

The semantics of conversion nouns and *-ing* nominalizations: A quantitative and theoretical perspective

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Introduction

Two major problems in derivational semantics

One form - many meanings

One affix may give rise to different meanings (e.g. EVENTIVE vs. REFERENTIAL)

One meaning - many forms

One concept may be expressed by more than one form (affix competition, *-ing*, *conversion*, *-ion*, *-ment*, *-age*)

An overview of this paper

- The general problem concerns competition between *-ing* nominalizations and *conversion* nouns.
- There are many claims about their semantics in the literature, but little solid empirical evidence.
- We look at *quantification* (mass vs. count), *eventuality* (eventive vs. referential), *aspectual class* (accomplishment, achievement, state, ...) in both types of nominalizations using a large data base (N=4282, COCA).
- We provide a quantitative analysis and then interpret the results in the light of extant morphological theories.

A sampling of claims in the literature

- **Morphological form and count versus mass**
Consensus in the literature (e.g. Brinton 1995, 1998, Grimshaw 1990, Langacker 1991, etc.):
-*ing* tends towards mass quantification and *conversion* towards count.
- **Aspectual class of base verb and count versus mass**
Mourelatos (1978): state and activity verbs → mass quantified;
accomplishment and achievement → count quantified

More claims

- **Aspectual class of base verb and form of nominalization:**
 - Brinton (1995): State verbs prefer *conversion*; activity verbs prefer *-ing* nominalizations.
 - Alexiadou (2001), Borer (2013): accomplishments and achievements disprefer *-ing* nominalizations (but see Iordachioaia & Werner 2019)
- **Morphological form and eventivity:**
 - Grimshaw (1990) and others: *-ing* nominalizations are interpreted as complex events; *conversion* nouns cannot be eventive.

Roughly, the expected association:

- *Conversion* ~ count quantification ~ referential reading
- *-ing nominalization* ~ mass quantification ~ eventive reading

Andreou & Lieber (2020)

- There is no necessary correlation between morphological form, eventivity, quantification, and aspectual class.
- Different morphological forms do not show strict preferences for particular aspectual classes.
- Any morphological form can in principle express any combination of quantification, eventivity, and aspectual class of base verb.

What Andreou & Lieber 2020 do not do:

- Provide a quantitative analysis to see whether there are any tendencies towards the associations predicted in prior literature.
- Investigate the role of the individual verb.
- Consider the data from two directions:

Semasiological: what does a form mean?

Onomasiological: which form do I choose to express an intended meaning

(A&L concentrate on the semasiological side.)

Methodology

- Subset of Andreou & Lieber's (2020) database from COCA/BNC of *-ing* and *conversion* nominalizations of 106 verbs:
57,000 → 4282 singular nouns
- Hand-coded by both authors for
 - eventivity
 - quantification
 - aspectual class
- Parallel independent coding for eventivity

Positive evidence for count versus mass

Count

- A determiner *a/an* precedes the noun
- ordinals or cardinals
- modifiers like *final, single, last*
- quantifiers like *each, every*

Mass

- Singular nominal with no determiner
- quantifiers like *much, some*

Examples

-ing count (evidence: indefinite article)

BNC 1992: ...tiny phosphorescent sparks around its hands, small ripples in the stone beneath its feet, a gentle breeze around its head, a sudden dampness and **DRIPPING** of water from the stones of the walls around it.

conversion mass (evidence: singular form, no determiner)

Independent School 2006: Overall, then, the single greatest obstacle to implementing curricular **CHANGE** and, over time, establishing a culture that values continuous reflection and improvement in a school, is the general predisposition of educators to resist change itself.

Positive evidence for eventive versus referential reading

Eventive (a few examples – there are others):

- modification by temporal adjectives like frequent or repeated
- tensed verb in context that suggests eventive reading
- paraphrases like ‘the activity of ...’ or ‘an instance of’

Referential (a few examples – there are others):

- coreference with a concrete noun present in context
- paraphrases like ‘a kind of ...’, ‘an entity or product’, ‘the thing or stuff Ved’, etc.

Examples

Eventive reading: manner adjective or adverb suggests eventivity

- *Shawshank Redemption 1994*: Norton keeps his eyes on Andy, looking for a wrong glance or nervous BLINK.

Referential reading: coreference with a clearly concrete noun in syntactic context

- *Mag. Inc. 1995*: “Today,” says Holman, “employees in the cleaning department, for example, know not to work on the easiest-to-clean CASTING or on the one that happens to be on the top of the pile.”

Aspectual class/features

| aspectual class | dynamic | durative | implied endpoint | example |
|-----------------|---------|----------|------------------|---------------------|
| state | - | + | - | <i>know, love</i> |
| activity | + | + | - | <i>push, float</i> |
| accomplishment | + | + | + | <i>cook, cover</i> |
| achievement | + | - | + | <i>arrive, find</i> |
| semelfactive | + | - | - | <i>blink, knock</i> |

What we eliminated

- **Quantification**: Cases where there was no positive evidence for quantification
- **Eventivity**: Cases where there was no positive evidence for eventivity, or where eventivity was unclear or ambiguous, or where raters disagreed on eventivity
- **Aspectual class**: Cases where verbal bases could be interpreted as more than one aspectual class depending on context

Datasets for each sub-study

- **Quantification**: N=2379 (only tokens with unambiguous evidence for mass or count reading)
- **Eventivity**: N=3286 (only unanimous ratings and unambiguous tokens)
78% agreement (4 values, Cohen's Kappa for 2 Raters: 0.584, $z=48.5$, $p=0$). Contradictory ratings: 8%
- **Aspectual class/feature**: N=3405 (only unambiguous verbs)
- Pooled data (**all semantic dimensions**): Intersection of 1-3, N=1421 (150 types based on 84 verbs)

