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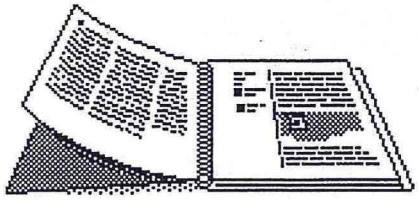

Edited by

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Nominalizations

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Editorial Preface

The present volume is a selection of the papers presented on workshops at ZAS in Berlin in November 2000 and at the University of Tübingen in April 2001, devoted to synchronic and diachronic aspects of various types of nominalizations. Nominalization has a long history in linguistic research. Its nature can only be captured by taking into account the interface between morphology, syntax and semantics on the one hand, and the interface between semantics and conceptual structure on the other.

The contributions to this volume offer empirical data of nominalizations of Present-day German, English, Italian and Russian, of Early New High German and Classical Greek. They provide insights into developments of modern linguistic theorizing on the division of labour between morphology, syntax and semantics, the relations among them, and their interface with the lexicon. The papers make contributions to the following issues:

Nominalizations can refer to various types of entities: situations, participants of situations, and so-called fluents. HAMM & van LAMBALGEN, EHRICH, EHRICH & RAPP, von HEUSINGER and ZIMMERMANN investigate the systematic interrelations between argument structure and the semantic form of verbs and their nominalizations. HAMM & van LAMBALGEN argue for the differentiation of fluents, events and objects as semantic types of the referential argument of nominalizations. EHRICH and EHRICH & RAPP show that different subevents with their participants can be foregrounded in nominalizations. ZIMMERMANN's paper focusses on process nominalizations proper, on their sortal properties and their characteristic distribution. EHRICH deals with special linking patterns for pluralized nominals of change-of-state verbs with respect to the thematic interpretation of post-nominal genitive complements. Von HEUSINGER discusses the semantic variability of nominalizations referring to situations or to their participants and tries to find out their common semantic basis.

The interpretation of nominalizations depends to a large extent on linguistic context and/or world knowledge. EHRICH & RAPP argue convincingly for the semantic underspecification of the involved constituents. They are concerned with the semantic relation between temporal prepositions and Aktionsart properties of German *-ung*-nominals, whereas von HEUSINGER demonstrates the relevance of sortal properties of the nominal base of Italian *-ata*-derivations.

The semantic interpretation of nominalizations can be related to a specific organization of morphological and/or syntactic structure. The nominalizing suffix can come into play on the level of word structure or phrasal structure. HAMM & van LAMBALGEN assume that the English suffix *–ing* is adjoined either directly to the verb or to its projections depending on the

semantic function of the suffix. ALEXIADOU examines changes in word order patterns for argument expressions in nominalizations that took place from Classical Greek to Modern Greek. She proposes to capture the structural similarities of verbal constructions and the corresponding nominalizations in Classical Greek by combining verbal and nominal functional projections and to explain the non-availability of certain prenominal positions in Modern Greek by the absence of the pertinent functional projections. DEMSKE, in contrast, demonstrates that certain semantic changes that took place in the history from Early New High German to Present-day German have influenced the syntactic organization and regularity of *–ung* nominalizations with the effect that they became less verb-like in Present-day German.

Although many problems of the sound-meaning correlation in nominalizations in general, and of achieving a compositional account of Vendler's famous distinction between perfect and imperfect nominalizations in particular, await further investigation, the papers of this volume deserve attention for theoretical and empirical reasons.

We thank the authors for their co-operation. Special thanks go to Susette POLKE for her competence and patience in preparing the papers for publication.

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Formal Foundations for Semantic Theories of Nominalisation

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Abstract

This paper develops the formal foundations of semantic theories dealing with various kinds of nominalisations. It introduces a combination of an event-calculus with a type-free theory which allows a compositional description to be given of such phenomena like Vendler's distinction between perfect and imperfect nominals, iteration of gerunds and Cresswell's notorious *non-arrival of the train* examples. Moreover, the approach argued for in this paper allows a semantic *explanation* to be given for a wide range of grammatical observations such as the behaviour of certain types of nominals with respect to their verbal contexts or the distribution of negation in nominals.

1 Introduction

In chapter five of his book *Linguistics in Philosophy*, Zeno Vendler (Vendler 1967) discusses two classes of nominalised predicates, the class of perfect and the class of imperfect nominals, and further two types of verbal contexts which either do or do not admit these nominals as arguments. Vendler argues in support of the thesis that a genuine semantic difference is responsible for many of his observations. The nominals he investigates are assumed to denote, in different categories, the category of *events* for one class of nominals and the category of *facts*, *results*, or *propositions* for the other. In his work Vendler does not provide precise definitions of these concepts but introduces them by way of example. However, we entertain the thesis that his observations are central for any semantic theory dealing with natural language nominalisations. Therefore, in the sections to follow we will first briefly summarise Vendler's findings and related ones and then introduce the formal tools which we think are required for the foundations of a general semantics of nominalisations which claims explanatory value. Roughly, these tools consist of an event-calculus which allows a formal account to be given of the difference between events and facts etc. and a system which is capable of transforming sentences and predicates into terms, thus providing a theory of reification. It is the combination of the two systems that allows the development of explanatorily adequate logical representations for the data. Hence, in the last sections we will put the machinery thus developed to work and show how to derive semantically adequate explanations for a series of observations mainly from Vendler. The central purpose, however, is to show by analysing puzzling examples that the tools introduced are suited to forming the basis of a general theory of the semantic part of natural language nominalisations.

In the following two sections, we introduce the most important characteristics of Vendler's observations and philosophical claims.

2 Two Types of Nominalisations

2.1 Perfect and Imperfect Nominals

Vendler's differentiation between perfect and imperfect nominals and his observations about their most important properties are illustrated in the following two groups of examples. Perfect nominals occur with determiners, can be modified by adjectives but not by adverbs,

and cannot appear in different tenses or be modalised. Further, it is impossible to negate perfect nominals. To summarise, perfect nominals are nominalised forms which have lost their verbal characteristics and behave like ``real'' nouns. This is why Vendler dubbed them perfect.

(1) (a) the singing of the song
(b) beautiful singing of the song
(c) *quickly cooking of the dinner
(d) *having cooked of the dinner
(e) *being able to cook of the dinner
(f) *not revealing of the secret

Imperfect nominals show the opposite behaviour, as the examples in (2) demonstrate. They cannot occur with nominal determiners, they can be modified by adverbs[1] but not by adjectives, they can occur in different tenses, they can be modalised, and it is possible to negate them.

(2) (a) *the singing the song
(b) *beautiful singing the song
(c) singing the song beautifully
(d) quickly cooking the dinner
(e) having cooked the dinner
(f) being able to cook the dinner
(g) not revealing the secret

Hence, imperfect nominals can occur externally in noun phrase positions, but their internal structure strongly resembles the structure of the VP or the S they are derived from. This is, of course, the reason why Vendler called them imperfect. We shall henceforth use the term perfect or imperfect nominal both for the respective nominal and for the NP which contains such a nominal.

Abney (1987) develops a detailed syntactic account of gerunds, which are part of the class of perfect and imperfect nominals. He distinguishes four classes of gerunds:

(3) (a) *Acc-ing*: John being a spy.
(b) *PRO-ing*: singing loudly.
(c) *Poss-ing*: John's knowing the answer.
(d) *Ing-of*: singing of the song.

Assuming that PRO-ing is a special case of Acc-ing or Poss-ing, there are three classes of gerunds, which differ with respect to their syntactic properties. For example, Abney shows that Acc-ing and Poss-ing constructions show differences with regard to agreement, long distance binding, pied piping, etc. But what about semantic differences? Of course, Ing-of gerunds and Poss-ing gerunds are among the perfect and imperfect[2] nominals introduced in this section, and Vendler's thesis is that there is a category distinction, i.e. something

[1] They can therefore occur with adverbial determiners like *always*.

[2] The concepts perfect and imperfect nominal are used by Vendler primarily to refer to sets of structural properties which are assumed to be conditioned by two different semantic types. This is especially clear when imperfect nominals are considered. This is a huge and structurally heterogeneous class including Poss-ing, Acc-ing gerunds, absolutive constructions, infinitives and even that-clauses, which are traditionally not thought of as nominal at all. Perfect nominals, however, are more coherent. This class contains Ing-of gerunds and some derived nominals like *blizzard* etc.

genuinely semantic, involved with these notions. In this paper it will be assumed that Acc-ing and Poss-ing constructions are semantically in the same class, the class of imperfect nominals.

Vendler (1968) demonstrates that the genitive in Poss-ing gerunds is not a "real" genitive like *John's* in *John's house*. This is shown by the following examples:

(4) (a) John's house
(b) the house of John
(c) John's singing the song
(d) *the singing the song of (by) John
(e) the singing of the song by John

Example (4b) is a paraphrase of (4a). An analogous paraphrase for (4c) does not exist. Compared with the genitive of imperfect nominals the genitive of perfect nominals behaves like a "real" genitive. This is also shown by the following observation: It is possible to delete the genitive of embedded imperfect nominals if it is coreferential with the matrix subject. Deletion in the case of perfect nominals, however, leads to ungrammaticality.

(5) (a) He shocked us by telling a dirty joke.
(b) *He entertained us by singing of arias. (Vendler 1968: 50)

We therefore will analyse the genitive in Poss-ing constructions in the same way as the subjects of Acc-ing gerunds. For more arguments in favour of the claim that the genitive of Poss-ing gerunds is not the same as the genitive in Ing-of nominals, see Vendler (1968).

2.2 Narrow and Loose Containers

Vendler also considers verbal contexts, which somehow discriminate between the above two classes of nominals. Expressions like *surprised us, is unlikely* are examples of *loose* containers. Their name derives from the fact that they accept both kinds of nominals as arguments, as shown in (6).

(6) (a) The beautiful singing of the aria surprised us.
(b) John's not revealing the secret is unlikely.
(c) The singing of the song is fun.
(d) John's quickly cooking the dinner surprised us.
(e) They were surprised by the sudden coming in of a stranger[3].

Verbal contexts like *was slow, occurred*, etc., which are called *narrow* by Vendler, show more restrictive behaviour. They accept as arguments only perfect nominals, as shown in (7).

(7) (a) *The soprano's singing the aria was slow.
(b) The soprano's singing of the aria was slow.
(c) John's revealing of the secret occurred at midnight.
(d) *John's revealing the secret occurred at midnight.
(e) *John's not revealing the secret occurred at midnight.

Narrow containers can be negated, and they stay narrow under negation, as the following examples demonstrate.

(8) (a) The singing of the song didn't occur at noon.

[3] This example is from Jespersen (1933: 327).

(b) *John's kicking the cat didn't occur at noon.

As already mentioned, negations of perfect nominals are usually bad, but they may occur marginally as in the following example from R. Cooper:

(9) ?Andrew's not stopping for the traffic light took place at noon.

But note that even if example (9) is acceptable, the negation will not be interpreted in a classical way but as an antonym, i.e. similar to E. Engdahl's example concerning naked infinitive complements of perception verbs.

(10) The policeman saw Andrew not stop for the traffic light.

Antonymic negation is characterised by the following pair of conditions, where $\neg$ signifies classical negation and ~ antonymic negation:

$$\sim\varphi \rightarrow \neg\varphi \text{ but not } \neg\varphi \rightarrow \sim\varphi$$

From the fact that *x is black* we certainly are allowed to conclude that *x is not white*, but by no means can we conclude from the fact that *x is not white* that *x is black*.

Note that the nominals *arrival of the train* and *non-arrival of the train* in the following examples, though similar to perfect and imperfect nominals in many respects, nevertheless behave differently. It may well be that *arrival of the train* is a perfect nominal, but *non-arrival of the train* is not an imperfect nominal in Vendler's sense because it can occur with nominal determiners and adjectives but not with adverbs.

(11) (a) The arrival of the train surprised us.
(b) The non-arrival of the train surprised us.
(c) The arrival of the train occurred at noon.
(d) *The non-arrival of the train occurred at noon.
(e) the unexpected non-arrival of the train
(g) *the non-arrival of the train unexpectedly

In Russian[4], nominalisations like *penie* (singing), *otkrytie* (discovery) *prichod* (arrival) and *sobljudenie* (respecting) show similar behaviour to English perfect nominals. For example, these nominals do not express temporal or modal differentiations. However, they can be negated with the prefix *ne*, which for instance results in the noun *nesobljudenie*. The meaning of *nesobljudenie* is a very strong form of negation which is similar to the marginal English *not stopping for the traffic light*; i.e. *ne* is interpreted as an antonymic negation. However, Ilse Zimmermann informed us that *nesobljudenie* can also be similar to the *non* in the English phrase *non-arrival of the train*, which - as will be shown in section 5.4 - results in a much more complicated interaction of different kinds of negation. But this second reading seems to be less prominent.

Antonym-like negations occur not only in nominalisations. For example, as already mentioned, certain perception verb complements show similar behaviour under negation. Moreover, this kind of negation is observed in the context of so-called Neg-Raising constructions.

[4] We thank Katja Jasinskaja and Ilse Zimmermann for informing us about the negation of Russian nominalisations. For more information about negation and nominalisation in Russian, the reader is referred to Zimmermann (1988).

(12) (a) Daniel does not claim that Louise came.
(b) Daniel claims that Louise didn't come.

The negation occurring in (12b) is not interpreted in a classical way but as an antonym; (12a) may be ambiguous between the two readings. For an analysis of Neg-Raising structures using negation as failure, see Tovena (2001).

Narrow containers are typical examples of extensional contexts in contrast to loose containers[5]:

(13) (a) The beheading of the tallest spy occurred at noon.
(b) The beheading of the tallest spy surprised us.

If the king and the tallest spy happen to be the same person, then it follows from (13a) that *The beheading of the king occurred at noon*. But certainly *The beheading of the king surprised us* does not follow from (13b).

Vendler's description of the meanings of perfect and imperfect nominals and their respective containers is rather vague, but he clearly suggests that a category distinction between events and facts or results forms the philosophical basis for these empirical findings. Events are taken to somehow be related to the meaning of perfect nominals, and facts or results to the meaning of imperfect nominals. We think it is fair to interpret Vendler as claiming that the relationship between the nominals and their respective containers is determined by this category distinction, but it is certainly unclear (a matter of debate?) whether he wants the other findings to be interpreted in this way or as conditioned by structural (i.e. syntactic) properties of English.

Schachter suggests that some gerunds – his gerundive nominals – behave like names.
"To return to gerundive nominals, I would claim that gerundive nominals without initial possessives or other determiners are also class names naming a type of activity in which one can participate, a type of condition, etc." (Schachter 1976: 215)

If we assume that imperfect nominals are like names, then this assumption accounts immediately for the lack of determiners in such phrases since names can in general not occur with determiners[6]. This assumption is further supported by the following observation from Pullum (1991):

(14) *his leaving her that you predicted

Neither Acc-ing nor Poss-ing gerunds tolerate restrictive relative clauses. One further observation supporting Schachter's proposal is that Ing-of nominals can sometimes be pluralised but Acc-ing and Poss-ing gerunds definitely can't. The following example is from Poutsma (1923).

(15) He ignored the sayings and doings of the ladies of his family.

Observations from Abney (1987: 244), moreover, show that perfect and imperfect nominals also differ in their ability to participate in N-bar deletion. For instance, an ellipsis with a Poss-ing construction as in (16a) is bad, while it is possible with an Ing-of gerund and a narrow container as shown in (16b).

[5] The examples are from Parsons (1990).
[6] In many languages - for example German - the definite article can occur with proper names; i.e. *der Peter* is grammatical. But note that this is restricted to the definite article (*ein Peter* is out). In some languages the definite article even functions as a kind of nominaliser. An example is ancient Greek (see Koptjevskaja-Tamm 1993). For a more careful discussion of this topic see Hamm (1999). An instructive discussion of the historical development of the English gerundial system is Hindsill (2001).

(16) (a) *John's fixing the sink was surprising, and Bill's was more so.
(b) John's fixing of the sink was skillful, and Bill's was more so.

Abney claims that the gerund *John's fixing of the sink* is ambiguous and can either refer to the manner in which John fixed the sink - called the Act-reading by Abney - or the fact that John fixed the sink (Fact-reading). N-bar deletion is only possible under the Act-reading.

Of course Abney does not develop a formal semantics for his Fact- and Act-readings. In his work these concepts are just labels which are used to name the intuitive reason for observations like the one above. In the following pages we will develop a formal theory which allows us to give a precise reconstruction of Abney's notions. His Act-reading will be described in terms of *event-types* and his Fact-reading in terms of *fluents*. These formal concepts are introduced in section 4.

Finally, we note the following examples of iterated nominalisations, a phenomenon which was not observed by Vendler.

(17) (a) John's supporting his son's not going to church
(b) John's improving his singing
(c) John's watching the dog's playing
(d) my discovering her not leaving
(e) his discussion of John's revealing the secret

We are interested in these examples because the negation in say (17a) seems to have antonymic force, and all examples seem to be factive in the sense that they presuppose that the fact expressed by the embedded nominal holds. For instance (17a) implies that John's son is not going to church.

In this paper only the Act- and Fact-readings of gerunds are considered. The habitual or generic reading of a gerund like *eating apples* will be neglected[7].

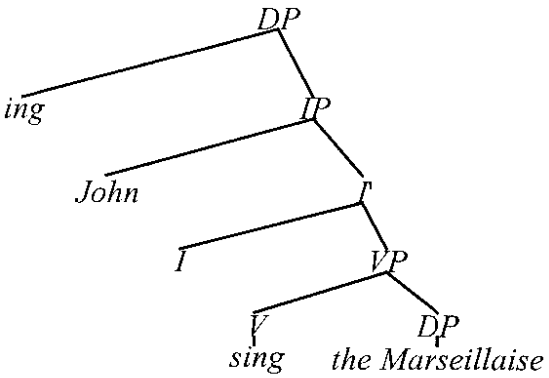
3 Syntax

In this section we will briefly mention Abney's syntactic analysis of English gerunds. Our main purpose here is to show that the formal apparatus we will develop in the following sections allows a strictly compositional interpretation of the discussed nominalisations. However, although we will be concerned with Abney's work, we want to stress that the proposed interpretation process is not tied to a specific syntactic framework. For example, in Hamm/van Lambalgen (2000) we show how to interpret Pullum's GPSG-based theory of *nominal gerund phrases* (Pullum 1991) which are Abney's Poss-ing gerunds in a strictly compositionaal way too.

Abney's account is based on a conservative extension of classical X′-theory. It is conservative in the sense that it does not eliminate any inferences of X′-theory on the phrasal level. Abney's approach differs from the classical theory only in so far as he assumes that the function of the affix *-ing* is to convert a verbal category into a nominal one. The essence of his analysis is then that the differences in the structures of the various types of English gerunds reduce to the question of where in the projection path of the verb this conversion takes place. It is presumed that *-ing* can only be adjoined to the lexical category V and to the maximal projections VP and IP. Furthermore, it is assumed that this abstract morphological element does not have a syntax of its own in the sense that it does not project any structure. This assumption allows X′-theory to be kept intact at the phrasal level.

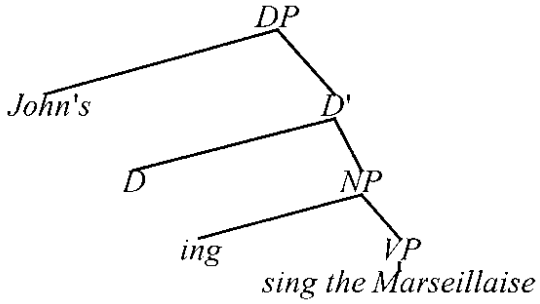
[7] See Portner (1991) for a discussion of such examples.

If *-ing* is sister of IP, the resulting s-structure is that of Acc-ing. Abney assumes that at LF the verb *sing* is raised to *ing*.

