

Two Types of States: A Cross-linguistic Study of Change-of-State Verb Roots

John Beavers*, Michael Everdell*, Kyle Jerro*, Henri Kauhanen†, Andrew Koontz-Garboden†,
Elise LeBovidge*, and Stephen Nichols†

* = The University of Texas at Austin, † = The University of Manchester

Corresponding author email: jtbeavers@utexas.edu

1 Introduction

- It is typically assumed that verb meanings consist of an “event structure” constraining the events described by the verb, consisting of (a) a template built from basic event-denoting predicates (e.g. via functional v heads; Marantz 1997) and (b) idiosyncratic roots filling in real world meanings (e.g. manner, state; Rappaport Hovav and Levin 1998):

(1) a. John flattened the rug $\approx [{}_{vP} \text{ John } [{}_{v'} v_{\text{cause}} [{}_{vP} \text{ the rug } [-en_{v_{\text{become}}} \sqrt{\text{flat}}]]]]$

b. Kim cracked a vase $\approx [{}_{vP} \text{ Kim } [{}_{v'} v_{\text{cause}} [{}_{vP} \text{ a vase } [{}_{v'} v_{\text{become}} \sqrt{\text{cracked}}]]]]$

- The template defines the verb’s lexical aspectual properties, argument structure, and regular derivational morphology; the root just determines the verb’s idiosyncratic morphology.
- An underexplored question (though see Dowty 1979, Goldberg 1995, Wechsler 2005, a.o., for related discussion) is whether there is a clean divide between meanings entailed by roots and by templates, e.g. are CAUSE and BECOME *only* introduced templatically?
- The null hypothesis is that if templates determine grammatical behavior semantically, such meanings should be excluded from roots, Embick’s (2009) “Bifurcation Thesis for Roots” (BTR) and Arad’s (2005) “Root Hypothesis” (also Borer 2005, Dunbar and Wellwood 2016).
- If this is true, then all change-of-state verbs should have the same templatic structures (e.g. that introduce an entailment of change) and when the roots of change-of-state verbs are used in templates lacking entailments of change no such reading should arise.
- We present a broad typological study into this question, focusing on the change entailment in change of state verbs, a meaning that on all approaches is templatic. We show that across languages certain root classes entail change regardless of the template, and show morphosyntactic properties indicating that they are derived in distinct ways not predicted by the BTR.
- We argue that some roots entail templatic meaning, which furthermore has grammatical effects, ultimately arguing against the BTR (Beavers and Koontz-Garboden in prep).

2 Change-of-State Roots

- As discussed, usually a change-of-state verb is built around a state-denoting root. Most accounts are inexplicit as to the precise meaning of the root; the BTR entails, however, that it is purely stative, with no templatic meaning packaged into it, such as change.
- While this may be correct for some change-of-state verbs, it is not for others (cf. Megerdoo-mian 2002, Koontz-Garboden 2006). We distinguish Dixon’s (1982) **property concept** (PC) roots (those of Levin’s 1993: 245 deadjectival change-of-state verbs) from **result roots** (those of Levin’s various non-deadjectival change-of-state verbs).

- Examples are given in (2) and (3); for the full list of roots used in our study see the appendix.

(2) **Property Concept Roots**

- Dimension*: large/big/enlarge, small/shrink/shrunken, short/shorten, ...
- Age*: old/aged/age
- Value*: bad/worsen/worse, good/improve/improved
- Color*: white/whiten, black/blacken, red/redden, green/make green, ...
- Physical Property*: cool/cool, dirty/dirty, dry/dry, wet/wetted, ...
- Speed*: fast/speed up, slow/slow down
- Human Propensity*: angry/anger, calm/calmed, sick/sicken, ...

(3) **Result Roots**

- Entity-specific Change of State*: burned/burn, melted/melt, frozen/freeze, ...
- Cooking Verbs*: cooked/cook, baked/bake, fried/fry, roasted/roast, ...
- Breaking Verbs*: broken/break, cracked/crack, crushed/crush, ...
- Bending Verbs*: bent/bend, folded/fold, wrinkled/wrinkle, creased/crease
- Verbs of Killing*: dead/killed/kill, murdered/murder, drowned/drown
- Destroying Verbs*: destroyed/destroy (ruined/ruin)
- Verbs of Calibratable Change of State*: go up, go down, ...
- Verbs of Inherently Directed Motion*: come/come, gone/go, go in, go out, ...

- There are morphological and semantic arguments that while PC change-of-state verbs are built on state-denoting roots lacking templatic entailments, result root verbs are not, contra the BTR and assumptions in the literature (e.g., Hale and Keyser 2002, Embick 2004).

