

# Nominalizations as a window into the structure and analysis of participles

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## 1 Introduction

- Starting point of this talk: word formation is entirely syntactic and there is no generative lexicon (as in Distributed Morphology, Nanosyntax, Exoskeletal Syntax,...)
- Corollary of the lack of a generative lexicon is the principle of containment: “the analysis and structures proposed for a form must also be contained within the analysis of any structure derived from that form” [Harley, 2009, p. 320]
- In this talk, I argue that the containment principle enforces a distinction between “high” German participles derived above vP and “low” German participles derived below vP.

## 2 Basic Data: Word formation in German

### 2.1 Prefix-Verbs

- I consider constructions from the German root  $\sqrt{mal}$  (‘spot’, ‘mark’).
- Insertion of  $\sqrt{mal}$  into a verbal structure derives the verb *malen* (‘to paint’) (1-a), insertion into a nominal structure the noun *Mal* (‘mark’) (1-b).

- (1)    a.    Peter malt eine Blume.  
          Peter paint a flower  
          ‘Peter is painting a flower.’
- b.    Das Mal des Bösen  
              the mark of the evil  
              ‘the mark of the devil’

- German has a productive system of prefixation; e.g.  $\sqrt{mal}$  can be combined with the prefix *be* which is productive in particular for nominal structures.
- German *be-* roughly functions like *be-* in old English *begifted*, *benighted*, *bewigged*, *becharmed*
- $\sqrt{mal+be}$  derives the verb *bemalen* (‘to bepaint’) as in (2).

- (2)    Peter bemalt die Wand.  
          Peter be.PREFIX.paint the wall  
          ‘Peter is be-painting the wall.’

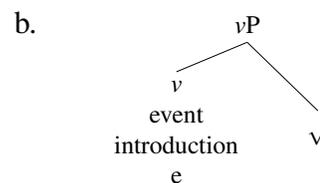
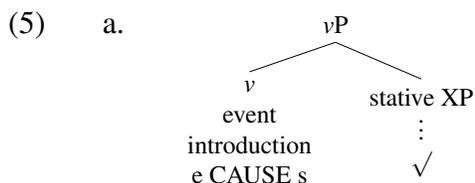
### 2.2 Nominalizations

- Constructions from  $\sqrt{mal+be}$  but not unprefixated constructions from  $\sqrt{mal}$  can be suffixed with the productive nominalizer morpheme *ung*.

(3) \*Die Malung  
the paint.ung.NMLZ  
'the painting'

(4) Die Bemalung  
the be.PREFIX.paint.ung.NMLZ  
'the be-painting'

- According to containment, the structure and analysis of  $\sqrt{mal+be}$  must be contained in the structure and analysis of  $\sqrt{mal+be+ung}$ .
- *ung*-nominalization requires a bi-eventive (5-a) but not mono-eventive (5-b) input structure [Roßdeutscher and Kamp, 2010].



⇒ The verb *bemalen* but not the verb *malen* has a bi-eventive construction type.

- (Note: I am agnostic with respect to whether or not the encyclopedic meaning of roots like  $\sqrt{mal}$  must be the same in (5-a) and (5-b))

### 2.3 Sortal ambiguity

- One and the same surface form derived from  $\sqrt{mal+be+ung}$  can mean quite different things in different contexts

- (6) a. Die Bemalung der Wand wurde unterbrochen.  
the be.PREFIX.mark.ung.NMLZ of the.GEN wall was interrupted.EVENT  
'The be-painting of the wall was interrupted.'
- b. Die Bemalung der Wand besteht unverändert fort.  
the be.PREFIX.mark.ung.NMLZ of the.GEN wall persist.STATE unchanged on  
'The be-painting of the wall persists unchanged.'
- c. Die Bemalung der Wand wurde entfernt.  
the be.PREFIX.mark.ung.NMLZ of the.GEN wall was removed.MATERIAL  
'The wall painting was removed.'

