When roots license and when they respect semantico-syntactic structure in verbs

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Roots. Word formation from the perspective of "core lexical elements".
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Introduction

In this talk I will present a way of constructing DRT-based semantic representations of verbs from specifications of their roots.

• I assume three basic types of roots.
  (a) event type denoting roots √arbeit (work), √steig (rise), √tauch (dive)
  (b) property denoting roots and √full (full), √leer (empty), √schließ (close)
  (c) sortal roots: material objects, e.g. √deck (cover), √lad (load); spatial regions, e.g. √ort (location) configurations; e.g. √stapel (pile); laws, e.g. √regel (rule), etc.

• The sort of entity types denoted by a root makes it suitable for selection by v(erbal), a(djectival), or n(ominal) functional heads. They may also enter other configurations.

• In verbal constructions all roots serve to specify the functional v-head in a number of different ways on many routes. The three types of roots either license or respect structure, in particular argument structure. In the first part of the talk I will show how they do this.

• A restricted set of roots, with appropriate encyclopaedic properties, may merge directly [Embick (2004)], leading to the syntactic and semantic structures of unergative and non-core-transitive verbs, [Levin (1999)], [Marantz (2005)].
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- A restricted set of roots, with appropriate encyclopaedic properties, may MERGE with the functional verbal head **directly** [Embick(2004)], leading to the syntactic and semantic structures of unergative and non-core-transitive verbs, [Levin(1999)], [Marantz(2005)].
simple eventive roots, unergative verbs

arbeit(en)  
(to work)

(i)  

(ii)  

(iii)  

\[
\begin{align*}
\text{vP} & \quad \text{vP} \\
\text{v} & \quad \text{v} \\
\sqrt{\text{arbeit}} & \quad \sqrt{\text{arbeit}_1} \\
\end{align*}
\]

\[
\begin{align*}
\text{vP} & \quad \text{vP} \\
\text{v} & \quad \text{v} \\
\sqrt{\text{arbeit}} & \quad \sqrt{\text{arbeit}_1} \\
\text{agent} & \quad \text{agent} \\
\text{voice'} & \quad \text{voice'} \\
\text{voice} & \quad \text{voice} \\
\sqrt{\text{arbeit}+v_i} & \quad \sqrt{\text{arbeit}+v_i} \\
\end{align*}
\]
simple eventive roots, unergative verbs

*Arbeitung

(i) v introduces a binding condition for the referential argument e'
(ii) e' is a process the root’s event predicate applies to e': e' is substituted for e.
(iii) vP external subject

Morpho-phonological form via MOVE

HEAD MOVEMENT CONSTRAINT

[Baker(1988)]

An X₀ can only move into an Y₀ which properly governs it

Interpretation via MERGE

[Baker(1988)]

An X₀ can only move into an Y₀ which properly governs it
relational eventive root, unaccusative verbs

der Drachen steig(en)
the kite move upwards

(i)  
\[
\text{comp} \quad \text{r} \\
\text{der Drachen} \quad \sqrt{\text{steig}}
\]

(ii)  
\[
\text{v/vP} \\
\text{rP} \quad \text{v} \\
\text{comp} \quad \text{r} \quad \sqrt{\text{steig}}_1 \quad \text{v} \\
\text{der Drachen} \quad \text{t}_1
\]

*die Steigung des Drachens

\[
\begin{align*}
\langle e', \rangle \\
\text{kite(y)} \\
\text{MOVE}(e',y) \\
\text{ALIGN}(e',\text{VERT})
\end{align*}
\]

\[
\begin{align*}
\langle y, \rangle \\
\text{kite(y)} \\
\text{MOVE}(e,y) \\
\text{ALIGN}(e,\text{VERT})
\end{align*}
\]

\[
\langle y, \rangle \\
\text{kite(y)} \\
\text{MOVE}(e,y) \\
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\langle e', \rangle \\
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\begin{align*}
\langle e', \rangle \\
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\text{MOVE}(e,y) \\
\text{ALIGN}(e,\text{VERT})
\end{align*}
\]

(i) the DP's referential argument y in comp is substituted for y in rP.