We show that result roots but not PC roots entail change, violating the BTR.

3 Morphological observations

- One morphological prediction of the BTR is that barring lexical idiosyncrasy all roots of change-of-state verbs should show all of the same stative forms.
- PC roots generally show two stative adjectival forms in English, one a simple, underived adjective and one deverbal with verbalizing *-en* morphology.

- (4)
- Look at the bright picture on your left. (=camera took a bright picture)
 - Look at the brightened picture on your left. (=camera took a bad picture, brightened with e.g. software)

- Embick (2004) analyzes these as the same root occurring in two adjectivalizing contexts: one consisting of just a root with the adjectivalizing Asp head, one with verbal structure that includes also a v_{BECOME} head, i.e. a deverbal adjective:

- (5)
- Basic states (cp. Embick 2004: 363): $[_{\text{AspP}} \text{Asp } \sqrt{\text{Root}}]$
 - Result states (cp. Embick 2004: 367): $[_{\text{AspP}} \text{Asp}_R [_{vP} \text{DP } v_{\text{BECOME}} \sqrt{\text{Root}}]]$

- Crucially, with result roots there is just one morphological form, the *-en* form.

- (6) broken, chipped, cracked, crashed, crushed, fractured, ripped, shattered, smashed, snapped, splintered, split, torn, baked, barbecued, blanched, boiled, braised, ...
- Under the BTR, any stative root should appear in either of (5), yet result roots seem to not appear in (5a). (Embick 2004: 358) claims, however, that they do, but what makes result roots different is that *-ed/en* realize both Asp and Asp_R with them, while with PC roots only Asp_R is *-ed/en* and Asp is null. This is considered an accident of English morphology.

We show below that this is not an accident: this pattern recurs across languages.

4 The lexical semantics of the two kinds of roots

- The BTR gives rise to predictions about the derivatives of roots of change of state verbs:

- (7) a. Simple adjectives (e.g. *red*) will not entail prior change.
- b. Derived adjectives from deadjectival verbs (e.g. *reddened*) will entail prior change.
- c. *boiled, split, cracked*, etc., since they realize both (5a) and (5b), will not entail prior change (since in any context, the adjective could be realizing (5a)).

- The predictions in (7a,b) seem to be borne out:

- (8) a. The red dirt has never been reddened.
- b. The bright photo has never been brightened.
- (9) a. #The reddened dirt has never been reddened.
- b. #The brightened photo has never been brightened.

- The prediction in (7c) is not — such adjectives entail a change of the kind named by the verb they are derivationally related to (Koontz-Garboden 2005, 2010, Deo et al. 2011).

- (10) a. #The shattered vase has never been shattered.
- b. #The cooked chicken has never been cooked.

- NB: There are also the “derived statives” of Nedjalkov and Jaxontov (1988). However, recent work has shown these uses describe *atemporal* change along a spatial or even non-spatial scale and also that there are corresponding verbal uses as well (Gawron 2006, Deo et al. 2011, 2013), i.e. these uses are *semantically* deverbal (Koontz-Garboden 2010).

- Now, this could just be a fluke of English. Maybe some roots for some reason always require a *v_{become}* head for categorization, or something like that.

- But we also see a split in *again* modification. PC root verbs are well-known to allow both restitutive and repetitive interpretations with *again*, supposedly due to a scopal ambiguity.

- (11) John flattened the rug again.
 - a. [_{vP} John [_{v'} v_{cause} [_{vP} the rug [*-en*_{v_{become}} [\sqrt{flat} again]]]]] (restitutive)
 - b. [[_{vP} John [_{v'} v_{cause} [_{vP} the rug [*-en*_{v_{become}} \sqrt{flat}]]]] again] (repetitive)

- But as Rappaport Hovav (2010: 7) and Beavers and Koontz-Garboden (2012: 358) observe, result roots do not allow pure restitutive readings, having only a repetitive reading:

- (12) a. John thawed the meat again. (necessarily two thawings)
 b. John melted the soup again. (necessarily two meltings)
 c. John drowned the zombie again. (necessarily two drownings)

- This is very difficult to analyze on a decompositional approach.

Result and PC roots are not semantically uniform, a pattern we show occurs in other languages.

- The data above though are from English only. Could it be that these are just quirks or exceptions that do not point to a general trend? We explore this next.

