 Towards a solution

- Most analyses propose some sort of operation/rule that changes one structure into the other at some point in the derivation (see Newell 2019 for a summary).

⋆ But I think everyone's been missing something really obvious:

- All $\leq 2\sigma$-bases ending in *(-)y* [(-)i] take *-er* (whether or not that ending is a suffix).
- And, crucially, there's a well-agreed upon exception to the $>2\sigma$ restriction:
  - ○ Longer adjectives that end in (the suffix?) *-y* take *-er* (35).
  - ○ (Maybe also those ending in *-ly* (36)?)

(35) Longer adjectives in *-y* that take *-er* (Rowicka 1988:141–142)
  a. *slippery* → *slipperier*
  b. *shadowy* → *shadowier*
  c. *finicky* → *finickier*
  d. *fidgety* → *fidgetier*

(36) Longer adjectives in *-ly* that (maybe) take *-er*
  a. *heavenly* → ?*heavenlier*
  b. *gentlemanly* → ?*gentlemanlier*

- As far as I can tell, all the supposed *un-ADJ-er* bracketing paradox forms end in *-y*.
  - ○ This could be encoded as a phonological restriction, along the lines of the syllable count restriction.
  - ○ Or as a morphological restriction saying that *-er* can always attach to the adjective-forming *-y* suffix (à la Fabb 1988).

→ Either way, *unhappy*, *unlucky*, etc. then **don't** contradict the morpho(phono)logical selectional requirements of *-er*, and there is no paradox: **we have Parse A all the way down**.

2.3 "Level ordering" paradoxes: *ungrammaticality*

- The second type of paradox is another one which is primarily a theory-internal problem.

2.3.1 Level ordering

- In Lexical Phonology and Morphology (LPM; Pesetsky 1979, Kiparsky 1982, Mohanan 1982, et seq.), following earlier work by Siegel (1974) and Allen (1978), affixes are divided up into two types:

(37) Types of affixes in LPM

a. **Level 1 affixes:** "stem affixes", attach earlier in the derivation
-al, *-(i)an*, *-ate*, *-ic*, *-(t)ion*, *-ity*, *-ive*, *-ous*, *-y* (N), etc.

b. **Level 2 affixes:** "word affixes", attach later in the derivation
-er (agentive), *-ful*, *-hood*, *-ism*, *-ist*, *-less*, *-like*, *-ly*, *-ness*, *-y* (Adj), etc.

- The two sets of affixes are said to map onto clear distinctions in a number of areas:

Non-phonological distinctions between Level 1 and Level 2 (in English, and generally)

1. Bases of affixation
   - Level 1 affixes can attach to free-standing words and **bound roots**: *prolif-ic*, *frag-ment*, *ed-ible*
   - Level 2 affixes attach only to free-standing words; i.e. no words like **prolif-y* or **frag-ness*

2. Order of affixation
   - Level 1 affixes can attach to a constituent headed by another Level 1 affix (38a).
   - Level 2 affixes can attach to a constituent headed by another Level 2 affix (38d).
   - Level 2 affixes can attach to a constituent headed by a Level 1 affix (38b).
   - **But:** Level 1 affixes **cannot** attach to a constituent headed by a Level 2 affix (38c).

(38) Affix ordering

a.	✓	[[[Base] **1**] **1**] (1>1):	*curi-os$_1$-ity$_1$*
b.	✓	[[[Base] **1**] **2**] (1>2):	*myst-ic$_1$-ism$_2$*
c.	✗	[[[Base] **2**] **1**] (2>1):	**affix-less$_2$-ity$_1$*
d.	✓	[[[Base] **2**] **2**] (2>2):	*affix-less$_2$-ness$_2$*

∗ **N.B.:** No (obvious) difference in syntactic categories between the affixes in the different levels, so this seems to be a truly morpho(phono)logical restriction (if true).

3. Productivity
   - Level 1 affixes are generally lexically restricted; Level 2 are fairly/fully productive.
   - Even clearer: inflectional suffixes (*-s*, *-ed*, *-ing*) are completely productive and leave virtually all stem properties intact (i.e. clearly Level 2).

4. Semantic transparency
   - Level 1 affixes may yield semantically opaque derivatives.
   - Level 2 are relatively transparent.