- In (6-a), the verb *unterbrechen* ('to interrupt') selects for direct objects that denote an event, as only events can be interrupted.
- In (6-b), the verb *fortbestehen* ('to persist') selects for a state denotation of fillers of its direct object argument slot and thus *Bemalung* denotes a state.
- In (6-c), the verb *entfernen* ('to remove') selects for material properties of the denotation of *Bemalung*.
- *ung*-nominalizations regularly exhibit sortal ambiguity [Bierwisch, 1989, Ehrich and Rapp, 2000, Roßdeutscher, 2010, Roßdeutscher and Kamp, 2010].
- If there is no generative lexicon, the sortal ambiguity of *Bemalung* cannot be analyzed as a 'lexical' ambiguity.
- Instead, the sortal ambiguity of *Bemalung* must be reconstructed in a way such that the different denotations of *Bemalung* correspond to different syntactic analyses of *Bemalung*.

- According to containment, the different structures of *Bemalung* that derive the different readings of *Bemalung* must be intergradient, i.e. derived from each other in hierarchical order.

## 2.4 Semantic Containment

- Diagnosis of the hierarchy of semantic containment with copredication

(7) Die Bemalung<sub>1</sub> der Wand war anstrengend. Sie<sub>1</sub> bestand  
 the be.PREFIX.mark.ung.NMLZ the.GEN wall was exhausting.EVENT. It persist.STATE  
 jahrelang. Sie<sub>1</sub> wurde entfernt.  
 for years. It was removed.MATERIAL.  
 ‘The be-painting of the wall<sub>1</sub> was exhausting. It<sub>1</sub> persisted for years. It<sub>1</sub> has been removed.’

- In (7), the event denotation of *Bemalung* serves as the antecedent of an anaphoric construction that selects for a state denotation and for an anaphoric construction that selects for a material property denotation of *Bemalung*.
- If *Bemalung* is introduced as the direct object of a predicate that selects for a state denotation as in (8), *Bemalung* cannot function as the antecedent of an anaphoric construction that selects for an event (8-a) but only as the antecedent of an anaphoric construction that selects for a material property denotation (8-b).

(8) a. \*Die Bemalung der Wand<sub>1</sub> bestand jahrelang. Sie<sub>1</sub> war  
 the be.PREFIX.mark.ung.NMLZ the.GEN wall persist.STATE for years. It was  
 anstrengend.  
 exhausting.EVENT  
 ‘The be-painting<sub>1</sub> of the wall persisted for years. It was exhausting.’

b. Die Bemalung<sub>1</sub> der Wand bestand jahrelang. Sie<sub>1</sub> wurde  
 the be.PREFIX.mark.ung.NMLZ the.GEN wall persist.STATE for years. It was  
 entfernt.  
 removed.MATERIAL  
 ‘The be-painting of the wall<sub>1</sub> persisted for years. It<sub>1</sub> was removed.’

- If *Bemalung* is introduced in a context that selects for a material object, *Bemalung* cannot serve as the antecedent of anaphoric constructions that select for events, see (9).

(9) \*Die Bemalung<sub>1</sub> der Wand wurde renoviert. Sie<sub>1</sub> war  
 the be.PREFIX.mark.ung.NMLZ the.GEN wall was renovated.MATERIAL. It was  
 anstrengend.  
 exhausting.EVENT.  
 ‘The wall be-painting<sub>1</sub> was renovated. It<sub>1</sub> was exhausting.’

- If *Bemalung* is introduced in the context of a predicate that selects for a material object, it cannot serve as the antecedent of an anaphoric construction that selects for a result state, see (10).

(10) \*Die Bemalung<sub>1</sub> der Wand trocknete nicht. Sie<sub>1</sub> bestand jahrelang.

the.be.PREFIX.mark.ung.NMLZ the.GEN wall dried.MATERIAL not. It persist.STATE for years.  
 ‘The wall be-painting<sub>1</sub> did not dry. It<sub>1</sub> persisted for years.’