5 Cross-Linguistic Study

5.1 Morphology

- Our methodology was to take a balanced language sample and check for the existence of simple statives based on the root meanings discussed above in those languages.
- We targeted the WALS 100 Language list (Dryer and Haspelmath 2013). In cases where we lacked sufficient grammatical and dictionary resources, we substituted languages from the sister WALS 200 list, and also added in a few others based on available resources or native speakers/fieldworkers. The final total was 88 languages, mostly covering the areas and families of the WALS 100, for 85 root meanings (see the appendix for lists of each).
- We collected paradigms of simple state-inchoative-causative-result state (e.g. *red-redden-redden-reddened*) for translations of the roots we examined in English, plus also any underlying root for languages in which such paradigms are based on a shared bound root:

(13)	Language	underlying root	simple state	inchoative	causative	result state
	Tenango Tzeltal	—	<i>tut</i> 'small'	<i>tut-ub</i> 'shrink'	<i>tut-ub-tes</i> 'shrink'	<i>tut-ub-en</i> 'shrunken'
	Oromo	<i>dheer-</i> 'long'	<i>dheeraa</i> 'long'	<i>dheeraddh</i> 'become long'	<i>dheeressuu</i> 'lengthen'	—

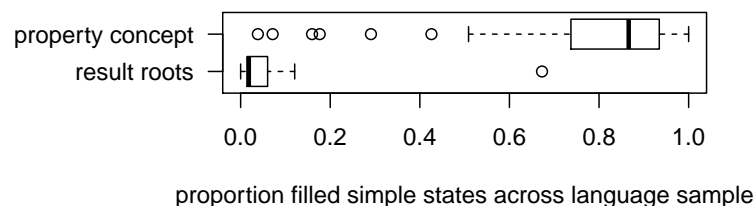
- We used the English adjectives/verbs (or equivalents in an appropriate source language for some resources) as translation terms to begin dictionary searches (looking in both directions). We did not assume all translations were perfect, just that the meanings were similar enough.
- We privileged lexicalized terms over productively derived terms, and morphologically derived terms over periphrastically derived terms, motivated by a general tendency across languages for more lexical(ized) forms to be “normal” or “default” expressions (see e.g. the literature on causatives such as Shibatani 1976, Shibatani and Pardeshi 2001, Harley 2008).
- If a form was unattested but our resources gave productive processes for deriving it, we constructed a hypothetical form (marked by @ so it could be left out of the analysis if need be). This was needed for highly agglutinating languages such as Kiowa where some dictionaries give roots and rules rather than full lists of forms (Watkins and McKenzie 1984: 153):

(14)	Language	underlying root	simple state	inchoative	causative	result state
	Kiowa		<i>ét</i> 'big'	@ <i>ét-óm-gyá</i> 'enlarge'	@ <i>ét-óm</i> 'enlarge'	@ <i>ét-dó</i> 'enlarged'

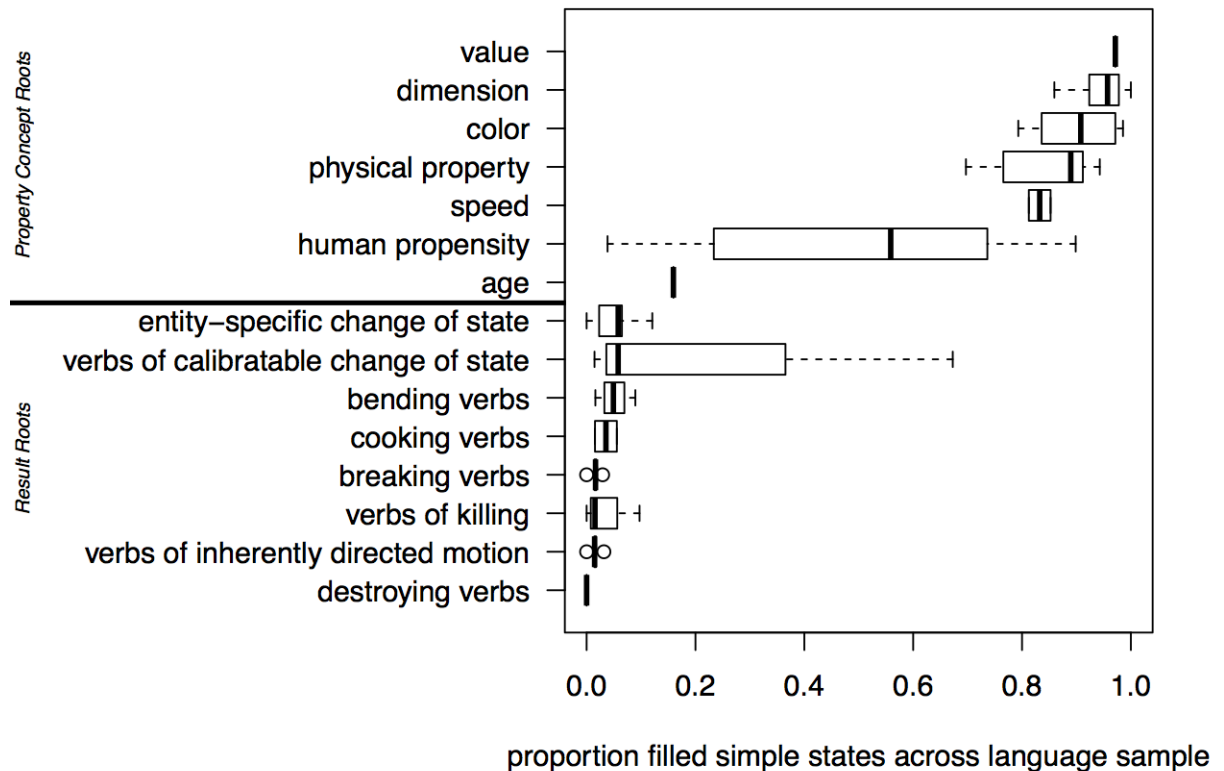
- The ultimate preference rankings for the forms we collected were:
 - (15) attested lexicalized form > attested productive morphological form > hypothetical productive morphological form > attested periphrastic form > hypothetical periphrastic form > no data
- For simple states we looked for predicative forms, including those with a possessive predicational strategy (Francez and Koontz-Garboden 2015).
- For consistency, we always took the dictionary translation seriously, e.g. if a morphologically simple stative term was translated as *broken* we actually listed it as a result state term.
- We have to date collected full data on 73 languages, and the main overall pattern holds: from a simple visual inspection it is clear PC roots overwhelmingly tend to have simple stative forms (that usually serve as input to the rest) and result roots overwhelmingly tend not to (though there are exceptions in both directions), e.g. the following is typical:

