

A feature theory for lexical and functional categories

Lexical Categories

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Approaches to lexical categories.

What are nouns? What are verbs? What is their difference?

- ☐ Naïve notional approaches.
- ☐ Superficial morphological-distributional approaches.
- ☐ Lexical categories are *not* pigeonholes.
- ☐ Are nouns, adjectives and verbs prototypes?

Generative approaches

The Amherst system (Chomsky 1970; as revised in Jackendoff 1977)

[+N]	nouns, adjectives
[-N]	verbs, prepositions
[+V]	verbs, adjectives
[-V]	prepositions, nouns

Categorial *features*! Nice.

Cross-classification of categories! Cool.

But

What do values $[\pm N]$ and $[\pm V]$ stand for? Are these merely taxonomic labels?

Is this cross-classification even correct?

Stowell (1981) thought feature specifications define *natural classes*; as they should:

the [+N] categories project phrases where *of*-insertion applies in English,

the [-N] categories assign Case,

the [+V] categories can be prefixed with *un-*,

the [-V] categories can be clefted.

Stowell's is the first *explanatory* theory of categorial features. Alas, it is wrong.

The Déchaine (1993) categorial system

[Nominal]	<i>Adjective</i>
[Nominal] [Referential]	<i>Noun</i>
[Referential]	<i>Verb</i>
–	<i>Preposition</i>
[Functional] [Nominal]	<i>Kase</i>
[Functional] [Nominal] [Referential]	<i>Determiner</i>
[Functional] [Referential]	<i>Tense</i>
[Functional]	<i>Comp</i>

Similar in spirit to Stowell, but more refined and more complete.

The Baker (2003) categorial system: a mixed system.

	<i>semantic interpretation</i>	<i>syntactic behaviour</i>
[N]	sortality	referential index
[V]	predication	Specifier

Non-generative approaches

Langacker (1987):

Nouns conceptualise THING

Verbs conceptualise PROCESSES

Adjectives / adverbs conceptualise ATEMPORAL RELATIONS.

Emphasis on “conceptualise”.

Anderson (1997): categories are “**grammaticalisations** of cognitive – or notional – constructs”:

a feature P, standing for *predicability*

a feature N standing for the ability to function as an argument.

The resulting categories for English are the following:

{P}	auxiliary
{P;N}	verb
{P:N}	adjective
{N;P}	noun
{N}	name
{ }	functor

The (non-)universality of nouns and verbs.

Are nouns and verbs universal?

This is really *not* a good question. Replace with the following four questions:

- a. Does a language possess a noun *word class* and a verb *word class*?
- b. Do we find in a language extensive nominalisation of verbs (deverbal nouns *and* mixed projections) and extensive verbalization of nouns (denominal verbs)?
- c. Can all roots in a language become *both* nouns and verbs? If yes, then nouns and verbs are grammatical constructs, not (necessarily) word classes.
- d. Can all *lexical* elements can be used interchangeably in all contexts? (Baker 2003, sec. 3.9)

Only the last case would be an example of a language where a noun-verb distinction, and lexical categorization, are *pointless*.

Famous candidates: Salish, Tagalog, Riau Indonesian. Only for Nootka the answer to the last question is (possibly) yes.

By the way, verbs are not *really* a word class in Jingulu, Farsi, Japanese – and maybe *Turkish*. We need to stop thinking in terms of Greek and Latin *in this* respect.

Category as a matter of interpretive perspective.

Synthesising the Amherst-Stowell-Déchine perspective with the Langacker-Anderson one (via Baker):

Lexical category is a matter of fundamental interpretive perspective.
 These perspectives are encoded by categorial features.
 Therefore, categorial features are LF-intepretable.

Remember: conceptual categorization \neq linguistic categorization

Consider: although all physical objects are nouns cross-linguistically, not all nouns denote concepts of physical objects (D. Pesetsky, p.c.).

In other words, *rock* and *theory* cannot belong together in any useful, or even coherent, conceptual category.

However, there is a way in which *rock* and *theory* are treated the same by grammar, even if they share no significant common properties notionally.

