

# State/change of state lability and the meaning of verbhood\*

Change of State Verbs – Empirical and Theoretical Perspectives  
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## 1 Lexical category and lexical semantics

Lexical categoryhood (aka “part of speech”) is among the most important and vexed issues in linguistics (Givón 1984; Croft 1991; Hengeveld 1992; Bhat 1994; Wetzer 1996; Stassen 1997; Croft 2001; Beck 2002; Baker 2003; Baker and Croft 2017).

### **Traditional question:**

Do lexical categories correspond to universal semantic categories?

### **Traditional answer:**

Major parts of speech correspond to notional categories:  
Verbs (prototypically) describe (transient) actions, nouns (time-stable) things, etc.  
(see e.g., Givón 1984, but similarly Langacker 1987).

Such ideas are often criticized for lack of clear articulation of key notions, and the ready availability of counterexamples (e.g., stative verbs don’t predicate actions, some nouns describe actions, etc.; see Newmeyer 1998; Baker 2003; von Stechow and Matthewson 2008; Baker and Croft 2017).

MAIN IDEA: Shift attention away from the search for a universal/one-to-one semantics underlying the categories. Search instead for constraints on the meaning/category relation (see Koontz-Garboden 2012, Francez and Koontz-Garboden 2017:Chapter 5).

**Our focus:** *property concept lexemes* (Dixon 1982; Thompson 1989)  
i.e. lexemes expressing the descriptive content of English adjectives

Crosslinguistically, property concept lexemes vary in their category and are often realized as nouns or verbs, as discussed extensively in the typological literature (Dixon 1982; Thompson 1989; Hengeveld 1992; Bhat 1994; Wetzer 1996; Stassen 1997; Beck 2002; Baker 2003).

**Today:** Can we learn anything about the lexical semantics of verbhood from contrasting verbal encoding of property concept lexemes with non-verbal encoding?

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**Yes:** There is a systematic difference in the derivational relationship of change of state verbs from associated property concept lexemes that correlates with whether the source property concept lexeme is verbal in category.

**Verbs are the only lexical category that relates individuals to events.**

Part of what it means to be a verb, as opposed to an adjective or noun, is to be able to relate individuals to dynamic events (i.e., can denote sets of individual/event pairs, individual/event triplets, etc). This is not all verbs do, but only verbs can do this.

**Outline:**

§2 Property concept lexemes

§3 A typological study

§4 Discussion and implications

§5 Concluding remarks

## 2 Property concept lexemes

Property concept lexemes are lexemes expressing the descriptive content of English adjectives, including the 36 concepts below:

- (1) Property concept meanings data collection based on for Verbal Roots database
  - a. *Dimension*: large/big, small, short, long, deep, wide, tall/height
  - b. *Age*: old, young
  - c. *Value*: bad, good
  - d. *Color*: white, black, red, green, blue, brown
  - e. *Physical Property*: cool, cold, warm, hot, dirty, dry, wet, straight, hard/tough, soft, tight, clear, clean, smooth, sharp, sweet, weak, strong
  - f. *Speed*: fast, slow

In the following, we provide a brief typological overview of the lexical category of property concept lexemes, and their morphophonological relation to their respective change of state forms.

### 2.1 Lexical categories

Crosslinguistically, property concept lexemes vary regarding their basic lexical category (Dixon 1982, Stassen 1996).

#### Adjectival

In some languages such as English, property concept lexemes belong to an adjectival class that is distinct from both nouns and verbs.

- (2)
  - a. The metal is flat.
  - b. the flat metal
  - c. \*The metal flats.
  - d. \*the flat of the metal

## Nominal

In other languages, such as Hausa, property concept lexemes are typically nominal ('abstract nouns of sensory quality' (Parsons 1955), i.e they exhibit the morphosyntactic properties of other nouns in the language (e.g., occurring in possessive constructions to express the same kind of meaning that an English adjective does with copula predication):

- (3) Hausa
- a. *Munà dà karf̄.*  
we.CONT with strength  
'We are strong.' (Newman 2000:224)
- b. *Yārin yā tanà dà zōbè.*  
girl she.CONT with ring  
'The girl has a ring.' (Newman 2000:222)

## Verbal

Finally, there are languages in which many property concept lexemes are verbs, e.g., Tongan (Churchward 1953, Koontz-Garboden 2007):

- (4) Tongan
- a. *'Oku loloa ho 'ulu.*  
IMP long your hair  
'Your hair is long.'
- b. *'Oku lea 'a Pita.*  
IMP speak ABS Pita.  
'Pita speaks.' (Churchward 1953:37)

However, languages may also show category splits, e.g. verbal and adjectival property concept lexemes in Daakaka (von Prince 2015), or show multiple strategies to encode the same property concept, e.g. Edo (Baker and Stewart 1997; cf. Dixon 1982, Stassen 1997, van Lier 2017).

- (5) Daakaka
- a. *Sini ma kekei.*  
green.pigeon REAL small  
'The green pigeon is small' (von Prince 2015:259)
- b. *Vyantē ente mw=i bur.*  
person DEM REAL=COP deaf  
'This person is deaf.' (von Prince 2015:131)
- (6) Édò
- a. *Èmèrí m̀sè.*  
Mary be.beautiful  
'Mary is beautiful.'
- b. *Èmèrí \*(ye) m̀sè.*  
Mary COP beautiful  
'Mary is beautiful.' (Baker and Stewart 1997:33)

**Crosslinguistically, property concepts can be lexicalized as various parts of speech.**

## 2.2 Direction of derivation between state and change of state

There is often morphology deriving a word describing a state into a word describing a change into that state (or vice versa; Koontz-Garboden 2005:94-99).

Depending on the kind of state (i.e., property concept state or result state), there are differences in direction of derivation (see Beavers et al. 2021 for a typologically robust demonstration).

- (7) a. Kim's face is *red*  
 b. Kim's face *reddened* with anger.
- (8) a. The vase is *broken*.  
 b. The vase *broke*.

In the context of property concept lexemes, three derivational relationships can be identified:

### Equipollent

The first derivational type is equipollent, where both stative and change of state are derived from a common root, as for example in Ulwa (also Hebrew; Doron 2003:61)

- (9) Ulwa (Hale and Keyser 2002:122-123; Koontz-Garboden 2009)
- | root   | state            | (intrans) COS    |               |
|--------|------------------|------------------|---------------|
| sang-  | sang- <b>ka</b>  | sang- <b>da</b>  | 'green/blue'  |
| yûh-   | yûh- <b>ka</b>   | yûh- <b>da</b>   | 'long, tall'  |
| baras- | baras- <b>ka</b> | baras- <b>da</b> | 'black, dark' |

### Change of state derived from state

In the second derivational type, the stative form is morphophonologically less marked than the change of state form.