- Semantic containment is asymmetric: an event causes a result state which manifests itself in e.g. material aspects of an object (but not the other way round):
  - (Material, Informational, Visual) Properties of Objects < State < Event

### 3 The syntactic and semantic function of nominalization

- Given semantic containment, approach structural disambiguation by taking into account the function of nominalization [Pross, 2015]:
  - Syntactically: nominalization as transformation of underlying (quasi-)sentential constructions [Vendler, 1967, Lees, 1960, Grimshaw, 1990]
  - Semantically: nominalization as reification of underlying (quasi-)sentential constructions [Reichenbach, 1947, Davidson, 1967]
- Syntactic structure of a nominalization is determined by the structure of the underlying sentential construction.
- Semantic interpretation of a nominalization is determined by the reification of the underlying sentential construction.

(11) property denotation ↔ prenominal participle (adjective proper)

- Die bemalte Wand trocknet langsam.  
 the.be.PREFIX.paint.PCTP wall dry slowly.  
 ‘The be-painted wall is drying slowly.’
- Die Bemalung der Wand trocknet langsam.  
 the.be.PREFIX.paint.ung.NMLZ of the wall dry slowly  
 ‘The wall be-painting is drying slowly.’

(12) state denotation ↔ adjectival participle

- Die Wand ist seit Jahren bemalt.  
 the wall is for years be.PREFIX.paint.PTCP  
 ‘The wall is be-painted since years.’
- Die Bemalung der Wand besteht seit Jahren.  
 the.be.PREFIX.paint.ung.NMLZ of the wall exists for years  
 ‘The be-painting of the wall exists for years.’

(13) event denotation ↔ verbal construction

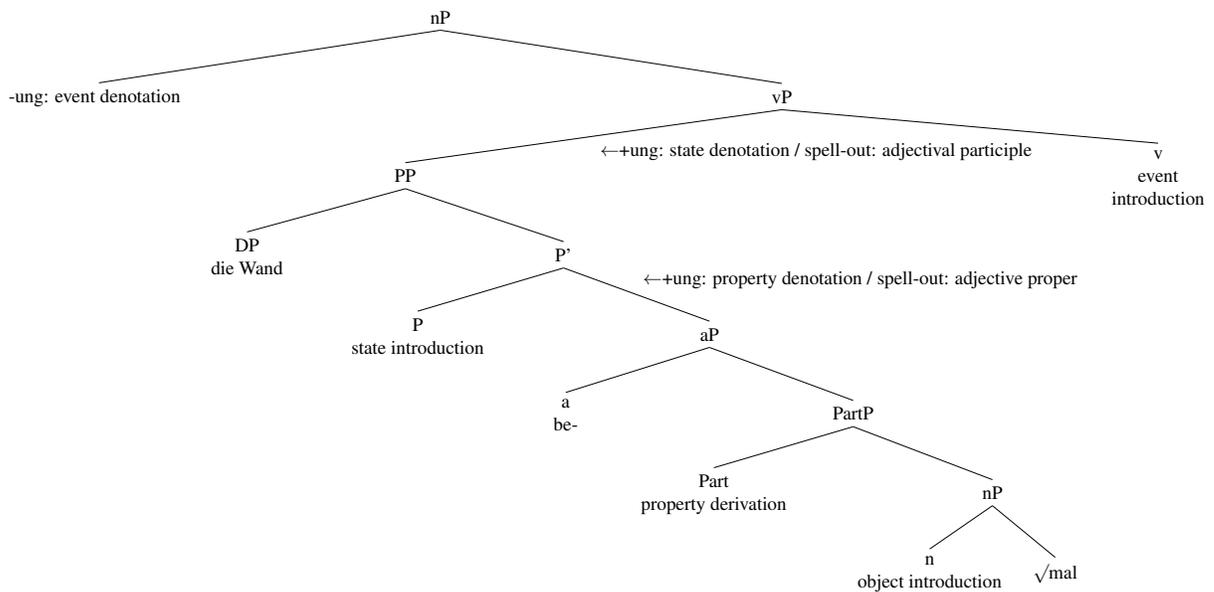
- Peter hat die Wand schrittweise bemalt.  
 Peter has the wall be.PREFIX.paint stepwise  
 ‘Peter be-painted the wall step-by-step.’
- Die schrittweise Bemalung der Wand durch Peter  
 the stepwise be.PREFIX.paint.ung.NMLZ of the wall by Peter  
 ‘Peter’s stepwise be-painting of the wall.’