This is what I call *fundamental interpretive perspective*.

This idea originates in Langacker (1987), Uriagereka (1999), Baker (2003, 293–94) and closely interacts with Acquaviva (2009), (2014).

Categorial features as LF-interpretable features.

The story:

[N] imposes a sortal perspective on the categoriser's complement at LF.
 [V] imposes an extending-into-time perspective on the categorizer's complement at LF.

Sortality: application *together with* identity (and individuation) – as implemented in Prasada (2008) and Acquaviva (2014).

Application: x applies to things of a certain kind, but not others

Identity: something which may replace A in the statement x is the same A as y

Extending into time (*not* predicativity / predicability) – following Uriagereka (1999) and Ramchand (2008, 38–42):

“both nouns and verbs correspond to mathematical spaces of various dimensions, the difference between them being whether those spaces are *seen as permanent or mutable*”.

Verbal constituents are inherently (sub-)eventive due to the temporal perspective contributed by the categorial feature [V].

Sortality will have to be associated with *individuation*, number, quantification etc. – realised as functional categories Number, Determiner etc.

‘Extending into time’ will be the seed of events and causation, and will require event participants, a way to encode length of event and relation between time intervals etc. – realised as an event projection / argument, Voice, Aspect, Tense.

Alternatively: ‘nouns lack temporal parts’ (Acquaviva 2014); [V] encodes abstract causation (Ilkhanipour 2013; cf. Darteni 2017, chap. 7).

Categorisers as lexical heads.

Assume a syntactic categorisation / syntactic decomposition framework – see Harley and Noyer (1998), Embick (2000), Alexiadou (2001), Folli, Harley and Karimi (2003), Arad (2003) and (2005), Folli and Harley (2005), Harley (2005a), (2005b), (2007), (2009) and (2014), Marantz (2005) and (2006), Embick and Marantz (2008), Lowenstamm (2008), Acquaviva (2009), Basilico (2008), Volpe (2009), Acquaviva and Panagiotidis (2012) and, in a slightly different framework but in considerable detail, Borer (2005), (2009) and De Belder (2011)

On the one hand we have functional heads, on the other roots.

n and v are typically analysed as functional heads – but this is due to the generalised confusion of what functional heads are (Panagiotidis 2011, 2015, chap. 5).

Categorisers host categorial features.

No functional head can categorise roots and root material – only categorisers.
Sub-categorial so-called “inner morphemes”, see Marantz (2000) and (2006), cannot categorise roots.

Roots themselves are a-categorial (categoryless).

You can build a derivation solely on categorisers, without roots. In this case categorisers behave as so-called *semilexical categories* (Corver and Riemsdijk 2001), such as ‘empty nouns’ (Panagiotidis 2003). See van Riemsdijk (1998), Haider (2001), and Schütze (2001).

Roots and subcategorial material are – syntactically speaking – optional: a well-formed syntactic representation can be constructed using just a categoriser and superimposed functional structure.

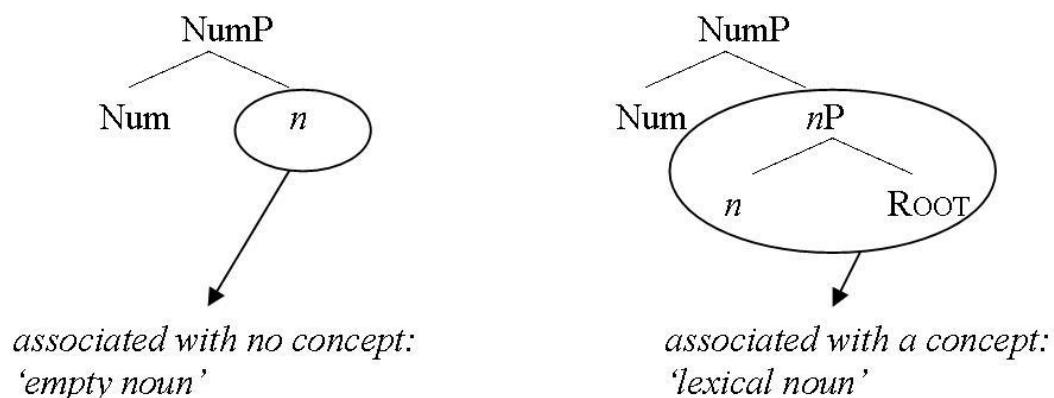
Categorisers are the only lexical heads. They either recategorise already categorised structures (i.e. *fantasy* → *fantasise*), or they categorise roots.