(16) Language	underlying root	simple state	inchoative	causative	result state
Tenango Tzeltal		<i>tut</i> 'small'	<i>tut-ub</i> 'shrink'	<i>tut-ub-tes</i> 'shrink'	<i>tut-ub-en</i> 'shrunken'
Tenango Tzeltal			<i>chijk</i> burn	<i>chik</i> burn	<i>chijk'-em</i> burned

- A statistical analysis confirms this, though we had to make the following assumption owing to the fact that a missing form could either be non-existent or just unattested in our resources:
 - We ignored any root meanings for which we had no data in a given language; this we assumed was not having the data (e.g. we were unable to find any data for a root meaning 'hurt' in Anejoñ, so we assumed we had a gap in the dictionary).
 - Otherwise, the methodology was to look at each remaining root and calculate for it the percentage of languages for which the simple state was attested.
 - If a root meaning corresponded to several apparent synonymys, for purposes of our statistical analysis we took one random synonym.
- We ended up with 3120 PC and 2241 result roots.
- We checked that the mean percentages of attested simple states for PC and result roots (and deviation from the mean) were significantly different. The results were striking and statistically significant (on a Mann Whitney U-test on the proportion of simple statives for PC and result roots; $p < 0.001$) (the results did not change if we threw out hypotheticals):



- We also did a similar comparison across root subclasses (and the difference was again significant on a one-way ANOVA across all subclasses; $p < 0.001$):



- Some noteworthy observations:
 - Age is the one PC root that patterns like a result root. We realized in hindsight that ‘old’ is semantically like a result root — one cannot be *old* without having started young. (*Old* is thus a rare English adjective that entails change. This is not surprising: *old* is historically deverbal, from the past participle of Old English *alan* “nourish, grow”.)
 - The other stand out is human propensity. But here there was a semantic category issue: the class is quite broad and encompasses such meanings as PC ‘angry’ and result ‘surprised’, related to whether the verbal forms are stative or eventive.
- Despite this, the trend seems clear:

(17) **The crosslinguistic morphological generalization:** State-denoting words based on result roots don’t exist in the morphological form that PC roots do. The former tend to lack simple stative forms, the latter have them.