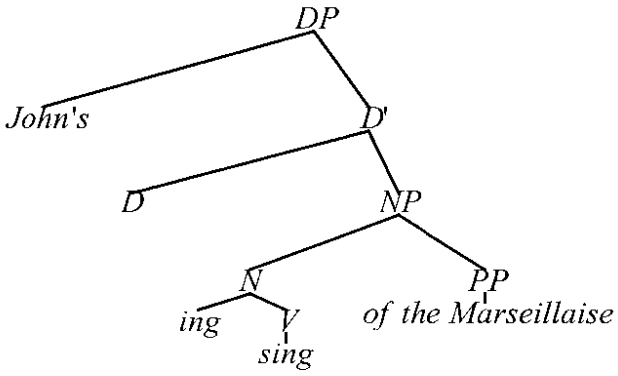


Acc-ing

In Poss-ing gerunds, *-ing* is sister of VP, and in Ing-of structures *ing* occupies the lowest place in the tree. Therefore, we arrive at the following two structures.

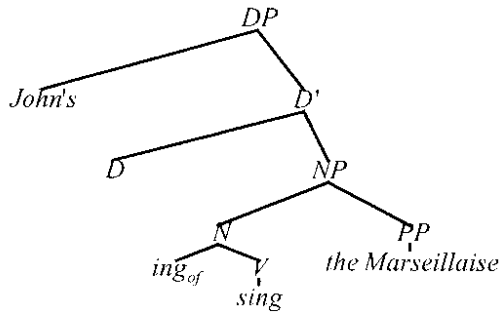


Poss-ing



Ing-of

We will slightly deviate from Abney's analysis here in assuming two different *-ings* – one, *-ing*, for Acc-ing and Poss-ing and the other, $-ing_{of}$, for Ing-of structures. The reason for this is that the semantic effect of *-ing* in Ing-of gerunds is slightly different from the effect *-ing* has for the other types of gerunds. Following Chomsky (1981) in assuming a rule of of-insertion, the following syntactic structure for Ing-of gerunds will be the input for semantic interpretation.



Ing-of

4 Formal Framework

The literature contains several formalisms for the semantics of events. A prominent example is Parsons (1990). But in this tradition, predicates like *Hold* or *Cul* which are intended to intuitively capture distinctions between different kinds of eventualities are not axiomatised and therefore formally empty. The literature in artificial intelligence also contains formalisms for reasoning about events, which have their roots in planning and are axiomatised. It has been suggested several times[8] that such formalisms might be useful for the semantics of natural language, although Hamm/van Lambalgen (2000) seems to be the first paper where the actual computations are done.

We will work with a variation of an event-calculus developed in Shanahan (1997) and combine this formalism with a type-free logical system[9] proposed by Feferman (1984). By combining the two systems, we derive a theory of reification for different kinds of eventualities. This will be explained in the next two sections.

4.1 Event Calculus

The event-calculus is a many-sorted first order logic with sorts for individuals real numbers, representing time, fluents and event-types marking the beginning and end of fluents. Fluents can be thought of as time-dependent properties; i.e. we expect that they *hold* or *don't hold* at a certain time t. Event-types are objects which initiate or terminate the life of a fluent. In contrast to fluents, these objects don't hold but rather *happen*.

Given this ontology, the following choice of basic predicates seems natural. We want to be able to say that fluents are initiated and terminated by events, or that a fluent held or was true at the beginning of time. If f is a variable over fluents, e a variable over events, and t a variable over time points, we may write the required predicates as

- *Initially*(f)
- *Happens*(e, t)
- *Initiates*(e, f, t)
- *Terminates*(e, f, t)

Intuitively *Initially*(f) means that at the beginning of time fluent f holds. *Happens*(e, t) says that event-type e takes place at time t. Therefore, the pair (e, t) may be thought of as a specific

[8] For instance in Steedman (1997).

[9] Standard logical system distinguish strictly between the set of terms and the set of formulas. Only terms are allowed as arguments in formulas. For example if P(x) and Q(y) are formulae formed from one place predicates P, Q and variables x, y an expression like P(Q(y)) is not well-formed. Type-free systems contain means to interpret expressions like the above. In the system presented in section 2.2 this is achieved via an abstract form of Gödelisation.

event-token and the set *Happens* as the set of event-tokens. *Initiates*(e, f, t) encodes one possible action of an event-type. It is true at time t if event-type e causes the time dependent property f to hold. It is assumed that f does not hold at t. *Terminates*(e, f, t) is the converse of *Initiates*. It encodes the other possible action of an event-type. This predicate says that at time t event-type e brings it about that fluent f ceases to hold. It is assumed that f holds at t.

The predicate *HoldsAt*(f, t) says intuitively that time dependent property f holds at time t or is true at time t. The combination with Feferman's type-free system will turn *HoldsAt* into a truth predicate.

Shanahan's calculus also contains the predicates *Trajectory* and *Releases*, which will not be used for the analysis of nominalisations. We therefore present here a simplified axiomatisation of his calculus. The two additonal predicates allow continous change and changing partial objects to be modelled. In Hamm/van Lambalgen (2000) they are used to provide an axiomatised account for the semantics of the progessive.

We introduce two special predicates for f-relevant events. *Clipped*(t_1, f, t_2) expresses that there is a terminating event between t_1 and t_2; the second predicate *Declipped*(t_1, f, t_2) expresses that there is an initiating event between t_1 and t_2. Therefore *Clipped*(t_1, f, t_2) says that between t_1 and t_2 some event happened which caused f not to hold. *Declipped*(t_1, f, t_2) is the opposite of *Clipped*(t_1, f, t_2). It says that between t_1 and t_2 an initiating event for fluent f occurred.

The axioms of the event calculus given below are a modified and simplified version of Shanahan (1997). In the following, all variables are assumed to be universally quantified. The set of axioms of the event calculus will be abbreviated by *EC*.

Axiom 1 $\quad$ *Initially*(f) $\wedge$ $\neg$*Clipped*(0, f, t) $\rightarrow$ *HoldsAt*(f, t).

Axiom 2 $\quad$ *Happens*(e, t) $\wedge$ *Initiates*(e, f, t) $\wedge$ t < t′ $\wedge$ $\neg$*Clipped*(t, f, t′) $\rightarrow$ *HoldsAt*(f, t′).

Axiom 3 $\quad$ *Happens*(e, t) $\wedge$ *Terminates*(e, f, t) $\wedge$ t < t′ $\wedge$ $\neg$*Declipped*(t, f, t′) $\rightarrow$ $\neg$*HoldsAt*(f, t′).

Axiom 4 $\quad$ *Happens*(e, s) $\wedge$ t < s < t′ $\wedge$ *Terminates*(e, f, s) $\rightarrow$ *Clipped*(t, f, t′).

Axiom 5 $\quad$ *Happens*(e, s) $\wedge$ t < s < t′ $\wedge$ *Initiates*(e, f, s) $\rightarrow$ *Declipped*(t, f, t′).

Let us first explain Axiom 2 (Axiom 1 is similar). This axiom says that if at time t an event e happened which initiated a fluent f and, moreover, if between t and t′ nothing interfered which terminated the life of f, then we know that at time t′ fluent f still holds. Axiom 3 treats the parallel case for a fluent not holding at a time t′. Axiom 4 and 5 constrain the meanings of the fluent relevant predicates *Clipped*(t, f, t′) and *Declipped*(t, f, t′). For instance, Axiom 4 informs us that if an event happens between t and t′ which terminates the life of fluent f, then this fluent is clipped between t and t′.

In the usual set-up of the event calculus, it is only said that *HoldsAt* is a truth predicate; the defining axioms for the truth predicate are lacking since the language of the event-calculus does not allow the characteristic truth axiom to be stated. To see this more clearly, consider a formula φ(a) with a temporal parameter a. We would like to map this formula to a fluent f and then formulate the following truth axiom:

$$\textit{HoldsAt}(f, t) \leftrightarrow \varphi(t).$$

However the language of the event-calculus does not have the means to do this. What we need is a method to transform formulas into terms. This is termed reification in Artificial Intelligence. Before developing the necessary machinery, let us first give some linguistic reasons – due to Chierchia (1989) – why such an operation of reification seems to be required. Consider:

(18) (a) Being home is nice.
(b) To be home is nice.
(c) John is nice.

Semantically *John*, the gerund *being home* and the infinitive *to be home* are arguments of the propositonal function *is nice*. But this is not possible with finite verb phrases as in (20).

(19) (a) *Are home is nice.
(b) *Is home is nice.

Chierchia therefore adheres to the old Fregean idea of conceiving of a function both as something which requires an argument, and as an object. In the examples above, the object correlate of the (propositional) function *are home* is the gerund *being home* or the infinitive *to be home*. Since these are both of the same semantic type as the proper name *John*, the examples in (18) are predicted to be acceptable. By contrast the expressions *are home* and *is home* in (19) are of a higher (function) type and for this reason are not acceptable as arguments of the propositional function *is nice*. This argumentation explains the observations in (18) and (19). The gerund and the infinitive here are the reified versions of their finite pendants.

4.2 Feferman Theories

Let L_0 be a first order language and S_0 be a theory formulated in L_0. We assume that S_0 admits a pairing scheme. This means that we reqire L_0 to contain a constant 0, two unary function symbols π_1 and π_2 and a binary function symbol π for which we will write (,). Furthermore we assume that S_0 proves

$$\pi(x, y) = (x, y) \neq 0$$
$$\pi_1(x, y) = x$$
$$\pi_2(x, y) = y$$

Given a model M_0 of S_0, π will be interpreted as a pairing function, i.e. as a function which maps an element of the cartesian product $M \times M$ to an element of M in such a way that the components can be recovered via the functions π_1 and π_2. We can now use induction to define the coding of n-tupels for arbitrary n. These requirements suffice to define an abstract form of Gödel numbering. We will henceforth write $\langle\varphi\rangle$ for the Gödel number of φ in L_0 and possible extensions thereof.

Now let φ be a formula with free variables among $o_1,...,o_k,y_1,...,y_m$. The *term* $(\langle\varphi\rangle,y_1,...,y_m)$ in L_0 contains contains $o_1,...,o_k$ as bound variables and $y_1,...,y_m$ as free variables or parameters. The following definition makes sense:

Definition 1 $\varphi[\hat{o}_1,...,\hat{o}_k,y_1,...,y_m] = (\langle\varphi\rangle,y_1,...,y_m)$. The variables $o_1,...,o_k$ are bound by abstraction in this term. We will also use standard set theoretical notation for $k = 1$ and write for $\{o|\ \varphi(o,y_1,...,y_m)\} = \varphi[\hat{o},y_1,...,y_m]$.

Let us see how to use this notation to formalise Chierchia's examples. To this end, let *home*(o,a), and *nice*(o,a) be predicates with a temporal parameter a. The sentence *John is home at time a* with j as a constant for John will therefore be formalised as: *home*(j,a). For the formal representation of the gerund *being home* let us choose the term *home*[ô,â]. Then the formula *nice*(*home*[ô,â],t) is a well formed expression representing the sentence *Being home is nice at time t*. Since *are home* would be rendered as *home*(o,a) we get the unacceptable representation *nice*(*home*(o,a),t) for (19)(a). The representation is unacceptable because *home*(o,a) is not a term and can therefore not occur as argument of the predicate *nice*. This accounts for the difference between (18) and (19).

We now add ``truth predicates'' T_n to L_0 and extend the original system S_0 by truth axioms, thereby forming an enriched system S. The intuitive meaning of $T_n(x_1,...,x_n,z)$ is that the tuple $(x_1,...,x_n)$ satisfies the formula coded by z. The following axiom scheme therefore makes sense.

Axiom 6 $\quad T_n(x_1,...,x_n, \varphi[\hat{o}_1,...,\hat{o}_n,y_1,...,y_m]) \leftrightarrow \varphi(x_1,...,x_n,y_1,...,y_m)$

Special cases of the above axiom scheme are:

$$T_0(\varphi[y_1,...,y_m]) \leftrightarrow \varphi(y_1,...,y_m)$$

For m = 0 and $\varphi[] = \langle\varphi\rangle$, this results in the famous Tarskian scheme:

$$T_0(\langle\varphi\rangle) \leftrightarrow \varphi$$

For T_1, we get the set theoretic principle known as comprehension, which is of special importance in this paper since it will turn out that $T_1 = HoldsAt$.

(20) $\quad T_1(x, \{o| \varphi(o,y_1,...,y_m)\}) \leftrightarrow \varphi(x,y_1,...,y_m)$

This shows that for T_1 we may as well write $\in$. Before we proceed, let us give a concrete example to demonstrate how T_1 works. Assume again that $\varphi(a)$ is a formula with a temporal parameter a, say *burn*(j, *the house*, a) which is the formal representation of the proposition *John burns the house at time a*. Let us formalise the *imperfect* nominal derived from this proposition – *John's burning the house* – via the term *burn*[j, *the house*, â]. This term is allowed as an argument of T_1 or of *HoldsAt*. From the axioms of Feferman's calculus we thus derive:

(21) $\quad HoldsAt(burn[j, \textit{the house}, â], t) \leftrightarrow burn(j, \textit{the house}, t)$

Intuitively *John's burning the house* holds at a certain time t if and only if the proposition *John burns the house at time t* is true. This explains the observation that although imperfect nominals are not propositions they are nevertheless somewhat proposition-like. Terms that are allowed as arguments of *HoldsAt* are proposition-like in other respects too. For example, for those fluents which can be defined in L_0, we can freely form conjunctions, disjunctions and negations according to the following recipe:

(22) $\quad HoldsAt(f_1 \wedge f_2, t) \leftrightarrow HoldsAt(f_1, t) \wedge HoldsAt(f_2, t)$ (similarily for $\vee$)

(23) $\quad \neg HoldsAt(f, t) \leftrightarrow HoldsAt(\neg f, t)$

However, for (23) it is crucial that the fluents are definable in L_0. Without this restriction, iteration of the *HoldAt*-predicate would lead to a version of Russell's paradox. In order to avoid such paradoxes, Feferman splits the T-predicates into a positive and a negative part, thereby interpreting the T-predicates by pairs (T,T') where T contains the extension and T' the anti-extension of the respective predicate. The two are required not to overlap but are allowed to have gaps; i.e. there may be (codes of) formulas which are neither in T nor in T'. This causes T' to behave like an antonym; i.e. we have

(24) $T \wedge T' = 0$ and
$T' \rightarrow \neg T$ but not vice versa!!

This property of the calculus is important for the analysis of iterated nominalisations. To see this more clearly, consider again the iterated imperfect nominalisation *John's supporting his son's not going to church*. This expression presupposes that John's son is indeed not going to church. Moreover, it is clear that the negation in the embedded nominal has the force of an antonym. It is not classical negation but means that John's son refrains from going to church. Let us write j for John, s for John's son and c for church, so that the embedded imperfect nominal receives the following logical representation:

$$\neg going[s, c, \hat{a}]$$

Now suppose that in order to account for the observed factivity the verb *support* is translated as:

$$SUPPORT(x, f, t) \leftrightarrow \text{HoldsAt}(f, t) \wedge support(x, f, t)$$

Under these assumptions the sentence *John supports his son's not going to church* will be represented as follows:

$$SUPPORT(j, \neg going[s, c, \hat{a}], o)$$

Transforming this proposition into a term again we finally arrive at the above iterated nominalisation.

$$SUPPORT[j, \neg going[s, c, \hat{a}], \hat{o}]$$

This term can occur as an argument of a loose container as in *John's supporting his son's not going to church was considered by many a severe mistake.* But now observe the following equivalences:

$$HoldsAt(SUPPORT[j, \neg going[s, c, \hat{a}], \hat{o}], t) \leftrightarrow SUPPORT(j, \neg going[s, c, \hat{a}], t) \leftrightarrow$$
$$HoldsAt(\neg going[s, c, \hat{a}], t) \wedge support(j, \neg going[s, c, \hat{a}], t) \leftrightarrow$$
$$\neg HoldsAt(going[s, c, \hat{a}], t) \wedge support(j, \neg going[s, c, \hat{a}], t)$$

These equivalences show that a negative occurrence is in the scope of HoldsAt, which means that $\neg HoldsAt(going[s, c, \hat{a}], t)$ has to be interpreted by $HoldsAt'(going[s, c, \hat{a}], t)$ which is $T_I'(going[s, c, \hat{a}], t)$. This accounts for the antonymic force of the embedded negated imperfect nominal *his son's not going to church* in a completely systematic way.

An important feature of Feferman's calculus is that it limits the demonstrated partiality to the system S proper. To be more precise, Feferman proves a theorem which says that if S_0 is a consistent system then there exists an extension S which contains truth axioms and which is conservative over S_0.

"Conservative" here means that the expanded system S does not touch the entailment relation of the system S_0. For instance, if we choose classical predicate logic as S_0, negation behaves classically for expressions from the system S_0. Nevertheless, it is important to keep in mind that negations with iterations of the *HoldsAt*-predicate always have antonymic force.

Although Feferman's calculus allows to introduce set-like objects $\phi[\hat{o}]$, which are usually written $\{o|\phi(o)\}$, it is important to note that the axiom of extensionality in general fails; i.e. we do not have:

$$\forall y(y \in \{o|\phi(o)\} \leftrightarrow y \in \{o|\psi(o)\}) \rightarrow \{o|\phi(o)\} = \{o|\psi(o)\} \qquad (= \phi[\hat{o}] = \psi[\hat{o}]).$$

Feferman's calculus, therefore, is a genuinely intensional calculus in which the identity of the objects $\phi[\hat{o}]$ and $\psi[\hat{o}]$ is not determined by their extensions.

To summarise, we have found a method to turn a formula φ into a term $\langle\varphi\rangle$, which is allowed as an argument of the *HoldsAt*-predicate. Therefore, the combination of the event-calculus with Feferman's type-free system permits the development of the required theory of reification. We have already shown how the combined theory allows denotations for imperfect nominals to be defined. But what about *perfect* nominals? The task here is to describe terms which are event-like and clearly distinguished from the proposition-like fluents. Since event-*types* don't contain temporal parameters, we choose to represent perfect nominals as $\exists a.\varphi[\mathbf{x},a]$, where **x** is a tuple of variables and a is a time parameter. To illustrate this definition, consider again the formula *burn*(x, *the house*, a). The formal representation of the perfect nominal *burning of the house* is the term $\exists a.$*burn*[x, *the house*, a]. This term is allowed to occur as argument of the *Happens*-predicate, but it is not of the right sort for the *HoldsAt*-predicate since the temporal parameter is bound by the existential quantifier. This also explains why event-types are not proposition-like entities, because the *Happens*-predicate is not a truth predicate and there is, therefore, no direct relationship between event-types and the corresponding propositions.

Hence we have arrived at the following two definitions:

Definition 1 If $\varphi(\mathbf{x},a)$ is a formula, the event-type generated by φ is the term $\exists a.\varphi[\mathbf{x},a]$.

Definition 2 The denotation of an imperfect nominal deriving from a formula $\varphi(\mathbf{x},a)$ is the term $\varphi[\mathbf{x},\hat{a}]$.

Event-tokens may be obtained from event-types by means of the *Happens*-predicate.

$$\mathit{Happens}(\exists a.\varphi[\mathbf{x},a], t)$$

An event-token thus is a pair consisting of an event-type and a time related by the *Happens*-predicate.

Let us briefly repeat the general idea of reification. Extensionally we can conceive of the denotation of a predicate as a function from a tuple of arguments to a truth value. For instance, *go*(x, y, a) assigns 1 or 0 to individuals x, y and a time a. Reification changes the values of such a function. Instead of truth values, the reified formulas $\exists a.$*go*[x, y, a] and *go*[x, y, â] will denote two kinds of eventualities, the first event-types and the second fluents. These eventualities are distinguished by two predicates of the axiomatised event calculus: the *HoldsAt*-predicate, which says that a *fluent* holds at a certain time t, and the *Happens*-predicate, which tells us that an event-type happens at a time t. The first predicate is a generalised truth predicate; i.e. it satisfies the equivalence *HoldsAt*(*go*[x, y, â], t) $\leftrightarrow$ *go*(x, y, t) for fluent term *go*[x, y, â]. Hence, it mirrors the relationship between fluents and propositions.