Why roots? What are they?

One of the first things linguistics looked at. Not as intuitively prominent as words, but a close second. The basic building blocks of words.

Since the advent of separationist / realisational theories, roots are a syntactically relevant class. Simple nouns and verbs involve root categorisation.

For instance, this how the picture for nouns looks like:



What are roots? How

I will loosely couch my discussion within Distributed Morphology: one of the few frameworks with concrete hypotheses about roots (also, Borer 2009).

Roots in Distributed Morphology are exceptional in four ways:

- category-neutral
- meaningful (although meaning is otherwise assigned late)
- phonologically identified (in spite of Late Insertion)
- syntactically active (syntactic nodes).

The content(lessness) of roots

Root content was until too recently a poorly-studied matter. Arad (2005, chap. 3), Borer (2009), Acquaviva & Panagiotidis (2012): roots are semantically impoverished / underspecified.

But why would we think that root meaning is impoverished / underspecified?

The general idea is that free (=uncategorised) roots are not appropriately / adequately specified to stand on their own as legitimate LF-objects. Syntax does not use some special operation to legitimize roots but embeds them within a categorizer projection (Panagiotidis 2011) – we will return to this.

But why are roots not “appropriately / adequately specified to stand on their own as legitimate LF-objects”?

Conceptual reason: if roots are meaningful, they are equivalent to verbs, nouns, adjectives – except for a label and/or vP, nP, aP structure (Acquaviva 2014): *DOG* vs *dog*.

For content

Looking at words derived from the same root, they seem to share a common conceptual core, cf. Hale & Keyser (1993), (2002); Rappaport Hovav & Levin (1998); Levin & Rappaport-Hovav (2005):

(1) *Well-behaved roots in English*

- _Nbutter _vbutter
- _Nland _vland
- _Ared _Nredness _vredden

Consider also the Hebrew root QLT (Arad 2005, 97)

(2) *Well-behaved roots in Hebrew: QLT*

Nouns:

miqlat ('shelter')
 maqlet ('receiver')
 taqlit ('record')
 qaletet ('cassette')
 qelet ('input')

Verbs:

qalat ('absorb', 'receive')
 hiqlit ('record')

An abstract common meaning core: 'keep, preserve'.

Even if semantically impoverished, a root contains the 'common semantic denominator' (Arad 2005, 4–6, 55–59, 271–74) of the words derived from it.

Content? Really?

Not all roots are like QLT: KBŠ (Aronoff 2007, 819)

(3) *Less well-behaved roots in Hebrew: KBŠ*

Nouns:

keveš ('gangway', 'step', 'degree', 'pickled fruit')
 kviš ('paved road', 'highway')
 kviša ('compression')
 kivšon ('furnace', 'kiln')

Verbs:

kibeš ('conquer', 'subdue', 'press', 'pave', 'pickle', 'preserve')
 kavaš (like *kibeš* plus 'store', 'hide')

Consider also the Greek root ESTH:

(4) *Less well-behaved roots in Greek: ESTH*

esth-an-o-me 'feel'
 esth-an-tik-os 'sensitive, emotional'
 esth-is-i 'sense'
 esth-is-az-mos 'sensuality'
 sin-esth-is-i 'realisation'
 esth-i-ma 'feeling'
 sin-esth-i-ma 'emotion'
 esth-it-os 'perceptible', 'tangible',
 esth-it-ir-ios 'sensory'
 esth-it-ik-os 'esthetic', 'beautician'

Or English conversion pairs like *egg, book, object...* or Italian METT:

(5) *Less well-behaved roots in Italian: METT*

mett-ere 'put'
 am-mett-ere 'admit'
 com-mett-ere 'commit'
 di-mett-ere 'dismiss / resign'
 pro-mett-ere 'promise'
 s-mett-ere 'quit'
 s-com-mett-ere 'wager'

Or even worse (Acquaviva and Panagiotidis 2012):

(6) *More instances of unruliness*

Swahili

class 11/4:	u-siku 'night'	
class 9/10:	siku 'day'	
class 3/4:	m-ti 'tree'	mi-ti 'trees'
class 7/8:	ki-ti 'chair'	vi-ti 'chairs'

Latin

malus 'apple tree' (fem)	malum 'apple' (neut)
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Italian

man-ic-o 'handle' (masc)	man-ic-a 'sleeve' (fem)
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Some roots are thicker than others?

Do we then get a scale (cf. Saab 2016) in which

- Some roots, like METT or KBŠ, are meaningless.
- Others, like QLT or NOM, seem to have some content – or to be polysemous until they are categorised (Marantz 2012) .
- Others, like SUGAR, seem to have a lot of and pretty concrete content, too?

Can we say that less specified roots give rise to crazier, more idiosyncratic word meanings and more specified roots to more 'compositional' ones? This essentially the claim in Alexiadou & Lohndahl (2017): languages like English have basically QLT and SUGAR type roots, whereas Semitic has KBŠ and QLT type roots. They also, like Saab (2016), draw a correlation between concreteness and unboundedness, like in the case of METT or English MIT.

But how is a native speaker / linguist to decide how much content a root has? She will have to look at words derived from it. All of them? some? which? How come the least 'productive' roots are the most concrete ones?

Consider the case of the word *laser*, derived from a root LASER (originally an acronym, 1957: "light amplification by stimulated emission of radiation"). It has a

concrete and rich meaning, but there are no other words derived from it, so we cannot really know. Having said that: *a laser stare, throw a laser*. Consider now the words derived from the Greek root ZAXAR.

(7) *Sugar?*

zaxar-i	'sugar'
zaxar-o	'diabetes', 'blood sugar'
zaxar-en-ios	'made of sugar' (not 'sweet')
zaxar-ux-o	'dulce de leche' (a substantivized adjective: 'having sugar')
zaxar-on-o	'crystallize (for edibles)', 'leer at something', 'get turned on' (lexical gap!)

Roughly: the greater the number of words derived from a root, the smaller / vaguer its 'content'. In other words:

- (8) The illusion of root concreteness is created by the fact that very few words are derived from it.

We will return to this. Until then, yes: ***the unit of lexical semantics is the word, never the root.***

"Words have morphological structure even when they are not compositionally derived, and roots are morphologically important entities, [even] though not particularly characterized by lexical meaning."
(Aronoff 2007, 819)

Radically against root content

What is all roots are completely meaningless in isolation (Acquaviva 2009; Borer 2009; Acquaviva and Panagiotidis 2012; Harley 2014; Panagiotidis 2014).

Let's flesh this out:

- (9) Roots don't identify word-specific, non-structural meaning.

Roots can have a meaning only in a particular grammatical context: category, affixes, particles etc. Consider the Greek root *nom-*:

[_{nP} nom-os]	'law'
[_{vP} nom-iz-]	'think'
[_{nP} [_{vP} nom-iz-] ma]	'coin, currency'
[_{σP} ne- [_{vP} nom-iz-] men-]	'legally prescribed'

Roots acquire meaning within grammatical structure, but not necessarily the structure projected by the categoriser:

- Borer (2003): same root, different ontological typing (event, object), different syntax:

collection ₁	'the frequent collection of mushrooms by Eric' (process)
collection ₂	'let me show you my collection of stamps' (result)

- Acquaviva (2009): same root, different types, different derivations:
 - argu-ment₁ ‘logical category’
 - argu-ment₂ ‘event of arguing’
 - argu-ment-al ‘relative to argument₁, #argument₂’
- Acquaviva & Panagiotidis (2012): lexical meaning may be expressed through inflectional means:

membro (masc) ‘member’
 Pl. (masc) *membri* ‘members’
 Pl. (fem) *membra* ‘limbs’
è mancato pres perf. ‘was missed’: ‘died’
mancava ‘was missing’ NOT ‘was dying’
nero (‘water’) – *nera* (‘rain’) (Cypriot Greek)

Roots have no content in isolation. They are not like shadows of words or stem-like ‘partial’ words.

