

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

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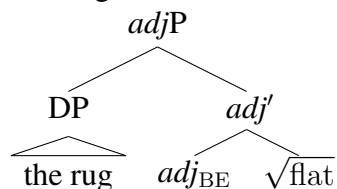
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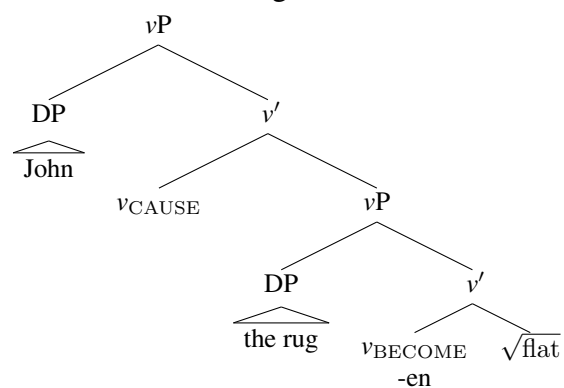
1 Introduction

- 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 heads like v , adj ; Marantz 1997) and (b) idiosyncratic roots filling in real world meanings (e.g. manner, state; Rappaport Hovav and Levin 1998):

(1) a. The rug is flat.



b. John flattened the rug.



- 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 (by v)?
- Many people assume a clean divide, Embick’s (2009) “Bifurcation Thesis for Roots” (BTR) and Arad’s (2005) “Root Hypothesis” (also Borer 2005, Dunbar and Wellwood 2016), so that if there’s change in a verb meaning there must be a v_{become} plus its concomitant syntax.
- If this is true, then all change-of-state verbs should have the same templatic structures (e.g. that introduce an entailment of change like (1b)) and when the roots of change-of-state verbs are used in templates lacking entailments of change like (1a) 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 roots, it is not for others (cf. Megerdooian 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

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

(3) Result Roots

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

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

- Embick (2004: 363, 367) analyzes these as the same root occurring in two adjectivalizing contexts: one consisting of just a root with the adjectivalizing *adj* head, one with verbal structure that includes also a *v_{become}* head, i.e. a deverbal adjective:

- (5) a. Basic states: [_{adjP} DP [_{adj'} *adj*_{be} $\sqrt{\text{Root}}$]] (e.g. *bright*)
 b. Result states: [_{adjP} *adj*_{be} [_{vP} DP *-en*_{v_{become}} $\sqrt{\text{Root}}$]] (e.g. *brightened*)

- 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 *adj_{be}* is always marked (*-ed/en*) with result roots but it's null in (5a) for PC roots but marked for (5b). 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 PC roots (e.g. *reddened*) will entail prior change.
 c. Result root adjectives will not entail prior change (owing to the (5a) reading).
- 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 cooked chicken has never been cooked.
 b. #The shattered vase has never been shattered.
- 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 [- $en_{v_{\text{become}}}$ [$\sqrt{\text{flat}}$ again]]]]] (restitutive)
 b. [[_{vP} John [_{v'} v_{cause} [_{vP} the rug [- $en_{v_{\text{become}}}$ $\sqrt{\text{flat}}$]]]] 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 drowned the zombie again. (necessarily two drownings)
 b. John thawed the meat again. (necessarily two thawings)
 c. John melted the soup again. (necessarily two meltings)

- 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 World Atlas Language Structures (WALS) 100 Language list (Dryer and Haspelmath 2013). If we lacked sufficient grammatical and dictionary resources, we substituted languages from the sister WALS 200 list, and added in a few others based on available resources or native speakers/fieldworkers. The total was 88 languages, mostly covering the areas and families of the WALS 100, for 85 root meanings (see 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>dheer-aa</i> 'long'	<i>dheer-addh</i> 'become long'	<i>dheer-essuu</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