Phonological distinctions between Level 1 and Level 2 in English

1. Stress attraction
   - Level 1 affixes (really, suffixes) attract stress, i.e. pull it to the right (39).
     - ◇ Stress in the derivatives is equivalent to stress in monomorphemic words:
       - ▷ Stress the penult if the final is heavy,
       - ▷ Stress the antepenult if the final and penult are light.

(39) Stress attraction in Level 1

	1st/2nd syll stress in base			2nd/3rd syll stress in derivative			
a.	*phóneme*	[**fóʊ**.nim]	→	*phoném-ic*	[fə.**ní**.mɪk]	(**phónem-ic*	[**fóʊ**.ni.mɪk])
b.	*sýllable*	[**sí**.lə.bl̩]	→	*sylláb-ic*	[sə.**lǽ**.bɪk]	(**sýllab-ic*	[**sí**.lə.bɪk])
			→	*sylláb-ify*	[sə.**lǽ**.bə.faɪ]	(**sýllab-ify*	[**sí**.lə.bə.faɪ])
c.	*prósody*	[**prá**.zə.ɾi]	→	*prosód-ic*	[prə.**zá**.ɾɪk]	(**prósod-ic*	[**prá**.zə.ɾɪk])
			→	*prosód-ify*	[prə.**zá**.ɾə.faɪ]	(**prósod-ify*	[**prá**.zə.ɾə.faɪ])
d.	*prodúctive*	[prə.**dʌ́k**.tɪv]	→	*productív-ity*	[pròʊ.dʌk.**tí**.vɪ.ɾi]	(**prodúctiv-ity*	[prə.**dʌ́k**.tɪ.vɪ.ɾi])
	...*ó*H/...*ó*LL in base			...*ó*H/...*ó*LL in derivative			

   - Level 2 affixes always maintain the stress properties of their base, even if this results in an otherwise bad stress pattern (i.e. further back than ...*ó*H or ...*ó*LL). Compare:
     - ◇ Level 1 *-ity* (A → N): *productív-ity* [pròʊ.dʌk.**tí**.vɪ.ɾi] (...*ó*LL)
     - ◇ Level 2 *-ness* (A → N): *prodúctive-ness* [prə.**dʌ́k**.tɪv.nɪs] (...*óσ*H, *...*σó*H)

2. Trisyllabic shortening/"laxing"
   - Level 1 suffixes cause underlyingly long/tense diphthongs in certain positions in the base to shorten to their "vowel shift correspondents" (40).
     - ▷ (One exception: *obēse* [oʊb**iː**sɪɾi] (*[oʊb**ɛ**sɪɾi]).)
     - ◇ Similar dispreference for long vowels seen in monomorphemic words.
       - ▷ (Though there are some exceptions, e.g. *D*[oʊ]*berman*.)

(40) Trisyllabic shortening with Level 1

	Base				Derivative		
[aɪ]	*divīne*	[dəv**áɪ**n]	→	[ɪ]	*divīnity*	[dəv**ɪ́**nɪɾi]	(*[dəv**áɪ**nɪɾi])
[iː]	*serēne*	[sər**íː**n]	→	[ɛ]	*serēnity*	[sər**é**nɪɾi]	(*[sər**íː**nɪɾi])
[eɪ]	*profāne*	[prof**éɪ**n]	→	[æ]	*profānity*	[proʊf**ǽ**nɪɾi]	(*[proʊf**éɪ**nɪɾi])
[oʊ]	*verbōse*	[vərb**óʊ**s]	→	[a]	*verbōsity*	[vərb**á**sɪɾi]	(*[vərb**óʊ**sɪɾi])
[aʊ]	*profound*	[prof**áʊ**nd]	→	[ʌ]	*profundity*	[proʊf**ʌ́**ndɪɾi]	(*[proʊf**áʊ**ndɪɾi])

   - Level 2 affixes never trigger this kind of shortening (41):

(41) No shortening with Level 2

	Base			Derivative		
a.	*tīme* [t**áɪ**m]	→	*time-less-ness*	[t**áɪ**mlɪsnɪs]	(*[t**ɪ́**mlɪsnɪs])
b.	*hope* [h**óʊ**p]	→	*hope-ful-ly*	[h**óʊ**pfəli]	(*[h**á**pfəli])

3. Final clusters
   - Level 2 affixes reduce root-final clusters that are illicit in word-final position (42b), just like roots do in actual word-final position (42a).
   - Level 1 affixes, on the other hand, protect those illicit final clusters (42c).