Results

Univariate analyses

Relation between two variables
at a time

Quantification

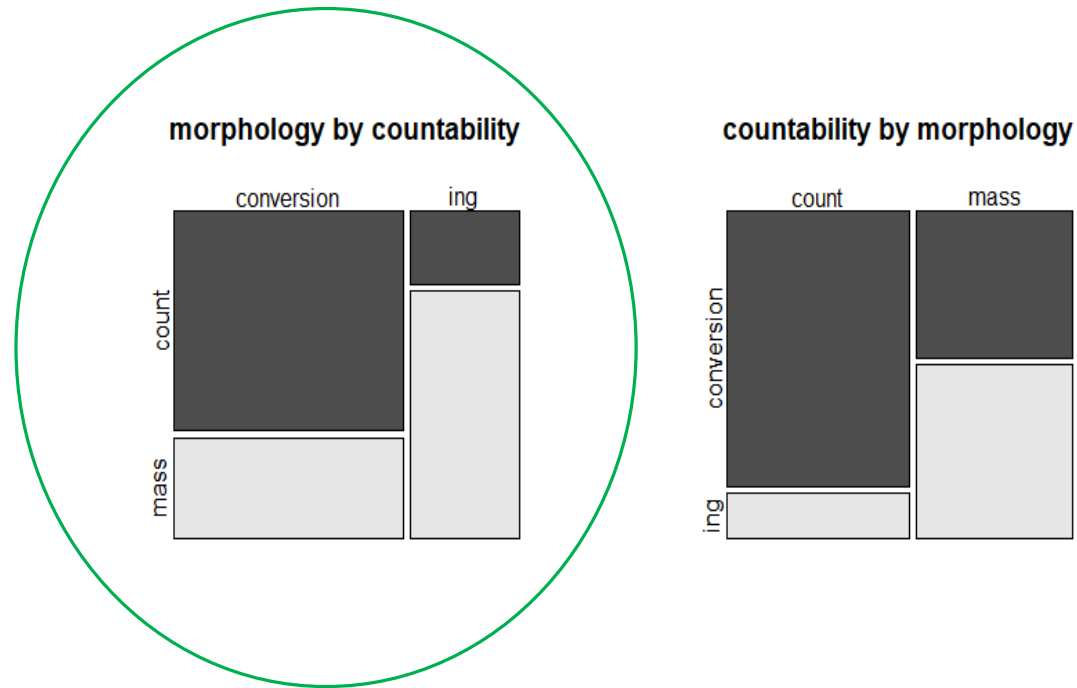
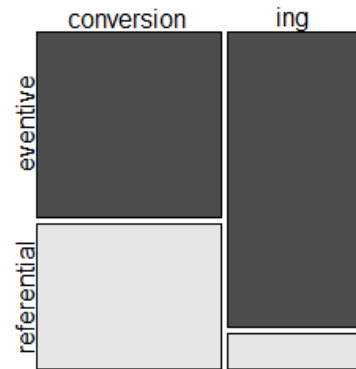


Figure 1: Morphology and quantification, N=2379

Eventuality

morphology by E/R semantics



E/R semantics by morphology

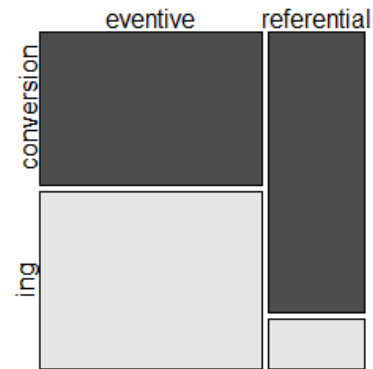


Figure 2: Morphology and eventivity, N=3286

Aspectual features: Morphology



Figure 6: Aspectual features by morphology (N=3405)

Aspectual features: Quantification

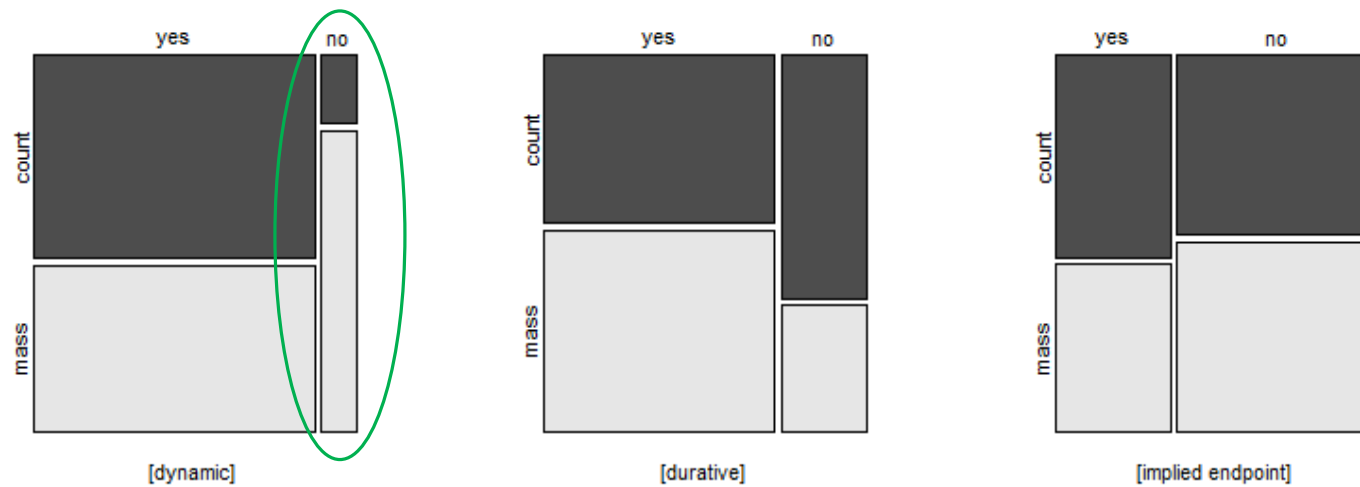


Figure 7: Aspectual features by quantification ('yes' indicates a positive value for the feature, 'no' a negative value for the feature, N=1934)

Aspectual features: Eventivity

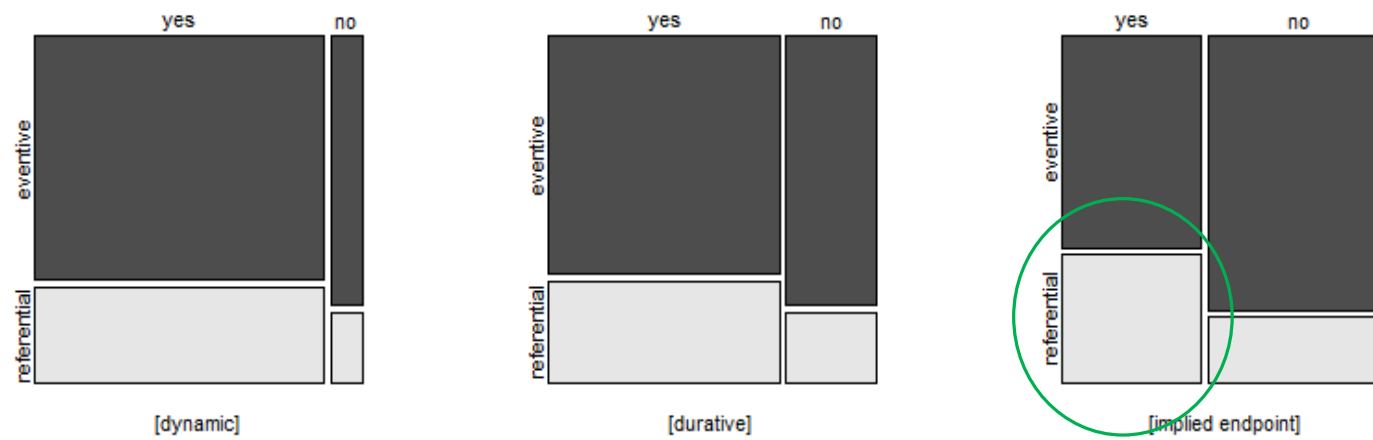


Figure 8: Aspectual features by eventivity (N = 2568).

