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What about lexical semantics if syntax is the only generative component of the grammar?

A case study on word meaning in German

Prefinal Version

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Abstract This paper explores the semantic consequences of the principle of containment embodied by the popular assumption that word formation is entirely syntactic and that there is no generative lexicon. According to the principle of containment, the analysis and structure of a given form must also be contained within the analysis of any structure derived from that form. The implications of the containment principle for the analysis of word meaning are elucidated with a detailed case study of ambiguous German nominalizations. The resulting analysis of ambiguous German nominalizations is employed as a probe into the structure and analysis of contained constructions to derive novel insights about the syntax and semantics of adjectival participles in German.

Keywords Lexical Semantics · Syntax-Semantics Interface · Word Formation · Ambiguity · Nominalization · Participle · Adjectival Passive · Causatives · Possession · German

1 Introduction

1.1 The syntax-only hypothesis

The starting point of the present paper is a conception of the human language faculty according to which the grammar is made up of a number of interacting modules for semantics, syntax, and phonology. More specifically, the paper is concerned with a particular hypothesis about the architecture of the syntactic module, according to which there is no dedicated submodule of the syntactic module (the so-called generative lexicon) which is responsible for the generation of the internal constituent structure of morphologically complex words (see e.g. Ackema and Neeleman (2004, ch. 1) for a contextualization of this hypothesis). Instead, and according to this hypothesis,

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complex words are generated by the same system that generates the syntactic structure of phrases and sentences. The assumption that syntax is the only generative component of the grammar is embodied by a number of theories of word formation, e.g. 'Distributed Morphology' (DM, Halle and Marantz (1993); Marantz (1997); Alexiadou (2001)), the 'Exo-Skeletal Framework' Borer (2005, 2013) or 'Nanosyntax' Starke (2009), although these theories differ in the details of the implementation of the tenet that word formation is entirely syntactic. In the present paper I focus on DM because (i) DM has been applied to a wide range of linguistic phenomena including those that constitute the empirical basis of this paper: nominalizations, causative verbs, adjectival participles and possession constructions and (ii) DM makes a number of strong claims about the organization of the syntactic module: in DM, words are formed from category-neutral, atomic and non-decomposable 'roots' which combine with features to build larger linguistic elements. While I develop my argument with the example of DM, the conclusions that I draw pertain to the general hypothesis that word formation is entirely syntactic and thus hold true of other frameworks that embody a syntax-only approach to word formation.

Starting from the assumption that the syntactic module has a DM-like architecture, the present paper explores the consequences of the hypothesis that syntax is the only generative component of the grammar for the semantic module. Naturally, the claim that syntax is the only generative component of the grammar makes sense only if it also holds of that module of the grammar which is responsible for providing words and sentences with a semantic interpretation. If syntax is the only generative component, the meaning of complex words cannot be generated by those lexical (i.e. non-syntactic) principles that underlie established frameworks of lexical semantics such as 'event structure templates' (Rappaport Hovav and Levin, 1998), 'semantic forms' (Bierwisch, 2007) or 'qualia structures' (Pustejovsky, 1995). Instead, to maintain that syntax is the only generative component, it must be shown that the meaning of complex words is determined by the compositional semantic interpretation of their syntactic structure, in the same way that the meanings of phrases and sentences are determined by the compositional interpretation of their syntactic structure. As there doesn't seem to be any principle that precludes the decomposition of lexical semantic entries in the syntax (see e.g. Rappaport Hovav and Levin (1998) for discussion), this might create the impression that the syntax-only hypothesis does not have any semantic consequences that would require further investigation. On the basis of a case study of ambiguous nominalizations in German I show that on closer inspection this impression is only superficial. The present paper strives to expose – from as neutral a point of view as possible – some of the challenges and prospects that arise when the hypothesis that syntax is the only generative component of the grammar is pushed to its logical conclusions. But the present paper emphatically does not aim at providing arguments for or against the hypothesis that word formation is entirely syntactic. Its goal is to lay bare the by and large disregarded semantic flipside of the syntax-only hypothesis: if the enterprise of a purely syntactic approach to word formation is to have overall credibility, its semantic and compositional consequences have to be fully explored.

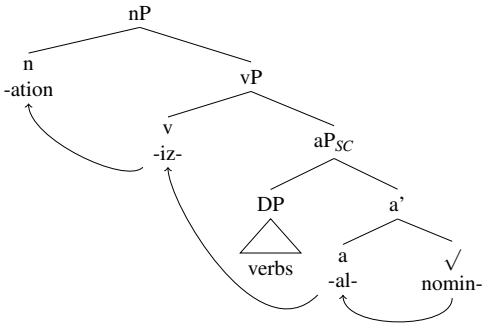
1.2 The problem of ambiguous nominalizations

A corollary of the syntax-only hypothesis is what I call the *principle of containment*, see (1).

(1) "In a 'pervasive syntax' approach to morphologically complex forms, like that of Distributed Morphology, the analysis and structures proposed for a form must also be contained within the analysis of any structure derived from that form. That is, in the same way that the structural analysis for *Mary left* is contained within the structural analysis for *John said that Mary left*, the structure for *marginalize* must be contained within the structure for *marginalization*." (Harley, 2009, p. 320)[1]

Ambiguous nominalizations are a touchstone for the assessment of the semantic consequences of the assumption that syntax is the only generative component of the grammar. To see why, consider the internal syntactic structure of a nominalization like *nominalization of verbs* in (2) which Harley (2009) argues to be dictated by the containment principle. In this analysis, and also in the analyses I present below, complex words are formed via incorporation under the head movement constraint (Travis, 1984; Baker, 1988).

(2)



(see Harley (2009, p. 337))

As required by the containment principle, the structure of the complex word *nominalization* in (2) contains the structure of the verb *to nominalize* (from which *nominalization* is derived) which in turn contains the structure of the adjective *nominal* (from which *to nominalize* is derived). English *-(a)tion* nominalizations are often ambiguous. Consider for example the nominalization *examination*. As (3) shows, *examination* can be used to describe an event that took some time (3-a) but *examination* can also be used to refer to that object which comes about as the result of the event described by the verb *to examine* (3-b) (cp. (Grimshaw, 1990, p. 49)). Because the two readings of the nominalization *examination* are semantically related, *examination* is

[1] It should be noted that because the syntactic analysis of a seemingly idiomatic meaning does not differ from the syntactic analysis of a compositional meaning, the containment principle obtains regardless of whether or not the meaning of a structure is idiomatic.

systematically ambiguous, as opposed to the accidental homophony of the noun *bank* (which can be used to refer to a financial institution or the side of a river).

(3) a. The examination of the patients took some time.
b. The examination was on the table.

Grimshaw (1990) famously observed that the ambiguity of nominalizations like *examination* (which, following Grimshaw, are often called 'complex event nominals' or 'process nominals') is resolved in the presence of argument structure. *Examination of the patients* in (4-a) can only describe an event but not an object (4-b).

(4) a. The examination of the patients took a long time.
b. *The examination of the patients was on the table.

In turn, English nominals like *exam* (which Grimshaw called 'result nominals') – although they may be used to describe an event – never take arguments, see (5).

(5) The exam *(of the patients) took some time.

The observation of Grimshaw has been captured as a structural phenomenon by syntactic approaches to word formation with what I will call the *embedded vP hypothesis* (see e.g. van Hout and Roeper (1998); Borer (1999); Alexiadou (2001); Borer (2003)). According to the embedded vP hypothesis, the internal syntactic structure of complex event nominalizations like *examination* but not the structure of result nominals like *exam* contains a verbal projection. The presence of a verbal projection in complex event nominals is argued to be responsible for the licensing of argument structure (and other verb-like properties that complex event nominals exhibit according to Grimshaw, e.g. compatibility with aspectual modifiers).

Because the result reading is not distinguished morphologically from the complex event reading of *examination*, Harley argues that according to the containment principle the result reading must have the same analysis as the complex event reading in (2). In particular, the result reading of *examination*, like the complex event reading, contains the morpheme *in*, which in (2) is associated with a verbal functional layer. Consequently, an analysis that wants to do justice to both the principle of containment and the embedded vP hypothesis faces a dilemma (besides Harley (2009), see also e.g. Borer (2003), Alexiadou (2009) for discussion). According to containment, the result reading of *examination* must contain a vP. According to the embedded vP hypothesis, the result reading of *examination* must not contain a vP. To resolve the dilemma, Harley relinquishes the embedded vP hypothesis and concludes that "some other factor must be interfering with internal-argument licensing in process nominals"(Harley, 2009, p. 338)[2]. The 'other factor' Harley calls into play is pragmatic reinterpretation ('coercion'). She proposes that a complex event nominalization can be reinterpreted as a result nominal when the direct object of the base verb is not

[2] Like Harley, Alexiadou (2009), gives up on the embedded vP hypothesis: "the difference between AS [Argument Structure] and non-AS nominals does not depend on the presence of verbalizing morphology" (Alexiadou, 2009, p. 256). Borer (2003) keeps the embedded vP hypothesis but gives up on containment: the result reading is not derived in the syntax but roots like $\sqrt{exam}$ "may be associated, in the L-D [lexical phrasal domain], with an inserted nominal (and verbalizing) affix" (Borer, 2003, p. 52)

present as an argument of the nominalization (see (3-b)); but only then, since "the presence of a syntactic object is incompatible with the coercion of a process nominal" to a result nominal (as in (4-b)).

Explaining the meaning of an ambiguous nominalization like *examination* with the presence or absence of a direct object may be a viable option for English, where the semantic distinction between the complex event reading and the result reading of an ambiguous nominalization coincides with the presence or absence of a syntactic object. But this coincidence is a peculiarity of English. For example, Bierwisch (1989)[3] shows that in German the semantic ambiguity of derived nominalizations is independent of the presence or absence of direct objects. Consider what will become the leading example of this paper, the *ung*-nominalization *Bemalung* ('painting') in (6) and (7)[4]. (The formation of *Bemalung* is discussed in section 1.3.)

(6) Die Bemalung der Wand wurde unterbrochen.
the be-PRFX.mark.ung-NMLZ the.GEN wall was interrupted^{E}
'The be-painting of the wall was interrupted.'

(7) Die Bemalung der Wand wurde renoviert.
the be-PRFX.mark.ung-NMLZ the.GEN wall was renovated^{O}
'The wall be-painting was renovated.'

Bierwisch also argues that Grimshaw's diagnostics for the distinction between event and result readings of English nominals like agent-oriented modifiers, pluralization or definiteness are inconclusive for German. Moreover, Grimshaw's diagnostics provide only a negative characterization of the result reading (i.e. by those constructions in which the result reading is ungrammatical) whereas in what follows a positive characterization of result readings is required. Thus, in (6) and (7), and also in what follows, I employ selection restrictions of verbs to diagnose the readings of nominalizations. Accordingly, the different readings of *Bemalung* in (6) and (7) are testified by the compatibility of *Bemalung* with verbs which select for a different sort to which the denotation of its direct object argument slot must belong. This method – using the selection restrictions associated with one word or phrase to determine the syntactic or semantic properties of another word or phrase – goes back at least to Vendler (1967) and has become a central diagnostics for the 'metaphysics' (Bach, 1986) of word meaning, see e.g. Jackendoff (1988); Pustejovsky (1995); Asher (2011). In particular, this method must also be used to determine the possible readings of a word. For instance, the readings of derived nominals like *examination* can be explored by exploring which verbs, with the various restrictions they impose on their direct objects, accept or do not accept DPs of which the target word is the head (e.g. the DPs *the examination* or *Mary's examination*). In (6), the verb *unterbrechen* ('to interrupt') selects for direct objects that denote an event, as only events can be interrupted. Consequently, I say that in (6) *Bemalung* denotes an event (which corresponds to

[3] For a similarly critical inspection of Grimshaw's claims with respect to English nominalizations see e.g. Newmeyer (2009); Grimm and Mcnally (2013).

[4] I use the following glossing conventions for German examples: NMLZ = Nominalization, PRFX = Prefix, PRTC = Particle, PTCTP = Participle, GEN = genitive. I indicate the selection restrictions of a predicate with a superscript: E (event), S (state), O (object). When there is no suitable translation of a German *be*-prefixed construction into English, I indicate the *be*-prefix also in the translation.

Grimshaw's complex event reading). Because only objects can be renovated but temporal entities like events cannot, the verb *renovieren* ('to renovate') in (7) selects for an object denotation of *Bemalung* (which corresponds to Grimshaw's result reading).

Bierwisch also observes that one must distinguish between two types of result readings of nominalizations in German. Besides the event reading and the physical object reading of *Bemalung* indicated in (6) and (7), *Bemalung* can also be used to describe the state that holds after the event described by the underlying verb has taken place. For example, adopting the diagnostics of Ehrich and Rapp (2000), in (8) the verb *fortbestehen* ('to persist') selects for a state reading of *Bemalung*, namely that state the wall is in after having been painted. I discuss the distinction between objects and states with selection restrictions of verbs in more detail in section 2.1.

(8) Die Bemalung der Wand bestand unverändert
the be-PRFX.mark.ung-NMLZ the.GEN wall persist^S unchanged
fort.
on.PRTC
'The wall be-painting persisted unchanged.'

A state reading may also be argued to be available for English nominalizations like *examination*, see e.g. (9). However, from now on I will focus on German nominalizations.

(9) The child's previous physical examination is still valid.

There are at two main reasons for why I use German *ung*-nominalizations as a starting point for the investigation of ambiguous nominalizations. First, as outlined above, German *ung*-nominalizations exhibit the same ambiguity as English derived nominalizations but the presence or absence of direct objects appears to play no part in this. Instead, the ambiguity of German *ung*-nominalizations requires a genuinely semantic explanation. Second, unlike English, where only gerund formation is a productive process of nominalization (see e.g. Alexiadou (2001)), but the derivation of nominals with *-(a)tion* and other suffixes like *-ment* are not, German *ung*-nominalization is highly productive.