(42) Treatment of root-final clusters in derivatives

	a. Base		b. Level 2 Derivative		c. Level 1 Derivative	
/mn/	*colu<u>mn</u>*	[kálə**m**]	*colu<u>mn</u>-like*	[kálə**m**ləik]	*colu<u>mn</u>-ar*	[kalá**mn**ər]
	autu<u>mn</u>	[ɔ́tə**m**]	*autu<u>mn</u>-y*	[ɔ́tə**mi**]	*autu<u>mn</u>-al*	[ɔtá**mn**əl]
/mb/	*bo<u>mb</u>*	[bá**m**]	*bó<u>mb</u>-er*	[ba**m**ər]	*bo<u>mb</u>-ard*	[bə**mb**árd]
/gn/	*resi<u>gn</u>*	[rizáı**n**]	*resi<u>gn</u>-ing*	[rizáı**n**ɪŋ]	*resi<u>gn</u>-ation*	[rèzɪ**gn**éɪʃən]

4. Nasal assimilation
   - Level 1 nasal-final prefixes (e.g., negative *in-*) undergo place assimilation to a base-initial consonant (43a).
   - Level 2 nasal-final prefixes (e.g., negative *un-*) **don't** (obligatorily) undergo place assimilation (43b).

(43) Nasal place (non-)assimilation in prefixes

Initial-C Place	a. Level 1 /in-/	b. Level 2 /un-/
Bilabial	*i*[**m**]*possible*	*u*[**n**]*productive*
Labiodental	*i*[**ɱ**]*fallible*	*u*[**n**]*fortunate*
Velar	*i*[**ŋ**]*credible*	*u*[**n**]*coordinated*

5. Irregular alternations
   - A number of irregular/restricted morphophonological alternations are triggered only by Level 1 affixes (44).
     - ◇ These include velar softening (44a,b), palatalization (44b–d), and assibilation (44a,e–g).

(44) Morphologically restricted alternations

a.	*opa*[k]*ue*	→	*opa*[s]*ity*
b.	*analo*[g]*(ue)*	→	*analo*[dʒ]*y*
c.	*permi*[t]	→	*permi*[ʃ]*ion*
d.	*allu*[d]*e*	→	*allú*[ʒ]*ion*
e.	*permi*[t]	→	*permi*[s]*ive*
f.	*pira*[t]*e*	→	*pira*[s]*y*
g.	*elu*[d]*e*	→	*elu*[s]*ive*

   - Level 2 affixes never trigger these alternations, **or any other alternations**:

(45) No alternations with Level 2 affixes
   a. *do*[g] ↛ **do*[dʒ]-*y* (dimin.)
   b. *nu*[d]*e* ↛ **nu*[s]-*ist*
   c. *rabbi*[t] ↛ **rabbi*[s]-*y* (Adj)

- Level 1 affixes can also trigger more suppletion-y, lexically idiosyncratic adjustments.
- Level 2 affixes always use the default allomorph.

(46) Suppletive allomorphy with Level 1

	Root	Level 2 affixation	Level 1 affixation
a.	*assume*	*assum-ing*	*assump-tion*
b.	*destroy*	*destroy-ing*	*destruc-tion*
c.	*conjoin*	*conjoin-ing*	*conjuc-tion*
d.	*maintain*	*maintain-ing*	*mainten-ance*
e.	*giant*	*giant-ish*	*gigant-ic*

Local take-aways

- There is clearly a ton of evidence for this breakdown into two groups, and it really does hold up pretty well to scrutiny.
  - However, there are some affixes, e.g. *-ize* and *-able*, that take some properties from Level 1 and others from Level 2.
  - This suggests that our model needs to be even more fine-grained than just a two-way distinction.

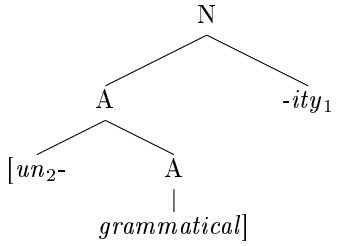
- Putting these potential problems aside for now, if we more or less buy into level ordering, the important point for bracketing paradoxes is:

(47) *Level 1 affixes combine with the stem before Level 2 affixes do.*

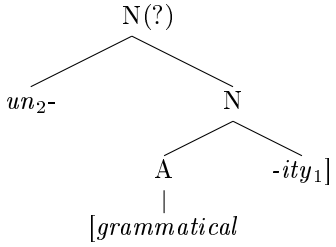
2.3.2 The problem: they don't

(48) Possible syntactic/semantic parses of *ungrammaticality*

A. 'the property of being [not grammatical]'



B. #'not [(having) the property of being grammatical]'



- In words like *ungrammaticality*, the semantics and the syntactic selectional requirements prefer attaching *un-* (a "Level 2" affix) before attaching *-ity* (a "Level 1" affix), i.e. Parse A.
  - Adhering to Level Ordering would lead us to Parse B.