Variation within and across base verbs and their nominalizations

Table 2: Token counts of nominalizations for three base verbs

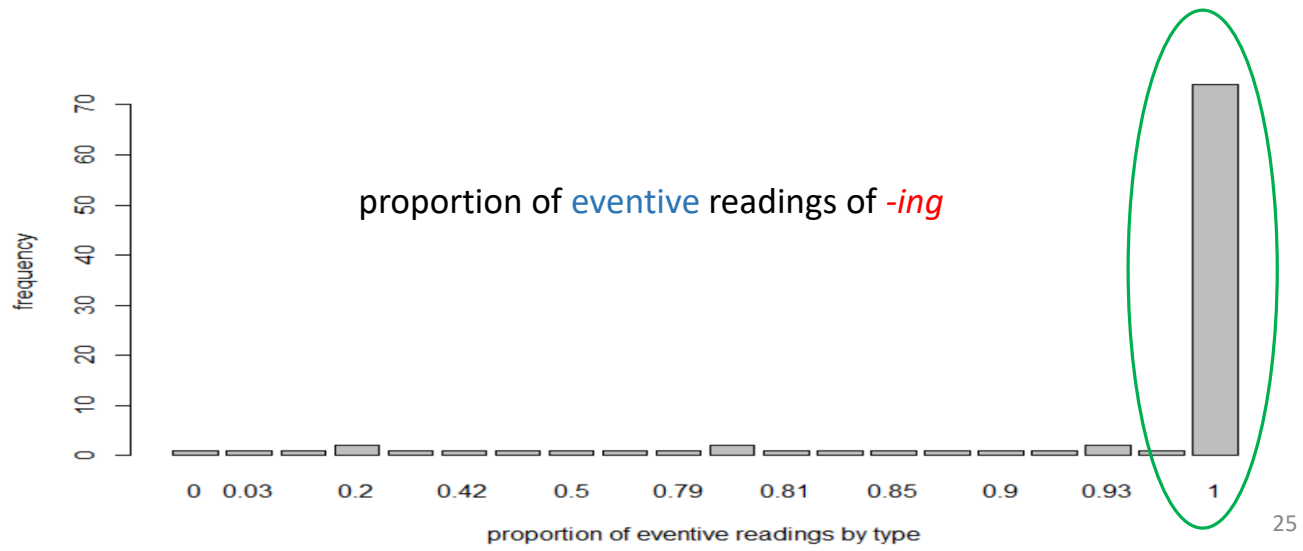
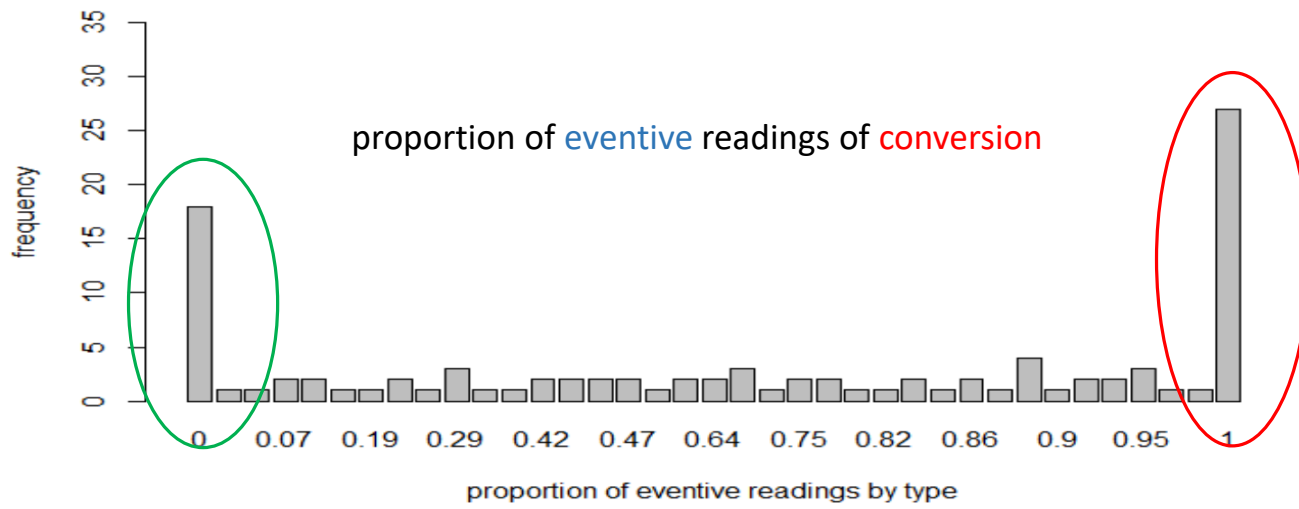
| | CUT | | DANCE | | DESIGN | |
|---|------------|----------------|--------------|----------------|---------------|------------------|
| | <i>cut</i> | <i>cutting</i> | <i>dance</i> | <i>dancing</i> | <i>design</i> | <i>designing</i> |
| eventive | | | | | | |
| referential | | | | | | |
| <i>proportion</i> <i>eventive</i> <i>readings</i> | | | | | | |