My preference for starting an investigation of the possible readings of derived nominalizations with German nominals like *Bemalung* rather than English nominals like *examination* can thus be motivated like this. If we assume that syntax is the only generative component of the grammar, and thus that every systematic ambiguity of complex expressions has its origin in the syntax and must be accounted for in terms of distinct syntactic representations, then the ambiguity of *Bemalung* presents more of a prima facie challenge since the presence or absence of a direct object is irrelevant; so *that* syntactic difference cannot be part of the explanation of the relevant ambiguities. Consequently, if the ambiguity between the event reading, the state reading and the object reading of *Bemalung* is the result of distinct syntactic representations, then the differences between syntactic representations of *Bemalung* must be of a different kind. It is these differences with which the paper will be centrally concerned (and I suspect that the ambiguity of *examination* should be accounted for along the same lines as the account I will propose for the ambiguity of *Bemalung*, a specula-

tion to which I will return in section 4). Let me call the principle that structurally determined ambiguities of complex nominalizations originate in distinct syntactic representations the *structural disambiguation principle*. Importantly, structural disambiguation is subject to the containment principle as containment requires that the structures of *Bemalung* employed for structural disambiguation are derived from each other in hierarchical order. To give an impression of what these requirements amount to, in the next section I introduce the details of the formation of the leading example of this paper, the German *ung*-nominalization *Bemalung*.

1.3 A snippet of German data

I develop the argument of the present paper with a case study of a class of German *ung*-nominalizations that is exemplified by *Bemalung*. The root of *Bemalung* is $\sqrt{mal}$ ('spot', 'mark'). $\sqrt{mal}$ can be inserted into a structure that derives the verb *malen* (10-a) as well as in one that derives the noun *Mal* ('mark, spot') (10-b).

(10) a. Peter malte (ein Bild).
'Peter painted (a picture).'

b. Das Mal des Bösen
'The mark of the devil'

German has a highly productive system of prefixation. E.g., the root $\sqrt{mal}$ can be combined with the prefix *be*, where *be* in present day German roughly resembles the *be*-prefix in old English constructions such as *bespectacled, begifted, benighted, bewigged, becharmed*. The combination $\sqrt{mal}$+*be* derives the verb *bemalen* ('to be-paint'), see (11).

(11) Peter bemalte die Wand.
Peter be-PRFX.paint the wall
'Peter be-painted the wall.'

Wunderlich (1987) analyzes the function of the prefix *be* as an instance of lexical preposition incorporation. According to Wunderlich, the function of *be* in examples like (13-a) is to shift the location specified by the prepositional phrase in the unprefixed verb construction (12-a) into the direct object position. The resulting alternation between *be*-prefixed and unprefixed constructions resembles *spray/load* alternations in English (Levin (1993)), cp. (12-b)/(13-b).

(12) a. Peter malte Blumen an die Wand.
'Peter painted flowers on the wall.'
b. Peter loaded hay on the truck.

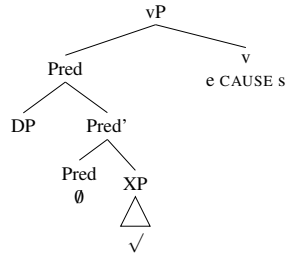
(13) a. Peter bemalte die Wand (mit Blumen).
Peter be-PRFX.paint the wall (with flowers)
'Peter be-painted the wall (with flowers).'
b. Peter loaded the truck (with hay).

One difference between the prefix-construction in (11) and the unprefixed constructions in (10) is that the former but not the latter allows suffixation with the nominalizer morpheme *ung* to derive a nominalization as in (14). Notably, according to the containment principle, the structure and analysis of $\sqrt{}$*mal+be* in (11) must be contained in the structure and analysis of the nominalization in (14-b) derived from $\sqrt{}$*mal+be+ung*.

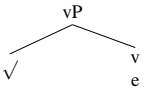
(14) a. *die Malung
the paint.ung-NMLZ
'the painting'
b. die Bemalung
the be-PRFX.paint.ung-NMLZ
'the be-painting'

To explain the difference in the licensing of *ung*-nominalizations in (14), Roßdeutscher and Kamp (2010) propose that *ung*-nominalization requires a bi-eventive input structure, adopting the syntactic account of bi-eventivity proposed in Marantz (2005). Marantz argues that in a mono-eventive construction the root $\sqrt{}$ modifies the verbalizer v as in (15-b), whereas in a bi-eventive construction, a morphologically empty verbalizer v is merged with a small clause that predicates a stative property of the object in its specifier position as in (15-a). In the bi-eventive construction, the root of the construction is introduced in the complement of the predicative small clause.

(15) a.



b.



The syntactic structures in (15) explicate the semantic difference between 'core transitive' verbs and 'non-core transitive' verbs (Levin, 1999). Core transitive verbs like *säubern* ('to clean') in (16-a) have a bi-eventive structure, where the small clause in the syntactic analysis (15-a) predicates the state of being clean of the obligatory direct object as being caused by the event described by the deadjectival verb *säubern*. Consequently, because *säubern* has a bi-eventive construction, it has an *ung*-nominalization, see (16-b).

(16) a. Peter säuberte den Tisch.
'Peter cleaned the table.'
b. Die Säuberung des Tisches
the clean.ung-NMLZ of the.GEN table

'The cleaning of the table'

The reason why Roßdeutscher and Kamp embark on the syntactic analysis of bi-eventivity rather than a lexical decomposition analysis à la Levin is that non-core transitive verbs like *malen* have a mono-eventive structure as in (15-b) regardless of whether they are used intransitively as in (17) or transitively as in (18).

(17) Peter malte.
'Peter painted.'

(18) Peter malte ein Bild.
'Peter painted a picture.'

(18) may appear like a perfect instance of a bi-eventive eventuality description of an event of Peter being engaged in the activity of painting and the result state of there being the picture which this activity produced. But the description is nevertheless not bi-eventive in the technical, syntactic sense that Roßdeutscher and Kamp postulate as the precondition for *ung*-nominalization. Following the analysis of Marantz, when *malen* is used transitively and appears with a direct object, the direct object DP is introduced as an adjunct to the little v head in the syntax. Thus, although the transitive construction (18) semantically resembles the bi-eventive transitive construction (16-a), (18) has a mono-eventive syntactic construction and thus lacks an *ung*-nominalization. The bi-eventivity constraint on the formation of *ung*-nominalizations has been provided broad empirical backup (see e.g. Roßdeutscher (2010) for a corpus study) but it should be noted right in advance that the landscape of *ung*-nominalizations is more complicated. While the bi-eventivity constraint works for *be*-prefixed constructions, on which the present paper focuses, it is obviously more difficult to apply to verbs like *hoffen* ('to hope') which, although they are apparently stative, have an *ung*-nominalization (*Hoffnung* ('hope')). I will discuss these complexities in more detail in section 2.7.

According to the bi-eventivity constraint on the formation of *ung*-nominalizations the verb *bemalen* has a bi-eventive syntactic construction and thus licenses an *ung*--nominalization whereas the unprefixed verb *malen* has a mono-eventive construction type which lacks an *ung*-nominalization. But as it stands, the bi-eventivity constraint pertains to the structure of verbal projections, so it cannot be made to account for the embedded vP hypothesis. According to the embedded vP hypothesis, the structures of the state and object reading of *Bemalung* do not contain a vP and thus cannot be bi-eventive in the sense of Marantz' analysis. Consequently, developing an analysis of *Bemalung* that does justice to the embedded vP hypothesis necessarily involves a reformulation of the bi-eventivity constraint on the formation of *ung*-nominalizations, which I will present in section 3.5.

1.4 Goals of the paper

The immediate goal of this paper is to show that an analysis of ambiguous German *ung*-nominalizations like *Bemalung* is possible under the assumption that word formation is entirely syntactic (in accordance with the principles of structural disambiguation and containment) and in fact that such an account can be given while keeping the embedded vP hypothesis and without any regress to pragmatically driven rein-

terpretation. The introductory discussion was meant to illustrate the main challenge that this endeavor faces. The principles of containment and structural disambiguation together with the embedded vP hypothesis impose a fine-meshed system of syntactic *and* semantic constraints and dependencies. If syntax is the only generative component of language, the resolution of this system of constraints and dependencies cannot take place in the lexicon or draw on the stipulation of lexical rules (like coercion) but must be generated by the general principles that govern the semantic interpretation of syntactic structure. The attempt made in this paper – to show how such a system of constraints and dependencies imposed by the containment principle can be solved through a case study of the ontological flexibility of derived nominals – is more ambitious in its goals than previous work on semantics in DM which does not consider the semantic implications of structural containment (see e.g. the overview article of Harley (2013) but also the pioneering work on *ung*-nominalizations in Roßdeutscher and Kamp (2010)).

The farther reaching goal of the present paper is to learn more about the semantic consequences of the syntax-only hypothesis. In the paradigm of lexical semantics, word meaning is constrained by a lexical entry comprising at least (a) the syntactic category of a word and (b) the membership of a word in a lexical semantic class (e.g. in the sense of the lexical semantic verb classes in Levin (1993) or the lexical semantic noun classes in Grimshaw (1990)). In contrast, the containment principle enforces a 'constructivist' approach to complex word meaning that is constrained relative to derivational 'families' of constructions originating from the same root. The focus on the derivational relations of constructions instead of lexical word classes shifts the locus of meaning from lexical entries to families of construction types of complex words and their meaning. Accordingly, the containment principle requires that the adequacy of the semantic interpretation of a word is not to be justified by appeal to the syntactic category of a word and features of the lexical class to which it belongs but with respect to those other constructions that can be derived from or are contained in that word.

1.5 Outline of the paper

In the first part of the paper, I develop a detailed account of the structural disambiguation of the nominalization *Bemalung* under containment while retaining the embedded vP hypothesis. To this end, section 2 considers the semantic behavior of *Bemalung* in co-predication contexts and argues that the prefix *be* functions as the adjectivizing head of a participle construction which must be contained in all the different readings that *Bemalung* has. The second part of the paper discusses in detail the fact that structural disambiguation of *Bemalung* under containment enforces a distinction of two types of participle constructions in German: a 'high' participle which is derived from the associated verb and a 'low' participle which is contained in the associated verb. In section 3 I relate the resulting split analysis of participle constructions in German to the discussion of property predication in recent literature and argue that *be* functions as an adjectivizing possessive morpheme. Section 4 concludes.

2 Structural disambiguation under containment

2.1 The lexicalist perspective on semantic containment

Given that those syntactic tests that Grimshaw proposed to distinguish the different meanings of English nominalizations are not viable for German, a genuinely semantic characterization is needed for the readings of *Bemalung* and the ways in which they are related. To this end, I draw upon established findings from lexical semantics. More precisely, I follow Hamm and Solstad (2010) in exploring the relationships between different interpretations of the same nominal by using tests in which the selection restrictions of verbs (and other verbal predicates) manifest themselves as constraints on anaphora across predication contexts provided by those verbs. In contrast to the examples in (6) and (7), such a 'co-predication' context involves not one but two or more verbal predicates with different selection restrictions. As a starter, consider the data in (19).

(19) Die Bemalung$_1$ der Wand war anstrengend. Sie$_1$
the be-PRFX.mark.ung-NMLZ the.GEN wall was exhausting^E it
bestand unverändert fort. Jetzt wurde sie$_1$ renoviert.
persist^S unchanged on.PRTC now was it renovated^O.
'The be-painting of the wall$_1$ was exhausting. It$_1$ persisted unchanged. Now it$_1$ was renovated.'

In (19), the initial predication of *Bemalung* as an argument of *anstrengend* ('exhausting') selects for an event denotation. But *Bemalung* also serves as the antecedent of an anaphoric construction with *bestehen* ('to persist') that selects for a state denotation of *Bemalung* and for an anaphoric construction with *renovieren* ('to renovate') that selects for an object denotation of *Bemalung*. Things are different when *Bemalung* is introduced as the argument of a predicate that selects for a state denotation as in (20) or an object denotation as in (21). In these cases, *Bemalung* cannot function as the antecedent of a pronoun that occupies an argument position of a predicate that selects for an event.

(20) Die Bemalung$_1$ der Wand bestand unverändert
the be-PRFX.mark.ung-NMLZ the.GEN wall persist^S unchanged
fort. #Sie$_1$ war anstrengend.
on-PRTC it was exhausting^E
'The wall be-painting$_1$ persisted unchanged. #It$_1$ was exhausting.'

(21) Die Bemalung$_1$ der Wand wurde renoviert. #Sie$_1$
the be-PRFX.mark.ung-NMLZ the.GEN wall was renovated^O it
war anstrengend.
was exhausting^E
'The wall be-painting$_1$ was renovated. #It$_1$ was exhausting.'

If *Bemalung* is introduced as the direct object of a verb that selects for a state denotation, then *Bemalung* can function as the antecedent of an anaphoric construction that selects for an object, see (22).

(22) Die Bemalung$_1$ der Wand bestand unverändert
the be-PRFX.mark.ung-NMLZ the.GEN wall persisted^S unchanged
fort. Jetzt wurde sie renoviert.
on.PRTC now was it renovated^O
'The wall painting$_1$ persisted unchanged. Now it$_1$ was renovated.'

The ontological distinction between states and objects is central to theories of event structure that distinguish the result state of an event from the object that is in that state, regardless of whether the decomposition is lexical (as in e.g. Rappaport Hovav and Levin (1998); Kratzer (2005)) or syntactic (as in e.g. Ramchand (2008)). But the linguistic diagnosis of the ontological separation of (result) objects and (result) states in ambiguous nominals is quite complicated.

First, there is a trivial state denotation associated with any object; namely the state of continued existence in time. As a consequence, the verb *unverändert fortbestehen* ('to persist unchanged') which I used to diagnose a state denotation (following Ehrich and Rapp (2000)) also accepts arguments which unequivocally denote objects and not states, for instance *the police station* in (23).

(23) Die Polizeistation bestand unverändert fort.
'The police station persisted unchanged.'