### 4 Low participles

- Let’s pull together the findings established so far.

- The structure and analysis of the active use of the verb *bemalen* contains a verbal functional layer that introduces an event.
  - Constructions from  $\sqrt{mal+be}$  are contained in  $\sqrt{mal+be+ung}$ , i.e. *bemalen* is contained in *Bemalung*.
  - The structure which derives a state denotation of *Bemalung* is contained in the structure which derives an event denotation.
  - German adjectival participles that select *sein* as a copula denote a state but not an event (e.g. Kratzer [2000])
  - $\Rightarrow$  the semantic hierarchy of containment in *Bemalung* requires that the state denotation of the adjectival participle *bemalt* is contained in the event denotation of *bemalen*: semantic containment dictates the order of syntactic derivation of contained structures.
- $\Rightarrow$  *Low participles*: participles of prefix-constructions are semantically (and thus syntactically) contained in vP.

(14)  $\sqrt{mal+be+ung}$  ("low participle")



## 5 High participles

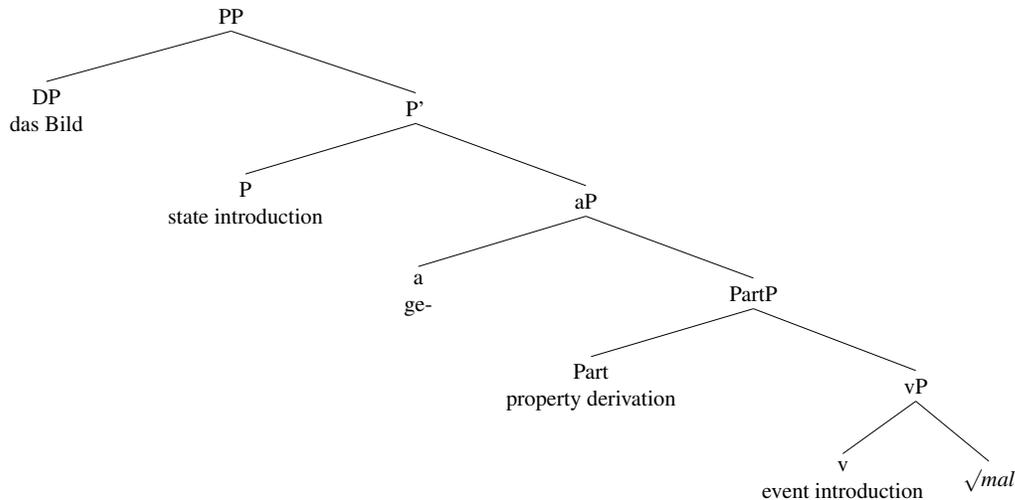
- Unprefixed constructions like *malen* in (15-a) form their adjectival participle from constructions prefixed with *ge-* as in (15-b)

(15) a. Peter malt ein Bild.  
Peter paint a picture  
Peter is painting a picture.

b. Das Bild ist gemalt.  
The picture is ge.PREFIX.paint.PTCP  
The picture is painted

- The structure and analysis of *malen* is contained in the structure and analysis of *gemalt* and thus the participle (15-b) is derived from (15-a).
- Participles of *ge-*prefixed constructions are *high participles* (i.e. derived from vPs).