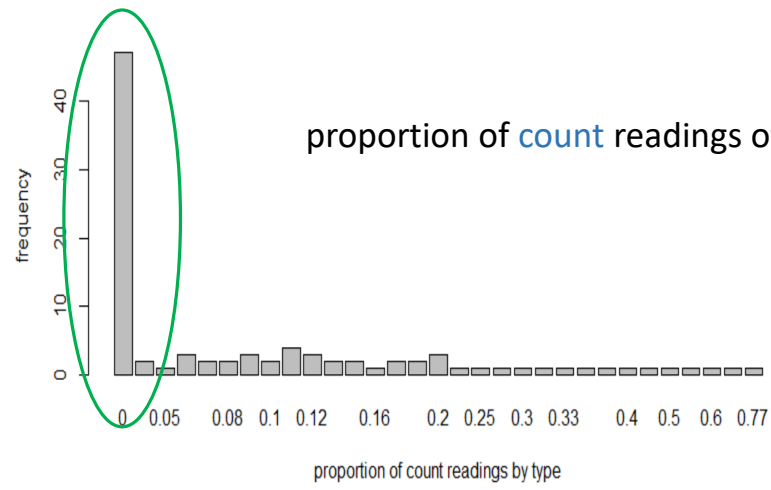
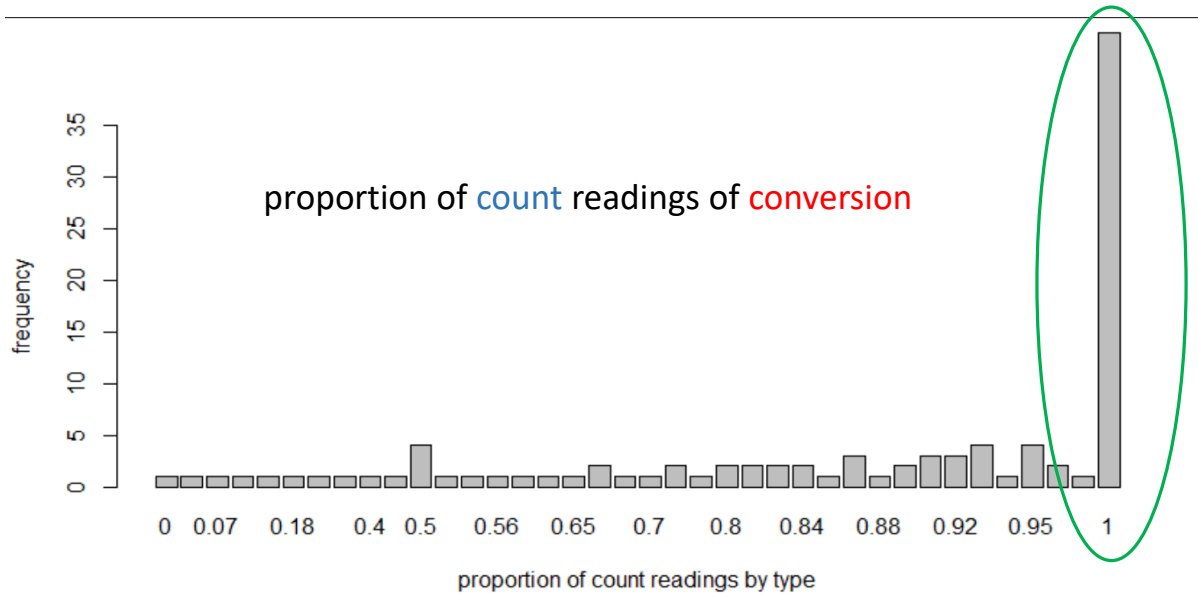
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| | CUT | | DANCE | | DESIGN | |
|-------------------------------------|-------------|----------------|--------------|----------------|---------------|------------------|
| | <i>cut</i> | <i>cutting</i> | <i>dance</i> | <i>dancing</i> | <i>design</i> | <i>designing</i> |
| eventive | 3 | 5 | 5 | 11 | 0 | 9 |
| referential | 10 | 7 | 4 | 2 | 23 | 0 |
| <i>proportion eventive readings</i> | <i>0.23</i> | <i>0.42</i> | <i>0.55</i> | <i>0.85</i> | <i>0</i> | <i>1</i> |

How are these proportions distributed across all verbs?





Results

Multivariate analyses

The effect of many predictor variables
at the same time
on an outcome

Conditional inference trees

- Predict an outcome on the basis of all other variables ('predictors')

Three models

- **MORPHOLOGY** ~ QUANTIFICATION * EVENTIVITY * [\pm DYNAMIC] * [\pm DURATIVE] * [\pm ENDPOINT]
 - **QUANTIFICATION** ~ MORPHOLOGY * EVENTIVITY * [\pm DYNAMIC] * [\pm DURATIVE] * [\pm ENDPOINT]
 - **EVENTIVITY** ~ MORPHOLOGY * QUANTIFICATION * [\pm DYNAMIC] * [\pm DURATIVE] * [\pm ENDPOINT]
-
- Partition the data into subsets
 - Subsets
 - differ significantly in their distribution of the outcome variable
 - have particular constellations of the values of the predictor variables
 - Advantage: complex interactions
 - Disadvantage: necessarily excludes VERB as predictor