- This problem is specific to theories that strongly adhere to level ordering.
  - ⋆ But not all theories of the phonology-morphology interface build in level ordering in this way:

- Fabb (1988): ordering properties purportedly derived by level ordering are insufficient to capture the distribution of affix combinations in English, and that level ordering does not add additional explanatory value beyond his proposal to encode it with affix specific attachment requirements.
- Stanton & Steriade (2014) et seq. capture the phonological properties with (clustered) affix-specific constraint rankings, which better captures the actual behavior (which doesn't fall so neatly into two groups).

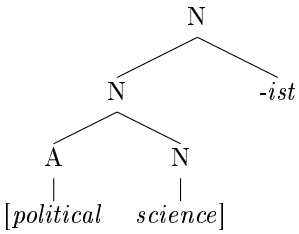
→ So, if you don't buy full-on level ordering, there is no paradox.

2.4 Compounds: *nuclear physicist*

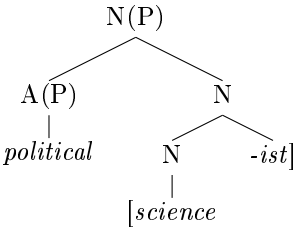
- The kind of bracketing paradox that I think is actually interesting is the kind involving compounds:
  - In a word(?)/phrase like *political scientist* (49) or *nuclear physicist* (50) there are two possible readings:

(49) Possible syntactic/semantic parses of *political scientist*

A. 'a person who studies [political science]'

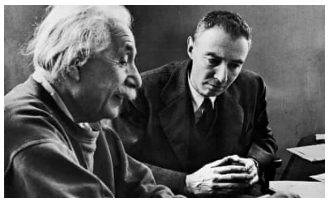


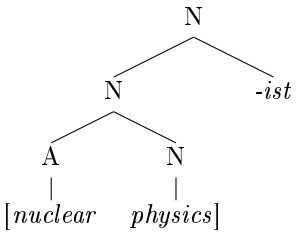
B. 'a political [person who studies science]'



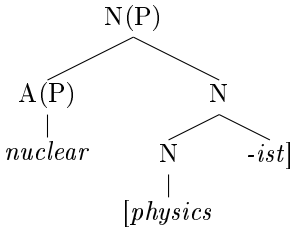
(50) Possible syntactic/semantic parses of *nuclear physicist*

A.





B.



- Many others examples (see, e.g., Beard 1991, Liberman & Sproat 1992, Cetnarowska 2019), including:

(51)
a. *theoretical linguist*
b. *criminal lawyer* (think Rudy Giuliani)
c. *moral philosopher*
d. *discrete mathematician*
e. *stand-up comedian*

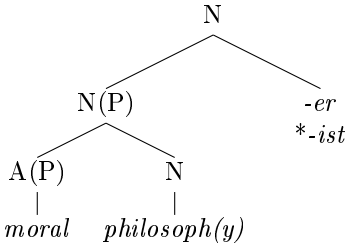
- When the semantics point to Parse B, there's no problem.
  - However, when the semantics point to Parse A...

2.4.1 What's at issue here?

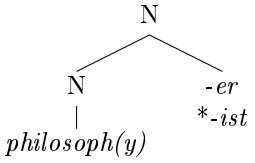
- Parse A involves the nominalizing affix attaching to a compound (or maybe it's a phrase too).
  → Nevertheless, the specific nominalizing affix *always* matches the one that would be selected for the righthand member in isolation (52–54b).