(ii) the verbaliser's e' is substituted for e of rP.
relational eventive root, unaccusative verbs

*der Drachen steig(en)*
the kite move upwards

(i)

```
  rP
    comp  r
     /   \
der Drachen  √steig
```

(ii)

```
  v/vP
   rP  v
     /  /  
  comp r  v
     /   /  
der Drachen  √steig
        /  / 
t1 1
```

MOVE head movement

MERGE
(i) the DP’s referential argument y in comp is substituted for y in rP
(ii) the verbaliser’s e’ is substituted for e of rP.
property roots
Johnny Depp füllte die Kinokassen (mit Geld)
' J.D. filled the cinemas’ tills (with money)'

die Füllung der Kinokassen

(i)                  (ii)
   rP   
Kinokassen  √full  
   rP   
Kinokassen  t1  √full1  v

MOVE: Introduce an eventuality $s$ with the condition
' $s$:FULL(Y) '$ (s consists in Y being full).
Interpret MOVE as an (anti)-causative construction: 'e' CAUSE s'
property roots

Johnny Depp füllte die Kinokassen (mit Geld)
' J.D. filled the cinemas’ tills (with money)'

die Füllung der Kinokassen

(i)

Kinokassen
\(\sqrt{\text{full}}\)

(ii)

Kinokassen
\(t_1\)
\(\sqrt{\text{full}}_1\)
\(v\)

MERGE: Introduce an eventuality \(s\) with the condition
' \(s: \text{FULL}(Y)\)' (\(s\) consists in \(Y\) being full).

MOVE

Interpret MERGE as an (anti)-causative construction: '\(e' \ CAUSE s'"

- An (anti)-causative verbal construction is bi-eventive [Marantz(2005)], and per hypothesis, constructions which project causative relations are always bi-eventive.
sortal roots

Morpho-phonological form by MOVE.

*den Kopf bedecken*
'cover the head'

(i) \[ PP=SC \]
\[ \quad \text{den Kopf} \quad P' \]
\[ \quad \text{P} \quad \sqrt{\text{deck}} \]
\[ \quad \text{be} \]

(ii) \[ PP=SC \]
\[ \quad \text{den Kopf} \quad P' \]
\[ \quad \text{P} \quad \sqrt{\text{deck}} \]
\[ \quad \text{t} \]
\[ \quad \text{be} \]

(iii) \[ PP=SC \]
\[ \quad \text{den Kopf} \quad t \]
\[ \quad \text{be}+\sqrt{\text{deck}} \]
\[ \quad v \]
sortal roots

Interpretation by MERGE

den Kopf bedecken
’cover the head’

\[ \text{vP} \]
\[ \langle s, \text{s: HAVE}(y,v) \text{ FUNCT-AS-COVER}(v) \rangle ; \langle e', \text{head}(y) \text{ e’ CAUSE s} \text{ s: HAVE}(y,v) \text{ FUNCT-AS-COVER}(v) \text{ s}^0 \supset \subset e’ \rangle \]

\[ \text{den Kopf fi y head(y)} \]
\[ \langle y, \text{head}(y) \rangle \]

\[ \text{P’} \]
\[ \langle y, v \text{ FUNCT-AS-COVER}(v) \text{ HAVE}(y,v) \rangle \]

\[ \text{P} \]
\[ \langle z, y \text{ HAVE}(y,z) \text{ FUNCT-AS-COVER}(v) \rangle \]

\[ \text{v \sqrt{deck} v} \]
\[ \langle z, y \text{ HAVE}(y,z) \text{ FUNCT-AS-COVER}(v) \rangle \]

\[ \text{den Kopf fi y head(y)} \]
\[ \langle y, \text{head}(y) \rangle \]
The examples above are instances of productive verb formation patterns.

Simple and relational eventive roots denote event-types to be predicated of an event introduced by \( v; \) \((v\text{-modification})\). This yields mono-eventive structures. No \(-ung\)-nouns.

Property-roots and prepositional heads license structure for internal arguments. They create argument slots to be filled in \( r(oot)Ps \) which they head and provide the basis for bi-eventive structures.

Sortal roots introduce arguments that must be related to some other argument in the verbal structure. Thus they typically fill argument slots created by prepositional heads.
direct MERGE with a property root, \( \sqrt{\text{full}} \)

**bi-eventive**
Johnny Depp füllte die Kinokassen (mit Geld)
’J.D. filled the cinemas’ tills’
That what J.D. did caused the result state of the tills being full, which is an intrinsic part of the predication expressed by the bi-eventive structure. This causal relation takes many forms and need not be in the control of the agent.
Let’s call this ‘non-control CAUSE’.