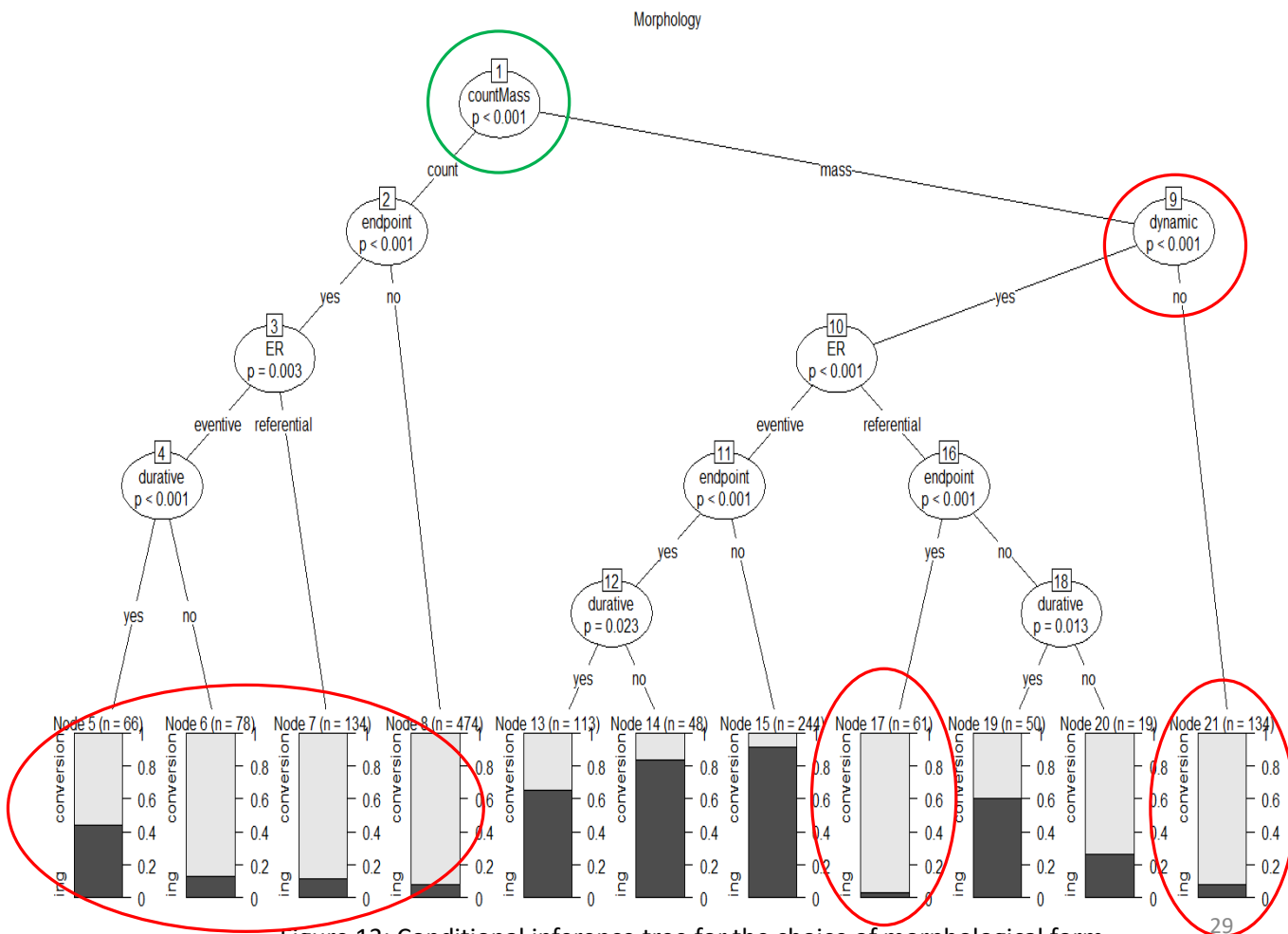


Figure 13: Conditional inference tree for the choice of morphological form

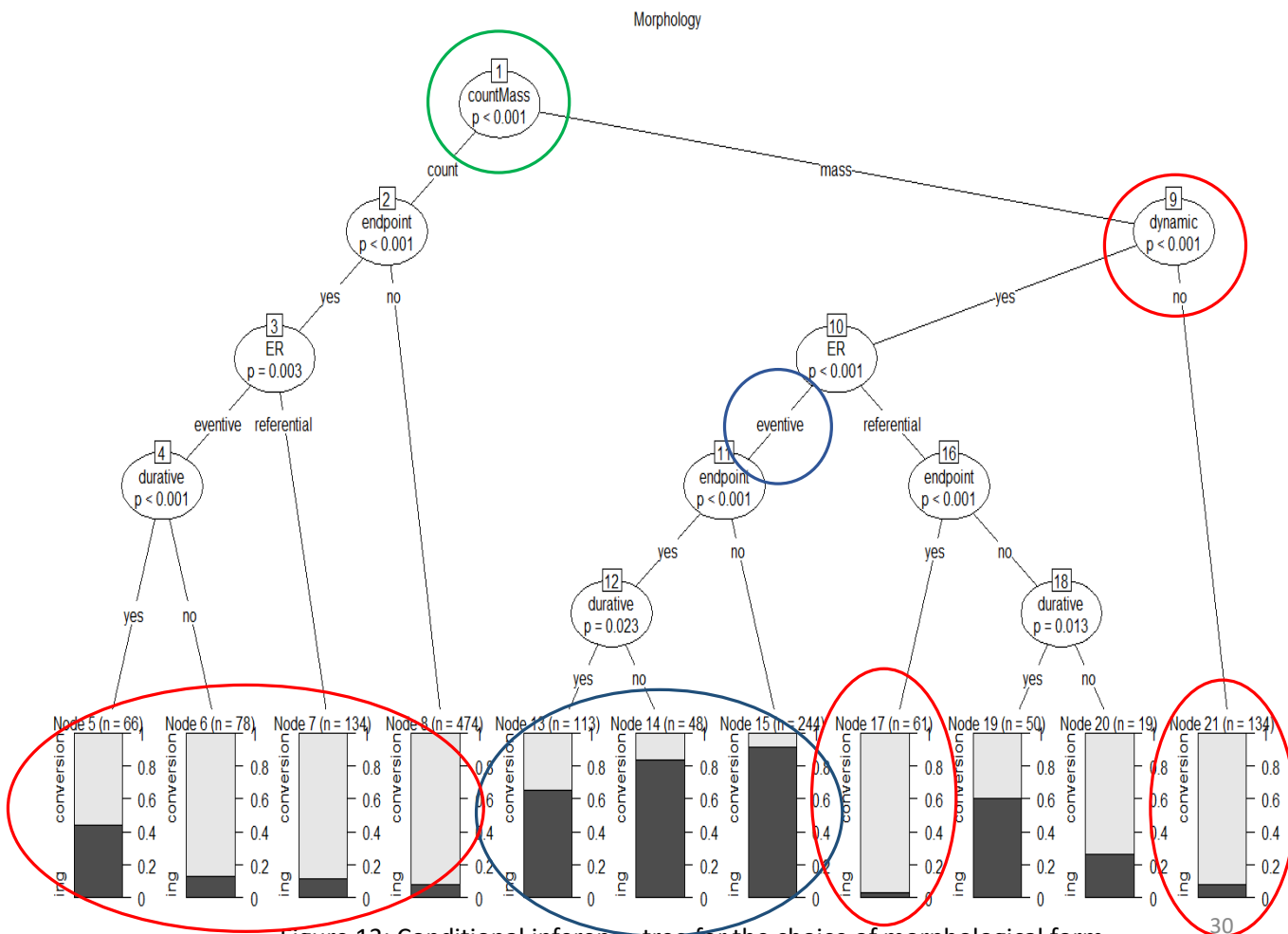


Figure 13: Conditional inference tree for the choice of morphological form