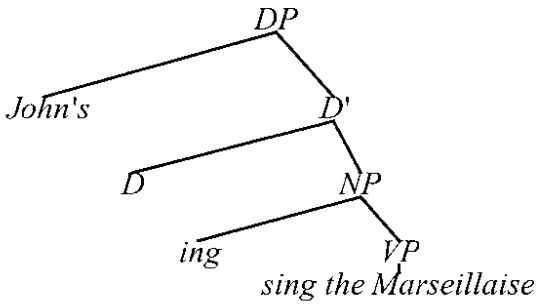
The second predicate is not a truth-predicate. It allows only *event-types* and times as arguments. The combined formal methods allow us to generate objects which are distinguished via the axioms of the event-calculus. These objects can then be used for a detailed description of the semantics of two kinds of nominalisations.

5 Applications

In the following section we will discuss some applications of the developed formal system. We will first show how to interpret the syntax trees from section 3 in a strictly compositional way.

5.1 Compositionality

We will develop a detailed interpretation for only one syntactic analysis. The necessary modification for the other trees are obvious. Let us consider Abney's analysis of Poss-ing gerunds.



Poss-ing

Assume that the verb *sing* is represented by *sing*(x, y, a), where a is again a temporal parameter. The VP *sing the Marseillaise* is formed in the usual way by applying the propositional function corresponding to *sing* to the object *the Marseilaise*. Let us write m for the *NP the Marseillaise*. The VP is therefore represented by *sing*(x, m, a). So far there is nothing new. The semantic function of the abstract morphological element *–ing* is reification. Syntactically, *–ing* transforms a V-projection into an N-projection. The corresponding semantic operation is the transformation of the propositional function *sing*(x, m, a) into the fluent valued function *sing*[x, m, â]. The last step consists in applying the fluent valued function to the object John (j), which results in the fluent object *sing*[j, m, â], which is the semantic representation of the Poss-ing gerund *John's singing the Marseillaise*. In accordance with the observations from section 2.1 *John's* is not analysed as a determiner in this construction but is treated in the same way as *John* in Acc-ing gerunds.

Acc-ing gerunds are interpreted similarly. The only difference is that the reification process applies to *sing*(j, m, a), which is in accordance with Abney's analysis. The result is again the fluent object *sing*[j, m, â].

The compositional interpretation of Ing-of gerunds preceeds in the same way with one additional complexity, however. This complexity concerns the role of determiners, which can occur with perfect nominals but not with imperfect nominals. Note that *John's* is considered a determiner when this expression occurs as part of perfect nominals but not when it occurs as part of imperfect nominals.

5.2 Verbal Contexts and Determiners

Before we analyse determiners we have to fix the denotations of the verbal contexts or containers in Vendler's terminology. If we stipulate the denotation of a loose container like *surprised us* to be a set of fluents, then according to the analysis so far, we predict that the sentence

John's singing the Marseillaise surprised us.

is semantically well-formed since the imperfect nominal *John's singing the Marseillaise* denotes a fluent object which may well be an element of the set *surprised us*. We have two possibilities for choosing denotations for narrow containers: sets of event-types or sets of event-tokens. In both cases we predict that the sentence

John's singing the Marseillaise took place at noon.

is semantically not well formed since a fluent can neither be an element of a set of event-types nor an element of a set of event-tokens. But on closer inspection, the second option seems to be more appropriate because narrow containers can be temporally modified. Since the time parameter of event-types is bound by an existential quantifier, there is no way to temporally modify event-types. By contrast, event-tokens, being pairs of event-types and times, can be readily modified by temporal operators. Therefore, if we choose (sets of) event-types as denotations for perfect nominals and (sets of) event-tokens as denotations of narrow containers, their behaviour with respect to temporal modification is explained. Specifically, we predict that temporal modification of perfect nominals is not possible, which is supported by the above-mentioned fact that the form *having cooked of the dinner* is not acceptable. A further advantage of choosing different denotation types for perfect nominals and narrow containers is that we may assume that it is possible to negate narrow containers without assuming that negation of perfect nominals is possible too. We can therefore assume that the negation of narrow containers is complementation with respect to the set of event-tokens, i.e. with respect to the set *Happens*. This explains the following two observations:

The singing of the song didn't occur at noon.
*John's kicking the cat didn't occur at noon.

The second fact follows since *didn't occur at noon* denotes a set of event-tokens – the complement of *occur at noon* with respect to *Happens* – which may not contain the fluent *John's kicking the cat*. In order to explain the first, we have to analyse the role of determiners. Since perfect nominals denote sets of event-types and narrow containers denote set of event-tokens, the task of determiners is to relate the two sets. This relationship can be established with the help of the *Happens*-predicate of the event-calculus. Under these assumptions, a sentence like *Every singing of the aria took place at noon* will be formalised as follows (here a abbreviates the NP *the aria*):

$$\forall x,s(\mathit{Happens}(\exists t.\mathit{sing}[x, a, t],s) \rightarrow \mathit{took\ place\ at\ noon}(\exists t.\mathit{sing}[x, a, t], s))$$

On this analysis, the licensing conditions for determiners is the positive occurrence of the *Happens*-predicate in the restrictor. This immediately explains why imperfect nominals cannot occur with determiners, because fluents like *break*[x, r, â] are not allowed as arguments of the *Happens*-predicate. Therefore, an expression like

every breaking the record

is not acceptable.

In order to give a strictly compositional analysis of Abney's analysis of Ing-of gerunds we have to develop a semantic representation for the meanings of determiners. We will use lambda notation to unambigously denote functions. The general scheme for determiners that occur with perfect nominals is then:

$$\lambda P \lambda Q \; \textit{Det}\; x,t(\textit{Happens}(P(x), t), Q(P(x), t))$$

This scheme is best explained by working out a concrete example. Suppose then that $\lambda x \exists t.\textit{sing}[x, a, t]$ represents the perfect nominal *singing of the aria*. The determiner *Every* = $\lambda P \lambda Q$ *Every* x,t(*Happens*(P(x), t), Q(P(x), t)) applied to this nominal gives:
λQ *Every* x, t(*Happens*($\lambda x \exists t.\textit{sing}[x, a, t](x)$, t), Q($\lambda x \exists t.\textit{sing}[x, a, t](x)$, t), which reduces to
λQ *Every* x, t(*Happens*($\exists t.\textit{sing}[x, a, t]$, t), Q($\exists t.\textit{sing}[x, a, t]$, t). This function, when applied to the narrow container *took place at noon*, results in *Every* x, t(*Happens*($\exists t.\textit{sing}[x, a, t]$, t), *took place at noon*($\exists t.\textit{sing}[x, a, t]$, t), which is the generalised quantifier representation of the above formula. Therefore, Abney's syntactic analysis of Ing-of gerunds can be interpreted in a strictly compositional way too[10].

To summarise we have arrived at the following denotation types for perfect versus imperfect nominals and narrow versus loose containers:

• perfect nominals	sets of event-types
• imperfect nominals	fluents
• narrow containers	sets of event-tokens
• loose containers	sets of pairs consisting of fluents and times

But what about a sentence like *John's breaking of the records surprised us*, where a perfect nominal occurs as an argument of a loose container?

5.3 Coercion and Intensionality

Vendler observed that perfect nominals tend to be interpreted like imperfect ones when they occur as arguments of loose containers. Thus, a paraphrase of the sentence *The collapse of the Germans is unlikely* is *That the Germans collapsed is unlikely*. No such paraphrase exists for *The collapse of the Germans was gradual* for the narrow container *was gradual*.

An informal description of the meaning of the sentence *The collapse of the Germans is unlikely* might run as follows: What is unlikely is the fact that an event characterised by the noun *collapse of the Germans* is happening. This intuition can be cast into a precise definition.

Definition 3 Let e be an event-type; then there exists a canonical fluent f associated to e defined by f := *Happens*[e,â].

Let us demonstrate this definition with an analysis of the sentence *The beheading of the king surprised us*. The formula representing this sentence is:

The x,s(*Happens*($\exists$a.*behead*[x,*the king*, a], s), *surprised us*(*Happens*[$\exists$a.*behead*[x,*the king*, a], â], s))

[10] We refer the reader to Hamm/Zimmermann (2002) and Westerståhl (1989) for a detailed analysis of other determiners like *the*, *John's* etc. and for the analysis of quantifiers in object positions.

An intuitive paraphrase of the formula is: Given that a unique event characterised by the phrase *beheading of the king* happened this very fact surprised us. Determiners here function similarily to determiners which relate nominals to narrow containers; however, in the case of coerced readings determiners relate event-types not to event-tokens but to the canonical fluents associated with them.

The type of coercion just encountered is of importance for the difference between intensional and extensional contexts too. As already observed, narrow containers are typical extensional contexts while loose containers are in general intensional contexts. Thus, if the king and the famous commander are one and the same person, then

The beheading of the king occurred at noon.

implies *The beheading of the famous commander occurred at noon* and vice versa. No such mutual dependence is observed in the case of *The beheading of the king surprised us* and *The beheading of the famous commander surprised us*.

Since the nominal *beheading of the king* is represented by $\exists a.behead[x, the\ king, a]$ and *beheading of the famous commander* by $\exists a.behead[x, famous\ commander, a]$ they are different according to the intensional set up of the Feferman calculus. Therefore *The beheading of the king surprised us* may be true without *The beheading of famous commander surprised us* being true as well and vice versa. But now we have to face a problem. The same holds for the pair *The beheading of the king occurred at noon* and *The beheading of the famous commander occurred at noon*. However, as observed these sentences imply one another.

To solve this problem note that it seems reasonable to assume that event-types which are derived from equivalent formulas happen at the same time. They are extensional in this sense. The effect is captured formally by the following axiom:

Axiom 7 Let ϕ and ψ be logically equivalent formulas, then
$Happens(\exists a.\phi(\mathbf{x}, a), t) \leftrightarrow Happens(\exists a.\psi(\mathbf{x}, a), t)$.

This is not yet sufficient to guarantee extensional equivalence of the pair *The beheading of the king occurred at noon* and *The beheading of the famous commander occurred at noon*. The equivalence is arrived at by the following *empirical* hypothesis:

Every narrow container is a Boolean combination of the *Happens*-predicate.

Since the sentence *The beheading of the king occurred at noon* is formalised as

$The\ x, s(Happens(\exists a.behead[x, the\ king, a], s), occurred\ at\ noon(\exists a.behead[x, the\ king, a], s))$

Axiom 7 and the empirical hypothesis plus the assumption that the king and the famous commander are the same person force the two sentences to have the same truth value.

Examples for the use of fluents associated with event-types more involved than the intensional phrases above are provided by Cresswell's sentences.

5.4 Negation of Event-Types

Consider again the examples in (25).

(25) (a) The non-arrival of the train caused consternation.
(b) *the non-arrival of the train unexpectedly
(c) the unexpected non-arrival of the train

(d) *The non-arrival of the train occurred at noon.
(e) Every non-arrival of a train causes consternation.

The problem the phrase *non-arrival of the (a) train* poses is that it exhibits the internal behaviour of a perfect nominal but the external behaviour of an imperfect nominal. Let us first consider the nominal *arrival of the (a) train*. Although this is a derived nominal, we take it as an event denoting expression[11]. Its translation is therefore $\exists a.arrive[x, t, a]$, where t is short for *the (a) train*. The problem now is to analyse the effect of *non*. The obvious representation of *non-arrival of the train* as $\exists a.\neg arrive[x, t, a]$ seems to be out since this would turn *non-arrival of the train* into an event-type, which would not help to explain the external behaviour of this expression, which is that of an imperfect nominal as shown by (25)(d). For a way out, consider the *Happens*-predicate again. Given *Happens*(e,a), we can form the negation $\neg Happens(e,a)$ and then construct from this formula the fluent denoting term $\neg Happens[e,\hat{a}]$; intuitively this term denotes the fact that e didn't happen. Let us fix this observation as a definition.

Definition 4 The fluent negation $\approx e$ of an event-type e is defined by $\approx e := \neg Happens[e,\hat{a}]$.

With the help of definition 4, a possible logical representation of the crucial sentence pair *The non-arrival of the train surprised us* versus **The non-arrival of the train occurred at noon* is now:

(26) *The* x, s($\neg$*Happens*($\exists$a.*arrive*[x,t,a], s), *surprised us*($\approx\exists$a.*arrive*[x,t,a], s) $\leftrightarrow$
The x, s($\neg$*Happens*($\exists$a.*arrive*[x,t,a], s), *surprised us*($\neg$*Happens*[$\exists$a.*arrive*[x,t,a], ô], s)

(27) *The* x, s($\neg$*Happens*($\exists$a.*arrive*[x,t,a], s), *occurred at noon*($\approx\exists$a.*arrive*[x,t,a], s) $\leftrightarrow$
The x, s($\neg$*Happens*($\exists$a.*arrive*[x,t,a], s), *occurred at noon*($\neg$*Happens*[$\exists$a.*arrive*[x,t,a],ô], s)

These formulas give a partial explanation for Cresswell's observations. First, the sentence *The non-arrival of the train occurred at noon* is out because *occurred as noon* is a set of event-tokens, and the pair ($\neg$*Happens*[$\exists$a.*arrive*[x, t, a], ô], s) cannot be an element of a set of event-tokens since $\neg$*Happens*[$\exists$a.*arrive*[x, t, a], ô] is not an event-type but a fluent (recall that event-tokens are pairs of event-types and times). On the other hand, ($\neg$*Happens*[$\exists$a.*arrive*[x, t, a], ô], s) may well be an element of *surprised us* since loose containers contain pairs of fluents and times. But there is still one problem left.

The condition ($\neg$*Happens*($\exists$a.*arrive*[x, t, a], s) in the restrictor of determiners is not the licensing condition we need for determiners. Determiners were licensed by a *positive* occurrence of the *Happens*-predicate in the restrictor. But suppose we introduce a negation ~ which maps event-types to event-types and which satisfies the following postulate:

(28) $\forall e(Happens(\sim e, t) \rightarrow \neg Happens(e, t))$

Postulate (28) turns ~ into an antonymic negation. Such a negation seems to be required independently because of the Russian nominalisations negated by *ne*, for instance *nesobljudenie* (not-respecting). With (28) we can now choose the following translations for the sentences *The non-arrival of the train surprised us* and *The non-arrival of the train occurred at noon*.

[11] This is in accordance with Vendler's observations that some derived nominals (like *blizzard*) are perfect nominals.

The x, s(*Happens*(~∃a.*arrive*[x,t,a], s), *surprised us*(¬*Happens*[∃a.*arrive*[x,t,a], ô], s)
The x, s(*Happens*(~∃a.*arrive*[x,t,a], s), *occurred at noon*(¬*Happens*[∃a.*arrive*[x,t,a], ô], s)

These formulas satisfy the licensing conditions for the occurrence of determiners, and (26) and (27) can be derived from clause (28). These formalisations explain the puzzling character of Cresswell's examples too because according to the above formulas two different kind of negations interact in a non-trivial way.

However, we have to face a further problem now. As already observed, negation in perfect nominals – if it can occur at all – is not classical logical negation. The question then is why the strengthening of (28) with (29), which introduces classical negation of event-types, is not allowed?

(29) $\forall e(\neg Happens(e, t) \rightarrow Happens(\sim e, t))$

Before we go on investigating this particular problem, let us first see that it makes sense to introduce at least some Boolean connectives on the set of event-types. First, we observe that we can form conjunctions and disjunctions of perfect nominals. The following examples are acceptable and perfect nominals:

(30) (a) John's breaking of the record and his winning of the race
(b) John's breaking of the record or his winning of the race

For the analysis of these examples disjunctions and conjunctions of event-tpes seem to be required. It is easy to introduce such operations. First observe that if two formulas ϕ, ψ are given, we can form new event-types from event-types $\exists a.\phi[\mathbf{x},\mathbf{a}]$ and $\exists a.\psi[\mathbf{x},\mathbf{a}]$ by setting $\exists a.\phi[\mathbf{x},\mathbf{a}] \wedge \exists a.\psi[\mathbf{x},\mathbf{a}] := \exists a.(\phi \wedge \psi)[\mathbf{x},\mathbf{a}]$ and similarily for $\exists a.\phi[\mathbf{x},\mathbf{a}] \vee \exists a.\psi[\mathbf{x},\mathbf{a}]$. However, since *Happens* is not a truth predicate[12], we do not know how these new terms behave with respect to this predicate of the event-calculus. But we can stipulate proper behaviour by means of two axioms.

Axiom 8 $Happens(e \wedge e',t) \leftrightarrow Happens(e,t) \wedge Happens(e',t)$
Axiom 9 $Happens(e \vee e',t) \leftrightarrow Happens(e,t) \vee Happens(e',t)$

The question now is whether there are any reasons to reject (29)? To answer this question, we have to give a brief informal sketch of the approach to computing denotations in van Lambalgen/Hamm 2001.

In this paper, the computation of the denotation of expressions is viewed as a non-monotonic process which on the basis of the description of a concrete situation incorporating lexical information (an *episode* in the terminology of van Lambalgen/Hamm 2001) delivers a *minimal* model of the situation. The computation process is given by a constraint logic program based on the axioms of the event calculus *EC*. Let us explain this in more detail.

An inference relation $_q$ is monotonic if it satisfies: $\Gamma \ _q \varphi$; then $\Gamma \cup \Sigma \ _q \varphi$, where φ is a formula and Γ, Σ are sets of formulas. An inference relation is non-monotonic if it is not monotonic. So strengthening the antecedents preserves a given inference in monotonic systems, but it may destroy such an inference in non-monotonic systems.

Non-monotonic systems establish *minimal* models in the sense that nothing is assumed beyond what is given by the data. The algorithm which computes denotations always

[12] Note that this contrasts with the case of *HoldsAt*, which is a truth predicate.

computes a minimal model compatible with the present data. This point bears some elaboration. Both monotonic and nonmonotonic reasoning start from the maxim:

(M) assume only what is given in the premises

but they implement (M) in different ways. Non-monotonic reasoning takes (M) to mean: all existence assumptions beyond those required by the premises are false; by contrast, monotonic reasoning interprets (M) as: suspend judgement on statements which do not follow (and whose negations do not follow) from the premises. In the interesting cases, these two interpretations of (M) can be reformulated as follows. In non-monotonic reasoning, people construct a *minimal model*, i.e. a model which makes everything false except the given data, of the premise (which is often unique); in monotonic reasoning, they must consider *all* models of the premises. We believe that the intension or sense of an expression can be profitably identified with an algorithm constructing such minimal models. For a precise definition of Frege's notion *sense* using algorithms for the construction of denotations in minimal models, see van Lambalgen/Hamm (2001).

Let us now apply this general approach to the problem we encountered with (29). Instead of giving a general proof, we will demonstrate the refutation of (29) by way of a concrete example.

Assume that n event-types are given and, further, that there is an episode which only mentions that event-type e happens at time t. What do we know about the minimal model **M** of this episode?

Certainly, *Happens*(e, t) is true in **M**. Moreover, for all $e_i \neq e$, $\neg$*Happens*(e_i, t) is true in **M** as well. Now suppose for some $e_j \neq e$ and $\sim e_j \neq e$. Then we have that $\neg$*Happens*(e_j, t) and $\neg$*Happens*($\sim e_j$, t) are true in **M** since **M** is a minimal model. From (29) we derive now: *Happens*($\sim e_j$, t) and *Happens*($\sim\sim e_j$, t). Therefore $\sim e_j = e - \sim\sim e_j$. It follows from (28) and *Happens*($\sim\sim e_j$, t) that $\neg$*Happens*($\sim e_j$, t) which contradicts *Happens*(e, t).

This example demonstrates that (29) prevents the computation of denotations in minimal models. We therefore conclude that only antonymic negation, i.e. a negation satisfying (28), is compatible with event-types.

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The Thematic Interpretation of Plural Nominalizations

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1 Introduction

Nominalizations, in German as well as in other languages, are systematically polysemous, a fact that has been widely discussed in the linguistic literature (see, among others, Lees 1960; Vendler 1967; Chomsky 1970; Ehrich 1977, 1991; Bierwisch 1989; Zucchi 1989; Grimshaw 1990; Asher 1993; Pustejovsky 1995). A given nominal (NOM) allows for a wide range of possible interpretations and may denote an event (1a), a state (1b) or an object (1c).

(1) a. Event Nominal
Vor der Absperrung des Geländes machten die Arbeiter eine Pause.
Before fencing the site off, the workers had a break.

b. Resulting-State Nominal
Während der Absperrung des Geländes sank die Zahl der Einbrüche.
While the site was fenced off, the number of burglaries decreased.

c. Resulting-Object Nominal
Der Bulldozer durchbrach die Absperrung des Geländes.
The bulldozer broke through the fence of the site.