**mono-eventive**
Johnny Depp füllte Geld in die Kinokassen
’J.D. poured money into the cinemas’ tills’

Surprise: J.D. has a bucket full of coins and small notes and pours them into tills.
The description provided by the mono-eventive structure does **not** entail that the tills are full. J.D can stop pouring at any point without thereby making the description invalid.
direct MERGE with a property root, √full

**bi-eventive**
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- Result state conditions of bi-eventive descriptions are an intrinsic part of the description.
direct MERGE with a property root, √full

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• Result state conditions of bi-eventive descriptions are an intrinsic part of the description.

• Result state conditions of mono-eventive descriptions are inferred.
direct MERGE with a property root, √full

- mono-eventive verbal descriptions build on unergative syntactic structures

  die Kellnerin stellte zwei Gläser hin und fing an, den Tequila einzufüllen und füllte, und füllte. (Google)

  the waitress placed two glasses and started [ filling [in(to)] ] the tequila and poured and poured
direct MERGE with a property root, $\sqrt{\text{full}}$

- mono-eventive verbal descriptions build on unergative syntactic structures
  
  \textit{die Kellnerin stellte zwei Gläser hin und fing an, den Tequila einzufüllen und füllte, und füllte}. (Google)
  
  the waitress placed two glasses and started [ filling [in(to)] ] the tequila and poured and poured

- In this construction $\sqrt{\text{full}}$ does not license an argument slot.
direct MERGE with a property root, √full

- mono-eventive verbal descriptions build on unergative syntactic structures
  *die Kellnerin stellte zwei Gläser hin und fing an, den Tequila einzufüllen und füllte, und füllte.* (Google)
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- In this construction √full does not license an argument slot.

- Still, it is the same root. So some kind of modification must have taken place. I will assume that this modification is a case of coercion. The coercion operation can be seen as one of 'zooming in'.

Assume the following situation: The waitress intends a glass to become full of Tequila. She starts pouring Tequila into it and stops when the glass is full.

*The waitress filled a glass (with Tequila)* truthfully describes the entire action.

*The waitress filled and filled* truthfully describes any stretch of pouring, between when she starts and when she stops.

Termination conditions may come from other sources, e.g. through adjunction of a quantized direct object phrase like *two deciliters of Tequila.*
direct MERGE with a property root, √/full (full)

The semantics of mono-eventive *füllen* derives from that of bi-eventive *füllen*: Because of its structure, mono-eventive *füllen* describes (agent-controlled) activities. The properties of these activities are those of the prototypical agentive instances of bi-eventive *füllen*. This entails that the activities instantiating mono-eventive *füllen* involve pouring by the agent of fluid or granulated material.

**bi-eventive**
- dir. object y qualifying as FULL;
- mit-phrase: stuff that y is 'full of'

**Das Zimmer mit Rauch füllen**
(to fill the room with smoke)

**eine Gans mit Äpfeln füllen**
(to fill the goose with apples)

**einen Sack mit Äpfeln füllen**
to fill a bag with apples

**mono-eventive**
- goal-DP y may qualify as FULL
direct object: stuff that y is 'full of'
- stuff that can be poured in a literal sense.

*Rauch in das Zimmer füllen*  
(lit: fill smoke into a the room)

*Äpfel in die Gans füllen*  
(lit: fill apples into the goose)

√ *Äpfel in einen Sack füllen*  
(lit: fill apples into a bag)
direct merge with a property root, √leer (empty)

- This additional restriction on direct objects is typical for verbal constructions built from property roots via direct merge.

\[ \text{etwas leer} \quad \text{Leerung} \]
\[ \text{bi-eventive} \]
\[ \text{dir. object } y \text{ qualifying as EMPTY} \]

\[ \text{etwas aus}_{\text{prtc}} \text{leeren}, \ast \text{Ausleerung} \]

\[ \text{mono-eventive} \]
\[ \text{dir. object } y \text{ may qualify as EMPTY} \]
\[ \& \quad y \text{ can be directly manipulated by an agent} \]
\[ \text{das Glas} / \text{den Eimer ausleeren} \]
\[ \text{(to empty [out] the glass / the bucket)} \]
\[ \ast \text{die Rohre} / \ast \text{die Blase ausleeren} \]
\[ \text{(lit: to empty [out] the pipes / the bladder)} \]
direct MERGE with a property root √schließen (close)

etw. schließen, Schließung
(to close s.th.)