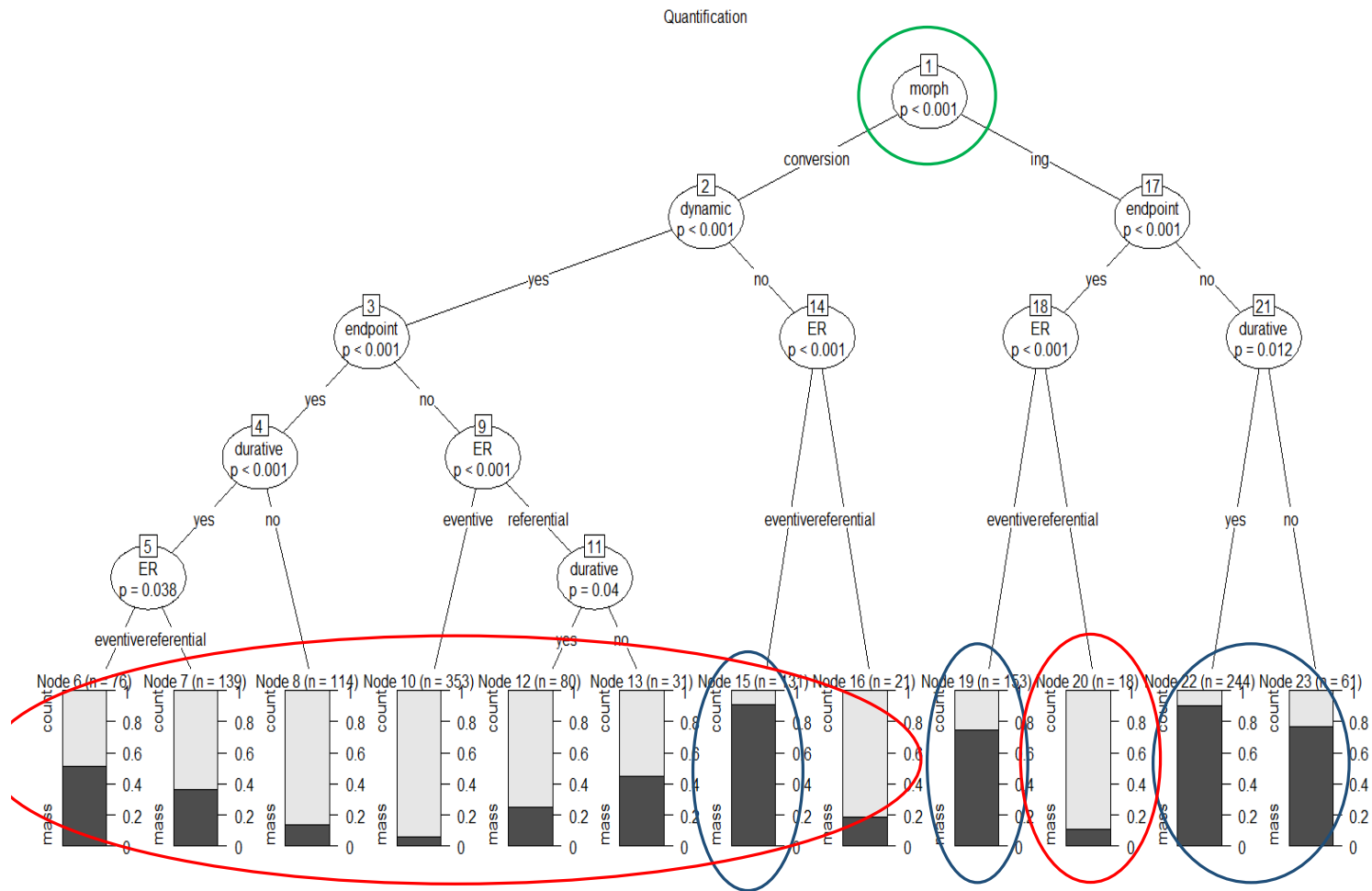


Figure 14: Conditional inference tree for the choice of count vs. mass reading

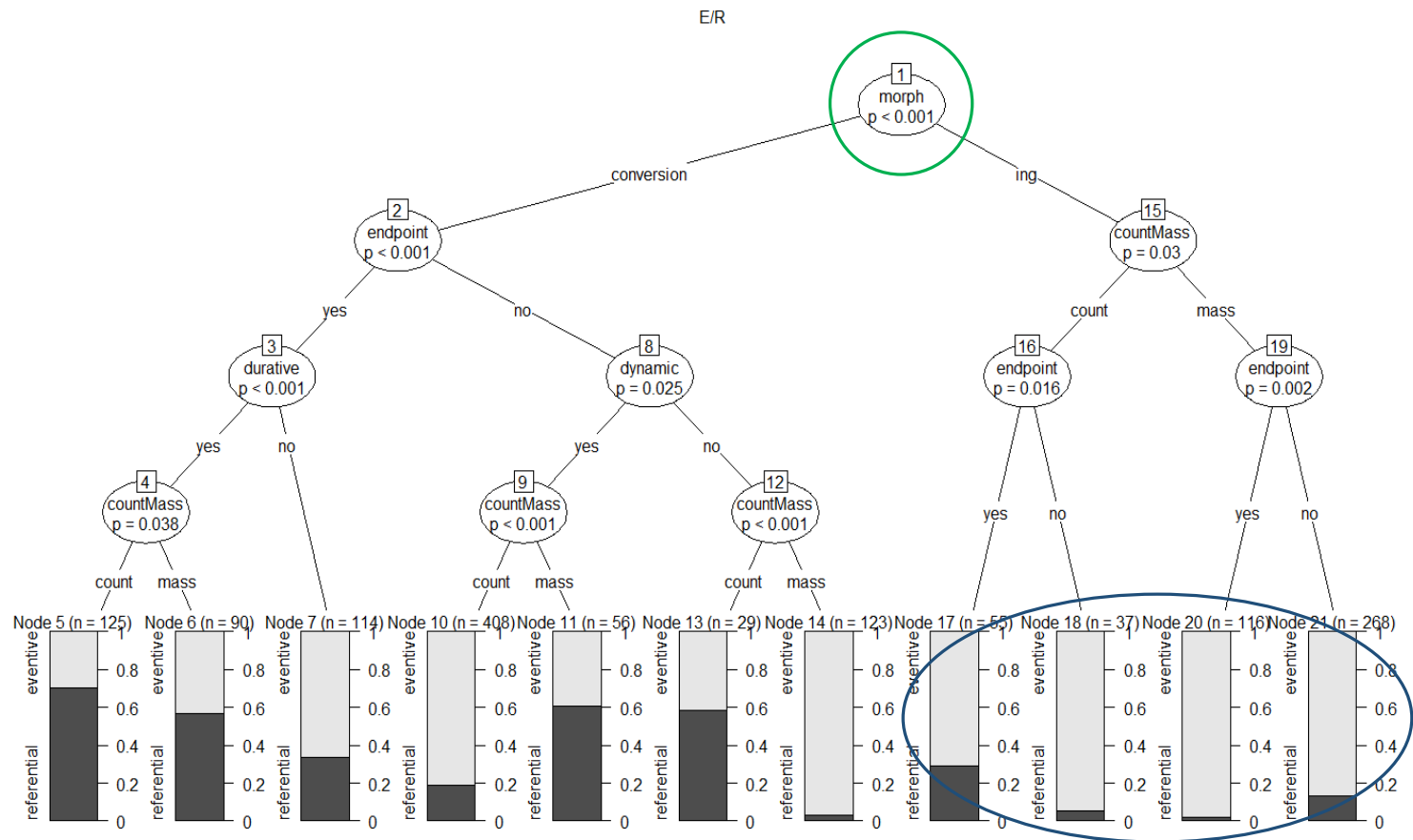


Figure 15: Conditional inference tree for the choice of eventive vs. referential reading 32