- Also, the allomorphy of the root under suffixation is always the same too:
  - *philosoph-y* → *philosoph-*, *physic-s* → *physic-*, *law-* → *lawy-*

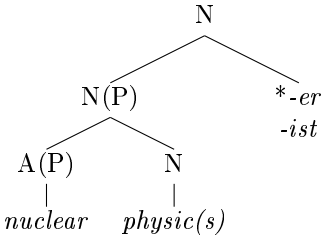
(52) a. *moral philosopher*



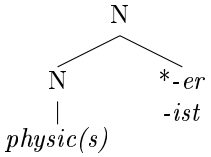
b. *philosopher* (**philosoph(y)ist*)



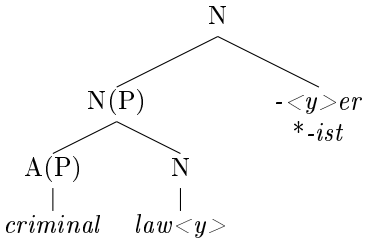
(53) a. *nuclear physicist*



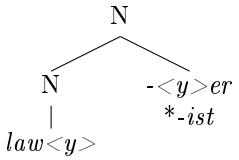
b. *physicist* (**physic(s)er*)



(54) a. *criminal lawyer* (cf. *criminal law*)

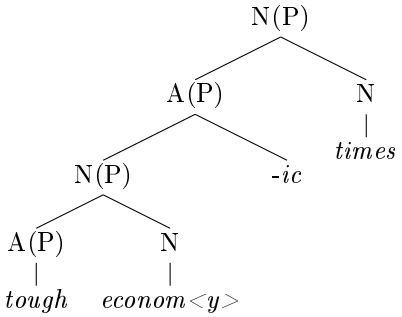


b. *lawyer* (**lawer*, **law(y)ist*)



- And here's something similar that I've seen out in the wild:

(55) [*tough econom*]*ic times* (**tough econom{-ous,-ish,-ic(-)al} times*)



  - This is additionally weird because it is (presumably) clearly affixation to a phrase and not a word.

- These are bracketing paradoxes because the suffix+head noun looks morphologically like a unit to the exclusion of the first compound member (as it truly is in Parse B), but the semantics point to Parse A.
  - Also, the suffix can affect stress on the second member but never the first, but this probably just because of the way stress attraction works (it's local).

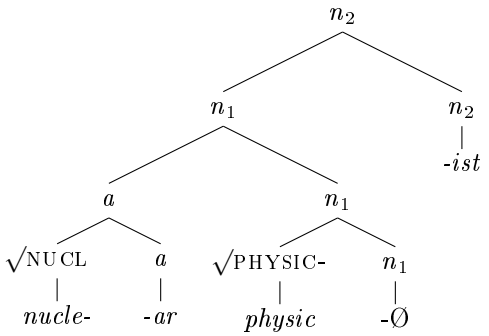
(56) *discrète màthemátics* → *discrète màthematíc-ian*

- More interesting for our purposes: the allomorphy relations between the head noun and the nominalizing affix (or adjectivizing affix for *economic*) are not disrupted by the extra layer of structure in between them.

2.4.2 What do we need to say?

- We probably want to assume an articulated structure something like (57), following recent work by (and summarized in) Harðarson (2020).
  - n and a are categorizing heads, that turn roots into nouns and adjectives, respectively.

(57) Structure of *nuclear physicist*



- Harðarson (2020) deals with compound structures just like these in Icelandic and other languages.
  - If I understand correctly, he argues that pretty much everything can condition allomorphy of everything else, contra Bobaljik (2012) and other similar proposals.

→ That does seem to be necessary in order to get things right with traditional structurally-conditioned allomorphy.
  - n_2 needs to be able to see all the way to the bottom to see √PHYSIC, in order to be spelled out as *-ist* and not, e.g., *-er*.
  - It's less problematic to say that n_1 can see n_2 since n_1('s highest segment) is sister to n_2.

⋆ In any event, this approach would need to say that the contents of n_1 have not been (fully) spelled out before n_2 is visible, since n_1 here alternates between Ø and *-s*.

- We could consider alternatives like Deal & Wolf (2017), where all members of the same spell out domain can interact transparently.
  - This could make available a *linear* analysis, where choice between synonymous nominalizers is handled using something like PRIORITY (cf. Bonet, Lloret, & Mascaró 2007, Mascaró 2007) coupled with Base-Derivative faithfulness (Benua 1997) with Lexical Conservatism (Steriade 1997).

→ If all of the allomorphs are available in the phonology, faithfulness to the existence of *physicist* could select *-ist* over *-er*.