- (10) Warlpiri (Hale and Keyser 1998:93)
- |    | <u>Noun</u> | <u>(intrans) COS</u> |       |
|----|-------------|----------------------|-------|
| a. | wiri        | wiri- <b>jarri-</b>  | 'big' |
| b. | maju        | maju- <b>jarri-</b>  | 'bad' |
- (11) English
- |    | <u>Adjective</u> | <u>(intrans) COS</u> |
|----|------------------|----------------------|
| a. | red              | redd- <b>en</b>      |
| b. | hard             | hard- <b>en</b>      |
| c. | damp             | damp- <b>en</b>      |
| d. | dark             | dark- <b>en</b>      |

### Labile

The final derivational type is labile, i.e., where there is no surface morphophonological difference between state and change of state lexemes (this might, in at least some languages, not be derivation at all, but this is a separate issue, see Koontz-Garboden 2005, 2007).

- (12) Tongan
- a. 'Oku **loloa** ho 'ulu.  
 IMP long your hair  
 'Your hair is long.'
- b. 'Oku **loloa** vave ho 'ulu.  
 IMP long fast your hair  
 'Your hair is quickly **getting** long.'
- (Koontz-Garboden 2007:117)

This pattern has been noted in the typological and descriptive literature, usually with the differences in meaning observed in the context of different aspectual marking on the polysemous word (e.g., Bybee et al. (1994:75-76), Tatevosov (2002:340ff.), Talmy (1985:92), Smith (1997:70), and Wetzler (1996:189) Chung and Timberlake (1985:217)).

- (13) Mandarin
- a. *malu hen kuan*  
road very wide  
'The road is very wide.'
- b. *malu kuan-le*  
road wide-PERF  
'The road widened' (Tham 2013:653)
- (14) Mokilese
- a. *Pahrangkije pe pwespwespwes*  
iron still warm(PROG)  
'This piece of iron is still warm.'
- b. *Ih lioas-ka*  
he angry-PERF  
'He got angry.' (Chung and Timberlake 1985:238)
- (15) Lao
- a. *?khòj5 kamlang2 suung3*  
1SG PROG tall  
'I am being/getting tall.' (Enfield 2003:7)
- b. *?khòj5 daj0 suung3*  
1SG ACHV tall  
'I was/got to be tall.' (Enfield 2003:6)

As aspectual marking typically occurs on verbal predicates, all examples above come from languages with verbal property concepts lexemes.

**Property concept lexemes can vary in their derivational relation between stative and change of state form.**

### 2.3 A correlation?

So far as we have been able to tell based on convenience sampling lability is common where property concept lexemes are described as being verbs rather than nouns or adjectives.

**Hypothesis:**  
Property concept state/change of state derivational relations are more likely to be labile when the state is verbal than when it is either adjectival or nominal in category.

## 3 Typological study

To investigate this hypothesis in a more systematic way, we conducted a typological study based on two underlying considerations:

Firstly, we must look at a set of lexemes describing particular property concept states and their derivation into words describing the associated COS across a representative set of languages.

Secondly, we must recognize that the issue we are interested in is not one of languages writ large, but rather **individual lexemes**, some of which might show overt derivation and some not in any particular language. (I.e., we are doing lexical typology, cf. Koptjevskaja-Tamm et al. 2015)

- (16) a. The metal was flat.  
 b. The metal flatt-**en**-ed.
- (17) a. The road was narrow.  
 b. The road narrow-ed.

### 3.1 Data

The database “Verbal Roots Across Languages” (<https://verbal-roots.la.utexas.edu>) was designed to systematically investigate the morphological derivational relationship between stative lexemes and their semantically related change of state lexemes crosslinguistically (see Beavers et al. 2018):

- The database includes information on 88 languages of the WALS 100 language list (Dryer and Haspelmath 2013), mostly covering the areas and families of the WALS 100, covering 72 root meanings.

For the purposes of the discussion here, we examine only the 36 property concept ones:

- (18) Property concept meanings data collection based on for Verbal Roots database
- Dimension*: large/big/enlarge, small/shrink/shrunken, 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

- For each property concept root, the database lists a paradigm of simple state-intrans COS-trans COS-result state (e.g. *red-redden-redden-reddened*) for translations of (19), plus also any underlying root for languages in which such paradigms are based on a shared bound root:

(19)

Language	underlying	simple state	intrans COS	trans COS	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'	—

- The database contains 3365 paradigms with data of some kind based on PC roots, from which we extracted all property concepts in all languages in which there was at least one labile paradigm.
- As the database does not include information on the lexical category, we extracted such information from one of the original sources listed.
- After excluding all cells that were marked as hypothetical, or for which we could not find a lexical category, we ended up with the following distribution (see Appendix 1 for a detailed description of the methodology):

## 3.2 Raw data

Table 1: Lability in state/COS by category of the state

	noun	adjective	verb	total
labile	3	51	190	244
non-labile	13	219	177	409
<b>total</b>	<b>16</b>	<b>270</b>	<b>367</b>	<b>653</b>
lability	19%	19%	52%	37%

Table 2: Lability in state/COS by category of the state (source discrepancies)

	noun/ adjective	adjective/ verb	verb/ noun	total
labile	0	2	0	2
non-labile	19	2	2	23
<b>total</b>	<b>19</b>	<b>4</b>	<b>2</b>	<b>25</b>
lability	0%	50%	0%	8%

## 3.3 Analyses & Results

We fit a Bayesian mixed effects logistic regression model to the data compiled as above with labile (1) and non-labile (0) as the outcome variable.<sup>1</sup>

The category of the property concept state was included as a fixed effect, and language included as a random effect on both the intercept and this slope.

Figure 1 shows the estimated log odds of lability for each category (verb, noun, adjective).

- The dot for each category represents the best estimate for the log odd of lability.
- The bars represent the uncertainty around this estimate: they represent the range in which the value falls with 90% probability.
- If the best estimate for adjectives and nouns falls outside this interval for verbs, we can say that there is  $< 0.05$  probability that their log odds of lability are as high as that of verbs. I.e., there is a greater than 95% probability that verbs have higher lability.

⇒ This is the case.

⇒ There is a greater than 95% probability that verbs are more likely to show lability.

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<sup>1</sup>The model was be fitted using STAN via *brms* (Bürkner 2017). A weakly informative prior was employed for the effects of category (normal distribution with a mean of 0 and a standard deviation of 20). The default LKJ prior with shape parameter 1 was used for the random effects. As in a small number of cases multiple categories were reported, our estimates are made by collapsing together 4000 iterations for each of 20 versions of the dataset (a single category was chosen for each of the ambiguous datapoints in each).