Another test for state denotation proposed in Ehrich and Rapp (2000) are verbs like *dokumentieren* ('to document') or *registrieren* ('to record'). (24) shows that *dokumentieren* distinguishes between objects and states slightly better than do stative verbs like *to persist*, because physical objects are questionable direct objects of *dokumentieren*. Furthermore, that *dokumentieren* selects for stative direct objects is indicated by examples in which the verb is used to describe a snapshot (as opposed to a video). In such scenarios, where an event reading for the direct object of *dokumentieren* is excluded because a snaphot can only capture a state but not an event, an argument phrase that does not denote a state but an object is judged as odd or out (24-a). That *die Bemalung der Wand* in (24-b) is nevertheless fully acceptable as the argument of the same predicate in relation to the same kind of scenario indicates that this phrase can be interpreted as denoting a state.

(24) a. ??Die Polizeistation wurde mit einem Foto dokumentiert.
'The police station was documented with a photo.'
b. Die Bemalung der Wand wurde mit einem Foto dokumentiert.
'The wall be-painting was documented with a photo.'

Second, verbs like *renovieren* that select for an object denotation of their direct object entail a change in their direct object. Thus, since states cannot change, a state denotation as in (26) is incompatible with *renovieren* for reasons independent of the selection restrictions of *renovieren*[5].

[5] As a reviewer notes, an anaphoric description of a state as in (25) appears to be compatible with the selection restrictions of *renovieren* if the second sentence starts with a temporal sequence connective like *danach* ('after that'). But in contrast to (26), the temporal connective in (25) enforces an interpretation of the anaphoric construction according to which the state to which the anaphoric construction refers back is not the state in which the wall painting was before the renovation but rather is the result state entailed by

(26) Die Bemalung$_1$ der Wand wurde renoviert. #Sie
the be-PRFX.mark.ung-NMLZ the.GEN wall was renovated^O it
bestand unverändert fort.
persisted^S unchanged on.PRTC
'The wall painting$_1$ was renovated. # It$_1$ persisted unchanged.'

A kind of verb that selects for objects but against states and lacks an entailment of change, suggested by one of the reviewers, is *sich rau anfühlen* ('to feel rough to touch'). This predicate does not assert any change in its single argument (realized as the grammatical subject). But it selects for arguments that can produce a sensation in anyone touching it, which presupposes that things can be touched, and states obviously can't. More and better tests for the distinction between object and state readings than those I have mentioned here would certainly be desirable, but I must leave this for another time. I take it, however, that the predicate *sich rauh anfühlen* does select for objects and against states clearly enough and that *dokumentieren* selects for states and against both objects and events. The example in (27) has been designed to guard as well I am able to against unwanted effects that can interfere in the assessment of selection restrictions. According to the judgments of my informants, (27) indicates that when *Bemalung* denotes an object, it cannot serve as the antecedent of an anaphoric construction that refers to a state.

(27) Die Bemalung$_1$ der Wand fühlt sich rau an. #Sie
the be-PRFX.mark.ung-NMLZ the.GEN wall feel^O REFL rough at it
wurde mit einem Foto dokumentiert.
was with a photo documented^S
'The wall painting$_1$ was rough to touch. #It$_1$ was documented with a photo.'

To make sure that these results obtained from co-predication tests are not a peculiarity of *Bemalung*, consider (28), which shows that the event reading of *Beschichtung* ('coating') selected by the adjective *einfach* ('simple') makes available a state and object reading.

(28) Die Beschichtung$_1$ des Autos war einfach. Sie$_1$ bestand
the be-PRFX.coat.ung-NMLZ the.GEN car was simple^E it persisted^S
unverändert fort. Jetzt wurde sie$_1$ entfernt.
unchanged on.PRTC now was it removed^O
'The car coating$_1$ was simple. It$_1$ persisted unchanged. Now it$_1$ was removed.

---

the verb *to renovate* that the wall is in after and because of the renovation. Thus, the acceptability of (25) is due to the temporal connective picking up the change of state entailment of *renovieren* and as such is independent of the selection restrictions of *renovieren*.

(25) Die Bemalung$_1$ der Wand wurde renoviert. Danach bestand sie
the be-PRFX.mark.ung-NMLZ the.GEN wall was renovated^O after that persisted^S it
unverändert fort.
unchanged on.PRTC
'The wall painting$_1$ was renovated. After that, it$_1$ persisted unchanged.'

(29) indicates that the state reading of *Beschichtung* does not make available its event reading.

(29) Die Beschichtung$_1$ des Autos bestand unverändert
the be-PRFX.coat.ung-NMLZ the.GEN car persisted^S unchanged
fort. #Sie$_1$ war einfach.
on.PRTC it$_1$ was simple^E
'The car coating$_1$ persisted unchanged. #It$_1$ was simple.'

Likewise, (30) shows that the object reading does not make the event reading available either.

(30) Die Beschichtung$_1$ des Autos fühlte sich rau
the be-PRFX.coat.ung-NMLZ the.GEN car felt^O REFL rough
an. #Sie$_1$ war einfach.
at.PRTC it was simple^E
'The car coating$_1$ felt rought to touch. #It$_1$ was simple.'

(31) indicates that the object reading does not make available the state reading.

(31) Die Beschichtung$_1$ des Autos fühlte sich rau
the be-PRFX.coat.ung-NMLZ the.GEN car felt^O REFL rough
an. #Sie bestand unverändert fort.
at.PRTC it persisted^S unchanged on.PRTC.
'The car coating$_1$ felt rough to touch. #It$_1$ persisted unchanged.'

Summing up, co-predication indicates that one configuration of building blocks in *Bemalung* must derive an event, state and object denotation. Another configuration of building blocks indicated by (20) and (22) derives a state and an object denotation but no event denotation. The final configuration of building blocks that is indicated by (21) and (27) is one which derives an object denotation but neither an event nor a state denotation. All in all, the behavior of *Bemalung* in co-predication contexts indicates that semantic containment in *Bemalung* is asymmetric. On the one hand, this asymmetry may not come as a surprise; for it would seem to reflect a commonsense understanding of the ontological dependencies in the ontology implicated in the denotation of the verb *bemalen*, between the event of painting, the result state the event causes and the object in which the result state manifests itself (the painted fresco or whatever). The asymmetry between events and their result states is also reflected in lexical decomposition approaches to causative verbs à la Dowty (1979), where the order of decomposition is BECOME $\prec$ CAUSE (and it figures also in more fine-grained approaches to event structure like Ramchand (2008), where ResultP $\prec$ ProcessP). On the other hand, the semantic asymmetry between event, state and object readings points to the embedded vP hypothesis. If the structure of the non-eventive readings of *Bemalung* does not contain a vP, then it follows that once *Bemalung* has been analyzed without a vP, the referent introduced by this analyzed nominalization cannot serve as the antecedent for a pronoun that wants to be interpreted as an event, i.e. as invoking an interpretation of the nominal that requires the presence of vP in its syntactic analysis.

Concluding, the overall goal of this section has been to argue that the asymmetry between events and their result states that is visible in the structure of bi-eventive verbs is also present in their nominalizations and, furthermore, that the additional building block corresponding to the object reading of such nominalizations is located at the bottom of their containment hierarchy. I do not claim, however, that all (German *ung*-) nominalizations have all these three readings nor that event, state and object readings are the only readings that nominalizations can have. Instead, I contend that if nominalizations have an event, state and object reading (or a subset thereof), the building blocks of meaning that realize these readings are hierarchically ordered as represented schematically in (32).

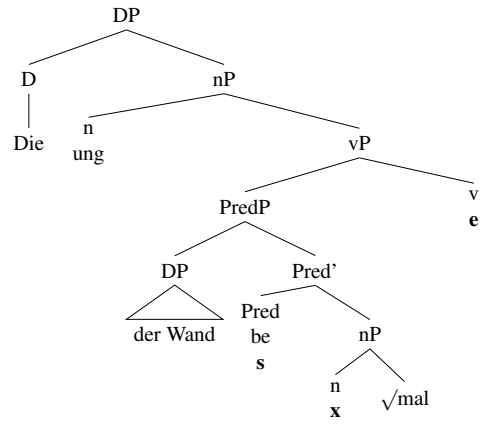
(32) Object $\prec$ State $\prec$ Event

Taking these tried and tested insights from lexical semantics as a starting point, the goal of the remainder of this section is to derive the hierarchy in (32) from an analysis of *Bemalung* that satisfies the principles of structural disambiguation and containment while keeping the embedded vP hypothesis, i.e. without regress to a lexical specification of the asymmetry of the ambiguity, either as a ranked disjunction or as a single meaning that can undergo pragmatic reinterpretation. Note that I do not aim at showing that such a syntactic reconstruction of the ambiguity of *Bemalung* is to be preferred over lexical or pragmatic approaches. Rather, a syntactic reconstruction of the ambiguity of *Bemalung* is a requirement that arises when the hypothesis that syntax is the only generative component of the grammar is taken at face value.

2.2 Structural disambiguation under containment, first attempt

The containment of building blocks diagnosed in section 2.1, Wunderlich's analysis of the *be*-prefix as an incorporated preposition and the constraint of Roßdeutscher and Kamp on the formation of *ung*-nominalizations point towards a certain syntactic structuring of building blocks. If we adopt the assumption of syntactic approaches to word formation that functional heads in the syntax are responsible for the introduction of a particular sort of discourse referents, e.g. that the verbalizer head v introduces a discourse referent **e** for an event and that the nominalizer head n introduces a discourse referent for an object **x**, the event and object building blocks of *Bemalung* would correspond to a verbal and a nominal functional layer, respectively. But what is the functional layer in the syntax associated with the state building block in *Bemalung*? Remember that the constraint on *-ung* nominalization proposed by Roßdeutscher and Kamp (2010) suggests that unlike the unprefixed verb *malen* ('to paint'), *bemalen* has a bi-eventive construction type. We may thus conclude that the prefix *be* is the head of the small clause PredP required for the bi-eventive construction according to (15-a). Consequently, the state denotation **s** of *Bemalung* would correlate with a small clause that predicates a stative property of the DP in its specifier. All in all, we would end up with a structural configuration of building blocks as outlined in (33), which is basically the syntactic analysis of *be*-prefixed *ung*-nominalizations that are ambiguous between an event, state and object reading proposed in Roßdeutscher and Kamp (2010).

(33)



Roßdeutscher and Kamp (2010) do not consider the principle of structural disambiguation under containment and do not account for the embedded vP hypothesis. Instead, they derive the different readings of an ambiguous *ung*-nominalization from the same syntactic structure and assume that, depending on the context, the nominalizer morpheme *ung* chooses one of the discourse referents **e, s** and **x** introduced by the derivation of the underlying vP as the denotation of the nominalization. But it seems as if the syntactic analysis in (33) can be made to account for structural disambiguation with little effort. A proposal in this direction has been made in Băsić (2010). Băsić correlates the readings of ambiguous nominalizations with different chunks of the verbal projection hierarchy 'InitiationP $>$ ProcessP $>$ ResultP' developed in Ramchand (2008). Adopting Nanosyntax as a framework of word syntax, Băsić proposes that the verbalizer spells out the full Ramchandian verbal projection hierarchy in Grimshaw's complex event reading, whereas in the result reading, the verbalizer spells out only ResultP. Because the ResultP layer of the verbal projection hierarchy is present in the result reading, the analysis of Băsić is not compliant with the embedded vP hypothesis. But applying a similar structural disambiguation to (33) (where v would correspond to the head of ProcessP and Pred to the head of ResultP), we would correctly predict that the event reading of *Bemalung* makes available the state reading and the object reading. If the nominalizer *ung* is applied to the small clause PredP of (33) before the verbal functional layer is realized, we predict that the state reading of *Bemalung* makes available the object denotation but not the event denotation. Because the *be*-morpheme is the head of a projection outside vP, this analysis would satisfy the embedded vP hypothesis, as the event reading but not the state reading contains a vP.

The problematic reading is the object denotation. As it stands, an analysis along the lines of Băsić does not single out the denotation of a physical object. The semantics that Ramchand associates with ResultP is a state description. Because ResultP is the lowermost projection of the analysis of Băsić, a state denotation would thus always be present in the meaning of *Bemalung*, and in particular also in the object reading. The same considerations apply to (33). If *be* is the realization of the head of

a state-introducing projection (the PredP in (33)), the state denotation of *Bemalung* is always present in the meaning of *Bemalung*. We would thus – given the asymmetry of containment identified by co-predication – wrongly predict that the object denotation of *Bemalung* also makes available the state denotation. Notably, the problem cannot be dismissed by simply assuming that *be* introduces a state only in some readings of *Bemalung* but not in others. As the object reading is morphologically contained in the state reading, according to the containment principle, the analysis of *be* must be constant throughout the derivation.

There are a number of further empirical and conceptual problems that speak against (33) as the appropriate basis for an analysis that is compliant with the word-syntactic paradigm. First, in the absence of a generative lexicon, an analysis according to which *be*-prefixed constructions result from a lexical rule of preposition incorporation (as proposed by Wunderlich (1987)) is not viable. Second, the prepositional analysis of *be* fails to account for a large number of *be*-constructions which do not alternate with a prepositional construction, cp. e.g. (34) and the discussion in Dewell (2015).

(34) a. Der König bestraft den Verbrecher mit Hieben.
the king be-PRFX.punish the criminal with hits
'The king be-punishes the criminal with hits'
b. *Der König straft Hiebe an/auf den Verbrecher
the king be-PRFX.punish hits at/on the criminal
'The king punishes hits at/on the criminal.'
c. Die Bestrafung des Verbrechers
the be-PRFX.punish.ung-NMLZ of the criminal
'The punishment of the criminal'

Third, a significant number of *be*-prefixed constructions occur exclusively in the form of participles and thus do not partake in verbal alternations at all, cp. e.g. (35). Remarkably, *ung*-nominalizations are not precluded in this case, a fact which I will address together with the necessary revisions to the bi-eventivity constraint on the formation of *ung*-nominalizations in section 3.5.