(16)  $\sqrt{mal+ge}$  ("high participle")



- My analysis of low participles runs counter to the established view on participles in both lexicalist (e.g. Wasow [1977], Levin and Rappaport [1986], Kratzer [2000]) and syntactic (e.g. Embick [2004], Bruening [2014]) approaches to adjectival participles, where there are only high participles.
- But the structure and analysis of low adjectival participles that my analysis suggests is not as far-fetched as it may seem at first glance

## 6 Kimian States

- The proposed analysis of adjectival participles relates to Maienborn [2005, 2007] and subsequent work in a straightforward way.
- Maienborn argues that states denoted by copula constructions (like adjectival participles) and stative verbs are ‘Kimian States’ that are ontologically poorer than ‘Neo-Davidsonian’ states.
- Kimian states are not defined relative to a (Neo-)Davidsonian event but Kimian states “are to be understood as reifications for the exemplification of a property Q at a holder x and a time t.” [Maienborn, 2009, p. 41].
- The characterization of Kimian states matches exactly to the structure and analysis of the state denotation of *Bemalung* I argued for, according to which the state denotation of *Bemalung* which reifies the low adjectival participle is defined independently of a causing event.
- For high participles of unprefixed verbs like *malen*, the state denotation is Kimian in that it is not caused by an event but derived from a property of events provided by *ge*-prefixation.
- The analysis proposed improves on Maienborn’s original proposal in that it provides a semantic explanation for why in low participles, the property Q is identical to the result state of the verb.
- In low participles, the property Q is identified with the result state of the verb because the result state is derived from Q.

## 7 Event-related satellites

- German adjectival participles allow for modifiers that resemble the modification of event-denoting verbal passives, albeit in a very restricted way, see the established data from Rapp [1997] in (17).

(17) a. Die Zeichnung ist von einem Kind angefertigt.  
 The painting is by a child an.PRTC.ge.PREFIX.make.PTCP

‘The drawing is made by a child.’

- b. Der Mülleimer ist (\*von meiner Nichte) geleert.  
The dust bin is (\*by my nice) ge.PREFIX.empty.PTCP  
‘The dust bin is (\*by my nice) emptied.’

- Gehrke [2015] explains restrictions on modifiers of adjectival participles by appeal to the fact that “the participle and the noun together name the state that could have resulted (in a broad sense) from an institutionalised activity” [Gehrke, 2015, p. 33]
- For low participles, this characterization of the acceptability of modifiers of adjectival participles can be reproduced as an instance of abductive inference (see Douven [2011]), i.e. an inference from an observation to the explanation of the observation.
- More precisely, modifiers in adjectival prefix-participles are licensed by the abduction of a “well-established” [Gehrke, 2015] verbal functional layer with which the structure and analysis of low adjectival participles could be extended in order to explain how the state denoted by the participle could have come about.
- Because in abductive inference a conclusion does not follow logically from the premises, the inference of a vP and thus the licensing of event-related modifiers from an adjectival participle heavily relies on world knowledge.
- Furthermore, because the inferred verbal functional layer cannot be more specific than the premises provided by the adjectival participle, it is expected that event-related modifiers are in general generic, as argued by Gehrke [2015].
- For high participles, the licensing of event-related modifiers depends on whether or not an event can be recovered from properties of the internal argument of the participle. As an illustration, consider the contrast in (18).

- (18) a. Der Brief ist von Kindern geschrieben.  
the letter is by children ge.PREFIX.write.PTCP  
‘The letter is written by children.’
- b. Der Brief ist (\*von Fussballspielern) geschrieben.  
the letter is (\*by soccer players) ge.PREFIX.write.PTCP  
‘The letter is written (\*by soccer players).’