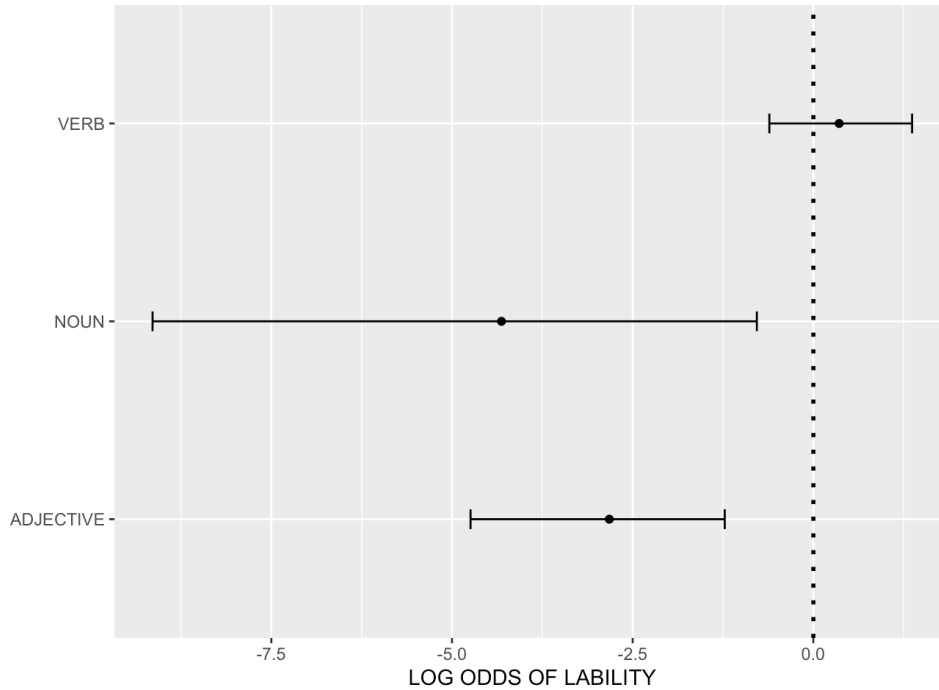


Figure 1: The log odds of lability for each category (verbal, nominal, adjectival) with 90% credible intervals.

**The data support the following generalization:**

For a given state  $\phi$  and a change into that state  $\psi$ ,  
 $\phi$  and  $\psi$  are significantly more likely to show a labile derivation if  $\phi$  is a verb.

## 4 Discussion and implications

Why should state/COS derivation be sensitive to category in this way?

Our explanation has two parts:

- 1 Change of state meanings are dynamic and therefore necessarily verbal.
- 2 Both category change and change of state can manifest as overt derivation.

### 4.1 Some assumptions and explanation

We believe asymmetry in morphological behavior follows from relatively uncontroversial (but non-trivial) assumptions about the lexical semantics of nouns, adjectives, and verbs.

- (20) The domain: different sorts of e-type objects
- a. Ordinary individuals
  - b. Mereologically ordered portions (sets of which are the denotations of mass nouns)
  - c. events (=dynamic eventualities)
  - d. states (=stative eventualities)



- (21) Some assumptions about word meanings
- a. **Nouns** denote sets of entities of any sort—individuals (e.g., *dog*), portions (e.g., *water*, *strength*), events (e.g., *exam*—see below), mixtures thereof (e.g., *thing*)
  - b. **Adjectives** denote contextually-sensitive sets of individuals (Kamp 1975; Klein 1980), degree relations (Cresswell 1977; von Stechow 1984; Heim 1985) (or measure functions if the degree-based theory is cast instead in that fashion, Kennedy 1997), or sets of stative eventualities (Wellwood 2015).
  - c. **Verbs** thematically relate individuals to eventualities, whether dynamic (events) or not (states).

(21a) is mostly uncontroversial. It is standardly assumed since at least Montague (1973) and is the foundation of work on generalized quantifier theory (Barwise and Cooper 1981), for example.

(21b) is obviously an open question; however the key point is that on no theory do they relate individuals to *dynamic* eventualities (as verbs can).

(21c) depends very much on your theoretical starting point. Some kind of event semantics seems by now orthodoxy in the syntax/semantics interface literature. But which kind exactly impacts very much what kind of meaning verbs have:

- Davidsonian: Verbs denote relations between individuals and events.
- Neo-Davidsonian: Verbs denote sets of events with arguments and associated thematic roles introduced as modifiers.
- Compositional event semantics (Champollion 2015): Verbs denote sets of properties of events. Arguments introduced in neo-Davidsonian fashion.

Which exact view doesn't really matter for our purposes.<sup>2</sup>

**Main idea**  
Only verbs can relate individuals to dynamic eventualities.

I.e., only verbs can denote:

- individual/event pairs (intransitive eventive verbs),
- individual/individual/event triples (transitive eventive verbs),
- individual/individual/individual/event 4-tuples (ditransitive eventive verbs), etc.

(Or, if you sever the external argument, then only verbs can relate an object to an event, an indirect object to an event, etc.)

This restriction is **unidirectional**: A particular kind of meaning must be lexicalized as a verb, but verbs can have other meanings as well.

In other words, verbhood  $\neq$  dynamicity. Verbs describe not only changes, but states as well, as is the case for property concept verbs (among other stative verbs).

<sup>2</sup>Couching our proposal within a neo-Davidsonian account is more complicated, but doable.

## 4.2 Inchoativization and category change

**Observation:** Change of state predicates are always **verbal**.

(They might be verbs, or light verb constructions, but the change of state core is always verbal.)

Bearing this in mind, there are two separate things happening when a change of state verb is derived from a noun or an adjective, which are often conceptually lumped together:

- Inchoativization (change in meaning, from state to change of state)
- Category change (from N or A to V)

We know that these are independent of one another, among other reasons, since there exist inchoatives that are overtly derived from (stative) property concept verbs.

Such a derivation is found in Washo (Hokan/isolate, USA), where all property concept lexemes are verbs, and where change of state predicates are derived from them with the suffix *-étiʔ*:

- (22) a. *baŋáya wa-yák'aš-i*  
outside STAT-be.warm-IND  
'It's warm outside.'
- b. *baŋáya wa-yák'aš-étiʔ-i*  
outside STAT-be.warm-**INCH**-IND  
'It's getting warm outside.' (online Washo Archive)
- (23) a. *di-Lóyaw-i*  
1-be.mad-IND  
'I'm angry'
- b. *di-Lóyaw-étiʔ-i*  
1-be.mad-**INCH**-IND  
'I got angry' (online Washo Archive)

What we see from this is that inchoativization can happen **independent of category change**.

There are also cases where we see overt **verbalization prior to inchoativization**.

This happens with bound property concept roots in Washo, which must be verbalized by the suffix *-iʔ* (Jacobsen 1964; Hanink and Koontz-Garboden 2021).