etw. auf_prclschließen, *Aufschließung
(lit: to 'close” s.th. open)
etw. ab_prclschließen *Abschließung
(lit: to close s.th. so that is is inaccessible),
zu_prctlschließen, *Zuschließung
(lit: to close s.th. so that it is shut),

bi-eventive constructions with
√schließen

admissible dir. obj.: those that denote entities that can be closed

den Kreis (the circle), die Augen (the eyes), den Spalt (the fissure) schließen (to close)
die Truhe (the chest), die Tür (the door), schließen
What triggers coercion of the property root in direct \textsc{merge}? This is the requirement imposed by the \textit{v}-head. The \textit{v}-head introduces an eventuality which is a homogenous process. The property root can act as a predicate of this process if it is re-interpreted as the distinctive property (or set of properties) of the prototypical events described by the bi-eventive structure built from the root.

The resulting predication of the process doesn’t entail any culmination. The mono-eventive structures built using direct \textsc{merge} can often be extended to particle verb structures. Such particle verbs often have culminations: in these cases it is the particle which contributes the culmination.
direct MERGE and non-monotonicity

- What restricts coercion of the property root in direct MERGE?
  Surprise: The set of property roots that undergo coercion is restricted to inherently relational and universal properties.
  ✓ full (full) (all parts of the argument have stuff in them);
  ✓ leer (empty) (all parts of the argument have no stuff);
  ✓ schließen (close) (all gaps/holes in the argument are blocked);
  Engl. ✓ clean ([Levin(2009)]) (all parts of the argument are free from dirt;)
  Note: ✓ offen (open) is not universal: some gaps/holes in the argument are not blocked.
  There are no particle verbs ending on öffnen.
  (In particular: *auföffnen vs. zuschließen, abschließen).
Recall: **bi-eventive** *füllen*

**Kinokassen füllen** (Füllung d. K.k.)

**mono-eventive** *füllen*

sie füllte und füllte

---

$v$ requires specifying conditions for the process $e'$; the root $\sqrt{\text{full}}$ cannot satisfy the requirement per se; the root $\text{FULL}$ can act as a predicate of $e'$, if it is reinterpreted as "manner" in the way described above. (Note: The root’s argument slot $y$ is filtered out).
prtcP or direct object PP- adjuncts above directly merged $\sqrt{\text{fill}}$

*Tequila (in ein Glas) [ein]$_{\text{prtc}}$füllen*

to fill [in]$_{\text{prtc}}$ tequila (into a glass)

$vP$

$\text{prtcP}$

$\text{e: go tequila into glass}$

$v/vP$

$\langle e', \text{FULL}(e') \rangle$

$v$

$\sqrt{\text{full}}$

$\langle e', \text{FULL}(e) \rangle$
Johnny Depp füllte Geld in die Kinokassen
’J.D. poured money into cinemas’ tills’

prtcP or direct object as PP adjuncts above directly merged √full
Intermediate summary

- The interpretation of direct **MERGE** of v with a property root respects the following requirements:
  (i) e’ is an intentional action. This is the only option left when vP is not bi-eventive, since the subject is not licensed by the complement of v.
  (ii) e’ is atelic.
  (iii) Direct objects can arise only through adjunction to vP of a prepositional head or particle head. These direct objects must be related to the process introduced by v as participants of the prototypical events described by the bi-eventive structure.
Intermediate summary

• The interpretation of direct \textsc{merge} of \(v\) with a property root respects the following requirements
  (i) \(e'\) is an intentional action. This is the only option left when \(vP\) is not bi-eventive, since the subject is not licensed by the complement of \(v\).
  (ii) \(e'\) is atelic.
  (iii) Direct objects can arise only through adjunction to \(vP\) of a prepositional head or particle head. These direct objects must be related to the process introduced by \(v\) as participants of the prototypical events described by the bi-eventive structure.