In this paper, I will discuss certain asymmetries concerning the interpretation of the post-nominal genitive in constructions like (2) and (3).

(2) a. die Entlassung des Richters
the dismissal of the judge

b. die Vernehmung des Richters
the examination of the judge

(3) a. die Hinrichtung des Henkers
the execution of the executioner

b. die Hinrichtungen des Henkers
the executions of the executioner

The post-nominal genitive in (2a) unambiguously refers to the judge as the person who got dismissed. The post-nominal geni-tive in (2b), on the contrary, is ambiguous between two readings for the judge, as either the examiner or the examinee. The interpretation for the genitive in (3a) corresponds to that in (2a), the executioner is to be seen as referring to the victim of the execution (although world knowledge is inconsistent with this reading). Pluralization of the head nominal, however, alters the interpretation: the executioner is seen as carrying out the execution in (3b).

To put it briefly, the post-nominal genitive is sometimes ambiguous between a reading as AGENT or PATIENT, sometimes it just denotes the PATIENT, in other cases the AGENT of the action referred to. In the present paper, I will try to account for these asymmetries. Section 1 discusses former accounts of the problem. In section 2, I will develop a semantic representation for the argument structure of singular *-ung*-nominalizations. Section 3 will be

devoted to the thematic interpretation of plural *-ung*-nominalizations. I will argue that the asymmetries illus-trated in (2-3) cannot be explained by reference to the concep-tual system, but form part of the grammar of *-ung*.

2 The interpretation of *-ung*-nominalizations

Past research on nominalizations has focussed on three kinds of mutually related problems: (i) the type-coercion problem (Pustejovsky 1995), (ii) the argument structure problem (Grimshaw 1990), (iii) the genitive interpretation problem (Lees 1960).

2.1 Type Coercion (Pustejovsky's problem)

The interpretation of a given nominal is resolved by reference to the meaning of a governing expression. Temporal prepositions like *vor* (1a) and *während* (1b) impose an eventive or stative reading onto their complements. Impact-by-contact verbs like *durchbrechen* (1c) induce an object reading. This contextual effect on the interpretation of a given nominal is called 'type coercion' in Pustejovsky (1995). The coercional force imposed by temporal prepositions is so strong that ordinary object nouns like *Tisch* ('table') or *Suppe* ('soup') are reinterpreted as event or state denoting expressions, when serving as complements to a temporal preposition (cf. Ehrich & Rapp 2002).

(4) a. Sie haben sich nach Tisch gut unterhalten.
They had a nice conversation after table.

b. Sie haben sich während der Suppe gut unterhalten.
They had a nice conversation during the soup.

However, the interpretation of a given nominal is not solely de-termined by coercion. Each deverbal noun has its own semantic potential, depending on the lexical meaning of the underlying verb. Thus, while *Bebauung* ('covering with buildings') allows for a reading as event or result nominal (5), *Erbaung* ('con-structing a building') does not (6).

(5) a. Während der Bebauung des Potsdamer Platzes wurde der Verkehr umgeleitet.
During the be-build-ung ('remodelling') of the Potsdamer Platz the traffic got redirected.

b. Von der ursprünglichen Bebauung des Potsdamer Platzes ist nicht mehr viel übrig geblieben.
There isn't much left from the original be- build-ung ('buildings') of the Potsdamer Platz.

(6) a. Während der Erbauung des Anhalter Bahnhofs wurde der Verkehr umgeleitet.
During the er-build-ung ('construction') of the Anhalter station the traffic got redirected.

b. *Von der ursprünglichen Erbauung des Anhalter Bahnhofs ist nicht mehr viel übrig geblieben.
There isn't much left from the original be-build-ung ('construction') of the Anhalter station.

In fact, we have to distinguish three parameters determining the interpretation of a given nominal: (i) the sortal requirements contextually coerced onto NOM by its linguistic context, (ii) the Lexico-Semantic Structure (LSS) of the base verb including its thematic structure and its situation type, and (iii) the contribution of the nominalizing affix. In this paper, I will take

type coercion for granted, using matrix verbs and prepositions just as diagnostic contexts for the distinction between different readings of *-ung*-Nominalizations (NOM-*ung*).

2.2 Argument Structure (Grimshaw's problem)

Grimshaw (1990) discusses argument structure restrictions on different sorts of nominalizations. She distinguishes between complex event nominals (CEN) like (7) and result nominals (RN), which occur as object nouns (8a,b) or as event nouns (9a,b).

(7) Complex Event Nominals (CEN)
- a. The professor's examination of the students took place in his office.
- b. Edison's invention of the phonograph changed the world and made Edison rich.
- c. Reagan's defeat of the liberals was a surprise.

(8) Object Nominals (RN)
- a. The professor's exam for the students is on the table.
- b. Edison's invention is a useful device.

(9) Simple Event Nominals (RN)
- a. Reagan's defeat was a surprise.
- b. John's murder was disastrous.

Grimshaw argues that CEN have argument structure, whereas RN don't. CEN-constructions having argument structure inherit both arguments of a transitive verb, such that the prenominal genitive corresponds to the verb's external, the post-nominal genitive to its internal argument. Where the internal argument of a verb is obligatory, its genitive counterpart is obligatory, too, which is why constructions like (10) are ungrammatical.

(10) a. *Cesar's$_{AG}$ destruction [_] $_{PAT}$
b. *the professor's$_{AG}$ examination [_]$_{PAT}$

The nominals in (9) are to be analyzed as passive counterparts of the corresponding CEN constructions as in (7), the prenominal genitives thus correspond to the internal arguments of the respective base verbs; this is how we know that the genitive in (9b) refers to 'John' as the victim (PATIENT/THEME) of the murder. A correspondence like this is not to be considered a syntactic inheritance relation. The genitives in (9) are not arguments inherited from the verb, but argument adjuncts (AA), which bear just a conceptual (not a grammatical) relation to the underlying verb. AAs behave like adjuncts in terms of their syntax and may be omitted in constructions like *the defeat*, accordingly.

Grimshaw's analysis predicts that a construction spelling out both arguments of a transitive verb, is to be analyzed as CEN. It is therefore deviant in contexts which require a non-eventive complement as (11).

(11) a. *The professor's examination of the students is on the table.
b. *The invention of the phonograph is a useful device.

However, the absence of an internal argument by itself doesn't guarantee the accessibility of a non-eventive object reading. The ungrammaticality of (6b) is not due to the fact that the nominal *Erbaung* combines with an overt PATIENT (THEME) argument (*Anhalter Bahnhof*). *Erbaung*, as opposed to *Bebauung*, never adopts an object reading (see Bierwisch 1989), no matter whether the THEME argument is spelled out (6b) or not (12b).

(12) a. Die ursprüngliche Bebauung verfiel nach dem Krieg.
The original be-build-ung became dilapidated after the war.

b. *Die ursprüngliche Erbauung verfiel nach dem Krieg.
The original er-build-ung became dilapidated after the war.

Although *bebauen* and *erbauen* are both change-of-state verbs, they differ with respect to the thematic status of their direct object. *Bebauen* is an applicative verb: it means 'cover with buildings' and its direct object, *Potsdamer Platz* in (5a), refers to a pre-existing area, which, as a result of the action, gets re-modelled by being covered with buildings. *Erbauen* is a creation verb, it means 'construct a building' and its direct object refers to the result of the action, the new building. In other words, *Potsdamer Platz* is GOAL in (5), *Anhalter Bahnhof* is THEME in (6). Adopting Dowty's (1991) notion of thematic proto-roles, one might say that the direct object of *bebauen* lacks one of the properties of PROTO-PATIENTs, the property of coming into existence, whereas the direct object of *erbauen* does have this property. In this sense, the direct object of *erbauen* is a better match for the role of PROTO-PATIENT than the direct object of *bebauen*, although both are incremental.

A nominalization complemented by both arguments of a transitive verb doesn't exclude an RN-interpretation (13), as is shown in Bierwisch (1989).

(13) a. Jonathan's description of the accident
b. Beethoven's adaptation of the sonata } is on the table.
c. Meier's calculation of the costs

Describe, adapt, calculate are applicative verbs, denoting actions which apply to pre-existing objects and thereby create new objects, namely descriptions, adaptations, or calculations. The direct objects of these verbs and of the corresponding nominals do not denote the result of the action, i.e. the object created, but the entity being submitted to it. It is not the presence or absence of an internal argument which determines the accessibility of a RN interpretation. The critical point is rather that the nominal's referential argument (i.e. the thing that is a description, adaptation etc.) and its object (the accident, the sonata etc. in the example) ought to be referentially distinct.

The structural distinction between CEN and RN is less straight-foreward in German than it is in English. This is due to the fact that the prenominal possessive is fairly restricted (to the use of proper nouns). Constructions like (14a) are highly marked in German, where (14b,c) represent the structural prototype of a nominalization.

(14) a. ??des Feindes Zerstörung der Stadt
the enemy's destruction of the city

b. die Zerstörung der Stadt (durch den Feind)
the destruction of the city (by the enemy)

c. $[_{DP}\ [_{D'}\ D^0\ ]\ [_{NP}\ N^0\ DP_{Gen}]]$

This distribution suggests that nominalizations are never of type CEN in German. This implies – in Grimshaw's terms – that they never have argument structure. The genitives accompanying them in constructions like (14b,c) are then to be analyzed as AAs throughout.

2.3 The thematic interpretation of the genitive (Lees' problem)

As is well known since the days of Lees (1960) post-nominal genitives are often ambiguous between a reading as 'subject' or 'object' of the action referred to.

(15) a. the chasing of the hunters
b. the description of the student
c. the evaluation of the committee
d. the siege of the enemies

Since a post-nominal Genitive must always be adjacent to N^0 in German, there is just one slot to be filled by a post-nominal. The adjacency requirement has the effect that the AGENT and the PATIENT-argument of a transitive verb compete for sisterhood to the nominal head, which is why a post-nominal genitive can often be analyzed as either AGENT or PATIENT of the action referred to (cf 16)[1].

(16)		AGENT	PATIENT
a.	Die Befragung The interrogation	des Richters of the judge	des Zeugen of the witness
b.	Die Beobachtung The observation	Galileis of Galilei	der Planeten of the planets
c.	Die Durchsuchung The searching	der Grenzer of the customs	der Reisenden of the travellers
d.	Die Messung The measuring	des Ingenieurs of the engineer	des Stroms of the current

...geht weiter ('goes on').

However, not every nominal shares this behaviour. The geni-tives in (16') do not permit an AGENT interpretation.

(16')		AGENT	PATIENT
a.	Die Beseitigung The removal	*des Mörders of the murderer	der Leiche of the corps
b.	Die Erschießung The shooting	*des Jägers of the hunter	des Hasen of the rabbit
c.	Die Entlassung The dismissal	*des Ministers of the Secretary	des Angestellten of the employee
d.	Die Versendung The sending	*des Autors of the author	des Manuskripts of the manuscript

...geschah unerwartet ('took place unexpectedly').

This discrepancy with respect to genitive interpretation is discussed in further detail in Ehrich & Rapp (2000). In the present paper, I am mainly concerned with the thematic interpretation of post-nominal genitives complementing plura-lized heads (see section 1).

(17) a. die Hinrichtungen dieses Henkers
the executions of this executioner

b. die Erschießungen der Geheimpolizei
the shootings of the secret service

c. die Zubereitungen des Kochs
the preparations of the cook

The genitives in (17), as opposed to those in (16), have to be understood as representing the AGENT. Obviously, pluralization has an effect on the thematic interpretation of the nominal.

[1] I don't want to deny that the AGENT reading is more naturally conveyed by a prepositional form like *die Befragung durch den Richter* ('the interroggation by the judge'), probably because this form *is unambigous. But* the existence of an alternative to the genitive doesn't affect the ambiguity of the genitive in constructions like *die Befragung des Richters* ('the interrogation of the judge').

This effect calls for an explanation.

3 Argument Structure

3.1 Verb Argument Structure

The argument structure (AS) of a verb specifies information about the verb's thematic structure and its situation type. Given a decompositional approach to verb semantics, the thematic structure (TS) of a verb is represented in terms of sublexical atomic predicates and their arguments[2]. Rapp (1997, 2001) distinguishes primitive predicates DO, BE, PSYCH, LOC, APPLY (18) and operators like BECOME, DEVELOP, CAUSE, which, applied to primitive predicates, yield complex predicates (19).

(18) primitive predicates

a.	*frieren* 'be cold'	BE (x)
b.	*lachen* 'lough'	DO (x)
c.	*streicheln* 'stroke'	DO (x, y)
d.	*wissen* 'know'	PSYCH (x, y)
e.	*umgeben* 'surround'	APPL (x, y)

(19) complex predicates[3]

a. $zerbrechen_{intr.}$ 'break'
BECOME (BE (x))

b. $zerbrechen_{trans}$ 'break'
CAUSE (<DO (x,y)>,<BECOME (BE (y))>)

c. *lernen* 'learn'
DEVELOP (PSYCH (x, y))

d. *beibringen* 'teach'
CAUSE (<DO (x)>,<DEV (PSYCH (z,y))>)

e. *erbauen* 'construct a building'
CAUSE (<DO (x)>, <DEVELOP (BE (y))>)

f. *bebauen* 'cover with buildings'
CAUSE (<DO (x, y)>,<DEVELOP (APPL (z,y))>)

Thematic roles making up the TS of a given verb are defined indirectly in terms of the position an argument has with respect to a primitive predicate (see for similar approaches Bierwisch 1997, Jackendoff 1983, 1990). Each primitive determines its own thematic hierarchy: the first argument is always higher in the hierarchy than the second.

(20)

	Decomposition	Thematic Roles[4]
a.	DO (x)	x: AGENT
b.	DO (x, y)	x: AGENT, y: PATIENT
c.	BE (x)	x: THEME
d.	PSYCH (x, y)	x: EXPERIENCER, y: ESTIMATUM
e.	LOC (x, y)	x: THEME, y: PLACE
f.	APPL (x, y)	x: APPLICATUM, y: GOAL

[2] Shalley (2002) shows that abetract atomis predicates , which are often conflated in the decomposition structure of Indo-European verbs, have to be spelled out in languages like Walmajarri.

[3] Parentheses are printed in different types, where this helps to improve the legibility of the formula.

[4] Following Jackendoff (1990), PATIENT and THEME are considered distinct roles, see Rapp (1997a, 2001) and Ehrich & Rapp (2000).

According to general Verb Linking Principles (VLP), the highest argument of a given decomposition is linked to the highest structural position θ1 in syntax (21i). The AGENT x of (18c) or the EXPERIENCER x of (18d) are thus linked to the position of θ1, whereas the PATIENT y of (18c) or the ESTIMATUM y of (18d) are linked to the position of θ2 (VLP 21i), (see for details Rapp 2001).

(21) Verb Linking Principles (VLP)

i Argument linking respects the thematic hierarchy. The higher argument (= the first argument) of a given primitive is linked to the highest structural position θ1, the lower argument is linked to θ2.

ii Arguments of DO have priority over arguments of other primitives.

iii If, according to (ii), the higher argument of a primitive cannot be linked to θ1, it is linked to an oblique position.

iv The oblique position for the EXPERIENCER is θ3. Other obliques are realized as prepositional adjuncts.

A linking conflict arises where complex predicates combine several primitives, for instance DO and PSYCH in (19d) or DO and APPL in (19f). The first argument x of DO as well as the first argument z of APPL in (19f) should be made subject of (22), if we adhere to VLP (21i). This linking conflict is resolved by the second VLP (21 ii), giving priority to the DO component. The AGENT x is thus linked to θ1, the APPLICATUM z to the position of an oblique (VLP 21 iii) and spelled out as a PP (VLP 21 iv) in (22).

(22) a. $Sie_{x,\,\theta 1}$ bebauen den $Platz_{y,\,\theta 2}$ mit $Kaufhäusern_{z,\,\text{oblique}}$.
They cover the place with ware houses
CAUSE (<DO (x, y)> , < DEVELOP (APPL (z, y))>)

Primitive predicates always denote temporally open situations (states or activities). Adopting a multi-sortal neo-Davidsonian approach to argument structure, we represent the situation argument as part of the lexical decomposition. Reference to activities is represented by the process-variable r, reference to states by the state variable s.

(23) a. DO ((x, y), r) *streicheln* ('stroke')
b. BE ((x), s) *frieren* ('be cold')
c. PSYCH ((x, y), s) *bewundern* ('admire')

The inchoative operators BECOME/DEVELOP turn the state predicates BE, PSYCH, LOC or APPL into a change-of-state predicate, the result is an achievement (BECOME) or an accomplishment (DEVELOP). Reference to a change of state is represented by the event variable e. CAUSE always combines with an inchoative operator (BECOME or DEVELOP) and never alters the situation type (24).

(24) a. *zerbrechen* $_{\text{intr.}}$ ('break')
BECOME (BE ((x), s), e)

b. *zerbrechen*$_{\text{trans.}}$ ('break')
CAUSE (<DO ((x, y), r)>, <BECOME (BE ((y), s), e)>)

c. *lernen* ('learn')
DEVELOP (PSYCH ((x, y), s), e)

d. *beibringen* ('teach')
CAUSE (<DO ((x), r)>,<DEVELOP (PSYCH ((y, z), s), e)>)

Complex decomposition structures like (24 b-d) contain up to three different situation arguments. A given verb, of course, belongs to exactly one situation type. In fact, where the

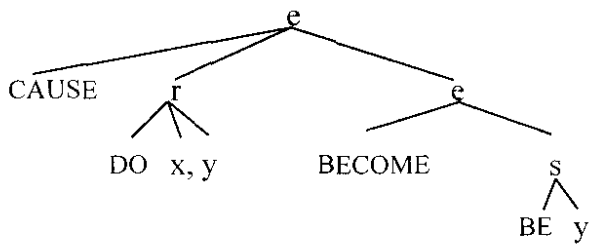
decomposition contains a process variable r, a state variable s and an event variable e, the verb regularly refers to a situation of type e. This regularity is the reflex of a hierarchical ordering between situation types, as assumed in Ehrich & Rapp (2000).

(25) i Situation Type Hierarchy (STH)
events: e > processes: r > states: s

ii Situation Type Assignment
The situation argument ranking highest in STH is the referential argument of a complex decomposition structure.

The LSS of a complex predicate like transitive *break* can now be represented as in (26):

(26)



So far, we discussed thematic properties and situation properties making up the LSS of a given verb. We are now ready to consider Argument Structure (AS). Following Bierwisch's approach to AS, we represent the Semantic Form (SF) of a verb as composed of its AS and its LSS (see Späth (2002) for a similar model). Only those thematic arguments which project into syntax are part of a verb's AS. The AS furthermore contains the (silent) referential argument. Each LSS argument which belongs to AS is bound by lambda (27). LSS arguments which are not part of AS are left unbound.

(27) a. *zerbrechen*$_{\text{intr.}}$ ('break')
λx λe [BECOME (BE ((x), s), e)]

b. *zerbrechen*$_{\text{trans.}}$ ('break')
λy λx λe [CAUSE (<DO ((x, y), r)>,<BECOME (BE ((y), s), e)>, e)]

c. *lernen* ('learn')
λy λx λe [DEVELOP (PSYCH ((x, y), s), e)]

d. *beibringen* ('teach')
λz λy λx λe [CAUSE (<DO ((x), r)>,<DEVELOP (PSYCH ((y, z), s), e)>, e)]

Thematic LSS arguments which are obligatorily implicit in surface syntax are not bound by lambda (28a), optional thematic arguments (arguments which may, but need not be left implicit) are bound by a lambda in parentheses (28b)[5].

(28) a. *schmausen*
λx λr [DO ((x, y) ,r)]

b. *kehren* ('sweep')
(λy) λx λr [DO ((x, y), r)]

[5] Constraints restricting the suppression of verb arguments are discussed in Ehrich (1996, 1997) and in Rapp (1977b).