Here we find that the inchoativizing suffix *-étiʔ* appears outside the verbalizing morphology:

- (24) a. *dewdiʔiš ʔilc'ác'im-iʔ-i*  
tree 3.green-**VBL**-IND  
'The tree is green'
- b. *dewdiʔiš ʔilc'ác'im-iʔ-étiʔ-i*  
tree 3.green-**VBL-**INCH****-IND  
'The tree is getting green' (online Washo Archive)

### Upshot

Category change and inchoativization are two separate processes at play in state/COS derivation.

This explains the predominance of labile derivational relations with verbal property concept lexemes, and the lack thereof with nouns and adjectives

- Change of state is dynamic (if not necessarily temporally so; Sweetser 1997; Gawron 2009; Koontz-Garboden 2010; Deo et al. 2013), and therefore can only be expressed verbally.
- If change of state can only be verbal, then it follows that to derive a change of state from a nominal or adjectival property concept lexeme, both inchoativization **and** category change are implicated—two processes which can be marked independently in the morphology.
- Category change is *not*, however, implicated in the derivation of change of state from verbal property concept lexemes. Only inchoativization is.
- Supposing that category changing derivations (see Štekauer et al. 2012) and inchoativization are subject to morphological marking, it follows that change of state verbs derived from verbal property concept lexemes are less likely to be morphologically marked, since they only undergo inchoativization, rather than both inchoativization and category change.

Because only verbs can relate individuals to dynamic eventualities, category change is a necessity in COS from underlying nominal and adjectival property concept lexemes.

## 5 Concluding remarks

Does lexical category have consequences for lexical semantics? **Yes.**

**Verbs are the only lexical category that relates individuals to events.**

From this it follows that labile derivational relationships between state and change of state predicates are much more likely when the state is lexicalized as a verb.

This is because no category changing derivation is required in the derivation of the change of state, by contrast with derivations from nouns or adjectives.

### Potential counterexamples?

Non-verbs which appear at first glance to relate an individual to a dynamic event:

- **Non-intersective modification** of the *beautiful dancer* type (Siegel 1976).

If we adopt Larson’s (1998) semantic analysis, it entails modification prior to nominalization with the event argument existentially bound at the DP level.

The issue becomes more complicated for e.g., *beautiful chef*. (Possibly this can fall out of a more general solution to coercion in modification, e.g., *a fast motorway*, see Bücking and Maienborn 2019 and references).

- **Deverbal nominalization**

- (25) a. Kim’s exam lasted an hour. *result noun*  
 b. Kim’s telling of the story took ages. *nominal gerund*

Only nominalizations derived from verbs have argument structure (Alexiadou and Grimshaw 2008, cf. Borer 2013); it is the underlying verb that relates an individual to an event.

At the level of nominalization, the meaning is a set of events (that can be related to a possessor).

Deverbal nouns (and nouns generally) do not denote individual/event pairs.

- **Deverbal adjectives**

- (26) a. The door was open.  
b. The door was open-ed.

Parallel to the case of nominalization above, deverbal adjectives that entail a dynamic event are derived from a verbal core. In contrast, purely stative deverbal adjectives do not (Kratzer 2000, Embick 2004, Alexiadou and Anagnostopoulou 2008, Alexiadou et al. 2015; cf. Beavers et al. 2021).

Deverbal adjectives (and adjectives generally) do not denote individual/event pairs, but denote sets of states (or individual/state pairs).

### **Outstanding questions:**

- How to analyze the labile pattern?

Null morphology? Coercion (Koontz-Garboden 2007)? Multiple sources, as in Matthewson et al. (2015)? Two different senses?

- Do the observations entail crosslinguistic variation in the lexical semantics of property concept lexemes?

How might that interact with other established variation in their lexical semantics (e.g., tied to degrees, Beck et al. 2010; Bochnak 2015; Bowler 2016 or to qualities, Francez and Koontz-Garboden 2017)?

Answering this question depends on resolving the analysis of the polysemy.

## **References**

- Alexiadou, Artemis. 2001. *Functional structure in nominals: nominalization and ergativity*. Amsterdam: John Benjamins.
- Alexiadou, Artemis, and Elena Anagnostopoulou. 2008. Structuring participles. In *Proceedings of the 26th West Coast Conference on Formal Linguistics*, ed. Charles B. Chang and Hannah J. Haynie, 33–41. Somerville, MA: Cascadilla Proceedings Project.
- Alexiadou, Artemis, Elena Anagnostopoulou, and Florian Schäfer. 2015. *External arguments in transitivity alternations: A layering approach*. Oxford: Oxford University Press.
- Alexiadou, Artemis, and Jane Grimshaw. 2008. Verbs, nouns and affixation. In *Incremental Specification in Context 01*, ed. Florian Schäfer, 1–16. Working Papers of the SFB 732.
- Anagnostopoulou, Elena, and Yota Samioti. 2013. Domains within words and their meanings: A case study. In *The syntax of roots and the roots of syntax*, ed. Artemis Alexiadou, Hagit Borer, and Florian Schäfer, 81–111. Cambridge: Cambridge University Press.
- Baker, Mark, and William Croft. 2017. Lexical categories: Legacy, lacuna, and opportunity for functionalists and formalists. *Annual Review of Linguistics* 3. URL <http://dx.doi.org/10.1146/annurev-linguistics-011516-034134>.
- Baker, Mark C. 2003. *Lexical categories: Verbs, nouns, and adjectives*. Cambridge: Cambridge University Press.
- Baker, Mark C., and Osamu Yim. 1997. Unaccusativity and the adjective/verb distinction: Edo evidence. *Proceedings of the 27th North East Linguistics Society (NELS57)* 33–47.
- Barker, Chris. 1995. *Possessive descriptions*. Stanford, CA: CSLI Publications.
- Barwise, Jon, and Robin Cooper. 1981. Generalized quantifiers and natural language. *Linguistics and Philosophy* 159–219.