• In a configuration where the property root is the head of a \(r(oot)P\) the root \underline{licences} argument structure (the argument slots it introduces into the structure). In mono-eventive structures the root only \underline{respects} constraints. These are imposed as part of coercion from a property to a "manner" root.
More of the same: direct *MERGE of v with sortal roots

In bi-eventive verbal structures of the 'load-alternation type' the same strengthening of selection restrictions can be observed:

*den Kopf (mit einem Tuch) bedecken, Bedeckung des Kopfes

bi-eventive
dir. obj.satisfies has cover(y);
DP in mit-phrase must be the cover of y as a result of e'

• den Boden mit einer Plane/ einem Teppich bedecken
(to cover the ground with a tarpauline / rug)
*den Boden mit Wasser / mit Krümeln bedecken
(to cover the ground with water / with crumbs)
die Hand mit Küssen bedecken
(to cover the hand with kisses)

* ein Tuch über den Kopf decken
* Deckung des Tuches
*Deckung des Tuches

mono-eventive
dir. obj. functions as cover of the prepositional object after e' & must be a simple 2dimensional object before and during e'
eine Plane / einen Teppich über den Boden decken
(lit: to cover a tarpauline )

*Wasser über den Boden decken,
(*Krümel über den Boden decken)

* Küssie über die Hand decken
direct MERGE and event structure

**bi-eventive**
- dir. object satisfies \textsc{has load(y)}
- DP in \textit{mit}-phrase: satisfies \textsc{functions as load’(v)}

\begin{itemize}
  \item \textit{den Wagen mit Heu (be-)laden}, (to load the wagon with hay)
  \textit{(die (Be)ladung des Wagens)}
  \textit{den Kondensator mit Spannung laden} (to charge a condenser with voltage)
\end{itemize}

**mono-eventive**
- dir. obj. satisfies \textsc{functions as load’(v)} & can be manipulated directly
- \textit{Heu auf den Wagen laden} (to load hay onto the wagon)
  \textit{(*die Ladung des Heus)}

\* \textit{Spannung in den Kondensator laden} (lit: to load voltage into the condenser)

This restriction indicates that the alternates on the right involve mono-eventive structures obtained via direct MERGE with a reinterpreted sortal root.
direct MERGE with sortal roots

What triggers coercion?
A sortal root can act as event predicate provided if it is coerced into one.
For instance, the analysis of *eine Plane über den Boden decken* (lit: to cover a
tarpauline over the ground) involves coercing the sortal root $\sqrt{\text{deck}}$ into denoting an
event property that is shared by all prototypical activities leading to their having a cover.
A similar focus on prototypical events is involved in the anlysis of *graben* (to dig).
*graben* has a mono-eventive structure that can be obtained via coercion of a sortal root
$\sqrt{\text{grab}}$ to an event predicate. (This sortal root enters as sortal root into the prefix-verb
*begraben* (*to bury s.o. or s.th.*) and *untergraben* (*to make a hole under s.th.*).
Similar effects can be observed for verbal constructions involving roots such as
$\sqrt{\text{lad}}$ (*load*),
$\sqrt{\text{deck}}$ (*cover*),
$\sqrt{\text{pflaster}}$ (*pavement*),
$\sqrt{\text{pflanz}}$ (*plant*).
Here too the restrictions governing the verbs in question can be explained as the basis of
the coercion of the root into a prototypical process predicate.
direct MERGE with sortal roots

Verbs like *(ein Schiff) be-mannen* (to man a ship),
*einen Soldaten besolden*, (to pay a soldier),
*jdm. (sich) kleiden* (to dress),
do not show such restrictions, thus are presumably built as bi-eventive structures, into which the sortal roots √mann, √sold, √kleid enter as sortal roots (i.e. without v-modification).
I conjecture that *absteigen* (lit. 'rise down') is the result of a reinterpretation of the root $\sqrt{steig}$ as a pure event predicate which has lost its argument slot for the internal subject. This reinterpretation involves the extraction of the manner-like properties of prototypical agentive instances of *steigen*, much as we saw in our analysis of mono-eventive *füllen* etc.
Conclusions

This is a case study of the contribution of a small selection of roots in 'expected' and 'unexpected' verbal constructions. The central results are:

• The 'unexpected' constructions are much more restricted in their applications than the 'expected' constructions.

• It is the semantics of the roots as it manifests itself in the coerced transition from property or sortal roots to event predicates that is responsible for these restrictions.

• The explanation of the contribution draws heavily on (a) principles of semantic decomposition in syntax as proposed by [Marantz(2005)], i.e. bi-eventivity as opposed to mono-eventivity; and (b) the idea of 'direct' merge, mentioned in [Embick(2004)].

• The syntactic structures built according to these principles allow for the systematic compositional construction of logically transparent semantic representations.
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