- Agent modification in (18-a) is acceptable if e.g. it is assumed that children write letters clumsily. If that is the case, properties of the letter are indicative of the agent of the event.
- In contrast, (18-b) is out because no similarly indicative property of letters is associated with the writing of letters by soccer players.
- That is, in line with Gehrke [2015], the inference of an appropriate property that ultimately licenses event-related modifiers must take off from ‘events-of-letter-writing-by-X’ rather than ‘events-of-letter-writing’.
- If event-related modifiers in high participles are licensed by the creative inference of properties, this may also explain why often the purpose of high participles is the creation of a property of the adjectival argument that incorporates the specifics of the agent, instrument or manner which was involved in the creation of that property.
- This purpose of adjectival participles to create ‘ad-hoc’ properties that invite the interpreter to invoke her world knowledge to extrapolate the specific ‘pragmatic’ flavour of the property denoted by the adjectival participle has been emphasized in Maienborn [2007] and subsequent work.

## 8 Stem alternation and Voice

- A morphological argument for the presence of an eventive verbal layer in adjectival participles has been brought up in the DM-based analysis of adjectival participles in Alexiadou et al. [2014]. Alexiadou and colleagues argue for the presence of Voice in adjectival participles (and thus implicitly for the derivation of adjectival participles from verbs) with stem alternations in causative/anticausative constructions.

- (19) a. Hans versenkt das Schiff.  
Hans ver.PREFIX.lower the ship  
'Hans causes the ship to sink'  
b. Das Schiff versinkt.  
The ship ver.PREFIX.sink  
'The ship sinks.'

- There are in principle two options to explain the difference in (19) within a framework like DM, i.e. a further verbal functional layer or Voice. [Alexiadou et al., 2014, p. 123] reject the former option because "there are no empirical arguments for an additional verbal layer in causatives" and thus both causatives and anticausatives are to be analyzed as bi-eventive.
- To simplify the matter, it is important to note that the stem alternation in the examples of Alexiadou et. al. in (19) is independent of the prefix *ver-*, see (20).

- (20) a. Peter senkt die Lautstärke.  
Peter lower the volume  
'Peter is lowering the volume'  
b. Die Lautstärke sinkt und sinkt und sinkt.  
the volume sink and sink and sink  
'The volume decreases and decreases and decreases'

- The unprefixated anticausative construction (20-b) is mono-eventive according to the repetition test of Kratzer [2005].
- The causative construction in (20-a) but not the anticausative construction in (20-b) has an *-ung* nominalization and is bi-eventive, see (21).

- (21) a. Die Senkung der Lautstärke  
the low.ung.NMLZ of the level  
'the lowering of the volume'  
b. \*Die Sinkung der Lautstärke  
the sink.ung.NMLZ of the level  
'the sinking of the volume'

- As has already been mentioned, Roßdeutscher [2010], Roßdeutscher and Kamp [2010] argue that "a verbal construction has an *-ung* nominalization if and only if the verb is constructed bi-eventively." [Roßdeutscher, 2010, p. 106].
- According to this diagnostics, (19-a) but not (19-b) is bi-eventive and there is an additional – causal – verbal layer in causatives that anticausatives lack.
- Accordingly, the presence of Voice (and a verbal functional layer) is not the only explanation of the stem alternation the causative alternation.
- As such, the present account of adjectival participles is not affected by the argument of Alexiadou

et al. [2014].