3.2 Nominalization and Argument Structure

Nominalization alters the argument structure of a given base verb in various ways. Thematic arguments complementing nominals as opposed to verbs are always optional. Hence, whereas AGENT and PATIENT are obligatory in the AS of *befragen* (29a), they are optional in in the AS of *Befragung*.

(29) a. Der Richter befragte *(den Zeugen) eine Stunde lang.
The judge interrogated the witness for an hour.

b. Die Befragung (des Zeugen) dauerte eine Stunde.
The interrogation of the witness took an hour.

Since nominals provide exactly one structural position for an NP-internal argument, only one of the verb's arguments can be linked to this position. This is why the genitive is ambiguous in constructions like *die Befragung des Richters* ('the interrogation of the judge'). However, as has been outlined above, this kind of ambiguity only arises in nominalizations of activities and states. Nominalizations of accomplishments and achievements like *die Entlassung des Richters* ('the dismissal of the judge') don't admit an AGENT interpretation (see 16, 16' above). Ehrich & Rapp (2000) propose noun specific linking principles (NLP), which account for these differences (30).

(30) Nominal Linking Principles (NLP)

i The lowest thematic argument of the inchoative component (BECOME / DEVELOP) has priority over all other components.

ii Arguments of the DO component have equal priority.

Befragen ('interrogate') refers to an activity (31a). The decomposition of the verb doesn't contain an inchoative component. NLP (30i) therefore doesn't apply to the correspon-ding NOM ('interrogation') in (31b), the thematic arguments x,y have equal priority and are both bound by a lambda (put into parentheses because thematic arguments to NOM are always optional).

(31) a. *befragen* ('interrogate')
$\lambda y\ \lambda x\ \lambda r$ [DO ((x, y), r)]

b. *Befragung* ('interrogation')
$(\lambda y)\ (\lambda x)\ \lambda r$ [DO ((x, y), r)]

Entlassen (32a) refers to an achievement (change of state); its PATIENT/THEME argument y has priority over all other argu-ments according to NLP (30i) and is bound by lambda (in parentheses again) in (32b); the AGENT argument x must be left implicit and is thus left unbound.

(32) a. *entlassen* ('dismiss')
$\lambda y\ \lambda\ x\ \lambda\ e$ [CAUSE (<DO ((x, y),r)>,<BECOME (BE ((y),s),e)>)]

b. *Entlassung* ('dismissal')
$(\lambda y)\ \lambda\ e$ [CAUSE (<DO ((x, y),r)>, <BECOME (BE ((y),s),e)>)]

Let us come back to *bebauen* ('cover with buildings'), *erbauen* ('construct a building') and the corresponding nominalizations. Both verbs refer to accomplishments, the event argument e is thus referential in (33a) and (34a), repectively, as well as in the decompositions of the corresponding event nominals (33b, 34b).

(33) *bebauen* 'cover with buildings'
$\lambda y\ \lambda\ x\ \lambda\ e$ [CAUSE (<DO ((x, y), r)>,<DEVELOP (z,y),s),e)>)]

(33') *Bebauung*$_{EV}$ ('covering with buildings')
(λy) λ e [CAUSE (<DO ((x, y), r)>,<DEVELOP (APPL ((z,y),s),e)>)]

(34) *erbauen* ('construct a building')
λ y λ x λ e [CAUSE (<DO ((x),r)>, <DEVELOP (BE (y),s),e)>)]

(34') *Erbauung*$_{EV}$ ('construction of a building')
(λy) λe [CAUSE (<DO ((x),r)>, <DEVELOP (BE ((y),s),e)>)]

The lowest argument y of the inchoative component has priority over the other arguments according to NLP (30i) and is thus bound by a lambda (in parentheses) in (33b, 34b). *Bebauung* has a second reading as resulting-object nominal (33c).

(33") *Bebauung*$_{RN}$ ('buildings covering a site')
(λy)λz [CAUSE (<DO ((x, y), r)>,<DEVELOP (APPL((z,y), s), e)>)]

The APPLICATUM z is referential argument of (33"), the GOAL y as lowest argument of the inchoative component is the single (but optional) thematic argument of (33"). The THEME argument y of *erbauen* (34) is accessible as thematic argument of the nominalization according to NLP (30i). It cannot, at the same time, serve as referential argument, because this would violate the theta-criterion. This explains why *Erbauung* does not admit a resulting-object interpretation.

The NLPs in (30) form part of the grammar of German *-ung*-nominalizations, according to Ehrich & Rapp (2000) but do not apply to implicit derivations (zero conversions) or nominalized infinitives (35,36).

(35)		AGENT	PATIENT
a.	der Schlag the hit	des Spielers of the player	*des Balls of the ball
b.	der Wurf the throwing	des Kriegers of the warrior	*des Pfeil of the target
c.	der Kuss the kiss	der Spinne of the spider	*der Spinne $_{PAT}$ the kiss of the spider

(36)				
a.	das Beobachten the observing	*des Astronomen of the astronomer	des Planeten the planet
b.	das Messen the measuring	*des Ingenieurs of the ingeneer	des Stroms of the current
c.	das Verfolgen the persecution	*des Detektivs of the detective	des Diebs of the burglar

Verbs like *schlagen* denote sequences of events (when viewed as iterations) or single events (semelfactives). Implicit derivations based on these verbs (35) are restricted to the semelfactive interpretation. This suggests that they behave like nominalizations of achievement verbs and allow for a PATIENT/THEME interpretation of the post-nominal genitive. But the genitives in (35) only permit an AGENT-interpretation. In-finitive conversions (36), on the other hand, though being based on activity verbs, are restricted to the PATIENT/THEME interpretation of the post-nominal genitive. Obviously, the NLPs nicely account for the interpretation of *-ung*-nominals, but don't apply to nominalizations of different morphological types. In other words, they belong to the grammar of *–ung*.

3.3 Argument Structure and Pluralization

As far as pluralization is concerned, some nominals do undergo plural formation (37), others don't (38).

(37) a. Er beobachtete die beiden Zerstörungen der Stadt.
He observed both destructions of the city.

b. Die jährlichen Überprüfungen des Betriebs führen immer wieder zu Protesten.
The annual controllings of the firm lead to protests over and over again.

c. Reinholds Besteigungen des K3 wurden von einem Fernsehteam gefilmt.
Reinhold's climbings of the K3 were filmed by a tv team.

(38) a. *Die Verzehrungen des Proviants waren erfrischend.
The consumptions of the lunch were refreshing.

b. *Der Kontrolleur kritisierte die Verschwendungen des Etats.
The controller criticized the wastings of the budget.

c. *Reinholds Erreichungen des Gipfels waren spektakulär.
Reinhold's reachings of the summit werde spectacular.

The constraints underlying these differences are far from clear. One may argue that they are purely conceptual: a given amount of food can be consumed (a given budget wasted) just once, which is why the consumption (wasting) of something is a singularity. A given summit may, however, be reached more than once, even by the same mountaineer, but *Erreichung* ('reaching') doesn't undergo plural formation, either. This suggests that pluralizability is an idiosyncratic property of lexical items. Anyway, semantic constraints restricting plural formation are not at issue in this paper. I will rather restrict myself to the interpretation of the genitive in those forms which do undergo pluralization.

The nominal linking principles NLP introduced in (30) above even apply where they are inconsistent with encyclopedic knowledge (39).

(39) a. Die Hinrichtung des Henkers$_{*AG / TH}$
The execution of the executioner

b. Die Verbrennung des Pyromanen $_{*AG / TH}$
The burning of the pyromaniac

c. Die Erschießung des Jägers$_{*AG / TH}$
The shooting of the hunter

...geschah des Nachts ('happened at night').

As outlined above, the interpretation of the genitive changes, when the nominals get pluralized (40).[6]

(40) a. Die Hinrichtungen des Henkers$_{AG /*TH}$
The executions of the executioner

b. Die Verbrennungen des Pyromanen$_{AG / *TH}$
The burnings of the pyromaniac

c. Die Erschießungen des Jägers$_{AG / *TH}$
The shootings of the hunter

...geschahen immer des Nachts ('always happened at night').

This discrepancy with respect to genitive interpretation might have an extralinguistic

[6] This insight goes back to Schäublin (1972) and Teubert (1978).

explanation. A given individual can be executed, burnt or shot just once. Thus, the interpretation of the genitive as AGENT in (40) seems to result from a conceptual shift: Since the THEME/PATIENT reading of the genitive is, as a matter of fact, impossible, one has to re-interpret it as AGENT. This kind of re-interpretation allows us to understand sentences like (41):

(41) a. Die Hinrichtungen dieses Henkers sind besonders grausam.
The executions of (by) this executioner are extraordinarily cruel.

b. Die Verbrennungen dieses Pyromanen richten großen Schaden an.
The burnings of this pyromaniac cause huge damages.

c. Die Erschießungen der Geheimpolizei geschehen immer des Nachts.
The shootings of the secret police always take place at night.

The conceptual-shift analysis is, however, not applicable to the genitives in (42), which are ambigous between AGENT and PATIENT/THEME readings.

(42) a. die Vergiftungen des Apothekers $_{AG/TH}$
the poisonings of the pharmacist

b. die Zerstörungen Roms $_{AG/TH}$
the destructions of Rome

c. die Entsorgungen der Atomfirma$_{AG/TH}$
the disposals of the nuclear firm

Somebody may have been poisoned over again (as long as he wasn't given a lethal dose), Rome was destroyed several times in history, but (42) still is in opposition with the corresponding singular constructions in (43), where in accordance with NLP (30i) the genitives must be interpreted as PATIENT/THEME.

(43) a. die Vergiftung des Apothekers $_{*AG/TH}$
the poisonings of the pharmacist

b. die Zerstörung Roms$_{*AG/TH}$
the destructions of Rome

c. die Entsorgung der Atomfirma$_{*AG/TH}$
the disposing of the nuclear firm

The asymmetries with respect to the interpretation of the genitive are not to be considered an effect of the plural as a morphological class. They can also be found in singular constructions with demonstratives or ordinals (44)[7].

(44) a. Die erste Hinrichtung dieses Henkers$_{AG}$ war besonders grausam.
The first execution of this executioner was extraordinarily cruel.

b. Nicht jede Vergiftung des Apothekers$_{AG}$ war erfolgreich.
Not every poisoning of the pharmacist was successful.

c. Die gestrige Beschädigung der Hooligans$_{AG}$ wird ein böses Nachspiel haben.
Yesterday's damaging of the hooligans will have bad consequences.

The nominals in (41, 42) directly denote pluralities, whereas those in (44) only presuppose that a selection is made from a plurality. We speak of a 'conceptual plural' in these cases.

The nominal linking principles introduced in section 2.2 imply that the genitive is ambiguous when complementing a process nominal (NLP 30ii). The explanation for the

[7] I owe this observation to Jack Hoeksema, Groningen (personal communication).

thematic inter-pretation of the genitive adjoined to a morphological or con-ceptual plural is related to this principle in a very straight-forward way: plural converts an event nominal into a process-like nominal. The singulars in (39, 43) denote single events (= changes of states), the corresponding plurals denote sequences of iterated events. These are comparable to processes in terms of their temporal characteristics, which is why they combine with time-span predicates (45, 46).

(45) a. Die jahrelangen Hinrichtungen des Henkers hatten nach der Revolution ein Ende.
The executions of the executioner which had been going on for years came to an end after the revolution.

b. Die mehrere Wochen andauernden Erschießungen der Polizei werden das Land noch lange traumatisieren.
The shootings of the police which had been going on for weeks will be traumatizing the country for long.

c. Die lang währenden Leerungen der Müllabfuhr verursachen schrecklichen Lärm.
The time-consuming emptyings of the collection department cause terrible noises.

(46) a. Die über Monate fortgesetzten Vergiftungen des Liebhabers haben denEhemann langsam getötet.
The poisonings of the lover continued over months gradually killed the husband.

b. Die jahrelangen Zerstörungen der Armee haben die Bevölkerung zermürbt.
The destructions of the army going on for years wore people down.

d. Die wiederholten Entsorgungen der Firma rufen immer wieder Proteste hervor.
The repeated disposings of the nuclear company cause protests over and over again.

To put it briefly, eventive pluralities denote processes. As such they give equal priority to AGENT and PATIENT/THEME arguments (NLP 30ii). The PATIENT/THEME interpretation for the genitive in (41), on the one hand, is indeed ruled out by conceptual reasoning. The accessibility of an AGENT interpretation, on the other hand, is rooted in the linking principles of nominal grammar in German.

Link (1992) and Krifka (1992) reconstruct the meaning of plurals as denoting semi-lattices. The lower bound is given by the individual elements of the denotatum and the upper bound by the totality of joins of the individual elements. Plurals (of nominalizations as well as of ordinary base nouns) denote homogeneous objects comparable to the denotations of mass nouns. Their denotations are characterized by the specific mass noun properties: divisivity and cumulativity.[8]

(48) i Divisivity
For any denotation D_{plur} of a noun with denotation F, there is a proper subpart D' of D_{plur}, such that D' is an instance of F.

ii Cumulativity
For any D' joining the denotation D_{plur} of a noun with denotation F, the resulting join is an instance of F.

These properties guarantee that morphologically pluralized or conceptually pluralic events behave like processes, which also implies that the corresponding nominals share the nominal

[8] This reconstruction of the plural meaning applies to any kind of common noun and is by no means specific for nominalizations. I will, therefore, not go into the details of this account. Alternative approaches are discussed in Schwarzschild (1996).

linking properties of process nominals as defined in (30). The thematic interpretation of plural nominalizations is, thus, not inconsistent with the principles suggested in Ehrich & Rapp (2000). On the contrary, the fact that eventive pluralities adopt the thematic properties of process nominals is a good confirmation of these principles.

Let us assume that *Zerstörung* denotes the set of all destruction events given in a domain D, such that the denotatum *ZERSTÖRUNG* is a proper subset of the set of individual events (*ZERSTÖRUNG* $\subset D_{ev}$). *Zerstörungen*, then, denotes a semi-lattice composed of the totality of joins between elements of *ZERSTÖRUNG*. Let Σ be a function, which, applied to the denotatum of a singular noun, gives us the corresponding plurality. Application of Σ to the denotatum $\alpha \subset D_e$ of a singular event nominal then converts the situation type of α, such that $\Sigma(\alpha) \subset D_{proc}$. The nominal denoting $\Sigma(\alpha)$ is therefore subject to the linking principles for process nominals, no matter whether α is a process itself.

(49) Pluralization, Situation Type and Argument Structure

i If α is the denotatum of a singular event nominal NOM-*ung* in the domain D_{ev} of events, then Plur (NOM-*ung*) denotes an eventive plurality $\Sigma(\alpha)$ in the domain D_{proc} of processes.

ii Plur (NOM-*ung*) is subject to the linking principles defined forsingular process nominals of type NOM–*ung*.

4 Conclusion

In this paper, I discussed the interaction between situation type and thematic structure of –*ung*-nominalizations. I argued that, whereas singular *-ung*-nominals share the situation type of their base verb, plurals always behave like process nominals. This has consequences with respect to argument structure. Singular nominals derived from change-of-state-verbs and the corres-ponding plurals show different linking patterns. While singular event nominalizations always give priority to the lowest argument of the inchoative component, their plurals share the linking pattern of singular process nominals and give equal priority to AGENT or PATIENT/THEME. This regularity conforms to the linking principles suggested in Ehrich & Rapp (2000).

The evidences discussed so far have been reconstructed as properties inherent to the nominal grammar in German. Is this the only way to interpret the results? Wouldn't it be more convincing to argue instead that the interpretation of the adnominal genitive is not rooted in grammar, but in the conceptual system?[9]

Reference to conceptual reasoning may provide a nice explanation for the asymmetries between process nominals (= nominalizations of activities) on the one hand and event nominals (= nominalizations of accomplishments or achieve-ments) on the other hand. If we refer to an ongoing activity, both participants, AGENT and PATIENT/THEME are equally important: ignoring one of them makes us miss a relevant part of what is going on. In reference to a change of state (=event), it's much more relevant to be aware of what happens to the entity undergoing the change. This might be the reason why post-nominal genitives accompanying process nominals are ambiguous between AGENT and PATIENT/THEME readings, whereas genitives adjoined to event nominals unambiguously refer to PATIENTs/THEMEs.

There is, furthermore, good evidence that genitives complementing nominalizations in

[9] The architecture of a two-level approach to meaning consisting of a conceptual and a semantic subsystem originally developed in Bierwisch (1983) and Bierwisch & Lang (1987) is outlined in further detail in Wiese (2002).

German aren't even arguments at all, but must be considered argument adjuncts in the sense of Grimshaw 1990, which is to say that German unlike English nominalizations never have argument structure, not even when they denote complex events (see sect. 1.2). This conclusion nicely fits the fact that obligatory verb arguments are optional, when showing up in nominalized constructions.

In this view, the nominal linking rules (NLP) introduced in section 2.2 above, have to be reconsidered as maxims guiding the conceptual interpretation of a given nominal. This doesn't make the evidences presented obsolete, but attributes a different theoretical status to them: they are facts not of the grammatical, but of the conceptual system.

Why then insist on the grammatical nature of the NLPs? The point is that the rules/maxims determining the thematic interpretation of post-nominal genitives only pertain to nominalizations with affix *–ung*. Implicit derivations (zero-con-versions) as well as infinitival conversions behave differently with respect to thematic interpretation (see section 2.2). This indicates that NLP (30) cannot be rooted in the conceptual system. If it were, the derivation type shouldn't make a difference. The very fact that it does suggests that the NLPs introduced above form part of the grammar of *–ung*.

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Nominalizations and Temporal Prepositions[1]

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Abstract

In this paper, we deal with the semantic interaction between *ung*-nominalizations of different event types and temporal prepositions like *während* 'during', *vor* 'before', *nach* 'after', *bis* 'until' and *seit* 'since'. According to the two-level-approach to semantics (Bierwisch 1983, Bierwisch / Lang 1989), we will argue that the meaning of temporal prepositions is determined on the level of semantic form (SF). When combined with an event nominal, the period in time required by the preposition has to be inferred on the level of conceptual structure (CS). Very often, the exact nature of the period in time is determined by pragmatic factors. There are, however, some important restrictions to this inference procedure which rely on the event noun's Aktionsart. In Ehrich/Rapp (2000), it was claimed that eventive *ung*-nominals inherit the Aktionsart of their base verb. This assumption receives strong support by the data presented in this paper.

1 Introduction

Event nominalizations, as being derived from verbs, share the event structure of their base and thus denote activities, accomplishments, achievements or states. They may function as arguments of temporal prepositions, accordingly (1).

(1) a. Während seiner Krankheit — lernte Jonathan Schach spielen.
During his illness — Jonathan learned to play chess.

b. Bei der Erreichung des Gipfels — jubelten die Bergsteiger.
When reaching the summit — the mountaineers shouted with joy.

(2) a. Vor der Vernehmung des Zeugen — studierte der Richter die Akten.
Before the examination of the witness — the judge studied the files.

b. Nach der Zerstörung der Stadt — zogen die Eroberer weiter.
After the destruction of the city — the conquerors marched on.

(3) a. Bis zur Behandlung durch einen Arzt — muss der Patient noch warten.
Until being treated by the doctor — the patient has still to wait.

b. Seit der Absperrung des Geländes — parken hier keine Autos mehr.
Since the barring off of the site — there are no more cars parking here.

Temporal prepositions require calendaric or eventive complements. This requirement is so strong that they even coerce an event reading onto non-eventive base nouns.

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(4) a. Während der Dias bin ich eingeschlafen / Während die Dias gezeigt wurden...
During the slides I fell asleep / While the slides were presented...

b. Bei einem Glas Wein kamen sie sich näher / Als sie ein Glas Wein tranken...
Over a glass of wine they got closer / When having a glass of wine

c. Vor seinem Buch war Hans weithin unbekannt / Bevor das Buch veröffentlicht wurde....
Before his book John was widely unknown /Before the book got published...

d. Nach der Autobahn begann es zu schneien / Nachdem wir die Autobahn verlassen hatten...
After the highway it began to snow / After we had left the highway...

e. Vor dem Doktor kommt erst der Magister / Bevor man den Doktorgrad erwerben kann...
Before the doctor's degree comes the master's degree / Before one can obtain a doctor's degree...

f. Seit dieser Pizza ist mir schlecht / Seit ich diese Pizza gegessen habe....
Since this pizza I feel sick / Since I have eaten this pizza...