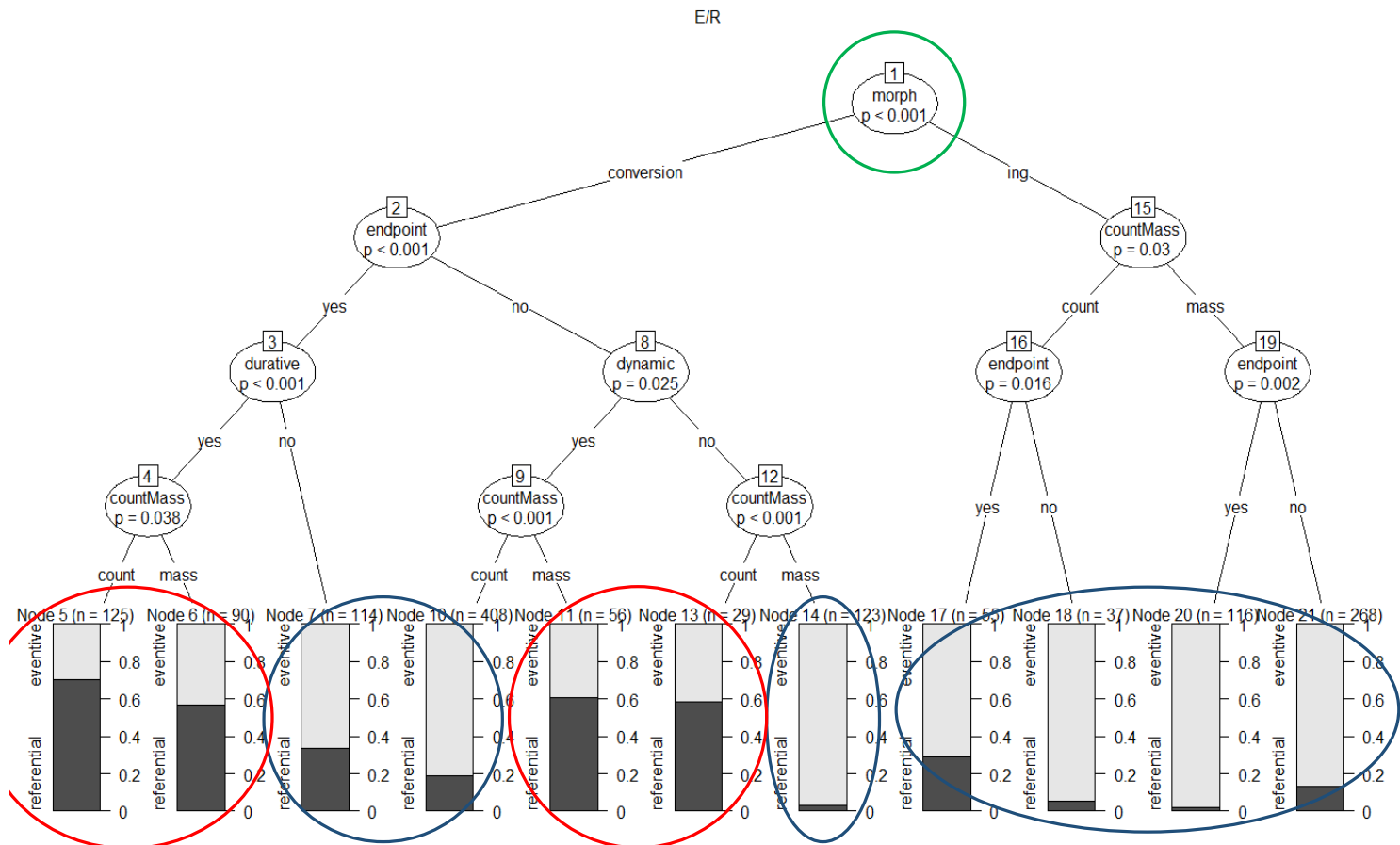


Figure 15: Conditional inference tree for the choice of eventive vs. referential reading 33

The role of the base verb: Linear mixed effects models

- Inclusion of VERB as predictor ('random effect')
- No interactions
- Strength of individual predictors

| model | predicted outcome | significant predictors | explained variance <i>fixed effects</i> | explained variance <i>RE of VERB</i> |
|-------|-------------------|---|--|---|
| 1 | MORPHOLOGY | QUANTIFICATION EVENTIVITY [DYNAMIC] | | |
| 2 | QUANTIFICATION | MORPHOLOGY [DYNAMIC] | | |
| 3 | EVENTIVITY | MORPHOLOGY [IMPLIED ENDPOINT] | | |

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|-------|-------------------|---|--|---|
| 1 | MORPHOLOGY | QUANTIFICATION EVENTIVITY [DYNAMIC] | 0.47 | 0.26 |
| 2 | QUANTIFICATION | MORPHOLOGY [DYNAMIC] | | |
| 3 | EVENTIVTIY | MORPHOLOGY [IMPLIED ENDPOINT] | | |

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| 1 | MORPHOLOGY | QUANTIFICATION EVENTIVITY [DYNAMIC] | 0.47 | 0.26 |
| 2 | QUANTIFICATION | MORPHOLOGY [DYNAMIC] | 0.33 | 0.34 |
| 3 | EVENTIVTIY | MORPHOLOGY [IMPLIED ENDPOINT] | | |

The role of the base verb: Linear mixed effects models

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| 2 | QUANTIFICATION | MORPHOLOGY [DYNAMIC] | 0.33 | 0.34 |
| 3 | EVENTIVITY | MORPHOLOGY [IMPLIED ENDPOINT] | 0.18 | 0.51 |

Summary

- Some tendencies in the expected directions for **quantification** and **eventivity**
- Some tendencies in the **opposite** direction (e.g. 56% eventive readings for conversion)
- A **lot of variation**, in both directions (form to meaning, meaning to form)
- Weak effect of aspectual categories (apart from [dynamic])
- Complex constellations of particular properties may go together with certain preferences in interpretation, or with preferences of morphological form.
- The individual base verb plays a very important role (sometimes the most important role) in the interpretation of a given nominalization form, or in the choice of the morphological form.