5.2 Semantics

- To test the semantic predictions cross-linguistically we choose opportunistic in-depth studies, using Kinyarwanda and Kakataibo as case studies (see Jerro 2017 and Valle et al. 2017, respectively, both at this conference), to which we can also add the English data above.
- As a brief illustration, PC vs. result roots show the distinction regarding change entailments, and the latter resist restitutive modification, as in the following from Kakataibo:¹

¹3=third person, A=subject of transitive verb, EMPH=emphatic, FACT=factitive, INDF=indefinite,

- (18) a. *báinka ani 'ikë 'aibika uini abi ni*
 báin=ka=a ani 'ikë 'ai=bi=ka=a uini a=bi ni
 hill=VAL=3A/S big be.3.IPFV then=EMPH=VAL=3A/S INDF.PRO 3=EMPH nor
Diosabi ni uni yubë unibi anioima.
 Diosabi ni uni yubët uni=bi ani-o-i-i=ma.
 God=EMPH nor man sorcerer man=EMPH big-FACT-IPFV=PROX=NEG
 'The hill is big, but nobody nor God nor a sorcerer made it big.'
- b. **ñu nami tëakë 'ikë 'aibika uini*
 ñu nami tëa-kë 'ikë 'aibika uini
 thing flesh cut=NFUT.NMLZ be.3.IPFV then=EMPH=VAL=3A/S INDF.PRO
abi tëakëma 'ikë.
 abi tëa-kë=ma 'ikë.
 3=EMPH cut=NFUT.NMLZ=NEG be.3.IPFV
 'The meat is cut but nobody cut it.'
- (19) a. [The desert starts off dry. Then, it is made non-dry. Then it turns dry again.]
madin papanka ëdkitëkënia.
 madi=n papa=n=ka=a ëd-ki-tëkën-i-a.
 sand=POSS father=A/S=VAL=3A/S dry-INTR-ITR-IPFV=N.PROX
 'The desert is getting dry again.'
- b. [The man picks up a banana, which is edible. A wizard makes it inedible. The man fries the banana and makes it edible again.]
#uninka nodi sasakatëkënia.
 uni=n=ka=a nodi sasa-ka-tëkën-a-x-a
 man=A/S=VAL=3A/S banana fry-TR-ITR-PFV-3-N.PROX
 'The man fried the banana again.'

- **Upshot:** While PC roots behave as predicted by the BTR having a purely stative meaning, result roots always have an entailment of change, a fact that holds up across languages.

6 Conclusions and Consequences

- PC and result roots differ consistently across languages in terms of the inferences they generate and their morphological behavior. This clearly violates the BTR:
 - Under the BTR the roots of result verbs should lack entailments of change and a form based on them would have to acquire one through addition of a v_{become} head.
 - This predicts that in contexts without v_{become} the change entailment should not arise.
 - Statives are such contexts, yet the entailment is there, violating the BTR.
 - Furthermore, on the analysis consistent with the BTR *again* modifiers should have access to the root below v_{become} , but this also does not arise.
 - Morphologically, in at least *some* languages result roots should have simple stative forms, i.e. where the stativizer is null. This rarely happens, and clearly not to the degree it does with PC roots.

INTR=intransitive, IPFV=imperfective, ITR=iterative, NEG=negation, NFUT.NMLZ=non=future nominalizer, POSS=possessive, PRO=pronoun, PROX=proximate, S=subject of intransitive verb, UP=up, VAL=validational

- So what would explain these data? A simple analysis would be to assume that roots of PC verbs and result root verbs differ in that the former describe simple states and the latter states for which it is also entailed that there exist a cause:

$$(20) \quad \begin{array}{l} \text{a. } \llbracket \sqrt{\text{flat}} \rrbracket = \lambda x \lambda s [\text{flat}'(x, s)] \\ \text{b. } \llbracket \sqrt{\text{crack}} \rrbracket = \lambda x \lambda s [\text{has.fissure}'(x, s) \wedge \exists e' [\text{become}'(e', s)]] \end{array}$$

- Defining v_{become} as in (21a) and combining it with (20) derives the inchoatives in (21b,c).

$$(21) \quad \begin{array}{l} \text{a. } \llbracket v_{\text{become}} \rrbracket = \lambda P \lambda x \lambda e \exists s [\text{become}'(e, s) \wedge P(x, s)] \\ \text{b. } \llbracket v_{\text{become}} \sqrt{\text{flat}} \rrbracket = \lambda x \lambda e \exists s [\text{become}'(e, s) \wedge \text{flat}'(x, s)] \\ \text{c. } \llbracket v_{\text{become}} \sqrt{\text{crack}} \rrbracket = \lambda x \lambda e \exists s [\text{become}'(e, s) \wedge \text{has.fissure}'(x, s) \wedge \exists e' [\text{become}'(e', s)]] \end{array}$$