(35) a. *Sie begabt den Redner.
she be.PRFX.gift the speaker
'She be-gifts the speaker
b. Der Redner ist begabt.
the speaker is be-PRFX.gift.PTCTP
'The speaker is gifted.'
c. Die Begabung des Redners
the be-PRFX.gift.ung-NMLZ the.GEN speaker
'The giftedness of the speaker'

Before I address the structural separation of the object denotation of *Bemalung* from its state denotation, we need to set forth in more detail how the many-sorted ontology of denotations underlying the ambiguity of *Bemalung* figures in the syntactic approach to word formation that is examined in the present paper.

2.3 Root meaning in context

If complex words have a complex (i.e. internally structured) meaning, a logical consequence of the assumption that complex words are generated by the syntax is that the meaning of a complex word is determined by the compositional interpretation of its syntactic structure. To appreciate the difficulties that come with this corollary, consider the object reading of *Bemalung*, which we identified as the one enforced by the selection restrictions imposed by the verb *renovieren* ('to renovate') on its direct object. Recall the motive for this identification: objects but not events or states can be renovated. So the fact that *renovieren* accepts direct object whose head noun is *Bemalung* suggests that *Bemalung* can denote an object. But an object reading of *Bemalung* does not only occur with *renovieren*. In (36), *Bemalung* is selected as the direct object of the verb *zeigen* ('to show').

(36) Die Bemalung der Wand zeigt Maria Himmelfahrt.
'The wall be-painting shows the assumption of Mary.'

In (36), the wall painting denotes an object not with respect to the material from which it is made but with respect to the information that the wall painting encodes. Notably, the two 'aspects' of object denotation that are selected by the verbs *renovieren* and *zeigen* are distinct from each other. A wall painting can show the assumption of Mary without the paint from which it is made showing the assumption of Mary. Such examples rule out a simple correlation of object denotations with corporeal physical entities, indicating that the ontology which underlies the semantic interpretation of *ung*-nominalizations like *Bemalung* is complex. In frameworks like DM this complex ontology must result from the semantic interpretation of the syntactic structure of a complex word to which root meaning is pivotal. On the one hand, root meaning feeds semantic content into the interpretation of the syntactic context into which the root is inserted. On the other, root meaning determines which syntactic contexts are licit for insertion. Both these aspects of root meaning have been addressed in one go by making the assumption that roots have a certain semantic category. For example, Marantz (1997) assumes that roots are categorized according to the lexical-semantic verb classes in Levin and Rappaport Hovav (1995)[6]. Accordingly, the root $\sqrt{mal}$ would be a 'manner-root' which does not entail a change of state and is internally caused. Because $\sqrt{mal}$ is a manner root, $\sqrt{mal}$ can be inserted only into a mono-eventive syntactic structure, whose interpretation will always be an activity description. The semantic categorization approach to root meaning is challenged by the fact that, as discussed in section 1.3, the root $\sqrt{mal}$ can be inserted not only into a verbal context but also into a nominal context, leading to the noun *Mal* which does not denote an event but an object. To account for variable insertion contexts, Roßdeutscher and Kamp propose that when several insertion contexts are licit for a given root, the semantic category of that root can be 'coerced' from its assumed

[6] "The exact (semantic) categories for roots that predicts their varying behavior in nominal and verbal environments is not important here (although identifying these categories is of course essential to syntactic theory). The important point is that there are such categories"(Marantz, 1997, p. 216)

base category into a root of a different category (Roßdeutscher and Kamp, 2010, p. 199).

While accounting for the meaning of roots in terms of lexical-semantic classes à la Levin and Rappaport-Hovav may be intuitively plausible and – given the immense groundwork in lexical semantics – easily accessible, it weakens the appeal of the syntax-only hypothesis considerably. For assuming that lexical-semantic classes are atomic units of meaning easily raises the impression that those questions that have been central to lexical semantics – like e.g. the complex internal structure of events – are now consigned to a 'root wastebasket' (as a reviewer put it) which just conceals but does not abolish non-syntactic generative mechanisms. Countering this objection is an obligation that proponents of the syntax-only hypothesis failed to discharge. Thus, to maintain that the syntax-only hypothesis is a viable conception of the grammar with substantial content, a minimal requirement is to outline a treatment of root meaning in context that at least addresses this objection. Naturally, the proposal I can offer within the limits and scope of this paper is not a full-fledged account of root meaning in context. What I aim for is a way to make precise what I mean in the following when I say that a functional head in the syntax selects for certain aspects of (root) meaning and that a functional head introduces a discourse referent that represents those selected aspects.

To make transparent the complex ontology of roots and their interaction with syntactic insertion contexts, I propose to model root meaning in a form similar to how word meaning is dealt with in the theory of dot-types (Pustejovsky (1995); Asher (2011). Let me first provide the gist of this. The theory distinguishes two levels at which the meaning of words is represented: the ontological level of dot-types and the semantic level of denotations. Dot-types are structured bundles of properties. Denotations are understood in the traditional model-theoretic sense as referential objects that can be quantified over at the level of logical form. Each (subset) of the aspects of a dot-object can serve as a denotation. The theory provides elaborate mechanisms that relate dot-types and denotations. A denotation is derived (or 'transformed', in Asher's terminology) when an argument associated with a dot-object is combined with a predicate. Predicates come with the presupposition that possible fillers of their argument slots are associated with a certain type. These 'type presuppositions' amount to what I called 'selection restrictions' earlier, and in what follows I understand selection restrictions as type presuppositions. The composition of a predicate and an argument phrase is licit if (a subset of the aspects of) the dot-object associated with the argument phrase satisfies the type presupposition of the predicate.

I propose to apply the theory of dot-objects to root meaning as follows. Roots are associated with a dot-type. For example, the dot-object associated with $\sqrt{mal}$ could be represented as in (37).

(37) $\sqrt{mal} \leftrightarrow$ PHYSICAL-OBJECT • INFORMATIONAL-OBJECT • EVENT

I suggest that the predicate-argument configuration which determines a subset of the dot-type as the denotation of a word in Asher's framework corresponds to the syntactic relation between a root and its categorizing head in DM, adopting the head typing principle (see (Asher, 2011, fn. 18, p. 114) and (Asher and Pustejovsky, 2006)),

according to which the syntactic head of a construction determines the type of the output of the composition. That is, categorizing heads in the syntax are associated with a type presupposition that must be satisfied by the dot-type of the root which is inserted. For example, when the verbalizer head is associated with a type presupposition for an event, the subtype EVENT of (37) satisfies the type presupposition of the verbalizer. Consequently, the sub-dot-type EVENT is transformed into a model-theoretic entity which can be referred to as an event at the level of logical form. In the following, I say that the verbalizer *selects* for the eventive aspect of the dot-object associated with $\sqrt{mal}$ and *introduces* a discourse referent for an event. Similarly, I say that a nominalizer head selects for objective aspects of a root and introduces a discourse referent for an object. In particular, the discourse referent for the object denotation of *Mal* is introduced when the objective subtype INFORMATIONAL-OBJECT • PHYSICAL-OBJECT of (37) is selected by a nominalizer.

Consider next the case where a syntactic head does not select for a root but for a (complex) complement. One case is the bi-eventive construction in (15-a), where the event type presupposition of the verbalizer cannot be satisfied by a root meaning because the root is inserted below the vP. In Asher's framework, when a type presupposition of the predicative head is not satisfied by the argument, the type presupposition can be accommodated in context. For the bi-eventive construction, the context for accommodation of the type presupposition of the verbalizer is the small clause which precedes the verbalizer in the compositional derivation and denotes a state. But how can a type presupposition for an event be accommodated in a state? Facing a similar problem, Kratzer (2005) proposes that the state denotation in a bi-eventive construction is type-shifted to an event property by the conceptually primitive predicate CAUSE. I propose that something similar accommodates the event presupposition of the morphologically empty verbalizer in a bi-eventive construction. The event type presupposition of the verbalizer in a bi-eventive construction is accommodated under the assumption that the event is the direct causer of the state contributed by the small clause complement of vP.

The sketched treatment of complex ontology has two main advantages over the semantic categorization approach. First, dot-types have no direct association with the notion of a (complex) word. As Asher (2011) discusses in chapter 4.1, to deal with systematic semantic ambiguities (such as the verb and the noun that can be derived from $\sqrt{}$dance) and accidental ambiguities (such as the nouns that can be derived from $\sqrt{}$bank) dot-types should be associated with word stems rather than words by themselves. Thus, the theory of dot-types is independent of the question where and how complex words are generated. In particular, dot-types are compatible with the assumption that complex words are generated by the syntax. The head typing principle is effective already for roots and no intermediate level of lexical generation of words need to be involved. Second, no coercion is necessary when roots can enter more than one derivation. Rather, different aspects of the root are selected when syntactic heads are associated with different type presuppositions. When the underlying ontology of dot-types is reasonably fine-grained, type presuppositions can be used to determine whether or not a root can be inserted into a particular context in the same way that selection restrictions of verbs determine grammatical choices for direct objects. Finally, it appears that there is no principled reason why the system of dot-objects and

type presuppositions cannot be translated into an – albeit very complicated – system of feature checking, which would be required to make good on the requirement that the meaning of complex words is derived in the syntax.

2.4 Nominalization and reification

Nominalization of complex complements (as opposed to nominalization of roots) figures into the account I have outlined of the relation between syntactic categorization and meaning in a peculiar way. Nominalization of complex complements does not introduce a denotation by itself, but according to rather standard assumptions "transforms a sentence into a noun phrase" (Vendler, 1967, p. 125). The intriguing effect of transforming a sentence into a noun phrase has been popularized by the analysis of the logical form of action sentences put forward in Davidson (1967). Consider the sentence in (38-a) and the nominalization in (38-b).

(38) a. Amundsen flew to the Northpole.
b. A flight by Amundsen to the Northpole.

Following Davidson, (38-a) and (38-b) describe the very same action of Amundsen. But (38-a) differs importantly from (38-b) in the way in which this action is referred to. The noun phrase *a flight* in (38-b) can be considered as expressing existential quantification over events, of which Amundsen's flight is one. (38-a) can interpreted as describing this same action but arguable in no other sense than that the action is the ground for the sentence's truth. This is an ontological distinction: that part of the world that is responsible for the truth of (38-a) is the very same that is responsible for the truth of (38-b). But the logical form of (38-a) treats the relevant part of reality as an instance of a quantifying expression, one where members can be the values of variables that can be bound by quantifiers over that domain. This process – of transforming a sentence whose truth is grounded in the existence of some event into one containing a variable that can take this event as a value – was referred to as *reification* in Reichenbach (1947). Nominalization can be regarded as a form of event reification, too, insofar as event nominals can be seen as defining quantification domains consisting of events, over which quantificational DPs with the event nominal as the head noun express quantification. For instance, the sentence in (39) expresses quantification over the extension of the event interpretation of the nominal *Bemalung* (or, more likely, over some contextually restricted subset of that extension).

(39) Keine Bemalung dauerte mehr als drei Tage.
'No be-painting took longer than three days.'

According to our central assumption each of the three readings of *Bemalung* is determined by its own syntactic structure. Furthermore, the co-predication results of section 2.1 showed that the three readings are ranked by 'derivational accessibility', with the event reading accessible from both the state reading and the object reading and the state reading accessible from the object reading, but not conversely. We also committed to the strategy of accounting for this ranking by assuming that the syntactic

structures of the accessible reading contains the readings from which it is accessible. Thus the syntactic structure of the object reading is included in the structure of the state reading, which in turn is included in the structure of the event reading. Suppose now that each of the readings of *Bemalung* involves the reification of a sentence-like expression in the same sense in which *a flight* involves reification of sentences containing the verb *to fly*. Thus, in particular the event reading of *Bemalung* will involve reification of what is described in sentences containing the verb *bemalen*, as in (40).

(40) Sie bemalte die Wand.
'She be-painted the wall.'

So the syntactic structure of the event reading of *Bemalung* will have to contain the syntactic structure of the verb *bemalen*. But if at the same time the structure of the state reading of *Bemalung* (and as part thereof the object reading) are contained in the structure of the event reading, how are these other two structures – the one for the state reading of *Bemalung* and the one for the object reading – related to the syntactic structure of quasi-sentential constructions involving the root $\sqrt{mal}$ and the prefix *be*? That is, are there other non-nominal expressions (built from the root $\sqrt{mal}$ and the prefix *be*) that stand in the same relation to the state reading and the object reading of *Bemalung* in which the verb *bemalen* stands to its event reading? These are two of the questions that will occupy us for most of the remainder of the paper. And if there are such expressions, then according to the containment principle, the structure of these non-nominal expressions will also be the structure that is input to *ung*-nominalization. In turn, this enables us to identify the critical details of the bottom structure of *Bemalung* that is responsible for the derivation of the object and state reading.

2.5 Approaching the adjectival core of the analysis

Let me summarize the findings established in the preceding sections. First, the co-predication data in section 2.1 showed that the minimal structure realized by $\sqrt{mal}$+*be* that underlies the object denotation of *Bemalung* neither contains an event-introducing verbal functional layer nor a state-introducing small clause. Second, the object reading of *Bemalung* should be analyzed as a dot-object, i.e. a structured bundle of properties. Third, *ung*-nominalization involves the reification of a sentence-like expression. In this section, I propose that these three desiderata on the minimal structure realized by $\sqrt{mal}$+*be* can be accounted for if the minimal structure that is realized by $\sqrt{mal}$+*be* is an adjectival structure.

Initial evidence for the hypothesis that the minimal structure realized by $\sqrt{mal}$+*be* is adjectival is constituted by the fact that $\sqrt{mal}$+*be* can be used to derive superlative comparatives devoid of temporal meaning. (41) is but one of many attested examples in which we find a superlative comparative derived from $\sqrt{mal}$+*be*.

(41) Der Maler ist nun 29 Jahre alt und beginnt sein ambitiöses Programm,
the painter is now 29 years old and start his ambitious program
das Kastelruth in das bemalteste Dorf Südtirols
that Kastelruth in the be-PRFX.paint.PTCP.SUPL village South Tyrol
verwandeln sollte.
turn would
'The painter is 29 years old now and starts with his ambitious program that would turn Kastelruth into the most be-painted village of South Tyrol.'[7]

Because in German *un*-prefixation is possible only for adjectival constructions, an adjectival analysis of the minimal realization of $\sqrt{}$*mal+be* finds further support by data as in (42).