2.4.3 Some other structures

- Here are some other structures which are at least superficially similar where irregular/suppletive allomorphy gets blocked:

(58) a. *fly out* (v.) → ✓***flied*** *out* ∼ $^{(?)}$***flew*** *out* (in baseball)
b. *grandstand* (v.) → *grand**standed*** ∼ $^{?*}$*grand**stood***
c. ***tooth**brush* (n.) (****teeth**brush*)

- All of these instances have to do with regular inflection, rather than nominalization, which is (more) derivational. So perhaps derivational allomorphy can see further down than inflectional allomorphy.

- ...But that kind of runs counter to what Bobaljik (2015) and Smith et al. (2019) say about contextual conditioning in suppletion:
  - Phase head-y things like nominalizers block contextual allomorphy but inflection-y things like Tense and Number allow allomorphy at longer distances.

- Harðarson (2020) rightly points out that compounds are an important piece of the puzzle.

2.5 Conclusions

- Compound bracketing paradoxes are really important for understanding the "ins and outs of contextual allomorphy".
- Level ordering bracketing paradoxes bear on (at least) the theory of affix ordering, because they are problematic for stratal approaches to affix order.
- Comparative paradoxes aren't really paradoxes, but they do raise interesting questions about head movement, blocking, and filters...

References

Allen, Margaret Reece. 1978. Morphological Investigations. PhD Dissertation, University of Connecticut.

Aronoff, Mark. 1976. *Word Formation in Generative Grammar* (Linguistic Inquiry Monographs 1). Cambridge, MA: MIT Press.

Baker, Mark. 1985. The Mirror Principle and Morphosyntactic Explanation. *Linguistic Inquiry* 16(3):373–415.

Bauer, Laurie, Rochelle Lieber & Ingo Plag. 2013. *The Oxford Reference Guide to English Morphology*. Oxford: Oxford University Press. doi:10.1093/acprof:oso/9780198747062.001.0001.

Beard, Robert. 1991. Decompositional Composition: The Semantics of Scope Ambiguities and 'Bracketing Paradoxes'. *Natural Language & Linguistic Theory* 9(2):195–229. doi:10.1007/BF00134676.

Benua, Laura. 1997. Transderivational Identity: Phonological Relations Between Words. PhD Dissertation, University of Massachusetts, Amherst.

Benz, Johanna. 2022. French Verbs: Decomposition and the Rules of Morpho-phonology. Talk Presented at the 2022 Princeton Phonology Forum, Princeton University, December 3, 2022. https://www.johannabenz.com/uploads/1/2/1/3/121373044/benzpphf2022.pdf.

Bobaljik, Jonathan David. 2012. *Universals in Comparative Morphology: Suppletion, Superlatives, and the Structure of Words*. Cambridge, MA: MIT Press.

———. 2015. Suppletion: Some Theoretical Implications. *Annual Review of Linguistics* 1(1):1–18. doi:10.1146/annurev-linguist-030514-125157.

Bonet, Eulàlia, Maria-Rosa Lloret & Joan Mascaró. 2007. Allomorph Selection and Lexical Preferences: Two Case Studies. *Lingua. International review of general linguistics. Revue internationale de linguistique générale* 117:903–927.

Caha, Pavel. 2009. The Nanosyntax of Case. PhD Dissertation, CASTL, University of Tromsø.

Cetnarowska, Bożena. 2019. *Compound Nouns and Phrasal Nouns in English and Polish*. Katowice: Wydawnictwo Uniwersytetu Śląskiego.

Deal, Amy Rose & Matthew Wolf. 2017. Outward-Sensitive Phonological ly Conditioned Allomorphy in Nez Perce. In Vera Gribanova & Stephanie S. Shih (eds.), *The Morphosyntax-Phonology Connection: Locality and Directionality at the Interface*, 29–60. New York: Oxford University Press. doi:10.1093/acprof:oso/9780190210304.001.0001.

Fabb, Nigel. 1988. English Suffixation Is Constrained Only by Selectional Restrictions. *Natural Language & Linguistic Theory* 6(4):527–539.

Gouskova, Maria & Jonathan David Bobaljik. 2020. Allomorphy and Vocabulary Insertion. Ms., NYU & Harvard University. (Under review in the Handbook of Distributed Morphology, Cambridge University Press).

Graziano-King, Janine & Helen Smith Cairns. 2005. Acquisition of English Comparative Adjectives. *Journal of Child Language* 32(2):345–73.