- The change-of-state use of the PC root only entails change by virtue of v_{become} , but the *crack* root has the entailment itself. This predicts that other uses of the root without v_{become} will give rise to the entailment, and that *again* modification, even if applying to the root alone, will still scope over an entailment of change.
- This does not capture the morphological asymmetry. However, default Spell-Out rules for Asp and v heads might explain this (overridden by root-specific rules as with *old*):

$$(22) \quad \text{Default Spell-Out for } v_{\text{become}} \text{ for root } \sqrt{R}: \\ \begin{array}{l} \text{a. If } \sqrt{R} \text{ entails change, then } -\emptyset \\ \text{b. If } \sqrt{R} \text{ does not entail change, then } -en/ed \end{array}$$

$$(23) \quad \text{Default Spell-Out for Asp:} \\ \begin{array}{l} \text{a. If } \sqrt{R} \text{ does not entail change, then } -\emptyset \\ \text{b. If } \sqrt{R} \text{ entail change, then } -en/ed \end{array}$$

- This has a functional motivation: the two categories are unmarked for opposite meanings.
- However, these rules go against the grain of standard event structural approaches, whereby regular morphological rules should not be sensitive to root semantics. Yet it seems clear that the pattern governing the overt realization must be contingent on root semantics, suggesting the overall correctness of our analysis, arguing against that aspect of event structural theories.
- In sum, the root carries an entailment that can be elsewhere introduced templatically, and it can matter grammatically. This is inconsistent with the BTR.

7 Acknowledgments

- This material is based upon work supported by the National Science Foundation under grant no. BCS-1451765.
- We aim to have all of the data collected online in a searchable database sometime in the coming months, with a bibliography and additional information about the methodology and results.

A Roots and Languages

- Here is the full list of root meanings, including synonyms we considered. These served as target terms for dictionary searches. The assumption was not that the translations would be perfect; rather, our goal was to target many root meanings within the same broader classes.

(24) Property Concept

- Dimension*: large/big/enlarge, small/shrink/shrunk, short/shorten, long/lengthen, deep/deepen, wide/widen, tall/height/heighten
- Age*: old/aged/age
- Value*: bad/worsen/worse, good/improve/improved
- Color*: white/whiten, black/blacken, red/redden, green/make green, blue/make blue, brown/make brown
- Physical Property*: cool/cool, cold/make cold, warm/warm, hot/heat up, dirty/dirty, dry/dry, wet/wetted, straight/straighten, hard/harden (tough/toughen), soft/soften, tight/tighten, clear/clear, clean/clean, smooth/smooth, sharp/sharpen, sweet/sweeten, weak/weaken, strong/strengthen
- Speed*: fast/speed up, slow/slow down
- Human Propensity*: angry/anger, calm/calmed, scared/scare (frightened/frighten), sick/sicken, sad/sadden (depressed/depress), hurt/hurt, tired/tire, embarrassed/embarrass, entertained/entertain, surprised/surprise, worried/worry, pleased/please

(25) Result Roots

- Entity-specific Change of State*: burned/burn, melted/melt, frozen/freeze, decayed/decay (rotten/rot), swollen/swell, grown/grow, bloomed/bloom (flowered/flower, blossomed/blossom), withered/wither (wilted/wilt), fermented/ferment, sprouted/sprout (germinated/germinate), rusted/rust, tarnished/tarnish
- Cooking Verbs*: cooked/cooked (baked/bake, fried/fry, roasted/roast, steamed/steam), boiled/boil
- Breaking Verbs*: broken/break, cracked/crack, crushed/crush, shattered/shatter, split/split, torn/tear (ripped/rip), snapped/snap
- Bending Verbs*: bent/bend, folded/fold, wrinkled/wrinkle, creased/crease
- Verbs of Killing*: dead/killed/kill, murdered/murder, drowned/drown
- Destroying Verbs*: destroyed/destroy (ruined/ruin)
- Verbs of Calibratable Change of State*: go up (raised/rise, ascended/ascend, increased/increase, gained/gain), go down (fallen/fall, dropped/drop, descended/descend, decreased/decrease, declined/decline)
- Verbs of Inherently Directed Motion*: come/come, gone/go, go in (entered/enter), go out (exited/exit), returned/return

- Here is the full of list languages we investigated (those marked with * were not included in our preliminary statistics):²

²All macroareas and genetic affiliations are taken from WALS. Each language is listed with its genus and family, except where those are the same.