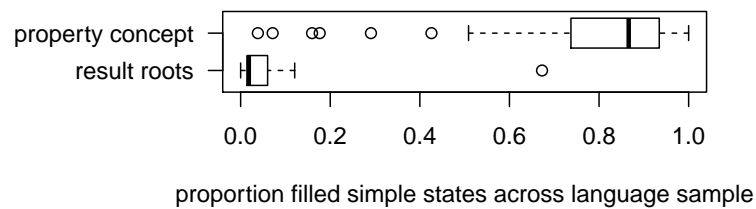
- For simple states we looked for predicative forms, including those with a possessive predicational strategy (Francez and Koontz-Garboden 2015).
- To place the forms of a root in the paradigm we could use either morphology or translation. We did both: we used translation to classify something into a cell in the paradigm, e.g. if a stative term was translated ‘broken’ we listed it as a result state term. But we also coded morphological relationships between forms based on Haspelmath (1993) (labile, suppletive, equipollent, derived from/input to, unrelated) plus information about the specific forms to be able to reconstruct a morphological classification. Rarely though was there a semantics/morphology mismatch.
- 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)

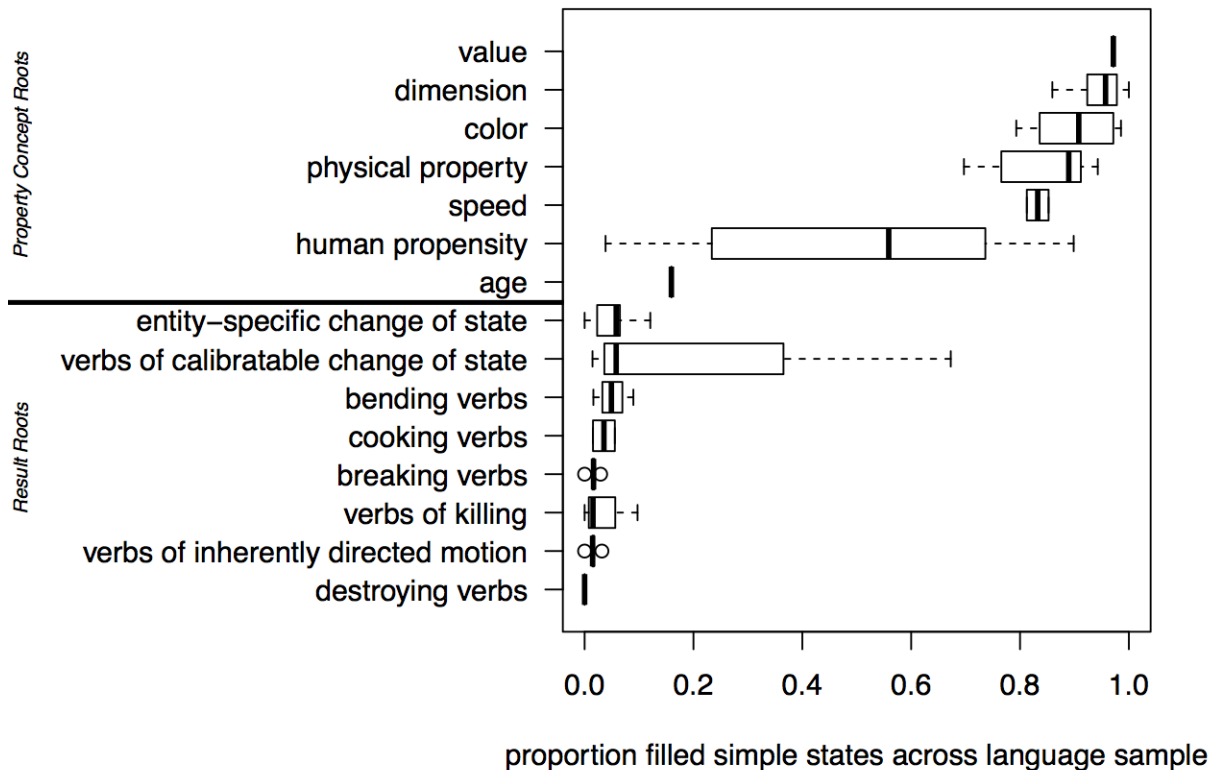
Language	underlying root	simple state	inchoative	causative	result state
Tenango Tzeltal		<i>tut</i> 'small'	<i>tut-ub</i> 'shrink'	<i>tut-ub-tes</i> 'shrink'	<i>tut-ub-en</i> 'shrunken'
Tenango Tzeltal			<i>chijk'</i> burn	<i>chik'</i> burn	<i>chijk'-em</i> burned

- A statistical analysis confirms this, though we had to make the following assumptions 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 3,120 PC and 2,241 result root paradigms, for a total of 5,361 paradigms. Each paradigm had 5 cells for a total of 26,805 possible forms, of which $\approx 17,500$ were filled.
- We then checked to see if 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 states 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. Here there was a semantic category issue: the class is quite broad and encompasses many transitive forms that were purely stative (e.g. experiencer subject verbs like *fear*) and derived forms that did not obviously fit the semantic patterns we set out to find.