Halle, Morris. 1990. An Approach to Morphology. In Juli Carter, Rose-Marie Déchaine, Bill Philip & Tim Sherer (eds.), *Proceedings of NELS 20*, vol. 1, 150–184. Amherst, MA: GLSA.

Halle, Morris & Alec Marantz. 1993. Distributed Morphology and the Pieces of Inflection. In Ken Hale & Samuel Jay Keyser (eds.), *The View from Building 20: Essays in Honor of Sylvain Bromberger*, 111–176. Cambridge, MA: MIT Press.

Harðarson, Gísli Rúnar. 2020. On the Domains of Allomorphy, Allosemy and Morphophonology in Compounds. *Natural Language & Linguistic Theory* doi:10.1007/s11049-020-09499-3.

Harley, Heidi & Mercedes Tubino Blanco. 2013. Cycles, Vocabulary Items, and Stem Forms in Hiaki. In Ora Matushansky & Alec Marantz (eds.), *Distributed Morphology Today: Morphemes for Morris Halle*, 117–134. Cambridge, MA: MIT Press.

Haugen, Jason D. 2016. Readjustment: Rejected. In Daniel Siddiqi & Heidi Harley (eds.), *Morphological Metatheory*, 303–342. Amsterdam/Philadelphia: John Benjamins Publishing Company.

Kang, Beom-mo. 1993. Unhappier Is Really a "Bracketing Paradox". *Linguistic Inquiry* 24(4):788–794.

Kiparsky, Paul. 1982. Lexical Morphology and Phonology. In I.-S. Yang (ed.), *Linguistics in the Morning Calm*, 3–91. Seoul: Hanshin.

Liberman, Mark & Richard Sproat. 1992. The Stress and Structure of Modified Noun Phrases in English. In Ivan A. Sag & Anna Szabolcsi (eds.), *Lexical Matters* (Lecture Notes 24), 131–181. Stanford: CSLI.

Mascaró, Joan. 2007. External Allomorphy and Lexical Representation. *Linguistic Inquiry* 38(4):715–735.

Merchant, Jason. 2015. How Much Context is Enough? Two Cases of Span-Conditioned Stem Allomorphy. *Linguistic Inquiry* 46(2):273–303. doi:10.1162/ling_a_00182.

Mohanan, K.P. 1982. Lexical Phonology. PhD Dissertation, MIT.

Newell, Heather. 2019. Bracketing Paradoxes in Morphology. In Rochelle Lieber (ed.), *Oxford Encyclopedia of Morphology* (Oxford Research Encyclopedia of Linguistics). Oxford: Oxford University Press. doi:10.1093/acrefore/9780199384655.013.589.

———. 2021. Bracketing Paradoxes Resolved. *The Linguistic Review*. doi:10.1515/tlr-2021-2072.

Pesetsky, David. 1979. Russian Morphology and Lexical Theory. Generals Paper (1998 version), MIT. https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.405.566&rep=rep1&type=pdf.

Radkevich, Nina. 2010. On Location: The Structure of Case and Adpositions. PhD Dissertation, University of Connecticut.

Rowicka, Grazyna. 1988. Synthetical Comparison of English Adjectives. *Studia Anglica Posnaniensia* 20:129–149.

Siegel, Dorothy Carla. 1974. Topics in English Morphology. PhD Dissertation, MIT.

Smith, Peter W., Beata Moskal, Ting Xu, Jungmin Kang & Jonathan David Bobaljik. 2019. Case and Number Suppletion in Pronouns. *Natural Language & Linguistic Theory* 37(3):1029–1101. doi:10.1007/s11049-018-9425-0.

Sproat, Richard. 1992. Unhappier Is Not a "Bracketing Paradox". *Linguistic Inquiry* 23(2):347–352.

Stanton, Juliet & Donca Steriade. 2014. Stress Windows and Base Faithfulness in English Suffixal Derivatives. Paper presented at mfm 22 Manchester, UK.

Steriade, Donca. 1997. Lexical Conservatism. Ms., MIT. http://lingphil.mit.edu/papers/steriade/Steriade1998SICOL.pdf.

Svenonius, Peter. 2012. Spanning. Ms., CASTL, University of Tromsø.

Zompì, Stanislao. 2023. *ABA in Multidimensional Paradigms: A Max/Dep-based Account. PhD Dissertation, MIT. https://ling.auf.net/lingbuzz/007653/current.pdf.