In virtue of being nouns, nominalizations are necessarily untensed and thus do not specify relational time information. Whether the event referred to by a nominal is anterior/posterior to the speaking time or overlapping with it has to be inferred from encyclopedic knowledge (5a) or from temporal modifiers combining with the noun in question (5b).

(5) a. die Ermordung Cäsars
the murder of Cesar

b. die gestrige Aufführung der Oper
yesterday's performance of the opera

The matrix verb and its tense are another source for the temporal interpretation of a nominal. Tense as used in (6) tells us that the flight to the North Pole is in the future (6a) or in the past (6b).

(6) a. Der Flug zum Nordpol wird Spaß machen.
The flight to the North Pole will be fun.

b. Der Flug zum Nordpol machte Amundsen berühmt.
The flight to the North Pole was the source of Amundsen's fame.

A given tense, however, does not always provide an unequivocal temporal interpretation for a nominal in its scope.

(7) a. Vor der Messung der Schadstoffbelastung wurde das Messgerät repariert.
Before the measuring of the pollution, the gauge was repaired.

b. Vor der Messung der Schadstoffbelastung konnte das Grundstück nicht verkauft werden.

Before the measuring of the pollution, the site could not be sold.

(7a) relates the repair of the gauge to the time at which the measurement is carried out. (7b) relates the selling of the site to a time after the measurement has been completed. The temporal information conveyed by (7a) corresponds to the information provided by a simple past (8a); the temporal information conveyed by (7b) corresponds to a past perfect (8b).

(8) a. Bevor die Schadstoffbelastung gemessen wurde,...
Before the pollution was measured, ...

b. Bevor die Schadstoffbelastung gemessen worden war,...
Before the pollution had been measured, ...

This kind of ambiguity is typical for nominals denoting accomplishments. It does not arise in cases where the nominal refers to an activity or a state[2].

(9) a. Vor der Belagerung der Stadt entkamen die Einwohner aufs Land.
Before the siege of the city, the inhabitants escaped to the countryside.

b. Vor seiner Krankheit trieb Jonathan viel Sport
Before his illness, Jonathan did a lot of sports.

The inhabitants' escape precedes the onset of the siege in (9a), the time, when Jonathan was doing a lot of sports is anterior to the outburst of his illness in (9b); there is no pluperfect paraphrase possible (10).

(10) a. Bevor die Stadt belagert wurde,... / *Bevor die Stadt belagert worden war
Before the city got besieged,... / Before the city had got besieged, ...

b. Bevor er krank war, ... / *Bevor er krank gewesen war
Before he was ill,... / Before he had been ill,...

The interaction between *ung*-nominalizations of different event types and temporal prepositions is the main issue of this paper. In particular, we examine the interrelations between the selectional restrictions of the preposition and the Aktionsart of its event complement. In Ehrich/Rapp (2000), it was claimed that *ung*-nominalizations preserve the Aktionsart of their base verb. This assumption is supported by the data presented in this paper: We will show that the distinction between activities, achievements, accomplishments and states plays an important role for the combination of *ung*-nominalizations with temporal prepositions. *Während* 'during', for instance, requires protracted events, achievement nominals are not allowed. In other cases the selectional requirements of the preposition induce an inference: if a 'punctual' preposition like *vor* 'before' or *nach* 'after' takes a protracted event as its complement we have to infer the delimiting point in time required by the preposition. Often, the exact nature of the delimiting point can only be determined by pragmatic factors – however, there are some important restrictions to pragmatic reasoning which rely on the event noun's Aktionsart. The selectional requirements imposed by the prepositions can only be explained if we assume that an *ung*-derivation does not alter the Aktionsart of the base verb.

[2] In this paper, we restrict ourselves to states situated in space and time. States of this kind are denoted by stage level predicates. We won't take into account non-situative states denoted by individual level predicates / state-zero-predicates in the sense of Klein (1994). (Cf. also Ehrich 1992, Rapp 1996, Maienborn 2001)

We will proceed as follows. In section 2 we consider temporal prepositions like *in* 'in', *um* 'at', and *während* 'during', which lexicalize an inclusion relation between an event and a time span. In 3 we investigate the prepositions which express that an event is anterior (*vor* 'before', *bis* 'until') or posterior (*nach* 'after', *seit* 'since') to a point in time.

2 Temporal Inclusion between THEME and RELATUM

According to the two-level-approach to semantics (Bierwisch 1983, Bierwisch / Lang 1989), the meaning of a linguistic expression (in our case, the meaning of a temporal preposition) is determined on the level of semantic form (SF), whereas its reference is resolved on the level of conceptual structure (CS). SF-information specifies the contextually invariant meaning of a given lexical item, including its decomposition into sublexical atomic predicates and its argument structure. On the level of SF, a lexical entry (LE) of a given language is assigned an abstract semantic structure underlying each occurrence of LE – independent of the context in which it is used. CS provides a rich base of knowledge which specifies linguistic as well as extra-linguistic information, including pragmatic (Gricean) principles of utterance interpretation, information about the specific context in which LE is used as well as encyclopaedic information about natural laws or cultural stereotypes.

Prepositions express a relation between a THEME and a RELATUM. Spatial prepositions like *in* relate the place of a THEME object to the PLACE of a RELATUM object (cf. Bierwisch 1988, Herweg 1989, Klein 1990):

(1) a. The wallet is in the bag.
THEME:x RELATUM:y

b. in
$\lambda y\, \lambda x$ [PLACE (x) $\subseteq$ PLACE (y)]

Temporal prepositions express a relation between the event time of a THEME situation e and a RELATUM time T. The abstract semantic form of a temporal preposition is given in (2).

(2) $PREP_{temp}$
$\lambda T\, \lambda e$ [Temp (e) ***R*** T]

Temporal *in* locates the time of the THEME event within a given RELATUM time T, where T is a calendaric-time-denotation (3).

(3) a. Im nächsten Jahr/im nächsten Monat/in dieser Woche wird Jonathan zwanzig.
Next year/next month/this week, Jonathan will turn twenty.

b. in_{Temp}
$\lambda T\, \lambda e$ [Temp (e) $\subseteq$ T]

The meanings of *um* ('at') and *während* ('during') are similar to that of temporal *in*, except that *um* requires a point in time and *während* requires a protracted period of time as RELATUM.

(4) a. Jonathan rief um drei Uhr mittags an.
Jonathan called at 3 p.m.

b. Jonathan rief während der Ferien an.
Jonathan called during the holidays.

(4') a. um
$\lambda T\ \lambda e$ [Temp (e) = T] where T is a calendaric point in time

b. während
$\lambda T\ \lambda e$ [TEMP (e) $\subseteq$ T] where T is a protracted period in time

One could argue that in the case of *während* the relation between THEME and RELATUM does not have to be proper inclusion. The following examples seem to indicate just an „overlap" relation:

(5) a. Während der Ferien arbeitete sie in der Fabrik, (und danach auch noch).
During the holidays she worked in the factory, and did so still afterwards

b. Während der Ferien war sie krank, (und zuvor auch schon).
During the holidays she was ill, and she had already been ill before

However, if we have a closer look at the examples we notice that an „overlap" relation is only possible if the THEME event is an activity or a state. Accomplishment and achievement THEMEs have to be included in the RELATUM:

(6) a. Während der Ferien las sie ein Buch.
During the holidays she read a book.

b. Während der Ferien brach sie sich ihr Bein.
During the holidays she broke her leg.

It is a well-known fact that homogeneous events (activities and states) are distributive in nature. An activity/state which is included in a certain time interval may be part of a bigger event of the same type overlapping with this specific interval. Hence, we may generalize that *während* **always** expresses an inclusion between THEME and RELATUM: Activities and states – as they are homogeneous – may however be subparts of larger events going beyond this interval.

Let us turn to the specific nature of the RELATUM and especially to the question, whether an event noun can appear as RELATUM. Interestingly, *in* and *um* only occur with calendaric time specifications, event nominals are excluded. *Während* and *bei,* on the other hand, allow for an event noun as RELATUM (7).

(7) a. Während der Hochzeit betrank sich der Brautvater.
During the wedding celebration, the bride's father got drunk.

b. Bei der Hochzeit betrank sich der Brautvater.
At the wedding celebration, the bride's father got drunk.

(7a) asserts that the bride's father got drunk at some time during the wedding party. World knowledge suggests that the father of the bride usually takes part in the wedding party. Thus, both (7a) and (7b) can be truthfully asserted about a situation where the bride's father got drunk while attending the wedding party. This, however, does not follow from the meaning of *während* ('during') repeated in (8); (7a) may be true, even when the bride's father did not take part in the wedding party and got drunk at a different occasion covering a subintervall of the wedding party time.

(8) während ('during')
$\lambda T\ \lambda e$ [Temp (e) $\subseteq$ T], where T is the event time of a protracted event

(7b), on the other hand, does entail that the bride's father took part in the wedding party. The difference between *während* and *bei* is evident in (9), where (9a) says that Jonathan earned a lot of money at a time when he was a student of German, whereas (9b) tells us that studying German was the source of Jonathan's earning money.

(9) a. Während seines Germanistik-Studiums hat Jonathan viel Geld verdient.
While studying German, Jonathan earned a lot of money.

b. Bei seinem Germanistik-Studium hat Jonathan viel Geld verdient.
By studying German, Jonathan earned a lot of money.

Spatial *bei* ('at') locates the place of the THEME object in the proximal neighbourhood of the place of the RELATUM. (10a) tells us that the car is parked near the church, (10b) says that the chair occupies a place close to the place of the desk.

(10) a. Das Auto parkt bei der Kirche.
The car is parked near the church.

b. Der Stuhl steht beim Schreibtisch.
The chair is located close to the desk.

Bei as opposed to *an* indicates that THEME and RELATUM are close neighbours in terms of their respective locations, but are not related to each other in any specific way beyond spatial proximity. (10b) is, for instance, inappropriate with respect to a situation where the chair is placed in the working space of the desk (see Lang 1993) for more detail).

(11) bei_{LOC}
$\lambda y\ \lambda x$ [PLACE (x) $\subseteq$ (PROX (y) - PLACE (y))][3]

Eventive *bei* is different in that the THEME event is part of the RELATUM event. Actually, eventive *bei* denotes a mereological (part-whole) relation between THEME and RELATUM[4].

(12) $\text{bei}_{\text{Event}}$ ('at')
$\lambda e'\ \lambda e$ [e' $\subseteq$ e] where e is an eventuality of any type

This semantic representation is supported by the fact that *bei* – in contrast to *während* – never takes a purely temporal expression as its RELATUM (**bei den Ferien* 'at the holidays', **bei der nächsten Woche* 'at the next week'): eventive *bei* does not express a relation between times, but between events. The temporal relation expressed by *bei* in (7,9) is indirect (13).

(13) $\forall$ e' $\forall$ e $\exists$ t' $\exists$ t [e' $\subseteq$ e & t'= Temp (e') & t = Temp (e) $\rightarrow$ t' $\subseteq$ t]

[3] *Bei* locates the THEME in the proximal neighbourhood of the RELATUM, but excludes from PROX (y) the space covered by the RELATUM itself.

[4] A similar usage of spatial *bei* is to be found in examples like *Fritz ist beim Bäcker* ('Fritz is at the bakery'), where the place of the THEME is included in the place or RELATUM.

Both *während* and *bei* impose specific restrictions on the RELATUM event. *Während* requiring a protracted event as complement can be combined with nominalizations of state, activity or accomplishment verbs, but is deviant with nominalizations of achievement verbs:

(14) a. State
Während seiner Krankheit blieb Jonathan zu Hause.
During his illness, Jonathan stayed at home.

b. Activity
Während der Befragung des Zeugen trank der Polizist Kaffee.
During the questioning of the witness, the policeman drank a cup of coffee.

c. Accomplishment
Während der Zubereitung des Essens trank sie ein Glas Sherry.
During the preparation of the meal, she had a glass of sherry.

d. Achievement
*Während der Erreichung des Gipfels jubelten die Bergsteiger.
During the reaching of the summit, the mountaineers shouted with joy.

The same restriction holds for the conjunctional counterpart of *während*. However, the temporal conjunction *während* allows a re-interpretation as an adversative conjunction when combined with an achievement verb (15). A re-interpretation of this kind is impossible for prepositional *während* in combination with an event nominal.

(15) a. Während Arved den Südpol erreichte, blieb Reinhold im Camp zurück.
While Arved reached the South Pole, Reinhold remained behind in the camp.

b. Während Jonathan eine Anstellung fand, blieb Ferdinand arbeitslos.
While Jonathan found himself a job, Ferdinand was still unemployed.

Bei, in contrast to *während*, can combine with nominalizations of achievement verbs (16a). Due to its mereological meaning, *bei* requires the THEME to be part of the RELATUM. This is why (16b) is ungrammatical. Staying at home is a state accompanying an illness, but it is not part of the illness.[5]

(16) a. Bei der Erreichung des Gipfels jubelten die Bergsteiger.
When reaching the summit, the mountaineers shouted with joy.

b. *Bei seiner Krankheit blieb Jonathan zu Hause.
When he was ill Jonathan stayed at home.

Während expressing a relation between times can be used where THEME and RELATUM are just temporally coincident (17a). *Bei* expressing a mereological relation between events requires that THEME and RELATUM overlap in time as well as with respect to at least one of the protagonists involved (17b).

(17) a. Während der Sprengung seines Hauses saß der Eigentümer ahnungslos in der Oper.

[5] There is also an emphatic use of *bei* in sentences like *Bei deiner Krankheit solltest du im Bett bleiben* ('Seen the fact that you are so ill, you should stay in bed') (personal comment by Ewald Lang).

During the blowing-up of his house, the owner was sitting unsuspecting in the opera house.

b. *Bei der Sprengung seines Hauses saß der Eigentümer ahnungslos in der Oper.
At the blowing-up of his house, the owner was sitting unsuspecting in the opera house.

To summarize: *In*, *um*, *während* and *bei* all lexicalize an inclusion relation between THEME and RELATUM. *In* and *um* only occur with proper time phrases. *Während* is also a genuine temporal preposition expressing mere inclusion of the thematic time into the RELATUM time; it can however take a protracted event or state nominal as its RELATUM. *Bei* expresses a mereological relation between events. As a consequence, the temporal interpretation conveyed by *bei* is only indirect, mediated by the fact that an event e' which is part of an event e covers a subsection of the event time covered by e.

3 Anteriority and Posteriority

In this section, we treat the prepositions *vor* 'before', *nach* 'after', *bis zu* 'until' and *seit* 'since', which locate the THEME at some time anterior or posterior to the RELATUM. This RELATUM is either given by the denotatum of a calendaric TADV or by the time of an event:

(1) a. Jonathan reiste vor Montag / vor der Tagung ab.
John left before Monday / before the conference.

b. Ich traf J. nach 5 Uhr / nach der Tagung.
I met J. after 5 o'clock / after the conference.

c. Jonathan las bis 5 Uhr / bis zu der Aufführung.
Jonathan. was reading until 5 o'clock / until the performance.

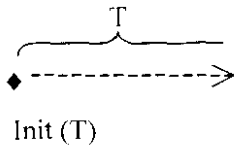
d. Jonathan wartete seit Mitternacht / seit der Explosion.
Jonathan was waiting since midnight / since the explosion.

Our claims are the following: We assume that *vor/nach/bis/seit* temporally locate the THEME event by reference to a point in time, which we call the **delimiting point**. The relation between this delimiting point and the THEME event is lexically specified for each preposition and will be formalized below (3.1). The delimiting point is introduced by the RELATUM. Things are easy if the RELATUM is given by a punctual TADV like *fünf Uhr* 'five o'clock' – however, if the RELATUM is a time span or a protracted event, the relevant point in time has to be inferred from contextual knowledge. We will show in 3.2 that the relevant inference procedure crucially depends on the Aktionsart for event nominals, and that it does not always yield unambiguous results. Hence, we claim that it is only the relation between the THEME and the delimiting point that is lexically specified for each preposition. The delimiting point itself has to be deduced by event structure based inference rules.

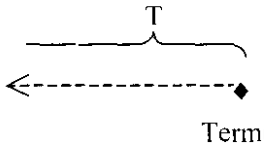
3.1 The lexical meaning of the prepositions: The relation between the THEME event and the delimiting point

To account for the specific meaning of each preposition we have to introduce some notions of interval semantics. Any event e spans over a given time interval T. T is a closed interval, iff it is initially as well as terminally closed.

(2) Initial Closure: Init (T) is the initial closure of T, iff
   a. Init (T) $\subseteq$ T and
   b. $\forall t\,[t \subseteq T \,\&\, t \neq \text{Init}(T) \rightarrow t > \text{Init}(T)]$



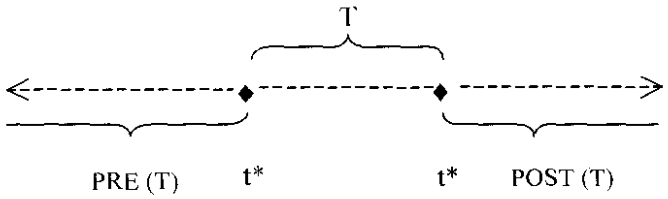
(3) Terminal Closure: Term (T) is the terminal closure of T, iff
   a. Term (T) $\subseteq$ T and
   b. $\forall\, t\,[t \subseteq T \,\&\, t \neq \text{Term}(T) \rightarrow t < \text{Term}(T)]$



An interval is semi-closed, iff it has either an initial or a terminal closure, but not both. An interval is open, iff it is neither initially nor terminally closed. If T is a point in time, it coincides with both its initial and its terminal closure.

For any closed interval T, there is a PRE-TIME T' of T and a POST-TIME T'' of T, such that T' and T'' are separated from T by a **delimiting point t*.**

(4)



(5) DELIMITING POINT: t* is the delimiting point between two subsequent intervals T' and T, iff $t^* \subseteq \text{Term}(T') \cap \text{Init}(T)$ and $\neg\exists t\,[t \neq t^* \,\&\, t \subseteq \text{Term}(T') \cap \text{Init}(T)]$

(6) PRE-TIME: T' is the Pre-Time of T (T' = PRE (T)), iff
   i. $\exists\, t^*\,[t^* \subseteq \text{Term}(T') \cap \text{Init}(T)]$ and
   ii. $\forall\, t'\,[t' \subseteq T' \,\&\, t' \neq t^* \rightarrow t' < t^*]$ and
   $\forall\, t\,[t \subseteq T \,\&\, t \neq t^* \rightarrow t > t^*]$

(7) POST-TIME: T'' is the Post-Time of T (T'' = POST (T)), iff
   i. $\exists\, t^*\,[t^* \subseteq \text{Term}(T) \cap \text{Init}(T'')]$ and
   ii. $\forall\, t''\,[t'' \subseteq T'' \,\&\, t'' \neq t^* \rightarrow t'' > t^*]$ and
   iii. $\forall\, t\,[t \subseteq T \,\&\, t \neq t^* \rightarrow t < t^*]$

These definitions guarantee that semi-closed intervals possess a clearly defined PRE-/POST-TIME by picking out the first / last point in time as the delimiting point.

Temporal *vor* locates the event under discussion within the PRE-TIME of the RELATUM-Time T. *Nach* locates Temp (e) within the POST-TIME of the RELATUM-Time T.

(8) vor ('before'): $\lambda\, T\, \lambda\, e\,[\text{Temp}(e) \subseteq \text{PRE}(T)]$

nach ('after'): $\lambda T \lambda e [Temp(e) \subseteq POST(T)]$

We tend to understand *vor / nach* as locating the THEME in proximal distance to the onset or termination of the RELATUM, which implies that J. arrived no later than 10 o'clock in (9a) and shortly before the beginning of the conference in (9b):

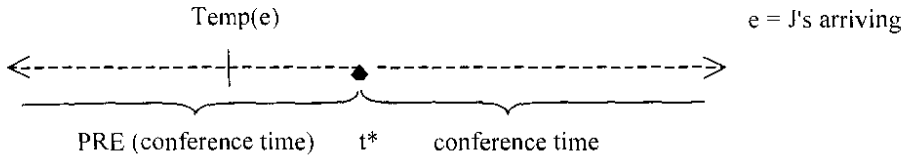
(9) a. Jonathan kam nach 9 Uhr an.
John arrived after 9 o'clock.

b. Jonathan kam vor der Tagung an.
John arrived before the conference.