- Beavers, John, Michael Everdell, Kyle Jerro, Henri Kauhanen, Andrew Koontz-Garboden, Elise LeBovidge, and Stephen Nichols. 2018. States and changes-of-state: A cross-linguistic study of the roots of verbal meaning. Unpublished ms., The University of Texas at Austin, University of Essex, University of Konstanz, University of Manchester, University of Washington.
- Beavers, John, Michael Everdell, Kyle Jerro, Henri Kauhanen, Andrew Koontz-Garboden, Elise LeBovidge, and Stephen Nichols. 2021. States and changes-of-state: A crosslinguistic study of the roots of verbal meaning. *Language* 97:439–484.
- Beck, David. 2002. *The typology of parts of speech systems: The markedness of adjectives*. Outstanding Dissertations in Linguistics. New York: Routledge.
- Beck, Sigrid, Sveta Krasikova, Daniel Fleischer, Remus Gergel, Stefan Hofstetter, Christiane Savelsberg, John Vandereist, and Elisabeth Villalta. 2010. Crosslinguistic variation in comparison constructions. *Linguistic Variation Yearbook* 9:1–66.
- Bhat, D.N.S. 1994. *The adjectival category: Criteria for differentiation and identification*. John Benjamins.
- Bochnak, M. Ryan. 2015. The degree semantics parameter and cross-linguistic variation. *Semantics and Pragmatics* 8:1–48.
- Borer, Hagit. 2013. *Taking Form: Structuring Sense, vol. III*. Oxford: Oxford University Press.
- Bowler, Margit. 2016. The status of degrees in Warlpiri. In *Proceedings of The semantics of African, Asian and Austronesian Languages 2*, ed. Mira Grubic and Anne Mucha, 1–17. Potsdam: Universitätsverlag Potsdam.
- Bücking, Sebastian, and Claudia Maienborn. 2019. Coercion by modification—the adaptive capacities of event-sensitive adnominal modifiers. *Semantics and Pragmatics* 12.9.
- Bürkner, Paul-Christian. 2017. brms: An r package for bayesian multilevel models using stan. *Journal of statistical software* 80:1–28.
- Bybee, Joan, Revere Perkins, and William Pagliuca. 1994. *The evolution of grammar: Tense, aspect, and modality in the languages of the world*. Chicago, IL: University of Chicago Press.
- Champollion, Lucas. 2015. The interaction of compositional semantics and event semantics. *Linguistics and Philosophy* 38:31–66.
- Chung, Sandra, and Alan Timberlake. 1985. Tense, aspect, and mood. In *Language typology and syntactic description*, ed. Timothy Shopen, volume 3, 202–258. Cambridge: Cambridge University Press.
- Churchward, C. Maxwell. 1953. *Tongan grammar*. London: Oxford University Press.
- Cresswell, Max. 1977. The semantics of degree. In *Montague grammar*, ed. Barbara Partee, 261–292. Academic Press.
- Croft, William. 1991. *Syntactic categories and grammatical relations: The cognitive organization of information*. Chicago, IL: University of Chicago Press.
- Croft, William. 2001. *Radical construction grammar: Syntactic theory in typological perspective*. Oxford: Oxford University Press.
- 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*, 97–115. Ithaca, NY: CLC Publications.
- Dixon, R.M.W. 1982. *Where have all the adjectives gone?: And other essays in semantics and syntax*. The Hague: Mouton.
- Doron, Edit. 2003. Agency and voice: The semantics of Semitic templates. *Natural Language Semantics* 11:1–67.
- Dowty, David. 1989. On the semantic content of the notion ‘thematic role’. In *Properties, types, and meaning*, ed. Gennaro Chierchia, Barbara H. Partee, and Raymond Turner, volume II: Semantic Issues, 69–130. Dordrecht: Kluwer.
- Dryer, Matthew S., and Martin Haspelmath, ed. 2013. *Wals online*. Leipzig: Max Planck Institute for Evolutionary Anthropology. URL <http://wals.info/>.
- Embick, David. 2004. On the structure of resultative participle in english. *Linguistic Inquiry* 35:355–392.
- Enfield, Nick J. 2003. Adjectives in Lao. In *Adjective classes: A cross-linguistic typology*, ed.

- Robert M.W. Dixon and Alexandra Y. Aikhenvald. Oxford: Oxford University Press. In press.
- von Fintel, Kai, and Lisa Matthewson. 2008. Universals in semantics. *The Linguistic Review* 25:139–201.
- Francez, Itamar, and Andrew Koontz-Garboden. 2017. *Semantics and morphosyntactic variation: Qualities and the grammar of property concepts*. Oxford: Oxford University Press.
- Gawron, Mark. 2009. The lexical semantics of extent verbs. San Diego State University, January 31, 2009.
- Givón, Talmy. 1984. *Syntax: A functional-typological introduction*. Amsterdam: John Benjamins.
- Grimshaw, Jane. 1990. *Argument structure*. Cambridge, MA: MIT Press.
- Hale, Kenneth L., and Samuel Jay Keyser. 1998. The basic elements of argument structure. In *Papers from the UPenn/MIT roundtable on argument structure and aspect*, volume 32, 73–118. MITWPL.
- Hale, Kenneth L., and Samuel Jay Keyser. 2002. *Prolegomenon to a theory of argument structure*. Cambridge, MA: MIT Press.
- Hanink, Emily A., and Andrew Koontz-Garboden. 2021. Possession and categorization in a degreeless language. In *the Proceedings of NELS 51*, ed. A. Farinella and A. Hill, volume 1, 199–212. Amherst, MA: GLSA.
- Harley, Heidi. 2009. The morphology of nominalizations and the syntax of vP. In *Quantification, definiteness and nominalization*, ed. Monika Rathert and Anastasia Giannadikou, 320–342. Oxford: Oxford University Press.
- Heim, Irene. 1985. Notes on comparatives and related matters. UT Austin.
- Hengeveld, Kees. 1992. *Non-verbal predication: Theory, typology, diachrony*. Berlin: Mouton de Gruyter.
- Jacobsen, William. 1964. A Grammar of the Washo Language. Doctoral Dissertation, UC Berkeley.
- Kamp, J.A.W. 1975. Two theories about adjectives. In *Formal semantics of natural language*, ed. Edward Keenan, 123–155. Cambridge: Cambridge University Press.
- Kennedy, Christopher. 1997. Projecting the adjective: The syntax and semantics of gradability and comparison. Doctoral Dissertation, UC-Santa Cruz, Santa Cruz, CA.
- Klein, Ewan. 1980. A semantics for positive and comparative adjectives. *Linguistics and Philosophy* 1–45.
- Koontz-Garboden, Andrew. 2005. On the typology of state/change of state alternations. *Yearbook of Morphology* 2005:83–117.
- Koontz-Garboden, Andrew. 2007. Aspectual coercion and the typology of change of state predicates. *Journal of Linguistics* 43:115–152.
- Koontz-Garboden, Andrew. 2009. Ulwa verb class morphology. *International Journal of American Linguistics* 75:453–512.
- Koontz-Garboden, Andrew. 2010. The lexical semantics of derived statives. *Linguistics and Philosophy* 33:285–324.
- Koontz-Garboden, Andrew. 2012. The universality of lexical categories: Comments on Chung. *Theoretical Linguistics* 38:103–117.
- Koptjevskaja-Tamm, Maria, Ekaterina Rakhilina, and Martine Vanhove. 2015. The semantics of lexical typology. In *The routledge handbook of semantics* :, Routledge Handbooks in Linguistics, 434–454.
- Kratzer, Angelika. 1996. Severing the external argument from its verb. In *Phrase structure and the lexicon*, ed. Johan Rooryck and Laurie Zaring, 109–137. Dordrecht: Kluwer.
- Kratzer, Angelika. 2000. Building statives. *Proceedings of the Berkeley Linguistics Society* 26 (BLS26) 385–399.
- Langacker, Ronald W. 1987. Nouns and verbs. *Language* 63:53–94.
- Larson, Richard K. 1998. Events and modification in nominals. In *Semantics and Linguistic Theory*, volume 8, 145–168.
- van Lier, Eva. 2017. The typology of property words in oceanic languages. *Linguistics* 55:1237–

1280.