Free roots are meaningless; they do not contain a fragment or a shadow of lexical meaning. We cannot do lexical semantics with roots – already in Arad (2005, 57–71).

Late Insertion for roots, too

The original formulation of ‘root’ is morphological. Roots are standardly understood as ‘forms’.

Aronoff (1994, 40): a root is what remains after all the morphology has been wrung out of a form.

Borer (2009): roots can be identified on the basis of their form (also given that they have no content...).

The idea that roots *are* forms is quite persistent, even in separationist frameworks like Distributed Morphology:

Roots are inserted early, complete with their form or as forms; Vocabulary Items undergo Late Insertion.

Conceptually, this is a problem, already noticed by Emonds (1985), (2000).

Empirically, too.

So, Borer (2009) says we can identify roots on the basis of their form *only* (they are contentless, right?)

Let's look at *nom-*. Look at some words containing a form “nom-“:

(10) *Of sewers and laws*

<i>nóm-os</i>	‘law’
<i>nom-ós</i>	‘prefecture’
<i>nom-i</i>	‘distribution’, ‘grazing’
<i>ypo-nom-os</i>	‘sewer’
<i>nom-arx-is</i>	‘prefect’
<i>astr-o-nom-ia</i>	‘astronomy’
<i>nom-ik-os</i>	‘legal ₁ , juristic’
<i>nom-im-os</i>	‘legal ₂ , lawful’
<i>para-nom-os</i>	‘illegal, outlawed’
<i>nom-o-thet-o</i>	‘legislate’
<i>nom-iz-o</i>	‘think, believe’
<i>nom-iz-ma</i>	‘coin’, ‘currency’

How many roots? Form is no (safe) criterion to identify roots for native speakers and/or linguists...

Consider now these well-known cases:

(11) *Root suppletion?*

be / was / were / is / are / was / were
go / went

Embick & Marantz (2008) explain such cases away as cases of functional allomorphy with no roots involved.

Still:

- What about French *oeil / yeux*? Look at the extensive discussion on true root allomorphy in Harley (2014).
- What about extensive Greek verb stem allomorphy? (‘paradigm defectivity’, but...)
- What about *will* the verb, the noun and the future marker?

And so on...

Late insertion of morphological and phonological features (Vocabulary Items) for roots, too: Galani (2005, chaps. 5 & 6); Siddiqi (2006, chap. 3); Haugen (2009).

Roots are not their forms. Two (or more) forms (Vocabulary Items) may be matched with a single root:

EYE <—> oeil
EYE, [Num: Plu] <—> yeux

The form *will* can be inserted either in a root slot or in a [Tense: future] one. And so on.

Consequences of Late Insertion:

- Roots ≠ morphological realization of roots.
- Morphological forms of roots may display *apparent* categorial specifications (e.g. noun only).
- They may abide by (morphological) constraints on their form (e.g. declension classes, three-consonant skeleton).
- Morphological forms matched with roots may also spell out functional terminals and semi-lexical categories

Roots as indices

Let's quite neutrally identify a root as "a syntax-internal criterion of lexical identity, so that two otherwise identical syntactic constructions count as different formal objects if they differ in the root, and as identical (that is, tokens of the same type) if the root is the same" (Acquaviva and Panagiotidis 2012, 11).

Roots are *featureless* indices serving as such a syntax-internal criterion of lexical identity. We can think of them as numeric indices.

Harley (2014, 242) says that "The root terminal node elements [...] can thus be notated as $\sqrt{279}$, $\sqrt{322}$, $\sqrt{2588}$, etc."

Maybe we can take this numerical notation a bit more seriously and, possibly, literally, thinking of roots as "the hijacking of the successor function by the Faculty of Language" (Richard Larson, p.c.) – see Panagiotidis (2014, 424–26).

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