(42) die unbemaltesten Armeen des Turniers
the un-PRFX.be-PRFX.paint.PTCP.SUPL armies the.GEN championship
trafen ausgerechnet im Finale aufeinander.
encounter just at the finals each other
'the most un-be-painted armies of the tournament encountered each other just in the finals.'[8]

The categorization of the minimal structure that is realized by $\sqrt{}$*mal+be* as an adjectival construction is reinforced by examples as in (43), where the nominalization *Bemalung* itself is prefixed with *un*. The meaning of the *un*-prefixed nominalization in (43) is best reproduced as 'unpaintedness'.

(43) ... ob ich die [Tupolev] jemals in einer anderen als dieser
... if I it ever in an other than this
Unbemalung gesehen habe
un-PRFX.be-PRFX.paint.ung-NMLZ seen have
... if I had ever seen it [the Tupolev] in another than this un-be-painting [9]

While *Unbemalung* is rare and illustrates primarily that *un*-prefixation of *be*-prefixed *ung*-nominalization is used productively in the wild, there are quite a few established instances of this construction in German, see e.g. the examples in (44).

(44) a. die Unbearbeitung
the un-PRFX.be-PRFX.work.ung-NMLZ
'the unworkedness'
b. die Unbeschädigung
the un-PRFX.be-PRFX.damage.ung-NMLZ
'the undamagedness'

[7] www.hotelwolf.it/de/traditionelle-fassadenmalerei.asp Last accessed: 21.6.2017

[8] http://www.forum.middenheim.de/YaBB.pl?board=allgemein;action=display;num=1158427446 Last accessed: 21.6.2017

[9] The example is from an internet forum for plainspotters and refers to the different paintings of Tupolev airplanes. http://www.dus-spotter.de/index.php/Thread/349-DUS-und-die-Tupolevs/?pageNo=4 Last accessed: 21.6.2017

c. Die Unbeachtung
the un-PRFX.be-PRFX.observe.ung-NMLZ
'the unobservance'
d. Die Unbeschränkung
the un-PRFX.be-PRFX.restrict.ung-NMLZ
'the unrestrictedness'

If the minimal structure realized by $\sqrt{}$*mal+be* is an adjectival structure, namely the adjective *bemalt* in (45) that underlies superlative construction in (41) and *un*-prefixation constructions as in (42), this raises the question whether and how this structure is related to the object reading of *Bemalung*. It is at this point that the dot-object analysis of the object reading comes into play. In section 2.3 I pointed out that the technical term 'object' denotation should not be confused with the way in which the natural language expression 'object' is used to describe corporeal things. Instead, I proposed, following Asher and Pustejovsky, that object denotations dissolve into structured bundles of properties. But (complex) properties are not only predicated by nominals but first and foremost by adjectives. That is, I propose that the relation between the object denotation of *Bemalung* and the property attributed by the adjective in (45) is similar to the relation between a verbal and a nominal description of an event: reification of the adjective in (45) transforms the predication relation in (45) whose truth is grounded in the existence of some property into one containing a variable that can take this property as a value. In plain words: the object denotation of *Bemalung* is the reification of the property attributed of the wall by the adjective in (45).

(45) Die bemalte Wand
the be-PRFX.paint.PCTP wall
'The be-painted wall'

If the *be*-prefix functions as the head of an adjectival phrase, what kind of adjectival phrase is this? To address this question, it is useful to consider in more detail the construction to which *be* is prefixed in the examples (41), (42) and (45). Notably, the adjectival constructions in (41), (42) and (45) bear the German marker for participle morphology, i.e. a suffix *t* inserted between the root $\sqrt{}$*mal* and the adjectival inflectional or superlative morphology. Consequently, *be* adjectivizes a 'denominal' participle derived from the nominal root phrase which instantiates $\sqrt{}$*mal*. In turn, the minimal structure realized by $\sqrt{}$*mal+be* which is contained in all of the readings of *Bemalung* is that structure and analysis of the attributive participle which is found in (41), (42) and (45). To asses this proposal in more detail, the next section presents an explicit reconstruction of the readings of *Bemalung* at the syntax-semantics interface, which in turn provides the starting point for further corroboration of the adjectival analysis of $\sqrt{}$*mal+be* in section 3.

2.6 Implementing structural disambiguation under containment

In this section, I cast the analysis of the readings of *Bemalung* under containment in the form of an explicit reconstruction at the syntax-semantics interface. The syntactic

structures I employ follow principles of minimalist syntax of phrase structure with move and merge (Chomsky, 1995). Argument structure is projected in the syntax and the thematic interpretation of arguments is determined by their syntactic position (Harley, 2011). I assume that participle morphology is the spell-out of a feature $[+part]$ according to the rule in (46) (but see footnote 10), where $[+part]$ is spelled out as a suffix t in the presence of the features $+a$ and $+Pred$ associated with adjectival phrases and small clauses but is empty elsewhere[10].

$$\begin{array}{rl} [+part] \rightarrow & /-t/\ /\quad +a \\ \rightarrow & /-t/\ /\quad +Pred \\ \rightarrow & /\emptyset/\ /\ elsewhere \end{array} \tag{46}$$

As regards the semantic interpretation of syntactic structures, I use a version of Discourse Representation Theory (DRT) as a logical form formalism. The basic representational unit of DRT is a so-called Discourse Representation Structure (DRS), a pair of a universe U (a set of discourse referents) and a set of DRS-conditions. For a formal definition of the syntax and semantics of the DRS language I refer the reader to (Kamp et al., 2011). In the following, I focus on those amendments to the standard syntax and semantics of the DRS language that are necessary to deal with the semantic interpretation of the syntactic structure of words under the assumption that there is no generative lexicon. I assume a set *Dref* of mutually disjoint sets of sorted discourse referents.

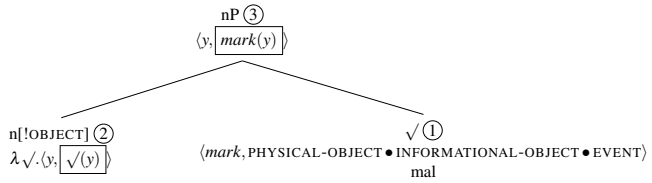
(47) $Dref = X \bigcup P \bigcup S \bigcup E \bigcup Q \bigcup Root$, where
X is a set of discourse referents for objects: $x, y, z, ...$
P is a set of discourse referents for properties: $p, p_1, ...p_n$
S is a set of discourse referents for states: $s, s_1, ...s_n$
E is a set of discourse referents for events: $e, e_1, ...e_n$
Q is a set of discourse referents for DRSs: $Q, Q_1, ..., Q_n$
Root is a set of predicate constants for names of roots: $\surd, \surd_1, ..., \surd_n$

I use Greek lower case letters $\alpha, \beta, ...$ to represent discourse referents for which no specific sort is indicated (i.e. to which subset of *Dref* the discourse referent in question belongs). I distinguish the following types of occurrences of discourse referents distinguished by their binding status. The discourse referents occurring in the universe U are understood as being existentially quantified within all conditions of the DRS (as standard in DRT). In addition the DRS may be preceded by a 'variable store', a finite list of discourse referents. The discourse referents in the store are unbound; they occur as arguments in conditions of the following DRS and are waiting to be bound at some later stage of the DRS construction. Only the DRS itself is subject to model-theoretic interpretation, much like a free variable formula (whose free vari-

[10] The spell-out rules in (46) simply circumvents the problem of the distribution of the *-t* morpheme in verbal conjugation by assuming that the spell-out of the [+part] feature is empty in contexts other than +a and +Pred. A reviewer suggested that a more thorough investigation may be able to come up with a systematic explanation of the distribution of the *-t* morpheme (which is not realized in the 1.SG/1.PL/3.PL present tense conjugation) in analogy to the systematic explanation of the seemingly idiosyncratic *t*-stem in Latin argued for in Steriade (2016), where – quite similar to my case – "some verbal derivatives have a stem that is identical to that of the perfect-passive participle"(Steriade, 2016, p. 114)

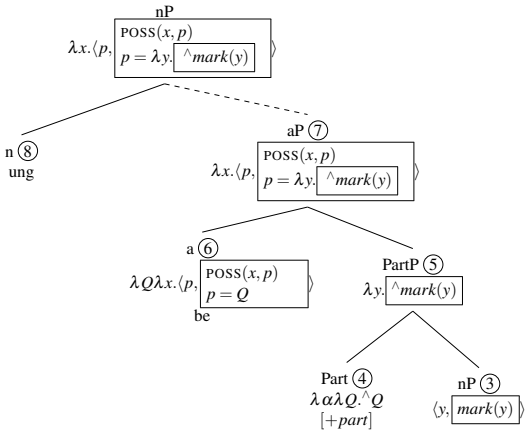
ables are the discourse referents in the store). What counts for the model-theoretic interpretation are DRSs that represent the meaning of a word. Within the framework used here this means that no further constructions steps can be applied to a DRS that represents the meaning of a word. If at this point there still remain discourse referents in the store of the representation, these will be all existentially bound (by transferring them to U) before the structure that derived that DRS is sent off to morphological spell-out. In the following, I refer to this requirement as the *existentialization* of discourse referents.
The composition of DRSs is driven by the syntax but I make use of λ-abstraction and β-conversion to indicate the way in which the semantic representations of two DRSs K_1 and K_2 are composed. That is, I employ λ-abstraction to indicate that a λ-prefixed DRS K_1 must combine with another DRS K_2 via λ-conversion, i.e. the insertion of a discourse referent of a certain sort supplied by K_2 into those positions of K_1 of the same sort which are bound by the λ-operator. I introduce additional principles of the syntax-semantics interface in the course of discussing the running example of this paper, beginning with the structure and analysis of the object reading of *Bemalung* in (49). To facilitate discussion, I label nodes and leaves of the derivation with circled numbers.

(48)



The derivation of *Bemalung* proceeds bottom-up and starts out from merging the root $\sqrt{mal}$ attached to node ① with the nominal head n attached to node ②, deriving the noun *Mal* ('mark') ③, see (48). According to the discussion of root meaning in section 2.3, I assume that the meaning of the root $\sqrt{mal}$ is specified by a dot-type. In turn, the nominal head ② is associated with a type presupposition for (aspects of) an object, which I represent as [!OBJECT]. The type presupposition of ② selects a subtype of the dot-type associated with the root $\sqrt{mal}$ – PHYSICAL-OBJECT • INFORMATIONAL-OBJECT – and transforms this subtype into a model-theoretic entity that is represented with a discourse referent y from X introduced by the nominal head. This discourse referent is kept in the variable store of the DRS at ② for later processing. The semantic composition step in (48) converts the $\lambda-$bound predicate constant $\sqrt{}$ of the DRS attached to ② against the predicate constant *mark* from the variable store of ①. One thing that (48) could be used for when the unbound discourse referent y in the store of the DRS at ③ is existentialized is to derive the semantics of the spell-out of the structure in (48) as the noun *Mal*.

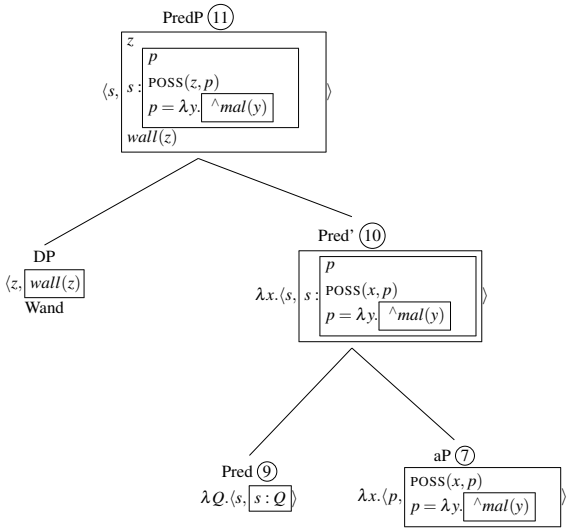
(49)



If derivation continues, the analysis of *be*-prefixation I am proposing is captured by the operations that combine ③ and ④ into ⑤, see (49). There are three operations invoked in this computation step: (1) λ-abstraction over the unique discourse referent y in the store of the DRS at ③ (2) λ-conversion of the DRS at ③ against the λ-abstracted discourse referent Q at ④ and (3) intensionalizing the predication $mark(y)$ to the proposition-denoting term $^{\wedge}mark(y)$ of the properties it expresses (using the intension-forming cap operator $^{\wedge}$ of Montague (1973)) . In plain words, the semantic function of the head Part ④ is to turn the semantic representation of the noun *Mal* ('mark') into the property of being a mark, i.e. into a function that returns for each time and world the extension of the predicate *mark*. According to the analysis of *be* as an adjectivizer, the next step in the derivation merges PartP ⑤ with the head ⑥ of an adjectival phrase aP ⑦. The adjectivizer ⑥ introduces a new discourse referent for a property p into the store of ⑥ and prefixes the DRS with a λ-bound discourse referent that the adjective predicates to be the bearer of p. In prose, the semantic purpose of adjectivization of ⑤ is to predicate the property described by 'being a mark' of an individual x such that x 'has' the property of 'being marked'. I represent the relation 'x possesses the property p' with the primitive conceptual predicate POSS. $\textsc{poss}(x,p)$ is a shorthand for the term $\lambda P.[P(x)](p)$, where P ranges over properties. $\textsc{poss}(x,p)$ is true at a time t iff p holds of x at t.

There are three different ways in which the derivation can proceed from ⑦. First, sending the aP structure to spell-out existentializes the property p and yields an attributive participle construction as in (45). Second, if an *ung*-nominalizer is inserted right above aP as in ⑧, the object denotation of *Bemalung* is derived via reification of the aP structure. Third, if derivation continues, the derivation of the state denotation of *Bemalung* proceeds by extending the aP ⑦ derived in (49) with a small clause PredP as in (50).