Eurasia Basque (Basque)

*Burmese (Burmese-Lolo, Sino-Tibetan)

Mandarin (Chinese, Sino-Tibetan)

*Meithei (Kuki-Chin, Sino-Tibetan)

*Burushaski (Burushaski)

*Chukchi (Northern Chukotko-Kamchatkan, Chukotko-Kamchatkan)

English (Germanic, Indo-European)

German (Germanic, Indo-European)

Modern Greek (Greek, Indo-European)

Persian (Iranian, Indo-European)

Russian (Slavic, Indo-European)

Spanish (Romance, Indo-European)

French (Romance, Indo-European)

Hindi (Indic, Indo-European)

Finnish (Finnic, Uralic)

Georgian (Kartvelian)

Modern Hebrew (Semitic, Afro-Asiatic)

Japanese (Japanese)

*Kannada (Southern Dravidian, Dravidian)

Khalkha (Mongolic, Altaic)

Korean (Korean)

Lezgian (Lezgian, Nakh-Daghestanian)

Thai (Kam-Tai, Tai-Kadai)

Turkish (Turkic, Altaic)

Vietnamese (Viet-Muong, Austro-Asiatic)

Africa Acholi (Nilotic, Eastern Sudanic)

*Egyptian Arabic (Semitic, Afro-Asiatic)

Middle Atlas Berber (Berber, Afro-Asiatic)

*Hausa (West Chadic, Afro-Asiatic)

Harar Oromo (Lowland East Cushitic, Afro-Asiatic)

Gújjolaay Eegimaa (Bak, Niger-Congo)

Swahili (Bantoid, Niger-Congo)

*Kinyarwanda (Bantoid, Niger-Congo)

Zulu (Bantoid, Niger-Congo)

Sango (Ubangi, Niger-Congo)

Yoruba (Defoid, Niger-Congo)

Khoekhoe (Khoe-Kwadi)

Koyraboro Senni (Songhay)

Malagasy (Barito, Austronesian)

North America Plains Cree (Algonquian, Algic)
Hopi (Hopi, Uto-Aztecan)
Yaqui (Cahita, Uto-Aztecan)
Jakaltek (Mayan)
Tenango Tzeltal (Mayan)
Karok (Karok)
Kiowa (Kiowa-Tanoan)
Koasati (Muskogean)
*Kutenai (Kutenai)
Lakhota (Core Siouan, Siouan)
Chalcatongo Mixtec (Mixtecan, Oto-Manguean)
*Mezquital Otomí (Otomian, Oto-Manguean)
Navajo (Athapaskan, Na-Dene)
Oneida (Northern Iroquoian, Iroquoian)
Rama (Rama, Chibchan)
Yup'ik (Eskimo, Eskimo-Aleut)
Zoque (Mixe-Zoque)

South America Barasano (Tucanoan)
Carib (Cariban)
Guaraní (Tupi-Guaraní, Tupian)
Minica Huitoto (Huitoto, Huitotoan)
Kakataibo (Cashibo-Cacataibo, Panoan)
Mapudungun/Mapuche (Araucanian)
*Mocoví (South Guaicurán, Guaicurán)
Paumarí (Arauan)
Huallaga Quechua (Quechuan)
Warao (Warao)
*Yagua (Peba-Yaguan)

Papunesia Alamblak (Sepik Hill, Sepik)
Kwoma (Middle Sepik, Sepik)
Anejom (Oceanic, Austronesian)
Bariai (Oceanic, Austronesian)
Fijian (Oceanic, Austronesian)
Hawaiian (Oceanic, Austronesian)
Chamorro (Chamorro, Austronesian)
Indonesian (Malayo-Sumbawan, Austronesian),
Paiwan (Paiwan, Austronesian)
Tagalog (Greater Central Philippine, Austronesian)
Lower Grand Valley Dani (Dani, Trans-New Guinea)

Kewa (Engan, Trans-New Guinea)
Koiari (Koiarian, Trans-New Guinea)
Daga (Dagan)
*Oksapmin (Oksapmin)

Australia Gooniyandi (Bunuban)
Kayardild (Tangkic, Tangkic)
Martuthunira (Western Pama-Nyungan, Pama-Nyungan)
Pintupi (Western Pama-Nyungan, Pama-Nyungan)
*Murrinh-Patha (Murrinh-Patha, Southern Daly)
Tiwi (Tiwian)