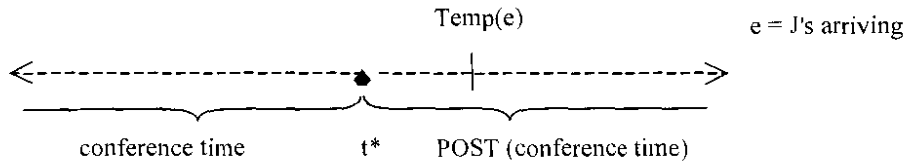
This understanding, however, is not part of the semantic meaning of *nach / vor*, but recurs to pragmatic reasoning. (9a) induces a scalar implicature in terms of the first maxim of quantity ('Say as much as necessary'): if a speaker uttering (9a) had wished to convey the message that Jonathan arrived after 10 o'clock he could have said so. Hence, the SF-representation of *vor / nach* just tells us that the THEME is located before or after a delimiting point T – it does not tell us anything about the distance to this point.

Telic THEME events have to be closed within PRE (T) or POST (T) respectively. In the case of achievements, the event time Temp (e) coincides with its initial as well as with its terminal closure.

(10) a. Jonathan kam vor der Konferenz / vor sieben an.
Jonathan arrived before the conference / before seven.

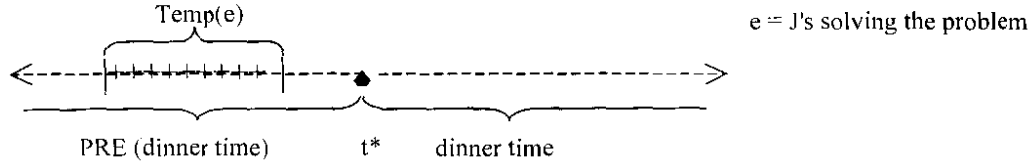


b. Jonathan kam nach der Konferenz / nach sieben an.
Jonathan arrived after the conference / after seven.

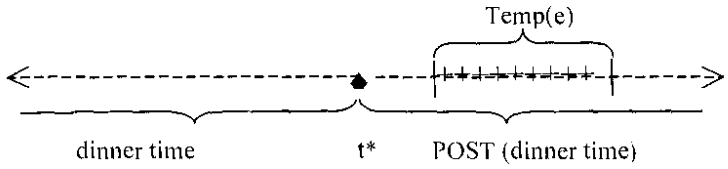


Accomplishments denote a protracted event that is initially **and** terminally closed in the PRE- or POST-TIME of the RELATUM:

(11) a. Er löste das Problem vor dem Abendessen / vor sieben.
He solved the problem before dinner / before seven.



b. Er löste das Problem nach dem Abendessen / nach sieben.
He solved the problem after dinner / after seven.



One might argue that in the case of (11b), the accomplishment could have its onset before the delimiting point: If someone solves a problem after seven, he could have started to think about it before seven. However, we assume that this thinking process is not part of the solving procedure, but belongs to a preparatory stage. If we take an accomplishment with incremental THEME (12), we easily notice that the whole event starts after the delimiting point:

(12) a. Er aß den Apfel nach dem Abendessen.
He ate the apple after dinner.

b. Sie malte das Bild nach 8 Uhr.[6]
She painted the picture after 8 o'clock.

If the event under consideration is an activity (13a,c) or a state (13b,d), its event time may span a period extending beyond the delimiting point t*.

(13) a. Vor sieben Uhr morgens / vor dem Frühstück spielte Jonathan Flöte.
Before seven a.m. / before breakfast Jonathan played the flute

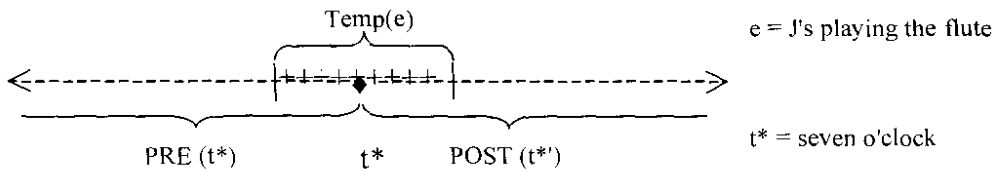
b. Vor sieben Uhr morgens / vor dem Frühstück saß Jonathan am Schreibtisch .
Before seven a.m./ before breakfast Jonathan was sitting at his desk.

c. Inge sprach mit Walter nach Mitternacht / dem Frühstück.
Inge talked to Walter after midnight / after breakfast.

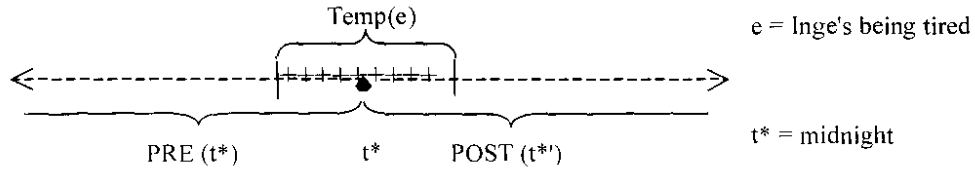
d. Inge war nach Mitternacht / dem Frühstück müde.
Inge was tired after midnight / after breakfast.

(13a) can be truthfully asserted about a situation where Jonathan began playing his flute before seven and finished doing so after seven. (13d) is true, if Inge was tired after breakfast, no matter whether she had been tired even before that:

(14)



[6] It is interesting to notice the difference to *aufessen, fertigmalen / vollenden* ‚achieve':
(i) Sie aß den Apfel nach dem Abendessen auf.
She finished the apple after dinner.
(ii) Sie vollendete das Bild nach 8 Uhr.
She accomplished the picture after 8 o'clock.
Here, the eating or painting event is likely to have started before dinner / before 8 o'clock; it is just the moment of finishing the apple / completing the picture that takes place after 8 o'clock.



This is consistent with the semantics given in (8). (13a) conveys an assertion about J's playing the flute at some time before seven. It does not follow that he stops doing so before seven. Due to the fact that playing the flute is a homogeneous event, e may have a continuation within a time period that extends to the time after seven. Again, it is due to pragmatic reasoning that we tend to understand these utterances in a more restricted way: if someone tells us that Inge had spoken with Walter after breakfast, there is a conversational implicature that she started doing so after breakfast. However, this is not part of the semantic meaning conveyed by the sentence.

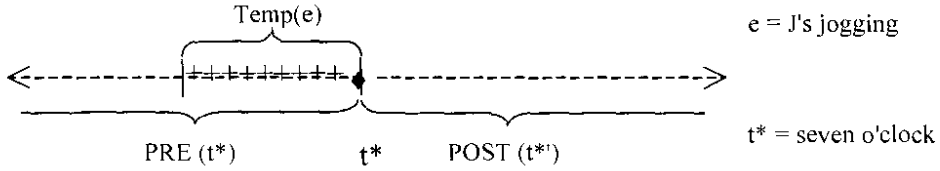
Bis (zu)[7] and *seit* share the relational information conveyed by *vor / nach* in that they also locate the THEME within the PRE-TIME / POST-TIME of the RELATUM.

(15) a. Jonathan joggte bis sieben Uhr.
Jonathan was jogging till seven o'clock.

b. Jonathan joggte seit sieben Uhr.
Jonathan was jogging since seven o'clock.

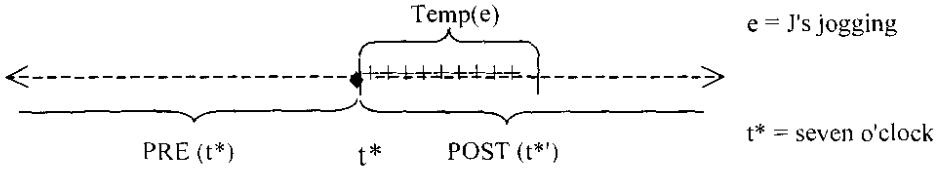
(15a) asserts that the time of Jonathan's jogging lasted (at least) till seven, (15b) that it least included the time immediately after seven. *Bis (zu)* T denotes a semi-open interval in PRE (T) including the terminal closure of PRE (T).

(16) bis (zu)
λ T λ e [Temp (e) $\subseteq$ PRE (T) & Temp (e) $\supseteq$ t*], where
e is a homogeneous event and t* is the delimiting time between PRE (T) and T.



Seit T denotes a semi-closed subsection of the POST-TIME including the initial closure of POST (T):

(17) seit[8]
λT λe [Temp (e) $\subseteq$ POST (T) & Temp (e) $\supseteq$ t*] where
e is a homogeneous event and t* is the delimiting time between POST (T) and T



[7] Note, that *bis* is replaced by *bis zu* when combined with determiner plus count noun – we consider this to be an allomorphy without semantic consequences.

[8] *Seit*, in fact, is more complicated than the other prepositions. For our purposes, however, it is enough to say that *seit* needs a punctual left side boundary as its RELATUM and a homogeneous THEME event.

Both *bis zu* and *seit* require homogeneous situations (states, activities) as THEMEs.

(18) a. Inge bleibt bis morgen zu Hause.

Inge stays at home until tomorrow.

b. Inge arbeitete bis zu der Konferenz an ihrem Vortrag.
Inge worked on her talk until the conference.

c. #Inge schreibt ihr Papier bis zu der Konferenz.
Inge writes her paper until the conference.

d. #Bis zum Abend kommt das Paket an.
Until the evening, the parcel arrives.

(19) a. Walter ist seit seinem Vortrag zu Hause.
Walter is at home since his talk.

b. Walter redet seit Mitternacht.
Walter is talking since midnight.

c. #Seit der Konferenz schreibt Walter sein Papier.
Walter is writing his paper since the conference.

d. *Seit sieben Uhr kommt der Zug an.
Since seven o'clock, the train arrives.

(18c, d) are not strictly ungrammatical; accepting them, however, presupposes a re-interpretation of the matrix predicates as referring to the state resulting from Inge's writing the letter / from the package's arrival (18').

(18') c. Inge wird ihr Papier bis zu der Konferenz geschrieben haben.
Inge will have written her paper until the conference.

d. Das Paket wird bis zum Abend angekommen sein.
The parcel will have arrived until the evening.

In the case of *seit*, accomplishments allow a re-interpretation in the sense of (19'). For achievements no such re-interpretation is possible.

(19') c. Seit der Konferenz arbeitet Walter an seinem Papier.
Since the conference, Walter is working on his paper.

d. *Seit sieben Uhr ist der Zug dabei, anzukommen.
Since seven o'clock, the train is arriving.

As *bis* and *seit* only occur with homogeneous situations (activities and states), the THEME event can always go on beyond the delimiting point:

(20) a. Inge und Walter redeten miteinander bis Mitternacht.
Inge and Walter talked to each other till midnight.

b. Inge und Walter redeten miteinander seit Mitternacht.
Inge and Walter talked to each other since midnight.

Being told that Inge and Walter talked to each other till midnight makes us infer that they stopped talking at midnight. Again, this inference is based on pragmatic reasoning (principle of relevance). A speaker telling us (20a) in reference to a situation where, in fact, Inge and Walter kept talking at midnight and afterwards, would refer to a temporal borderline of no relevance to the message conveyed.

To summarize: According to the two-level-approach to semantics, the representation of *vor, nach, bis (zu)* and *seit* just includes the contextually invariant meaning: *Vor/bis (zu)* on the one hand and *nach/seit* on the other hand locate the time of the THEME event before or after some delimiting point respectively. Furthermore, *bis (zu)* and *seit* require the THEME event to extend up to this point. Everything else is given by pragmatic (Gricean) principles, especially the principle of relevance. According to this principle, the expression of a temporal borderline should be relevant; a homogeneous THEME event is usually not considered to be part of a bigger event which extends beyond the delimiting point, accordingly. In the case of *vor / nach* the same principle makes us conclude that the THEME is in proximal distance to the RELATUM.

The "nature" of the – semantically required – delimiting point is not given by the prepositions either; hence, in the case of a protracted RELATUM it has to be inferred. This inference procedure, however, is not only determined by pragmatic principles: In the next section we will show that it crucially depends on the event structure of the RELATUM.

3.2 *Vor/bis/nach/seit* with event nominals: How to find the delimiting point

We have shown that *vor/bis/nach/seit* always need a point in time to anchor the THEME event. Our claim is that in the case of a protracted RELATUM this delimiting point has to be inferred from the given event structure (*Aktionsart*). Roughly speaking, it is only those event structure points which are conceptually prominent that can be chosen as delimiting points. Hence, the anchoring of temporal prepositions can give us important insights into the relative salience of event structure. In this section, we will concentrate on *ung*-nominals. Sometimes we will also refer to other event or state nouns. First note that the RELATUM event must always be a situation which can be closed.

(21) a. Vor/Bis zu seinem Bankraub war Hans arm.
Before/Until robbing a bank, John was poor.

b. *Vor/Bis zu seiner Klugheit war Hans arm.
Before/Until being wise, John was poor.

c. Nach/Seit dem Lotteriegewinn war Hans glücklich.
After/Since his lottery prize, John was happy.

d. *Nach/Seit seiner Bescheidenheit war Hans reich.
After/Since being modest, John was rich.

An open event with no conceivable closure may not serve as RELATUM as it does not offer a delimiting point. A condition for the use of *vor/nach/bis (zu)/seit* is the possibility of extracting such a point from the RELATUM's event structure. How this point in time is inferred for *vor/bis* on the one hand and *nach/seit* on the other hand will be shown in 3.2.1 and 3.2.2, respectively.

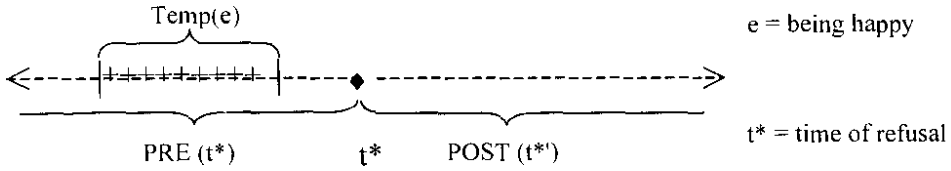
3.2.1 *Vor* and *bis*

Both *vor* and *bis* require a right side boundary for their THEME event. If the RELATUM is an achievement nominalization like *Ablehnung* („refusal") no ambiguities arise. Being telic, achievements have a culmination point: this is the point which corresponds to the resultant state's onset. As achievements lexicalize a punctual change of state, their culmination point and their proper onset coincide. Hence, achievements offer just one point which can be used as a boundary:

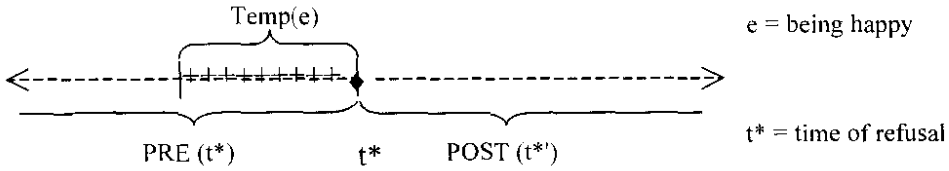
Achievements with *vor* and *bis*:

(23) Vor/bis zu der Ablehnung des Angebots war sie glücklich.
Before/until the offer was refused she was happy.

Delimiting point t* = culmination point
vor:



bis:

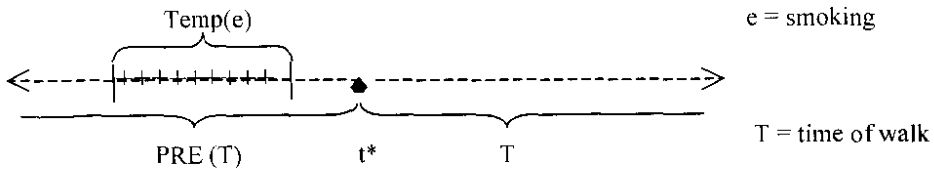


Things get more complicated if the nominal's event structure provides more than one point. In the case of *vor* and *bis*, we are approaching the time of the RELATUM event from the left side. The easiest thing, of course, would be to take the onset of the RELATUM event as delimiting point t*. This seems to hold for activities:

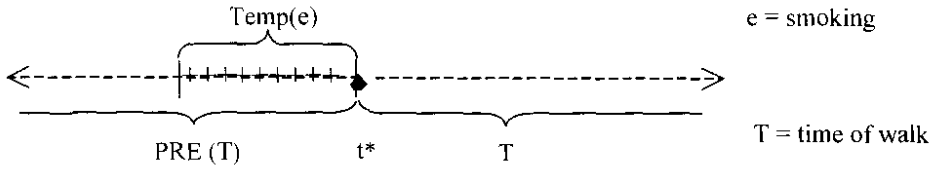
(24) ***vor/bis* with activity nominals:**
a. Vor/bis zu der Verfolgung Öcalans freute sie sich auf die Reise.
Before/until the persecution of Öcalan she was looking forward to the journey.

b. Vor/bis zu der Wanderung rauchte sie.
Before/until the walk she was smoking.

Delimiting point t* = initial closure of the activity:
***vor*:**



***bis*:**



Accomplishment nominals, however, show a different behaviour. We can either choose the onset or the culmination point:

(25) ***vor/bis* with accomplishments:**

a.	Vor/bis zu	der Auswertung der Akten rauchte sie.
	Before/until	the evaluation of the files she was smoking.
a'.	Vor/bis zu	der Auswertung der Akten gibt es keine Klarheit über dieses Problem.
	Before/until	the evaluation of the files nothing is clear about this problem.
b.	Vor/bis zu	der Erbauung der Kathedrale muss das nötige Geld gefunden werden.
	Before/until	the building of the cathedral the necessary money has to be found.
b'.	Vor/bis zu	der Erbauung der Kathedrale war die Stadt total unbekannt.
	Before/until	the building of the cathedral the town was totally unknown.
c.	Vor/bis zu	der Heilung des Patienten meditierte der Arzt.
	Before/until	the patient was cured the doctor was meditating.
c'.	Vor/bis zu	der Heilung des Patienten gab es keine Hoffnung.
	Before/until	the healing of the patient there was no hope.
d.	Vor/bis zu	der Lösung des Problems trank sie Kaffee.
	Before/until	the solution of the problem she was drinking coffee.
d'.	Vor/bis zu	der Lösung des Problems waren alle verzweifelt.
	Before/until	the solution of the problem everybody was desperate.

It depends highly on the context which delimiting point one would actually choose. Normally in (a) one would take the onset, in (a') the culmination point, and so on.

However, one might ask if there are indeed only two readings. In other words: Is it possible to have intermediate readings? In the case of *bis* this seems to be excluded. Consider *bis*-phrases modified by *fast* ('almost'):

(26) a. Sie trank fast bis zur Auswertung der Akten Kaffee.
She was drinking coffee almost until the evaluation of the files.

b. Sie rauchte fast bis zur Lösung des Problems.
She was smoking almostuntil the solution of the problem.

These sentences assert that the THEME event ended just before the RELATUM's onset or just before its culmination point. Other readings are excluded. We may conclude that *bis*-phrases with accomplishment nominals have just two distinct readings.

Things are less evident with *vor*. Here, the THEME event does not have to extend up to the delimiting point t*; it has to happen just some time before t*. Hence, the following sentences seem to be somehow vague:

(27) a. Sie trank vor der Auswertung der Akten Kaffee.
She was drinking coffee before the evaluation of the files.

b. Sie rauchte vor der Lösung des Problems.
She was smoking before the solution of the problem.

c. Meine kleine Tochter malte vor der Auswertung der Akten ein Bild.
My little daughter painted a picture before the evaluation of the files.

d. Der Politiker verschwand vor der Auswertung der Akten.
The politician disappeared before the evaluation of the files.

Obviously, in one reading the coffeedrinking, smoking, painting or disappearing took place some time before the RELATUM's onset. The other reading means that it happened before the culmination point t*. Of course, in this second reading it can have happened at any time before t*: hence, it could have happened before all the intermediate points as well.