(50)



The head Pred (9) introduces a discourse variable for a state $s \in S$. Semantically, (9) 'stativizes' the property p from the store of (7) to the effect that s is specified as the state of x possessing p. Having a property p for a certain time implies that this property is instantiated, i.e. that the variable p in the store of the DRS at (7) is existentially bound and thus ends up in the universe of the DRS (10). Pred projects a DP in its specifier. λ-conversion of the discourse referent z introduced by the DP against x yields the semantic representation of PredP (11). Again, there are three options to proceed from PredP. First, we can send (11) to spell-out, arriving at the stative predicative participle in (51) in which the unbound state discourse referent at (11) is existentially bound by the copula *sein* ('to be') according to Maienborn (2007)[11]. To keep the discussion focused, a detailed analysis of the resulting adjectival participle construction is postponed until section 3.

(51) Die Wand ist bemalt.
the wall is be-PRFX.paint.PTCP
'The wall is be-painted.'

Second, the nominalizer (8) can be added to the structure in (11) to derive the state denotation of *Bemalung* as in (52). The input structure to nominalization is PredP, a predicative small clause, which has been argued to be the syntactic structure of

[11] The proposed analysis of adjectival participles relates to Maienborn (2005) and subsequent work in a straightforward way. Maienborn argues that states denoted by copula constructions (like adjectival participles) are 'Kimian States', states that are ontologically poorer than 'Neo-Davidsonian' states. Kimian states are not defined relative to a (Neo-)Davidsonian event but "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), which is nothing other than the state derived with PredP.

deadjectival nominalizations like *Schönheit* ('prettiness') in DM, see e.g. Roy (2010) for a general argument and more specifically Alexiadou and Iordăchioaia (2014) for German.

(52) Die Bemalung der Wand besteht unverändert fort.
the be-PRFX.paint.ung-NMLZ the.GEN wall persists^{S} unchanged on
'The wall be-painting persists unchanged.'

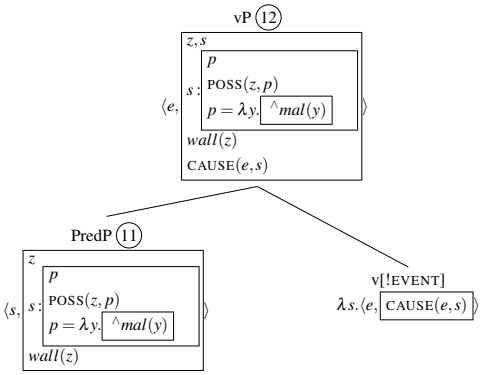
Third, if derivation continues, according to standard assumptions about derived event nominals, the event reading of *Bemalung* (53) is the reification of the verbal event description (54).

(53) Die schrittweise Bemalung der Wand durch Peter
the stepwise^{E} be-PRFX.paint.ung-NMLZ the.GEN wall by Peter
'Peter's stepwise be-painting of the wall.'

(54) Peter hat die Wand schrittweise bemalt.
Peter has the wall step by step^{E} be-PRFX.paint
'Peter be-painted the wall step-by-step.'

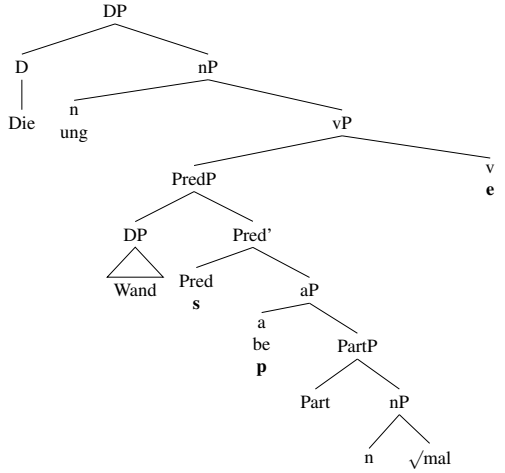
Extending (50) with a verbal functional layer yields the structure and analysis in (55).

(55)



The verbalizer v in (55) comes with a type presupposition for an EVENT. As discussed in section 2.3, the type presupposition is accommodated by the state *s* contributed by PredP with the introduction of the predicate CAUSE, which relates *e* with *s* by predicating *e* to be the cause of *s*. As required by the distinction between argument-taking and non-argument taking nominals, the DP in the specifier of Pred (the complement of vP) has argument status and receives a thematic interpretation as the Theme of the event description. If the *ung*-nominalizer (8) is added, reification of the DRS attached to node (12) yields the event denotation of *Bemalung*. If the derivation continues not with a nominalizer but with higher verbal projections like Tense and Voice, the verb *bemalen* is derived. The overall syntactic structure of the event reading of *Bemalung* I have discussed step-by-step is given in (56).

(56)



Summing up: as it stands, the proposed structure and analysis of *Bemalung* implements the intended structural disambiguation under containment while keeping the embedded vP hypothesis. I have presented a syntax-based analysis of *Bemalung* according to which the semantic representation of the event denotation **e** of *Bemalung* contains the semantic representation for the state denotation **s**, which in turn contains the semantic representation for the object denotation (where I analyzed the object denotation as the reification of a complex property **p**). To separate the prefix *be* from the introduction of a state, I argued that *be* serves as the adjectival head of a participle construction. Semantic containment located the participle as contained in the structure and analysis of the verb *bemalen*. Before I elaborate on this last finding in more detail, I conclude this section with a discussion of the empirical scope of the proposed analysis of *be*-prefixation.

2.7 Generalizing the analysis

There are two questions concerning the scope of the analysis of *ung*-nominalizations that naturally arise from a narrowly focused case study like the one I have presented in the last section. First, to what extent can the analysis of *Bemalung* I proposed be considered a general pattern for the analysis of *be*-prefixed *ung*-nominalizations in German? Second, how does the analysis of *Bemalung* relate to the analysis of *ung*-nominalizations in general? Let me first make clear that I chose *be*-prefixed constructions as an object of investigation because *be* is a "remarkably simple and regular prefix" (Dewell, 2015, p. 53) whereas the other German prefixes seem to lack a clear and consistent characterization. Thus, the analysis I proposed may inform without straightforwardly generalizing to them the analysis of prefixes other than *be*. As regards the former question, the structure proposed for *Bemalung* generalizes in a straightforward manner to *be*-prefixed *ung*-nominalizations derived from nominal

root phrases (cp. classes 2,4,5 of the corpus study of *be*-prefixed *ung*-nominalizations in Roßdeutscher (2010)).

Possible counterexamples to the analysis proposed are *be*-prefixed constructions which Roßdeutscher (2010) claims to lack an *-ung* nominalization. However, on closer inspection these examples differ importantly from the regular formation pattern exemplified by *Bemalung*. There are independent, pretheoretical reasons why these must receive a different analysis. One example are verbal constructions like *beruhen auf* ('to rest on') in (57) which take a prepositional object. Tellingly, these constructions lack a participle construction.

(57) a. Der Beweis beruht auf zwei Annahmen.
'The proof be-rests on two assumptions'
b. *die Beruhung
the be-PRFX.rest.ung-NMLZ
'the resting'
c. *der Beweis ist (auf zwei Annahmen) beruht.
'the proof is (on two assumptions) be-rested'

In general, a negative characterization of *be*-prefixed constructions that definitively lack an *ung*-nominalization is difficult to maintain given the productivity of both *be*-prefixation and *ung*-nominalization. In fact, Google search turns up examples of *ung*-nominalizations for all the *be*-prefixed constructions which according to Roßdeutscher (2010) lack an *ung*-nominalization. But one of many telling examples is *Belachung* ('the laughing at sth.') in (58).

(58) a. lachen
'to laugh'
b. *die Lachung
the laugh.ung-NMLZ
'the laughing'
c. belachen
be-PRFX.laugh
'to laugh at sb./sth.'
d. ?die Belachung
the be-PRFX.laugh.ung-NMLZ
'the be-laughing'

An example involving *Belachung* is given in (59), where *Belachung* refers to a soundtrack for a TV comedy show containing recorded laughter of the audience.

(59) Ab Folge 6 oder 7 gab es keine Belachung mehr.
since episode 6 or 7 exist there no be-PRFX.laugh.ung-NMLZ longer
'Since episode 6 or 7 there is no longer a laugh track.'[12]

According to my proposal *Belachung* as it occurs in (59) is formed by the same mechanism that derives *Bemalung*. The root $\sqrt{lach}$ appears as the root of a mono-

[12] http://forum.cinefacts.de/140752-switch-auf-dvd-7-print.html Last accessed: 21.6.2017

eventive verb in (58-a), but the same root appears also in the (somewhat outdated) noun *die Lache* ('the laugh'). The nominal root phrase which derives *die Lache* is turned into a participial property by *be*-prefixation, which provides the right starting point for a bi-eventive construction that can be *ung*-nominalized.

The syntactic analysis I proposed can account for those *be*-prefixed *ung*-nominalizations like *Begabung* ('giftedness') (see (35)) for which no verbal construction exists and thus no extension of the structure with a vP is possible. Consequently, I correctly predict that *ung*-nominalizations of these constructions lack an event reading. With respect to the type of readings I identified for *Bemalung* the situation is more complicated. Consider first the object reading of *Bemalung*, which decomposes into at least an informational and a physical aspect. But the object reading of a *be*-prefixed *ung*-nominalization like *Besteigung* ('ascent') can appear in context e.g. also as a spatial path that can be modified with degree adjectives like *steil* ('steep'), see (60).

(60) die extrem steile Besteigung der
the extremely steep be-PRFX.ascent.ung-NMLZ the.GEN
Marbichlerspitze
Marbichlerspitze
'the extremely steep ascent of the Marbichlerspitze'[13]

Ultimately, the relevant ontological difference between the object readings of *Bemalung* and *Besteigung* results from the different meanings of the roots of the construction, which I proposed to deal with in the theory of dot-types. The pivotal role of an ontologically informed theory of root meaning becomes apparent in the meaning of unprefixed *ung*-nominalizations that are not derived from deadjectival root phrases (where I discuss unprefixed deadjectival nominalizations like *Säuberung* in some more detail in section 3.5). The ontological diversity of unprefixed non-deadjectival *ung*-nominalizations is confirmed by the analysis in Roßdeutscher (2010), who lists over ten different ontological types of root meanings in unprefixed -ung nominalizations, among them abstract entities like e.g. rules (*Regelung* (rule.ung-NMLZ), ''regulation) mereological configurations (*Sammlung* (collect.ung-NMLZ), 'collection') or values (*Wertung* (value.ung-NMLZ), 'valuation'), but also idiosyncratic meanings like that of *Zeitung* (time.ung-NMLZ, 'newspaper'). With respect to the bi-eventivity constraint, unprefixed *ung*-nominalizations like *Forschung* (research.ung-NMLZ) or *Mischung* (mix.ung-NMLZ, 'mixture') are often remnants of early high German constructions, where the constraints on the licensing on ung-nominalizations were quite different than in present day German (Demske, 2002). In particular, *ung*-nominalizations were regularly derived from mono-eventive verbs. It should be noted, however, that there are also unprefixed non-deadjectival *ung*-nominalizations like *Blutung* (bleed.ung-NMLZ, 'bleeding') of apparently stative verbs the formation of which Pross (2015) argues to have a systematic semantic explanation that is compatible with the bi-eventivity constraint.

While the ontology of object readings may find a suitable treatment in the theory of dot-types, the situation is more complicated when the state reading is taken into account. Roßdeutscher and Kamp investigate a number of examples where the *ung*-

[13] http://www.hikr.org/tour/post109274.html Last accessed: 21.6.2017

nominalization lacks the state and/or object reading. For instance, they claim that for the *be*-prefixed *ung*-nominalization *Beleuchtung* ('illumination') "only the event reading is clearly attested" (Roßdeutscher and Kamp, 2010, p. 208), but a Google search for a context which diagnoses an object reading as in (61) turns up more than 500 hits.

(61) Die Beleuchtung war kaputt.
the be-PRFX.light.ung-NMLZ was broken
'The illumination was broken.'

A state reading of *Beleuchtung* is certainly more difficult to diagnose, but examples with predicates like *vorgefunden* ('encountered'), which according to Ehrich and Rapp (2000) diagnose a result state reading, are also attested, see e.g. (62).

(62) Häufig wird die vorgefundene Beleuchtung des Raumes genutzt, in dem etwa ein Vortrag stattfindet.
'Often the encountered illumination of the room is used, for example when a talk takes place in it.'[14]

Another example is *Bearbeitung* ('editing, arrangement') which according to Rossdeutscher and Kamp lacks an object reading. Again, there are examples as in (63) that have been cited in favor of the object reading (see e.g. Bierwisch (1989); Ehrich and Rapp (2000)), as only objects can vanish but not events or states.

(63) Die Bearbeitung der Sonate ist verschwunden.
the be-PRFX.work.ung-NMLZ the.GEN sonate has vanished
'The arrangement of the sonate has vanished.'

Rossdeutscher and Kamp as well as Ehrich and Rapp contend that *Bearbeitung* has an object reading but lacks a diagnosable state reading. But – I already addressed this point in section 2.1 – if *Bearbeitung* has an object reading, then it must have the trivial state reading of temporal existence, which is the state targeted in (64).

(64) Die Bearbeitung der Sonate besteht unverändert fort.
'The arrangement of the sonate persists unchanged.'

The point I want to make with the examples *Beleuchtung* and *Bearbeitung* is that the identification of (the very concept of) readings with selection restrictions is problematic. In (62), as Roßdeutscher and Kamp note, the event reading coincides with the state reading and in (64), as Ehrich and Rapp observe (fn. 41, p. 291), the object reading is indistinguishable from the state reading. Thus, as the examples of *Beleuchtung* and *Bearbeitung* show, it is difficult if not impossible to distinguish with selection restrictions the state reading from the event and object reading and vice versa.