References

- Arad, Maya. 2005. *Roots and Patterns: Hebrew Morpho-Syntax*. Dordrecht: Springer.
- Beavers, John and Andrew Koontz-Garboden. 2012. Manner and result in the roots of verbal meaning. *Linguistic Inquiry* 43(3):331–369.
- Beavers, John and Andrew Koontz-Garboden. In prep. *The Meaning of Verbal Roots and the Roots of Verbal Meaning*. Unpublished Ms., The University of Texas at Austin and The University of Manchester.
- Borer, Hagit. 2005. *Structuring Sense, Vol. I and II*. Oxford: Oxford University Press.
- Deo, Ashwini, Itamar Francez, and Andrew Koontz-Garboden. 2011. The morphosemantics of *-ed*. Paper presented at Dimensions of grammar in honor of Paul Kiparsky. Konstanz, August 3, 2011.
- Deo, Ashwini, Itamar Francez, and Andrew Koontz-Garboden. 2013. From change to value difference in degree achievements. In *Proceedings of Semantics and Linguistic Theory 23*, pages 97–115. Ithaca, NY: CLC Publications.
- Dixon, R.M.W. 1982. *Where have all the adjectives gone?*. The Hague: Mouton.
- Dowty, David. 1979. *Word meaning and Montague grammar*. Dordrecht: D. Reidel Publishing.
- Dryer, Matthew S. and Martin Haspelmath, eds. 2013. *WALS Online*. Leipzig: Max Planck Institute for Evolutionary Anthropology.
- Dunbar, Ewan and Alexis Wellwood. 2016. Addressing the “two interface” problem: Comparatives and superlatives. *Glossa* 1(1):1–29.
- Embick, David. 2004. On the structure of resultative participles in English. *Linguistic Inquiry* 35(3):355–392.
- Embick, David. 2009. Roots, states, and stative passives. Talk given at the 2009 Roots Workshop, Stuttgart.
- Francez, Itamar and Andrew Koontz-Garboden. 2015. Semantic variation and the grammar of property concepts. *Language* 91.3.
- Gawron, Jean Mark. 2006. Paths and scalar change. Unpublished Ms., San Diego State University, dated May 18, 2006.
- Goldberg, Adele E. 1995. *Constructions: A Construction Grammar Approach to Argument Structure*. Chicago, IL: University of Chicago Press.
- Hale, Kenneth L. and Samuel Jay Keyser. 2002. *Prolegomenon to a Theory of Argument Structure*. Cambridge, MA: MIT Press.

- Harley, Heidi. 2008. On the causative construction. In S. Miyagawa and M. Saito, eds., *The Handbook of Japanese Linguistics*, pages 20–53. Oxford: Oxford University Press.
- Jerro, Kyle. 2017. Change-of-state verb roots in Kinyarwanda. Paper presented at the Linguistic Society of America 91st Annual Meeting, Austin, TX.
- Koontz-Garboden, Andrew. 2005. On the typology of state/change of state alternations. *Yearbook of Morphology* 2005:83–117.
- Koontz-Garboden, Andrew. 2006. The states in changes of state. In press Proceedings of the 32nd annual meeting of the Berkeley Linguistics Society.
- Koontz-Garboden, Andrew. 2010. The lexical semantics of derived statives. *Linguistics and Philosophy* 33:285–324.
- Levin, Beth. 1993. *English verb classes and alternations*. Chicago, IL: University of Chicago Press.
- Marantz, Alec. 1997. No escape from syntax: Don't try morphological analysis in the privacy of your own lexicon. In *Proceedings of the 21st Annual Penn Linguistics Colloquium*, vol. 4.2 of *University of Pennsylvania Working Papers in Linguistics*, pages 201–225.
- Megerdooomian, Karine. 2002. *Beyond words and phrases: A unified theory of predicate composition*. Ph.D. thesis, University of Southern California, Los Angeles, CA.
- Nedjalkov, Vladimir P. and Sergej Je. Jaxontov. 1988. The typology of resultative constructions. In V. P. Nedjalkov, ed., *Typology of resultative constructions*, pages 3–62. Amsterdam: John Benjamins.
- Rappaport Hovav, Malka. 2010. Building scalar changes. The Hebrew University of Jerusalem.
- Rappaport Hovav, Malka and Beth Levin. 1998. Building verb meanings. In M. Butt and W. Geuder, eds., *The Projection of Arguments: Lexical and Compositional Factors*, pages 97–133. Stanford: CSLI Publications.
- Shibatani, Masayoshi. 1976. The grammar of causative constructions: A conspectus. In M. Shibatani, ed., *The Grammar of Causative Constructions*, pages 1–39. New York: Academic Press.
- Shibatani, Masayoshi and Prashant Pardeshi. 2001. The causative continuum. In M. Shibatani, ed., *The Grammar of Causation and Interpersonal Manipulation*, pages 85–126. Amsterdam: John Benjamins.
- Valle, Daniel, John Beavers, and Andrew Koontz-Garbodden. 2017. States and change-of-state in kakataibo: The role of the root. Paper to be presented at the Society for the Study of the Indigenous Languages of the Americas.
- Watkins, Laurel J. and Parker McKenzie. 1984. *A grammar of Kiowa*. Studies in the Anthropology of North American Indians. Lincoln / London: University of Nebraska Press.
- Wechsler, Stephen. 2005. What is right and wrong about little-*v*. In M. Vulchanova and T. A. Åfarli, eds., *Grammar and Beyond — Essays in Honour of Lars Hellan*, pages 179–195. Oslo: Novus Press.