- Matthewson, Lisa, Heidi Quinn, and Lynsey Talagi. 2015. Inchoativity meets the perfect time span: The niuean perfect. *Lingua* 168:1 – 36. URL <http://www.sciencedirect.com/science/article/pii/S0024384115001886>.
- Montague, Richard. 1973. The proper treatment of quantification in ordinary English. In *Approaches to natural language*, ed. K.J.J. Hintikka, J.M.E. Moravcsik, and P. Suppes, 221–242. Dordrecht: D. Reidel Publishing. References to reprinted version in Paul Portner and Barbara Partee (eds.) 2002. *Formal semantics: The essential readings*. Oxford: Blackwell. Pp. 17–34.
- Newman, Paul. 2000. *The Hausa language: An encyclopedic reference grammar*. New Haven, CT: Yale University Press.
- Newmeyer, Frederick J. 1998. *Language form and language function*. Cambridge, MA: MIT Press.
- von Prince, Kilu. 2015. *The grammar of daakaka*. Berlin: Mouton DeGruyter.
- Siegel, Muffy. 1976. Capturing the adjective. Doctoral Dissertation, University of Massachusetts, Amherst, MA.
- Smith, Carlota. 1997. *The parameter of aspect*. Dordrecht: Kluwer, 2nd edition.
- Stassen, Leon. 1997. *Intransitive predication*. Oxford: Oxford University Press.
- von Stechow, Arnim. 1984. Comparing semantic theories of comparison. *Journal of Semantics* 3:1–77.
- Sweetser, Eve. 1997. Role and individual interpretations of change predicates. In *Language and conceptualization*, ed. Jan Nuyts and Eric Pederson, 116–136. Cambridge: Cambridge University Press.
- Talmy, Leonard. 1985. Lexicalization patterns. In *Language typology and syntactic description*, ed. Timothy Shopen, volume 3, 57–149. Cambridge: Cambridge University Press.
- Tatevosov, Sergej. 2002. The parameter of actionality. *Linguistic Typology* 6:317–401.
- Tham, Shiao Wei. 2013. Change of state verbs and result state adjectives in mandarin. *Journal of Linguistics* 49:647–701.
- Thompson, Sandra A. 1989. A discourse approach to the cross-linguistic category ‘adjective’. In *Linguistic categorization*, ed. Roberta Corrigan, Fred Eckman, and Michael Noonan, 245–265. Amsterdam: John Benjamins.
- Štekauer, Pavol, Salvador Valera, and Livia Kórtvélyessy. 2012. *Word-Formation in the World’s Languages: A Typological Survey*. Cambridge: Cambridge University Press.
- Wellwood, Alexis. 2015. On the semantics of comparison across categories. *Linguistics and Philosophy* 38:67–101.
- Wetzer, Harrie. 1996. *The typology of adjectival predication*. Berlin: Mouton de Gruyter.
- Zucchi, Alessandro. 1993. *The language of propositions and events: Issues in the syntax and the semantics of nominalization*. Dordrecht: Kluwer.

## Appendix 1: Methodology

- Each cell in the paradigm of the database was coded for its derivational relation to other cells.
- This coding and a search mechanism allow us to extract all instances in which the property concept lexeme and the derivationally related (intransitive) change of state predicate are labile, i.e., where the same form describes both senses.
- The original coding of data in the database did not include lexical category for the property concept lexeme, which is required in order to investigate our hypothesis.
- We extracted all property concept lexemes in all languages in which there was at least one labile paradigm, and sought to find its category in descriptive sources.
  - In the general case, we aimed to return to the original source the paradigm was drawn from in the database.
  - If this was not possible, and there was another source used for the language in question in the database (e.g., for the inchoative or causative form associated with the language), we tried to access that source to see if it was listed there, and if so, took data from that source.
  - In a small number of cases, multiple sources were listed, and in a small number of those, the sources conflicted. We deal with these (as described below) by running two separate analyses, one for each categorization, to see if the conflict in categorization makes a difference.
  - In two cases, we drew on sources which were not listed in the database, but were in the bibliography for the language’s entry on WALS. See the appendix for more detail.
  - Finally, the following classes of data have been excluded from consideration:
    - \* We excluded paradigms for which the sources in the database and in the bibliography on WALS did not give lexical categories or were inaccessible (e.g., Otomi).
    - \* We excluded stative/inchoative pairs for which the lexical category was unclear (e.g. ‘Class 1’/‘Class 2’ in Chamorro).
    - \* We excluded stative/inchoative pairs if either one of the data points was listed in the database as hypothetical.
    - \* We excluded paradigms for which either the state or the inchoative is missing from the database.



## Appendix 2: Potential counterexamples

### Deverbal nominalizations

There are some challenges to this idea, deverbal nominalization among them.

There are different kinds of nominalization (see Zucchi 1993; Alexiadou 2001 for overviews).

Here we address three.

#### Result nouns: sets of events

Result nouns fail to take the constellation of arguments that their derivationally related verbs and even some other derivationally related nouns do:

- (27) a. Kim's examination by the doctor took 30 minutes.  
 b. \*Kim's exam by the doctor took 30 minutes.
- (28) a. The doctor's examination of Kim took 30 minutes.  
 b. ??The doctor's exam of Kim took 30 minutes.

They allow for different readings of the argument-like NPs, consistent more with being an adjunct (possessor NP) than an argument (selected):

- (29) a. Kim's exam lasted an hour.  
 b. Kim examined Sandy.

While in (29a), Kim can be the examiner, the examined, someone betting on a particular exam, etc., in (29b) Kim can only be the examiner (cf. Grimshaw 1990:48).

Only the latter two kinds have argument structure.

Result nouns can be treated simply as sets of events. Under the right conditions, they can host adjuncts, introduced via possessive morphosyntax, but these have different properties to arguments.

E.g., (29a) is a possessor, with the different readings of the possessor expected, given the underspecified semantics of the possessive relation.