It is against the problematic nature of an ontological conception of the readings of ambiguous nominalizations that the structural disambiguation approach to nominalization appears clearly advantageous. I am referring here in particular to the lexicalist

[14] Großkurth, Handke (Eds.): *Inverted Classroom and Beyond. Lehren und Lernen im 21. Jahrhundert*, tectum Verlag, Marburg, 2016.

treatment of such ambiguities discussed above, in which lexical entries for ambiguous *ung*-nominalizations stipulate their semantics as requiring a choice between two or more representations that differ primarily in the ontological categories they specify. Such entries make it possible to explain how the selection restrictions associated with argument positions of verbs and other predicates force the intuitively right interpretation of the nominalization when it is the head of a phrase filling such a position (viz. as the reading, or a reading that is compatible with the restrictions associated with the position). What such entries cannot account for are the co-predication effects that have served us here in formulating the containment-based account I have presented for *Bemalung* and like nominalizations. In contrast, the account I have presented makes explicit predictions about these co-predication effects. Another advantage of the present account is the close relationship it suggests between the syntactic structures of the different readings of nominalizations and the constructions from which the different readings are derived. Given our theoretical commitments we might expect there to be constructions that correspond to the state and object reading of *Bemalung* in the same way that the event reading relates to the verb *bemalen*. And indeed German has such constructions, viz. the 'adjectival participle'. From this point of view, it is the unambiguous semantics of those constructions that are contained in the different structural analyses of *Bemalung* that determines the semantics of the corresponding disambiguated nominalization. The state reading is especially interesting in this respect. Roßdeutscher and Kamp already make some steps towards using contained participles to examine the state reading when they examine the state readings of *Bearbeitung* and *Beleuchtung* by considering the corresponding participles. But because the analysis of Roßdeutscher and Kamp does not account for structural disambiguation, the relation between the state reading of the nominalization and the state described by the corresponding adjectival participle is intuitive rather than a feature of the analysis. In contrast, because in my analysis the state reading of a nominalization is identical to the state denotation of the adjectival participle (the only difference being the syntactic category of the expression (noun vs. adjective)), it provides a systematic way to tease apart different semantic kinds of state readings from the object reading and the event reading. The next section investigates in more detail the nature of the participial state reading of *Bemalung*.

3 Situating low participles

Readers familiar with the literature on (German) participles will have noted that low participles run counter to a fundamental assumption shared by approaches to adjectival participles independently of whether word formation is perceived as a lexical (e.g. Wasow (1977); Levin and Rappaport (1986); Kratzer (2000)) or a syntactic process (e.g. Embick (2004); Bruening (2014)). As suggested by the term 'adjectival passive' that is often used to refer to adjectival participle constructions, adjectival participle constructions are traditionally analyzed as adjectives that are derived from verbs. In contrast, the structure and analysis of low participles I argued for is contained in the corresponding verb and thus the verb is derived from the adjectival participle. However, the split analysis of participles I have argued for is not as far-fetched as it may

seem at first glance. In fact, there are surprisingly close parallels of low participles with the discussion surrounding participles of English change of state verbs on the hand and nominal possession predication strategies in English on the other.

3.1 Low participles and change of state verbs

I begin this section by describing a connection between the analysis of *be*-prefixed constructions in German and the analysis of change of state verbs like *to break* in English. The basic problem is that change of state verbs like *to break* – unlike change of degree verbs like *to flatten* – do no specify a designated result state although they clearly entail change. Adopting DM as a framework of analysis, Embick (2009) proposes that *break*-type roots appear in a mono-eventive construction, the result state of which is the "state caused by a breaking event' = broken" (Embick, 2009). As Beavers and Koontz-Garboden (2017) argue, such a mono-eventive analysis of change of state verbs is troublesome because it reduces ad absurdum the constitutive semantic property of mono-eventive constructions, i.e. the lack of a result state. But Embick's proposal that the result state of *to break* is the state of being broken links to the analysis of *be*-prefixed constructions in German developed in this paper in an interesting way. Notably, the predicate *broken* which according to Embick (in turn adopting a proposal of von Stechow (1996)) characterizes the result state of *to break* is the participle within the derivational family associated with $\sqrt{break}$. If change of state verbs are bi-eventive and a bi-eventive construction emerges via the combination of a morphologically empty vP and a state-denoting small clause, the result state of a bi-eventive verb like *to break* must be located below vP. Accordingly, it stands to reason that the result state of *break*-type verbs is specified by the same type of low participle – although with a morphologically empty adjectivizer – that I argued to be involved in *be*-prefixed constructions in German. Extending this line of reasoning, the parallel between low participles in *be*-prefixed constructions and the analysis of *break*-type verbs may be rooted in the type of denominal participle constructions I proposed. Support for a denominal analysis of *break*-type verbs comes from the fact that the derivational family of many *break*-type verbs contains zero-derived nouns like e.g. *to break*↔*a break* (as in *a bone break*), *to crack*↔*a crack* or *to cut*↔*a cut*. Moreover, Beavers and Koontz-Garboden (2017) consider a denominal state predication to be essential to the meaning of the root $\sqrt{break}$, see their lexical decomposition analysis in (65).

(65) $[\![\sqrt{crack}]\!] = \lambda x \exists s[has.fissure'(x,s) \wedge \exists e'[become'(e',s)]]$

As regards the lexical primitive *has-fissure*, one might wonder whether – given that *a crack* is a synonym for *a fissure* – the state described by *has-crack* is the same as that state which would be realized linguistically by the participle *x is cracked*. If this step of the argument is tenable, then the proposal made in this paper concerning the role of low participles in denominal bi-eventive constructions embodies the lexicalist analysis of Beavers and Koontz-Garboden (2017) while maintaining the assumption that word formation is entirely syntactic. There is another, more deeply embedded con-

nection between low participles and the analysis of *break*-type roots in (65), which I present in the next section.

3.2 Low participles and the syntax of possession

The semantic analysis I have proposed of the *be*-prefix as the head of an adjectival participle is that of possession of a (complex) denominal property, which I represented in the formal analysis using the POSS-relation (see the structure in (49)). If the result state of *break*-type roots is specified by a similar kind of participle, then it is not surprising that the lexical primitive *has-fissure* in (65) is a possessive predication, too. Possession of denominal properties has been a quite active area of recent research on what Francez and Koontz-Garboden (2017) dub a possessive predication strategy, a subclass of predicative constructions which Myler (2016) calls – following Stassen (2009) – predicativizations. Predicativization is a morphological process which converts what is possessed into a nominal or adjectival predicate. In German, possession can be predicated by a *have*-sentence as in (66-a). The same possession relation can also be predicated with the adjectival construction in (66-b) which is derived by suffixation of the root of (66-a) with the adjectivzing morpheme *-ig* (the cognate of the English *-y*).

(66) a. Peter hat Hunger.
Peter have hunger
'Peter has hunger.'
b. Peter ist hungrig.
Peter is hunger.ig-ADJ
'Peter is hungry.'

Possessive predicativizations are directly related to the analysis of *be*-prefixed constructions. Consider the two English constructions in (67).

(67) a. Sarah is brown-eyed.
b. Sarah is bespectacled.

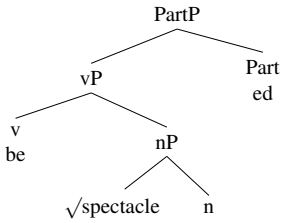
The interesting observation that can be made for (67) is that both constructions involve what looks like the English participle suffix *ed*. To account for this observation, Myler (2016, ch. 6.5.1) argues that the two constructions in (67) exemplify fundamentally different constructions. In (67-a) the *ed*-suffix is an adjectival morpheme that predicates possession. In contrast, *be*-prefixed constructions as in (67-b) "involve some verbal substructure" (Myler, 2016, p. 372) and the *ed*-suffix functions as a passive participle morpheme. Myler motivates the distinction between these two constructions with data parallel to (67) that can be found in German. The *be*-prefixed construction in (68-b) involves participle morphology but not the predicativization construction in (68-a).

(68) a. Das Madchen ist braunäugig.
the girl is brown.eye.ig-ADJ
'The girl is brown-eyed.'

b. Der Fuss ist beschuht.
the foot is be-PRFX.shoe.PTCP
'The foot is be-shoed.'

Adopting DM as a framework, Myler proposes a structure and analysis of *be*-prefixed constructions in West Germanic as in (69).

(69)



(see Myler (2016, p. 374))

Even though Myler assumes the analysis of *be* in (69) only "for concreteness", from what has been said so far it is evident that in a framework like DM (69) cannot be the correct analysis of *be*-prefixed constructions. Importantly, contrary to fact (69) predicts that an English verb *to bespectacle* exists. In fact, there are a reasonable number of *be*-prefixed constructions in German which – as the already mentioned German participle *begabt* ('be-gifted', see (35)) and the English participle *bespectacled*– lack a verbal construction, see (70) (cp. Dewell (2015); Günther (1974)).

(70) a. Der Berg ist bewaldet.
the mountain is be-PRFX.forest.PTCP
'The mountain is forested.'
b. Der Mann ist befrackt.
the man is be-PRFX.tailcoat.PTCP
'The man is be-tailcoated.'
c. Die Witwe ist begütert.
the widow is be-PRFX.asset.PTCP
'The widow is prosperous.'

The analysis of *be*-prefixed constructions in German as low participles avoids the undesirable prediction of non-existing verbs. But in contrast to Myler, I analyze the *be*-prefix as an adjectival predicativizing morpheme in Stassen's sense. I proposed that the possession relation predicated by the morpheme *be* holds between an individual and the intension of a nominal root phrase derived by a participle head. For the running example of this paper, the participle *bemalt*, the property that *be* predicates of an individual could be described with the nominalization *Bemaltheit* ('be-paintedness'). In turn, the syntactic characterization of *be* as an adjectivizing possessive morpheme gives rise to an interesting connection with the semantic characterization of possessive constructions in Francez and Koontz-Garboden (2017) which I discuss next.

3.3 Low participles and the semantics of possession

Francez and Koontz-Garboden (2017) distinguish two linguistic strategies by which properties can be predicated. First, a property can be predicated of an individual with an adjective like *wise*. Second, a property can be predicated with (abstract mass) nominals like *wisdom*, the denotation of which Francez and Koontz-Garboden call a 'quality'. Francez and Koontz-Garboden argue that qualities cannot be directly predicated of individuals – as the unacceptability of examples like (71) shows – but requires a possessive morpheme which takes "as an argument a quality and predicates possession of a portion of this quality, a property z of the internal argument x POSS(x,z)" (Francez and Koontz-Garboden, 2017, p. 44).

(71) *Peter ist Hunger.
Peter be hunger
'Peter is hunger.'

The analysis of possessive predication put forward by Francez and Koontz-Garboden is quite similar to the proposal I made for the syntactic and semantic function of the possessive *be*-morpheme, according to which *be* predicates the intension of a (de)nominal construction of an individual. But while Francez and Koontz-Garboden assume that qualities are atomic model-theoretic entities and thus that only one mechanism is required to predicate a quality of an individual, my proposal also requires a mechanism that derives qualities from (de)nominal input structures in the syntax. I chose intensionalization as the operation that forms abstract properties because of its formal simplicity. But the resulting properties can be regarded as clearly corresponding to the qualities by Francez and Koontz-Garboden and nothing I have said speaks against the adoption of a more elaborate mechanism for deriving qualities (such as kind formation or grinding). A derivation mechanism for qualities (which in the following I identify with noun intensions) is in particular expedient to explain complex constructions in which more than one instance of possessive morphology is involved, see e.g. the German example *beruhigen* ('to becalm') in (72-a).

(72) a. Das beruhigte Kind
the be-PRFX.calm.ig-ADJ.PTCP child
'The becalmed child.'
b. Das ruhige Kind
the calm.ig-ADJ.PTCP child
'The calm child.'

To give the gist of an analysis of (72-a), the root of the derivational family in (72) is $\sqrt{ruh}$, which can be used to derive the abstract mass noun *Ruhe* ('silence') When the possessive *ig*-suffix attaches to the nominal root phrase, a predicate of individuals is derived, the adjective *ruhig* ('calm') in (72-b). In turn, when the resulting denominal adjectival structure is fed to the Part head, the adjective *ruhig* is intensionalized (and the denotation of the resulting construction could be perceived of as the quality 'calmness'). When the *be*-prefix attaches to the intension derived by Part, the individual-characterizing property *beruhigt* ('becalmed') is derived via the predica-

tion of a possession relation between the internal argument and the intensional quality derived by Part.

Summing up, the Part head implemented in my analysis as intensionalization of (de)nominal constructions functions as a quality formation operator in the sense of Francez and Koontz-Garboden and *be* is an adjectival possessive morpheme that creates a predicate of individuals from a quality.

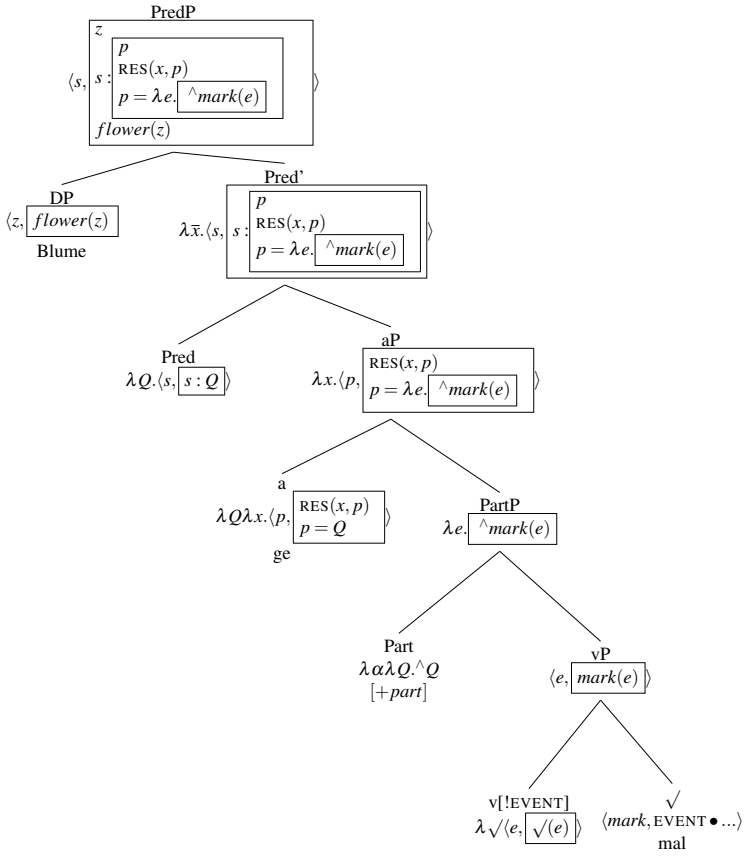
3.4 High participles and the predication of event properties

In the last section, I argued that low participles involve the formation and predication of a quality via the intensionalization and adjectivization of a noun denotation. For a comprehensive appreciation of the structure and analysis of low participles that falls out of the analysis of ambiguous nominalizations like *Bemalung* (under structural disambiguation and containment), it is important to take into account that participle formation in German is split into two types. Adjectival participles of prefix-constructions like *bemalen* are derived with the suffix *-t*. In contrast, the participles of unprefixed constructions like *malen* (and deadjectival verbs like *töten* ('to kill') but also particle verbs like *anmalen* (at.PRTC.paint, 'to paint sth.')) require a dedicated prefix *ge* in order to derive an adjectival participle marked with *t*, see (73).