## 9 Summary

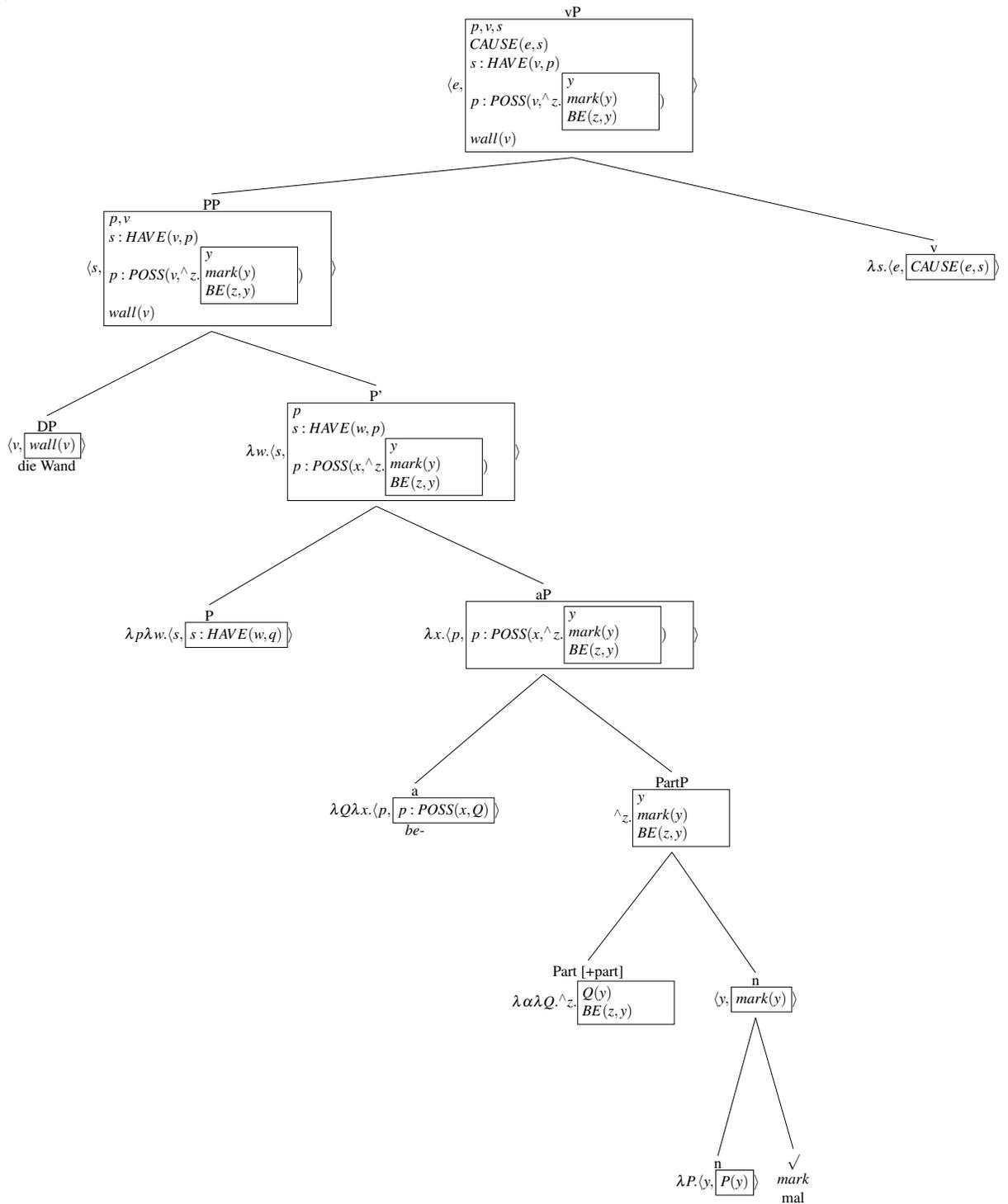
- I argued that the containment principle – a corollary of the lack of a generative lexicon in syntactic approaches to word formation – enforces a distinction between two types of participles in German:
  - ”high” participles of mono-eventive verbs derived above vP
  - ”low” participles of (prefixed denominal) bi-eventive verbs derived below vP