Assuming then a theory of English possessive noun phrases like Barker (1995), wherein 's is case marking, possession is introduced by a D head that takes a predicate and an individual as arguments to return the set of (predicate) entities standing in the underspecified possessive relation to the individual, (28) looks like (30) and (31):

- (30)
- A syntax tree for the noun phrase 'Kim's exam'. The root node is DP, which branches into NP and D'. The NP node dominates the string 'Kim's'. The D' node branches into D and NP. The D node dominates the string 'poss' and the NP node dominates the string 'exam'.

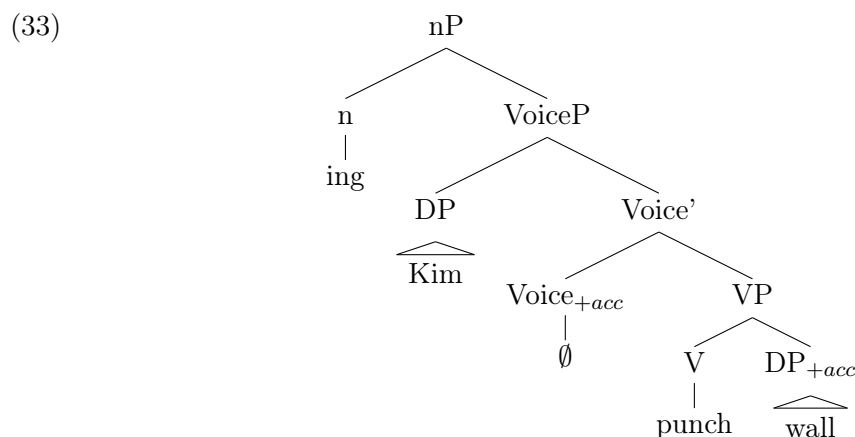
- (31) a.  $\llbracket \text{exam} \rrbracket = \lambda e. \text{exam}'(e)$   
 b.  $\llbracket \text{poss} \rrbracket = \lambda P \lambda x \lambda y. \pi(x, y) \ \& \ P(y)$   
 c.  $\llbracket \text{D}' \rrbracket = \lambda x \lambda y. \pi(x, y) \ \& \ \text{exam}'(y)$   
 d.  $\llbracket \text{DP} \rrbracket = \lambda y. \pi(\text{Kim}', y) \ \& \ \text{exam}'(y)$

## accusative -ing

- (32) [ Kim's punching the wall ] was rather unexpected.  
 (32) \*The news reported punching the wall.  
 (32) \*The news reported Kim's punching. (on reading where Kim is agent; okay if patient)

Harley (2009), building on Kratzer (1996): nominalization is high, crucially *after* the verb takes its arguments and combines with Voice (which we assume here, but can be dispensed with, see below).

This accounts for, among other things, the accusative case marking on the object.



- (34)
- $\llbracket \text{punch} \rrbracket = \lambda x \lambda e. \text{punching}'(e) \ \& \text{patient}'(e, x)$
  - $\llbracket \text{VP} \rrbracket = \lambda e. \text{punching}'(e) \ \& \text{patient}'(e, \text{wall}')$
  - $\llbracket \text{Voice} \rrbracket = \lambda x \lambda e. \text{agent}'(x, e)$
  - $\llbracket \text{Voice}' \rrbracket = \lambda x \lambda e. \text{agent}'(x, e) \ \& \ \text{patient}'(e, \text{wall}')$  (by event identification)
  - $\llbracket \text{VoiceP} \rrbracket = \lambda e. \text{agent}'(\text{Kim}', e) \ \& \ \text{punching}'(e) \ \& \ \text{patient}'(e, \text{wall}')$
  - $\llbracket \text{-ing} \rrbracket = \lambda P. P$
  - $\llbracket \text{nP} \rrbracket = \lambda e. \text{agent}'(\text{Kim}, e) \ \& \ \text{punching}'(e) \ \& \ \text{patient}'(e, \text{wall}')$

On such an analysis, it is a verb that relates the object to events, then taking a subject argument. That whole structure is then nominalized, with the nP denoting a set of events (crucially *\*not\** a set of event/individual pairs).

## -ing/of nouns

- (35) (Kim's)/(The) punching of the wall was harmful.

Harley analyzes the genitive argument in these cases on a par with the genitive argument of result nouns, i.e., as a genuine possessor rather than an argument, accounting for its optionality (cf. ACC nouns).

With the ACC nouns, the internal argument of the predicate is related to the event described while the predicate is still a verb. The same is true for *-ing/of* nouns.

What distinguishes *-ing/of* nominalization from ACC nominalizations is that there is no genuine *external argument*.

Arguments for the non-argument status of the genitive marked noun come from the fact that (i) it is optional (35), and (ii) that readings of it arise that are inconsistent with it being an argument of the verb (cf. ACC nouns).

- (36) CONTEXT: Kim and Sandy’s mother owns a movie theater and promises them each all the proceeds of one showing of *The Missing Link*. Neither Kim nor Sandy is responsible for any aspect of the presentation of the film.

Kim’s showing of the film took in more money.

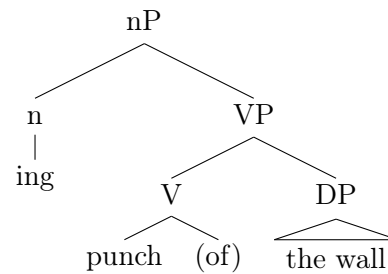
More saliently, consider the contrast with ACC nouns, where it is impossible for the genitive argument to have anything other than the same thematic relation to the event as that entailed by the derivationally related verb.

- (37) CONTEXT: (36) (where, crucially, Kim did not show the film), and supposing that the amount of money that Kim’s showing took in was more than expected.
- a. Kim’s showing of the film surprised us.
  - b. #Kim’s showing the film surprised us.

The conclusion (Harley’s conclusion, though see also Dowty 1989): genitive marked nouns in the *-ing/of* construction are introduced by possession, *not* by Voice (or the verb, on a non-severed analysis).

Nominalization takes place syntactically before the genitive argument is introduced (by contrast with ACC nouns).