(73) Die *(ge)malte Blume
the ge-PRFX.paint.PTCP flower
'the painted flower'

The morphological surface of the construction in (73) indicates that the structure and analysis of $\sqrt{mal}$ is contained in the structure and analysis of $\sqrt{mal}$+*ge*+*t*. Consequently, unlike *be*-prefixed participles which I have argued that their structure is a proper substructure of the structure of the corresponding verb, unprefixed mono-eventive verbs like *malen* are structurally contained in their adjectival participles, see (73). We thus arrive at a structure of adjectival participles of unprefixed constructions like that for *malen* in (74), where the adjectival participle is derived from vP.

(74)



The structure of the high participle construction in (74) is the same as for low participles of *be*-prefixed constructions except for one decisive difference[15]. For unprefixed mono-eventive verbs like *malen*, the input structure to the formation of participles is not a (de)nominal construction but a verbal construction. Consequently, the Part head in (74) derives a property of an event. The *ge*-prefix predicates this event property of an individual with a relation I labeled RES. To set apart the RES-relation from the POSS-relation in low participles, let me complete the picture of participle formation in German by considering another main construction type of German verbs. Besides the already introduced bi-eventive denominal and mono-eventive construction, German bi-eventive verbs can also be constructed from adjectival root phrases, see (75)-(76).

[15] I should add here that event-related modifiers (McIntyre, 2015, p. 941) "are unacceptable in adjectival participles unless they contribute to the description of the state expressed by the participle or of the theme during the interval during which this state holds.". Low participles denote states and thus are compatible with approaches to event-related modifiers in the literature like the incorporation approach of Gehrke (2015) and the Kimian state analysis of Maienborn (2009), see also footnote 11.

(75) a. offen
'open'
b. öffnen
'to open'
c. Öffnung
'the opening'

(76) a. tot
'dead'
b. töten
'to kill'
c. Tötung
'the killing'

Like *be*-prefixed denominal constructions, unprefixed deadjectival verbs in German have a bi-eventive construction and thus regularly license *ung*-nominalizations. In the by now standard scalar analysis of adjectives (see Kennedy and Levin (2008) and references therein), the internal argument of an adjective measures a degree on a scale. In turn, deadjectival verbs measure out a change between two temporally successive degrees of the theme measured on the same scale (determined by the adjective from which the verb is derived). The interesting feature of verbs derived from scalar constructions in German is that like mono-eventive verbs, they form high participles which predicate a property of an event, whereas the underlying adjectival construction predicates a property of individuals and determines the bi-eventivity of the construction. Scalar constructions thus allow for an interesting observation concerning the difference between properties of individuals and properties of events. Consider the contrast between (77-a) and (77-b).

(77) a. Der getötete Käfer
the ge-PRFX.dead.PTCP beetle
'the killed beetle'
b. Der tote Käfer
the dead beetle
'the dead beetle'

By virtue of their construction from the adjective *tot* ('dead'), both (77-a) and (77-b) entail that the beetle is dead. However, (77-a) but not (77-b) entails that the beetle has been killed; as a dead beetle may for all *tot* says have died from a natural cause or hunger. Intuitively, the difference between the two property predications in (77) is that (77-b) is a property predication of individuals, the truth of which depends just on whether or not the bug is dead. In contrast, the high participle (77-a) predicates a property of an event of killing the bug. Importantly, the truth-conditions of (77-a) are not determined by properties of the bug – whether or not the bug is dead – but by whether or not the bug has been killed. Notably, event properties are also predicated by high participles of mono-eventive verbs like *malen* (73) or *kochen* ('to boil'), see (78).

(78) die Kartoffel ist gekocht
the potato is ge-PRFX.cook.PTCP
'the potato is cooked'

As for high participles of scalar constructions, the truth of (78) depends on event properties – whether or not the potato has been boiled – but not on properties of the potato like being soft or tasty (that may be associated with its being cooked).

Possessive property predication with *be*-prefixed constructions (and *break*-type constructions) corresponds neither to the predication of an event property nor to a property of individuals. If, following Francez and Koontz-Garboden, possessive property predication is denominal, the predication of property possession inherits the complex ontology of nominals I discussed in section 2.3. Consequently, possessed property predication can range from possession of tangible nominals like clothing or body-parts to possession of abstract nominal capabilities like giftedness. In turn, the complex ontology of what can be possessed gives rise to a continuum of predicative constructions at the extremes of which are possession predications like *bemalt* (and *break*-type constructions) for which there is a verbal description of the associated event by which what is possessed could have been acquired and possession predications that attribute inherent qualities like the property ascribed by *begabt* ('gifted') and for which there is no verbal description of their acquisition. Somewhere in between are constructions like *bespectacled* which can be reasonably related to an event in which what is possessed is acquired although there is no verb that would describe this event.

In this section I have argued that we should distinguish three different property predication strategies: property predication of qualities with possessive morphology like *be*, property predication of individuals with adjectives and event property predication with high participles. The question which I explore in the last part of section 3 is how these three strategies of property predication give rise to a reformulation of the bi-eventivity constraint on the formation of *ung*-nominalizations, one that is also able to account for those *ung*-nominalizations that lack a verbal functional layer.

3.5 The roots of bi-eventivity

To account for the embedded vP hypothesis and for low participles which lack a verbal component to their construction, I argued that the input structure to *ung*-nominalization need not contain verbal functional projections. But I also assumed with Roßdeutscher and Kamp (2010) that input structures to *ung*-nominalization are bi-eventive. If bi-eventivity is understood as a property of verbal functional structure, this raises the question how bi-eventivity can figure as a constraint on *-ung* nominalizations in the absence of such projections. It could be posited as a makeshift that structures that lack a verbal functional layer can always be expanded by adding projections up to and including a morphologically empty verbal projection. Such a purely morphological conception of bi-eventivity might be intuitively appealing under the assumption that word formation is entirely syntactic. But it raises the question how a morphological approach of bi-eventivity can fulfill its designated semantic purpose (cp. the semantic definition of bi-eventivity in Rappaport Hovav and Levin (1998); Kratzer (2005)). The discussion of property predication strategies in the preceding paragraphs may provide an alternative answer to the question what licenses *ung*-nominalizations.

Recall that I proposed to distinguish three different property predication strategies: possessive predication of qualities, property predication of individuals and event property predication. Deverbal event property predication is associated with mono-

eventive constructions in which the root modifies the verbalizer v whereas quality predication is associated with possessive constructions in which the root enters the derivation below vP under a nominal head and scalar property predication is associated with adjectival constructions in which the root enters the derivation below vP under an adjectival head. Possessive predication of qualities and scalar property predication have in common that they attribute a property to an individual (in contrast to the event properties predicated by high participles). From this point of view, what licenses an *ung*-nominalization is a genuinely semantical criterion, i.e. whether or not the input structure to the *ung*-nominalizer predicates of an individual a scalar property or possession of a quality[16]. Moreover, as property-predicating and quality-possession constructions form the basis for the construction of bi-eventive verbs in German, the reformulation of the constraint of Roßdeutscher and Kamp on the formation of *ung*-nominalizations entails the bi-eventivity of eventual extensions of property-predicating and quality-possession constructions to a verbal functional layer. In fact, the revised criterion for *ung*-nominalization defines more precisely the semantic background of the syntactic account of bi-eventivity proposed by Marantz. If the complement of vP is a construction which predicates a property or possession of a quality of an individual, then the derived verb is bi-eventive. In turn, and in accordance with the proposal of Marantz, mono-eventive verbs predicate a property of events.

4 Summary and Outlook

The goal of the present paper was to explore the semantic consequences of the hypothesis that word formation is entirely syntactic. I investigated the prospects and challenges of taking at face value the hypothesis that syntax is the only generative component of the grammar by developing an account of ambiguous German *ung*-nominalizations that is consistent with this hypothesis and, more specifically, with the containment principle according to which syntactic structure is preserved by morphological derivation and the assumption that the different readings of ambiguous *ung*-nominalizations are also related to each other via structural containment.

The main methodological challenge imposed by the syntax-only hypothesis that I focused on in the present paper is the treatment of the systematic semantic ambiguity of morphologically complex words like *Bemalung*. I proposed that the differ-

[16] Such a revision of the licensing condition for *ung*-nominalizations would also account for the last construction type of verbs in German I didn't address at all, namely particle verbs. Following Roßdeutscher (2016) German particles like *ab* ('off') have a scalar semantics similar to that of scalar adjectives. And interestingly, mono-eventive verbs like *arbeiten* have an *ung*-nominalization (and thus are bi-eventive) in the presence of such a scalar particle as in (79-b).

(79) a. *Die Arbeitung
the work.ung-NMLZ
'the working'

b. Die Abarbeitung der Akte
the off-PRTC.work.ung-NMLZ the.GEN file
'the processing of the file'

ent readings of *Bemalung* correspond to syntactically different yet morphologically contained forms, and in such a way that the asymmetries revealed by copredication contexts are accounted for as well as the different readings as such. I argued that the object and state reading of *Bemalung* correspond to participial constructions in the same way that the event reading of *Bemalung* corresponds to the verb *bemalen*. In turn, you might say, equating the readings of *Bemalung* with disambiguating yet contained constructions bypasses the elusive role of ontology in the lexical analysis of the ambiguity of *Bemalung*. For example, in the analysis proposed, the denotation of the state reading of *Bemalung* corresponds to the state that is described by the associated predicative participle pre-eminently not because *Bemalung* and the participle construction refer to the same ontological sort of states but because the state reading of the nominalization and the state described by the participle are derived from the same structure and analysis of $\sqrt{}$*mal*+*be*. So, could I have built the argument of the present paper the other way round, so as to get rid of the lexical basis of my analysis? That is, instead of grounding structural disambiguation in the co-predication tests of lexical semantics, could I have used the proposed correlation of readings of *Bemalung* and contained non-nominalized constructions directly as a starting point (and thus 'predict' the co-predication behavior)? It seems to me that this question – if it is understood as a question about the superiority of either the lexical or the syntactic approach – is a chicken-and-egg question that cannot be solved on the basis of linguistic analysis alone. Answers will depend on extralinguistic theory-dependent assumptions, like ontological parsimony (a questionable principle at the best of times, see e.g. Ackema and Neeleman (2004) for discussion) or assumptions about the design of the human language faculty, often brought up by the proponents of the syntactic approach to word formation. Future research may well establish a methodological advantage of one direction of analysis over the other but I refrained from taking sides with either the syntactic or the lexical approach to word meaning. I considered the requirement for structural disambiguation of *Bemalung* as a commitment that arises from the assumption of the syntax-only hypothesis rather than an independently motivated principle.

The more specifically linguistic result that I would like to highlight in this conclusion is the distinction between low and high participles. Although my analysis does not not actually predict these low participles as part of the German grammar, low participles fill the empty slot towards which the analyses point that I have endorsed in this paper. Thus, I contend that the proposal for low participles can serve as a guide to the analysis of this specific category of predications. In any case, the distinction between low and high participles, with each having the properties that are predictable from their construction and observable through speaker's judgments are independent of the particular way in which low and high participles were arrived at here. Low participles are interesting also from a broader perspective, because they illustrate how the hypothesis that syntax generates both words and sentences can reveal cross-connections between words that at first glance may seem completely unrelated, such as participles and nominalizations. If there is no generative lexicon, the focus of attention cannot be on the lexical analysis of complex words but instead must center on derivational families of constructions originating in the same root. One immediate consequence of the redirection of attention is that the gravitational center of lexi-

cal analysis – the templatic structure of events – loses its primacy in the analysis of word meaning. Low participles constitute a particularly telling example of the emancipation of non-verbal structure that a syntactic approach to word formation fosters. The refined concept of bi-eventivity, as it has been proposed in section 3.5, may be another instance of a concept that is tied to templatic event structure in lexical semantics, but that in a syntactic approach is rooted in non-verbal functional structure (i.e. possessive and adjectival constructions).

As far as future tasks are concerned, a natural continuation of the argument developed in the present paper concerns the revision of (natural language) ontology in the spirit of what I said about objects and states on the one hand and root meaning on the other. Part of this is the development of a concept of properties that is narrow enough to distinguish the different types of properties I alluded to in the paper but at the same time wide enough to accommodate the complex nature of properties and their problematic metaphysical foundation, see e.g. Orilia and Swoyer (2016) for an overview. Finally, one task that naturally emerges from the explorations of the present paper proposes is to investigate how the syntactic approach fares when applied to other issues in lexical semantics. That is of course a very big territory, but one could start by testing the approach I have proposed on other types of *ung*-nominalizations, on the presumed English counterparts of nominalizations like *Bemalung* such as *examination* and then on the numerous other types of derived nominals of German and English.

The eponymous question 'What about lexical semantics if syntax is the only generative component of the grammar?' contours a problem area the complexity of which defies any quick generalizations, and, if at all, the answer that this paper might be considered to provide to this question is that semantics is crucial to the assessment of the hypothesis that word formation is entirely syntactic.

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