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. It is thus not an accident of English.

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), 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

(17) 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.’

(18) 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.]

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

#*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:
 - The BTR predicts total semantic and morphological parallelism between PC and result roots.
 - Yet result roots but not PC roots lack simple stative forms.
 - Furthermore, PC roots are dissociable from entailments of change, unlike result roots.
- 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:

- (19) a. $[[\sqrt{\text{flat}}]] = \lambda x \lambda s [flat'(x, s)]$
“*x* is in a state *s* of flatness”
b. $[[\sqrt{\text{crack}}]] = \lambda x \lambda s [has.fissure'(x, s) \wedge \exists e' [become'(e', s)]]$
“*x* is in a state *s* of having a fissure and that arose from some event *e*”

- Defining v_{become} as in (20a) and combining it with (19) derives the inchoatives in (20b,c).

- (20) a. $[[v_{become}]] = \lambda P \lambda x \lambda e \exists s [become'(e, s) \wedge P(x, s)]$
“*x* is in a state *P* and that came about because of event *e*”
b. $[[v_{become} \sqrt{\text{flat}}]] = \lambda x \lambda e \exists s [become'(e, s) \wedge flat'(x, s)]$
“*x* is in a state of flatness and that came about because of event *e*”
c. $[[v_{become} \sqrt{\text{crack}}]] = \lambda x \lambda e \exists s [become'(e, s) \wedge has.fissure'(x, s) \wedge \exists e' [become'(e', s)]]$
“*x* is in a state of having a fissure and that came about because of event *e* and there’s some event *e'* that caused it come about”

- 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 $\sqrt{\text{crack}}$ 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 *adj* and *v* heads might explain this (overridden by root-specific rules as with *old*):

- (21) Default Spell-Out for v_{become} for its complement root \sqrt{R} :
- a. If \sqrt{R} entails change, then $-\emptyset$
 - b. If \sqrt{R} does not entail change, then $-en/ed$
- (22) Default Spell-Out for adj_{be} for its complement XP (root \sqrt{R} or vP):
- a. If XP does not entail change, then $-\emptyset$
 - b. If XP entails change, then $-en/ed$

- 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.
- The deeper question is *why* this split should exist at all, and why consistently across broad meaning category types. Here we believe there is a kind of conceptual explanation: there are kinds of states out there which are conceived of as just occurring naturally, and another type which are conceived of as being the outcome of processes.
- Given that the latter involves a type of meaning we call “change” that figures into the grammars of languages independently (e.g. in the existence of v_{become} heads), it is not inconceivable that those roots would show patterning like the functional elements absent the functional elements themselves.

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.

(23) Property Concept

- a. *Dimension*: large/big/enlarge, small/shrink/shrunken, short/shorten, long/lengthen, deep/deepen, wide/widen, tall/height/heighten
- b. *Age*: old/aged/age
- c. *Value*: bad/worsen/worse, good/improve/improved

- d. *Color*: white/whiten, black/blacken, red/redden, green/make green, blue/make blue, brown/make brown
- e. *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
- f. *Speed*: fast/speed up, slow/slow down
- g. *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

(24) **Result Roots**

- a. *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
- b. *Cooking Verbs*: cooked/cooked (baked/bake, fried/fry, roasted/roast, steamed/steam), boiled/boil
- c. *Breaking Verbs*: broken/break, cracked/crack, crushed/crush, shattered/shatter, split/split, torn/tear (ripped/rip), snapped/snap
- d. *Bending Verbs*: bent/bend, folded/fold, wrinkled/wrinkle, creased/crease
- e. *Verbs of Killing*: dead/killed/kill, murdered/murder, drowned/drown
- f. *Destroying Verbs*: destroyed/destroy (ruined/ruin)
- g. *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)
- h. *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

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)

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

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, Algonquian)

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 Alambak (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)

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