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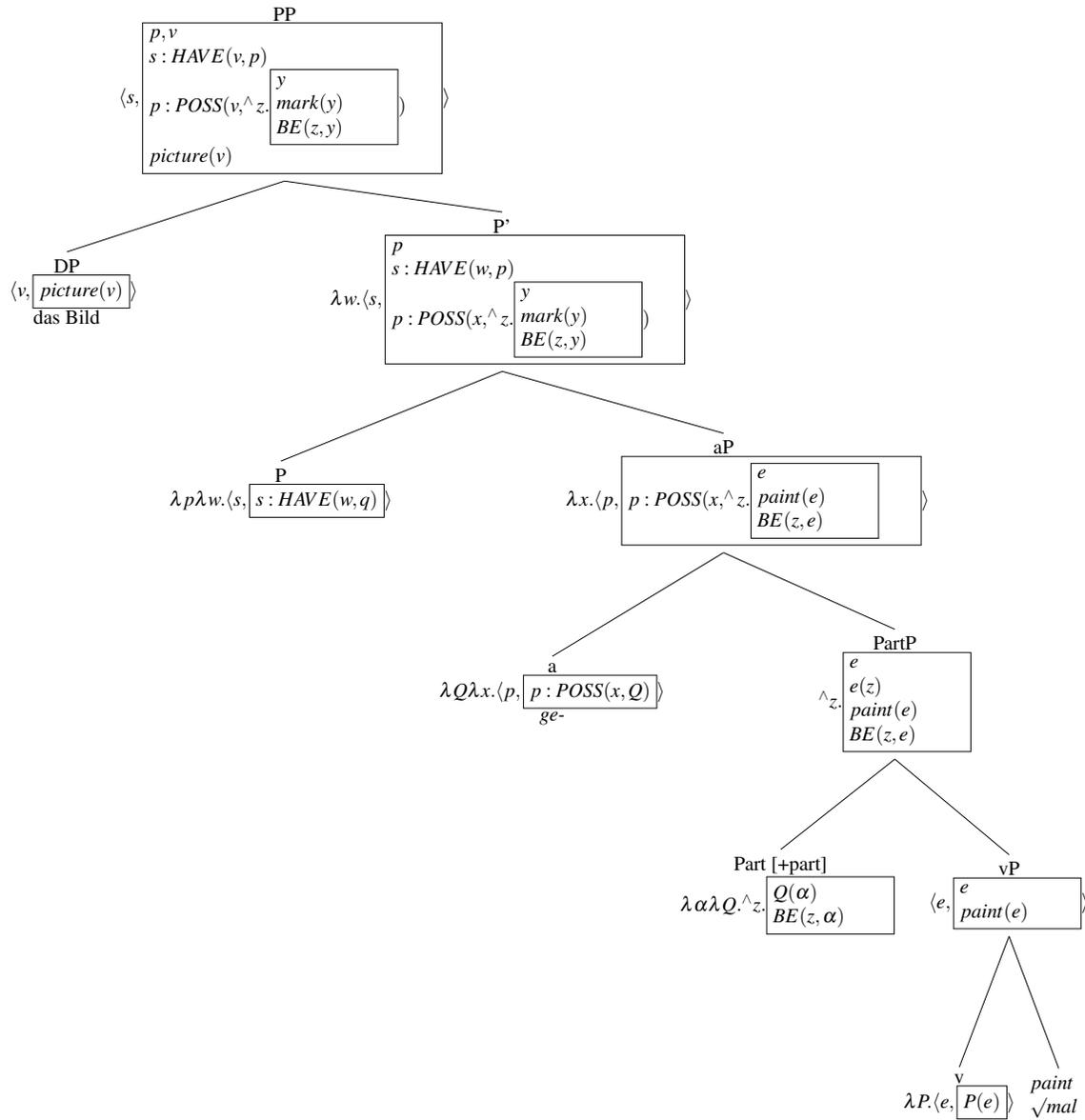
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## Appendix: Fully interpreted structures

(22)  $\sqrt{mal+be+-ung}$ : low participle



(23)  $\sqrt{mal+ge-}$ : high participle



(24) Semantics of the nominalizer morpheme -ung:  $\lambda \alpha. \langle \beta, \langle \beta = \text{REIFY}(\alpha) \rangle \rangle_{-ung}^n$

(25) Spell-out of participle morphology post-syntactically:  $[+part] \rightarrow / \emptyset / \quad / \quad +PRES$   
 $\rightarrow / -t / \quad / \quad elsewhere$