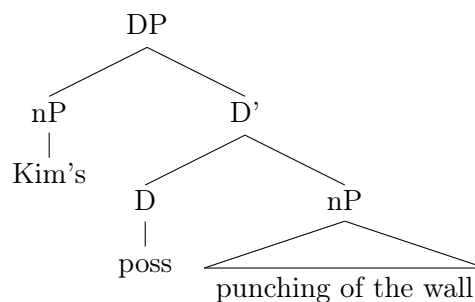
- (38) the/Kim’s punching of the wall



- (39) a.  $\llbracket \text{punch} \rrbracket = \lambda x \lambda e. \text{punching}'(e) \ \& \ \text{patient}'(e, x)$   
 b.  $\llbracket \text{VP} \rrbracket = \lambda e. \text{punching}'(e) \ \& \ \text{patient}'(e, \text{the wall}')$   
 c.  $\llbracket \text{-ing} \rrbracket = \lambda P. P$   
 d.  $\llbracket \text{nP} \rrbracket = \lambda e. \text{punching}'(e) \ \& \ \text{patient}'(e, \text{the wall}')$

Adopting the same theory of nominal possession as above, the relation of the genitive argument to the *-ing/of* nominalization is as in (40) and (41):

- (40)



- (41) a.  $\llbracket \text{poss} \rrbracket = \lambda P \lambda x \lambda y. \pi(x, y) \ \& \ P(y)$   
 b.  $\llbracket \text{D}' \rrbracket = \lambda x \lambda y. \pi(x, y) \ \& \ \text{punching of the wall}'(y)$   
 c.  $\llbracket \text{DP} \rrbracket = \lambda y. \pi(\text{Kim}', y) \ \& \ \text{punching of the wall}'(y)$

NB: If you don’t like severed external arguments:

- The (transitive) verb denotes a triple (a function from individuals to individuals to events).
- *-ing/of* nominalization existentially binds the verb’s external argument (i.e., there are two *ings*).

- This means that an external argument bearing the verb’s external thematic relation is entailed to exist. It might be contextually identified with the genitive NP, but as observed above needn’t be. An advantage of such an analysis is that it captures the (valid) inference that e.g., in any showing event, there must be a shower, even if the shower (as in the context above) is not specified in the linguistic context.

**Nominalizations (and nouns generally) do not denote individual/event pairs.** They can denote sets of events, but do not denote individual/event pairs (or individual/individual/event triples, etc.).

### Complications

- **What forces *of* insertion?** According to Harley, the presence/absence of Voice, which in addition to introducing the external argument, assigns accusative case (=Burzio’s generalization). When it is absence, *of* must be inserted for case-theoretic reasons. (If you don’t assume severed external argument, then whatever gets you Burzio’s generalization does this.)
- **What about differences in argument structure between result nouns and others?** These are expected: process and ACC nouns are verbs at some level of syntax, while result nouns are not (i.e., they are inserted as nouns). So, they cannot relate even an internal argument to the event (by contrast with result nouns).

### De-verbal adjectives

Another potential counterexample comes from deverbal adjectives, which are of adjectival category but appear at first glance to relate an individual to a dynamic event (Kratzer 2000).

- (42) a. The door was open.  
b. The door was open-ed.

However, parallel to the case of *-ing* nominalizations above, deverbal adjectives that relate a dynamic event to an individual are derived from a verbal core. In contrast, deverbal adjectives that do not entail a verbal core are purely stative (Embick 2004, Alexiadou and Anagnostopoulou 2008, Alexiadou et al. 2015; cf. Beavers et al. 2021).

In Greek, eventive and stative deverbal adjectives are marked by distinct morphology, i.e. *-menos* and *-tos*, respectively (Alexiadou and Anagnostopoulou 2008).

- (43) Greek
- a. *Ta keftefakia ine tiganis-mena (apo tin Maria)*  
ART meatballs are fried by ART Mary  
‘The meatballs are fried by Mary.’
- b. *Ta keftefakia ine tiganis-ta (\*apo tin Maria)*  
ART meatballs are fried by ART Mary.  
‘The meatballs are fried (\*by Mary).’ (Alexiadou and Anagnostopoulou 2008:35)

On the one hand, *-tos* derives purely stative adjectival forms (commonly with an idiosyncratic meaning) that do not entail an event, as indicated by their compatibility with the unaccusative verb *ginome* ‘become’, and their incompatibility with manner adverbs like *atsala* ‘sloppily’.

- (44) Greek
- a. *To kotopoulou egine vrasbf-to.*  
ART chicken became boiled  
‘The chicken was made boiled.’ (Alexiadou and Anagnostopoulou 2008:34)

- b. \**Afto to vivlio ine kala graf-to.*  
 DEM ART book is well written  
 Int.: ‘This book is well-written.’ (Alexiadou et al. 2015:89)

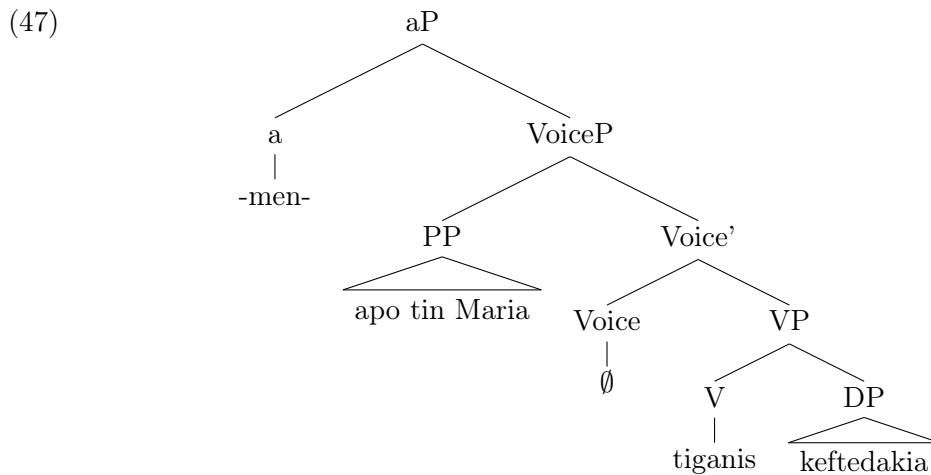
On the other hand, *-menos* derives stative adjectival forms that entail an event, as their incompatible with *ginome* ‘become’, but compatible with manner adverbs.

- (45) Greek
- a. \**To kotopoulou egine vras-meno*  
 ART chicken became boiled  
 Int.: ‘The chicken was made boiled.’ (Alexiadou and Anagnostopoulou 2008:34)
- b. *Afto to vivlio ine kala gra-meno.*  
 DEM ART book is well written  
 ‘This book is well-written.’ (Alexiadou et al. 2015:89)

Crucially, only *-menos*, but not *-tos* can attach to verb stems that are overtly pre-categorized by the eventive verbalizer *-ize-* (but see Anagnostopoulou and Samioti 2013:34 for a more detailed discussion).

- (46) Greek
- a. *aspr-iz-o* ‘(to) whiten’  
 b. *aspr-iz-menos* ‘whitened’  
 c. \**aspr-is-tos* ‘whitened’ (Alexiadou and Anagnostopoulou 2008:39)

This suggests that while *-tos* attaches low directly to the root deriving a purely stative deverbal adjectival, *-menos* attaches high to a verbal projection, which also introduces the patient argument (and in some contexts also the agent argument as in (43a)).



As they are verbs on the relevant level, deverbal adjectivizations (and adjectives more generally) do not denote individual/event pairs, but denote sets of states (or individual/state pairs).