Bottom line

- Predictions based on a single feature are not satisfactory.
- Categorical claims, as found in the literature, are clearly wrong.

What does this mean for
morphological theory?

Syntactic approaches

- Syntactic approaches like **Distributed Morphology** (DM) predict that ideally the association between morphological form, type of quantification, and eventivity ought to be categorical.
- Semantic nuances like count versus mass or eventive versus referential are encoded by adding functional projections or positioning nominalizers higher or lower in the syntactic structure
- Each combination of semantic nuances would require a different structural configuration with different functional categories and placements of nominalizers.
- The fewer the possible combinations, the neater the analysis.

Lexical Semantic approaches

- A purely lexical semantic approach like Lieber's **Lexical Semantic Framework (LSF)** predicts that ideally the association between morphological form, type of quantification and eventivity ought to be completely free.
- Different semantic interpretations are the result of underlying semantic underspecification and resolution of underspecification in context.
- If lexical semantic representations are highly underspecified and underspecification is resolved by context, then there should not be statistical preferences towards one combination of features or another.

Other possibilities

- Analogical modeling (e.g. A::M): well-suited for the task
No study available with semantic features
- Distributional semantics (Lapasa et al. 2018, Wauquier 2020): flexible, well-suited to deal with polysemy
No study available for English *-ing* and conversion nouns
- Watch this space 😊

Thanks for listening!

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Aspectual classes

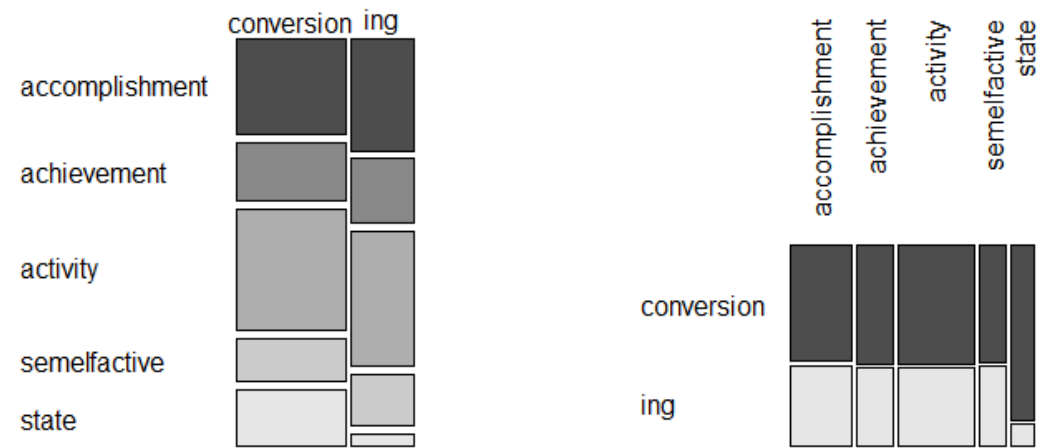


Figure 3: Morphology by aspectual class (N=3405)

Aspectual classes

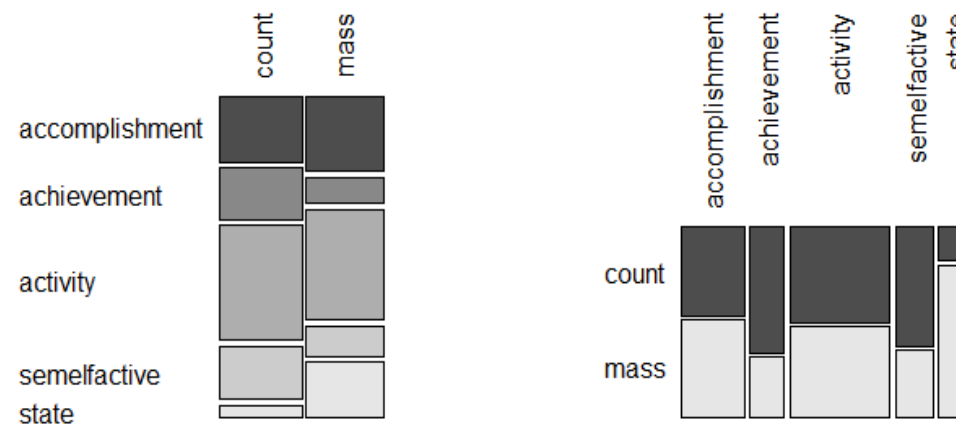


Figure 4: Quantification by aspectual class (N=1934)

Aspectual classes

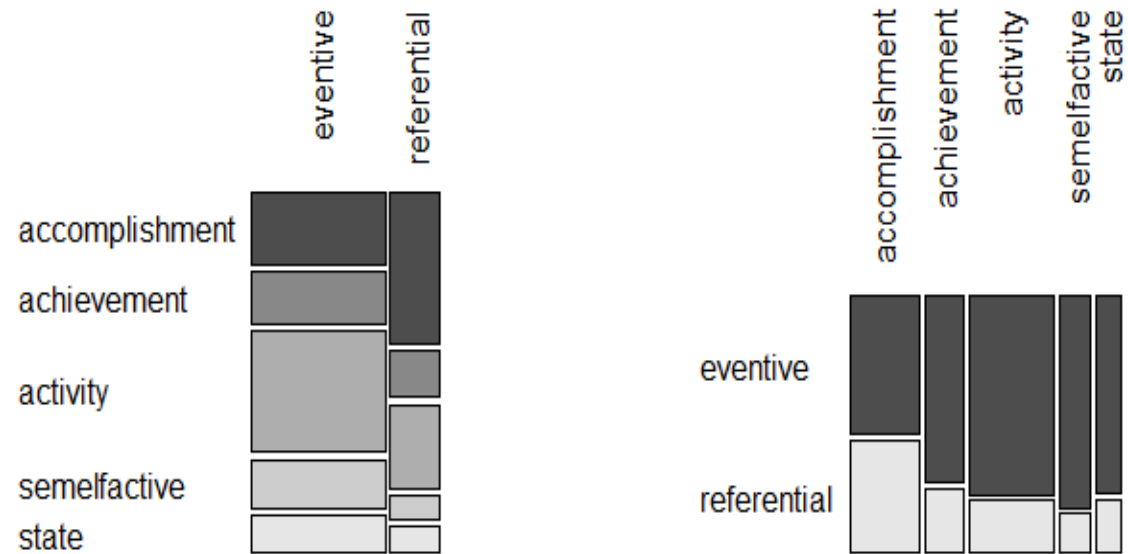


Figure 5: Eventivity by aspectual class (N=2568)