At this point it is interesting to consider negation. If *vor* combines a negated THEME event with a TADV we obtain the reading that an event of this kind did not take place before the specific time denoted by TADV:

(28) Vor 5 Uhr rauchte sie nicht.
Before 5 o'clock she did not smoke.

Now, if the RELATUM is an accomplishment nominal, there are definitely only two readings. The onset and the culmination point – but no intermediate points – can be taken as delimiting point:

(29) Vor der Auswertung der Akten rauchte sie nicht.
Before the evaluation of the files she did not smoke.

There is a similar effect if we use adverbials indicating that the THEME event does not end before the delimiting point:

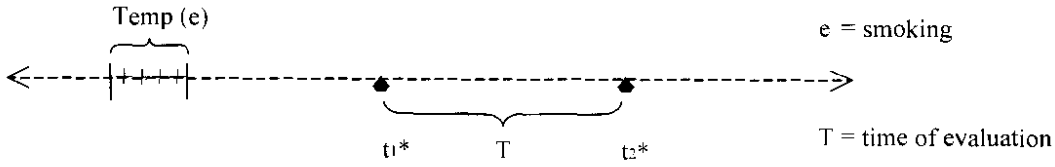
(30) a. Ich rauchte vor der Auswertung der Akten pausenlos.
I smoked non-stop before the evaluation of the files.

b. Vor der Lösung des Problems rauchte sie pausenlos.
Before the solution of the problem she smoked non-stop.

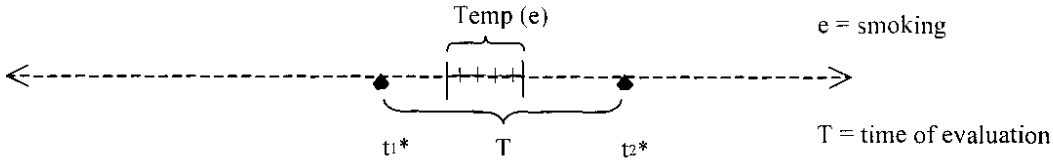
We conclude that there is a real ambiguity, if a *vor/bis*-PP takes an accomplishment nominal as its RELATUM. This ambiguity is shown in the following diagrams – the paraphrases of e1, e2 and T correspond to (25a):

(31) ***vor*:**

variant (i)

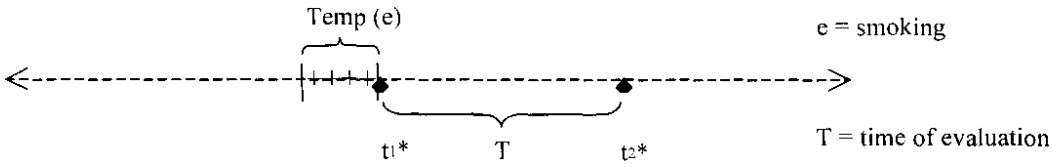


variant (ii)

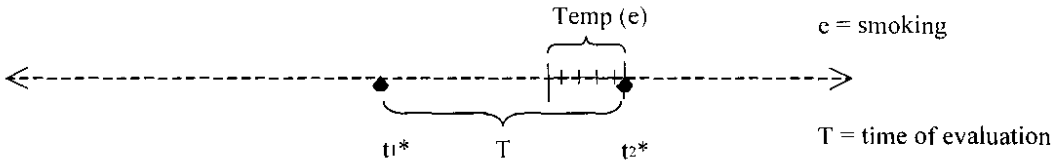


(32) ***bis*:**

variant (i)



variant (ii)



In the case of activity RELATA, on the other hand, there is only one reading. To explain this difference it is helpful to consider the conjunctional counterparts of the prepositions. If they embed a clause with an accomplishment verb, the conjunctions *bevor* and *bis* can always select two anchoring points. These two readings are made explicit by means of tense. The onset reading is indicated by a present/simple past, the culmination point reading by a perfect/past perfect:

(33) a. Bevor man die Akten auswertete,
Before one evaluated the files, ...

a'. Bevor man die Akten ausgewertet hatte,
Before one had evaluated the files, ...

b. Er trank Kaffee, bevor er den Brief schrieb.
He was drinking coffee before he wrote the letter.

b'. Ich gehe nicht, bevor du den Brief geschrieben hast.
I do not go before you have written the letter.

(34) a. Bis man die Akten auswertete,
Until one evaluated the files, ...

a'. Bis man die Akten ausgewertet hatte,
Until one had evaluated the files, ...

b. Maria wartete, bis Peter den Brief schrieb.
M. was waiting until Peter wrote the letter.

b'. Maria wartete mit dem Essen, bis Peter den Brief geschrieben hatte. (Herweg 1990:307 (10c))
M. was waiting with the dinner until Peter had written the letter.

c. Ich wartete hinter der geriegelten Tür, bis man das Donnern einer startenden Maschine hörte.
I was waiting behind the locked door until I heard the thundering of the take-off of a plane.

c'. Ich wartete hinter der geriegelten Tür, bis man das Donnern einer startenden Maschine gehört hatte. (Herweg 1990:308 (12b))
I was waiting behind the locked door until I had heard the thundering of the take-off of a plane.

If used with achievement verbs, both constructions don't really differ in meaning:

(35) a. Ich bedrängte ihn so lange, bis er mein Angebot annahm/angenommen hatte.
I pressurized him until he accepted/had accepted my offer.

b. Ich will dich nicht mehr sehen, bevor du diesen Vorschlag definitiv ablehnst/abgelehnt hast.
I do not want to see you anymore before you refuse/have refused this proposal definitely.

According to Herweg (1990:237), a present perfect/past perfect in *bevor*-clauses is quite rare with achievements; this could be due to its semantic equivalence with a present/simple past. In the case of activities, however, a perfect tense seems to be really deviant:

(36) a. Bevor man Öcalan verfolgte, ...
Before one persecuted Öcalan, ...

a'. ??Bevor man Öcalan verfolgt hatte, ...
Before one had persecuted Öcalan, ...

b. Bis man Öcalan verfolgte, ...
Until one persecuted Öcalan, ...

b'. ??Bis man Öcalan verfolgt hatte, ...
Until one had persecuted Öcalan, ...

Obviously, this deviance is related to the event structure of activities: Whereas accomplishments have a culmination point, activities do not provide a prominent termination which could be used as a limit.

Let us turn again to the corresponding prepositions used with eventive nouns. Here, the intended interpretation cannot be made explicit by tense. Nevertheless, the different readings match with those of the corresponding conjunctional clauses. As we have shown, there are no ambiguities for achievements. Although activity nominals are durative, they do not allow for more than one reading either: Obviously, they provide just one prominent delimiting point: their onset. We conclude that only accomplishments are ambigous with respect to the delimiting point t*: Depending on the context, one can choose either the onset or the culmination point.

Stative RELATA behave like activities. When the temporal conjunctions *bevor/bis* are used with stative verbs, there is always a reinterpretation procedure necessary (cf. Herweg 1990). The most likely case is that the state itself is reinterpreted in an ingressive manner:[9]

(37) a. ?Maria rief an bevor Hans im Bett lag. (Herweg 1990:236 (4b))
M. telephoned before H. was lying in bed.
= Maria telephoned before Hans went to bed.

b. Maria wartete mit dem Essen, bis Peter am Tisch saß. (Herweg 1990:307 (10b))
M. waited with dinner until Peter was sitting at the table.
= Maria waited with dinner until Peter sat down.

Herweg claims that this reinterpretation procedure is due to the fact that the conjunctions *bevor* and *bis* always need a clear-cut point in time (1990:236). We need the same kind of reinterpretation if the corresponding prepositions are used with state nominals:

(38) ***vor/bis* with state nominals:**

a. Vor/bis zu der offiziellen Duldung versteckte Sabine ihr Krokodil.
Before/until the official toleration Sabine was hiding her crocodile.

b. Vor/bis zu der Belagerung verließen Tausende die Stadt.
Before/until the siege thousands left the town.

c. Vor/bis zu ihrer Krankheit war sie ein fröhlicher Mensch.
Before/until her illness she was a cheerful person.

We conclude that stative RELATA are possible, provided they can be reinterpreted in an ingressive manner.[10] Hence, it is quite natural that *vor/bis* occur with resultant-state-

[9] Whereas the conjunction *bis* can only be used with a temporal meaning, Herweg notes that *bevor* is very often reinterpreted in a non-temporal manner. This holds for states as well as for all the other Aktionsarten (cf. Herweg 1990:244 (12)):

(i) Bevor Peter den weiten Weg zu Fuß geht, fährt er (lieber) mit dem Auto.
Before P. walks the long way he (rather) goes by car.

(ii) Bevor ich das glaube, fresse ich (lieber) einen Besen.
Before I believe that I (rather) eat a broom.

Such an interpretation does not seem to be possible for the corresponding preposition *vor*:

(iii) ??Vor einem Ausflug mit dir bleibe ich (lieber) zu Hause.
Before a trip with you I (rather) stay at home.

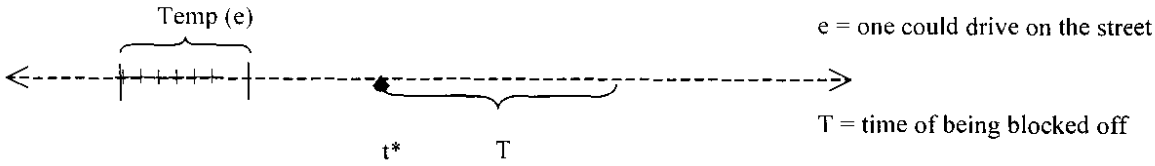
[10] Note that psychological state nouns, being open events without an initial closure, hardly allow for an ingressive reinterpretation:

(i) ??Vor/??Bis zu ihrer Liebe zu Carlo hatte sie keine Probleme.
Before/Until her love to Carlo she had no problems.

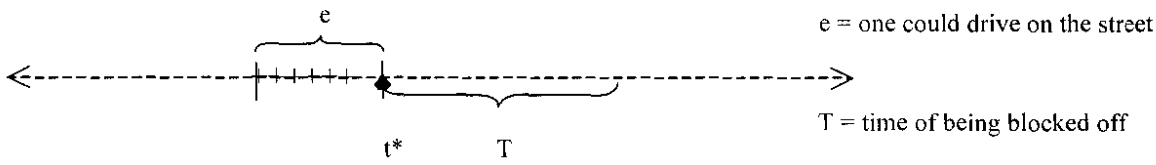
RELATA. Here the delimiting point corresponds to the culmination point of the preceding event.[11]

(39) ***vor/bis* with resultant state nominals:**
Vor/bis zu der dreimonatigen Absperrung konnte man auf der Straße fahren.
Before/until the blocking off which went on for three months one could drive on the street.

(40) ***vor*: Delimiting point t* = culmination point (= onset of the resultant state):**



***bis*: Delimiting point t* = culmination point (= onset of the resultant state):**



Our conclusion is that *vor* and *bis* always need a right side delimiting point. Normally, they take the next one available, e.g. the RELATUM's onset. In the case of accomplishments, however, it is also possible to use the culmination point. This corresponds exactly to the

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(ii) ??Vor/??Bis zu ihrer Bewunderung für den Fernsehstar war sie ganz normal.
Before/Until her admiration for the TV star she was quite normal.

There seem to be some counterexamples like the following:

(iii) Vor/bis zu der Bewunderung des Ausblicks unterhielten sie sich.
Before/until the admiration of the panorama they talked.

(iv) Vor/bis zu der Verehrung der griechischen Götter liebten die Römer Naturgottheiten.
Before/until the worship of the Greek gods the Romans loved gods of nature.

We assume that here the nominals don't refer to real states but to activities; *Verehrung* for example can be understood as the ceremony involved with religious cults. Hence, real psychological state nouns cannot appear as a RELATUM to temporal prepositions. However, we have to leave open why an ingressive reinterpretation seems to be much better for psychological state verbs than for the corresponding nominals:

(v) Bevor/Bis sie Carlo liebte, hatte sie keine Probleme.
Before/Until she loved Carlo she had no problems.

(vi) Bevor/ Bis sie diesen Fernsehstar bewunderte, war sie eigentlich ganz normal.
Before/Until she admired this TV star she was quite normal.

[11] In the case of nouns like *Absperrung* 'blocking off' we distinguish an eventive reading and a resultant state reading (cf. Ehrich/Rapp 2000):

(i) **Event nominalization:**
die um 12 erfolgte Absperrung des Geländes
the blocking off of the area at 12
(punctual time specification)

(ii) **Resultant state nominalization:**
die dreimonatige Absperrung des Geländes
the blocking off of the area for three months
(durative time specification)

conditions for the temporal conjunctions *bevor* and *bis*: An endpoint reading – here indicated by tense – can only be chosen if this end point is provided by the culmination point of the action in question. Obviously, the interpretation for both the prepositional and the conjunctional use is determined by event structure properties of the RELATUM.

3.2.2 *Nach* and *seit*

In contrast to *vor* and *bis*, *nach* and *seit* require a left side delimiting point. What happens if these prepositions take an event nominal as their RELATUM? It is quite clear that it should always be possible to select the termination of the noun's event structure. The question is whether it is also possible to take the onset. Consider *nach* and *seit* with achievements, activities, accomplishments and states:

(41) ***nach/seit* with achievement nominals:**
Nach/seit der Ablehnung des Angebots war sie glücklich.
After/since the refusal of the offer she was happy.

(42) ***nach/seit* with activity nominals:**
Nach/seit der Verfolgung Öcalans waren viele Menschen besorgt.
After/since the persecution of Öcalan many people were worried.

(43) ***nach/seit* with accomplishment nominals:**

a. Nach/seit der Auswertung der Akten trank sie Kaffee.
After/since the evaluation of the files she was drinking coffee.

a'. Nach/seit der Auswertung der Akten war das Problem gelöst.
After/since the evaluation of the files the problem was solved.

b. Nach/seit der Erbauung der Kathedrale klagten die Bürger über den Lärm.
After/since the construction of the cathedral the citizens complained about the noise.

b'. Nach/seit der Erbauung der Kathedrale war die Stadt bekannt.
After/since the construction of the cathedral the town was well known.

(44) ***nach/seit* with state nominals:**

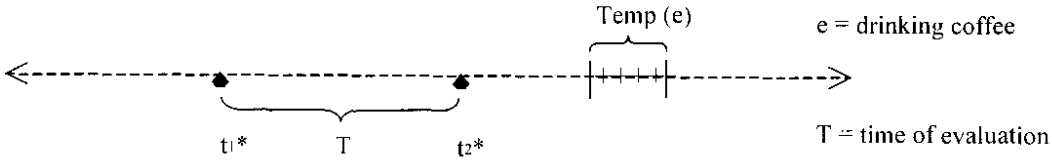
a. Nach/seit der offiziellen Duldung wohnte das Krokodil im Gartenhaus.
After/since the official toleration the crocodile lived in the garden shed.

b. Nach/seit der Belagerung verließen Tausende die Stadt.
After/since the siege thousands left the town.

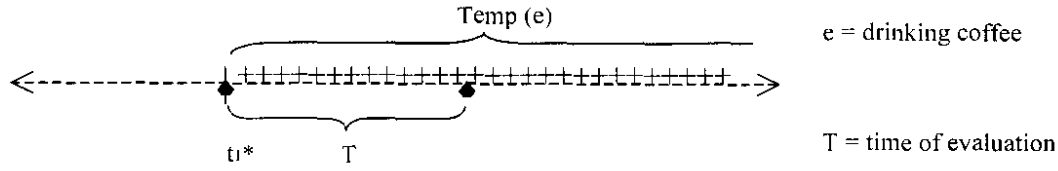
(45) ***nach/seit* with resultant state nominals:**
Nach/seit der dreimonatigen Absperrung des Gebiets erholten sich die Wasservögel.
After/since the blocking off of the area which went on for three months the water birds recovered.

For achievement nominals being punctual in nature, there is only one possibility to anchor the temporal prepositions. For the other Aktionsarten, there is an interesting difference between *nach* and *seit*. The *nach*-examples have only one reading: The delimiting point always corresponds to the termination. The *seit*-examples, on the other hand, are ambiguous, as they do not only allow for a termination but also for an onset reading:

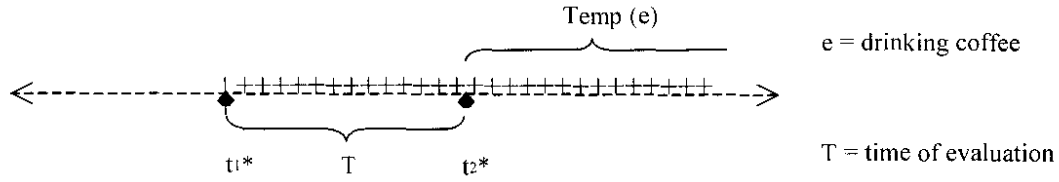
(46) ***nach*: Delimiting point t* = termination of the event**



(47) ***seit*: Delimiting point t* = onset or termination of the event:**
variant (i)



variant (ii)



However, one might ask if this analysis is the only possible one. In 3.1 we argued that a homogeneous THEME can always be part of a bigger event of the same kind which goes beyond the delimiting point:

(48) a. Sie trank vor 7 Uhr Kaffee (und auch danach).
She was drinking coffee before 7 o'clock (and did so afterwards, too).

b. Sie trank bis 7 Uhr Kaffee (und auch danach).
She was drinking coffee until 7 o'clock (and did so afterwards, too).

c. Sie trank nach 7 Uhr Kaffee (und auch schon zuvor).
She was drinking coffee after 7 o'clock (and did so already before).

d. Sie trank seit 7 Uhr Kaffee (und auch schon zuvor).
She was drinking coffee since 7 o'clock (and did so already before).

In (48), the delimiting point just gives a potential borderline for the subevent. It is a conversational implicature that we consider this borderline to be relevant, e.g. to delimit the whole event – however in the case of homogeneous events this is not a necessary condition.

We have seen that *seit* requires a homogeneous THEME. Hence, we might argue that, here, the delimiting point is **always** given by the termination of the RELATUM event. Being homogeneous, the THEME could nevertheless be part of a bigger THEME extending up to the onset of the RELATUM event. There would then be no need to claim an ambiguity for the temporal anchoring of *seit*-THEMEs. The delimiting point would always be given by the termination, and the onset reading would just result from cancelling the conversational implicature that this temporal borderline is a relevant one.

However, this explanation does not seem appropriate for *seit*. Again, it is interesting to compare *nach* and *seit*, when used with homogeneous RELATUM events. In the case of *nach* the RELATUM's termination clearly is considered to be the relevant borderline for the whole THEME event. This implicature can be cancelled in two ways:

(49) a. Nach dem Frühstück sprachen Lena und Klaus miteinander (wie auch schon während des Frühstücks).
After breakfast Lena and Klaus talked to each other and they did so already during breakfast.

b. Nach dem Frühstück sprachen Lena und Klaus miteinander (wie auch schon vor dem Frühstück).
After breakfast Lena and Klaus talked to each other and they did so already before breakfast.

In both examples there are two talking events. In (49a), however, these two events can be part of one long talking event which goes beyond the delimiting point given by *nach*, e.g. the termination of breakfast. In (49b) such a reading is excluded: The two talking events need to be distinct: they are separated by the protracted RELATUM breakfast.

Now consider *seit* when used in the same contexts:

(50) a. ??Seit dem Frühstück sprachen Lena und Klaus miteinander und auch schon während des Frühstücks.
Since breakfast Lena and Klaus talked to each other and they did so already during breakfast.

b. Seit dem Frühstück sprachen Lena und Klaus miteinander und auch schon vor dem Frühstück.
Since breakfast Lena and Klaus talked to each other and they did so already before breakfast.

The cancelling procedure in (50a) is rather odd for *seit*. According to the context, *seit* takes the RELATUM's onset as delimiting point quite naturally. Hence, there is no implicature like "They did not talk to each other before the end of breakfast" and no need to cancel it. On the other hand, *seit* always yields the implicature that the THEME event does not go beyond the RELATUM's onset. As usual, it is possible to cancel this implicature (50b). Now, in contrast to (49b), (50b) can have the meaning that Lena and Klaus talked to each other without an interruption before and after the beginning of breakfast. If *seit* always had to take the RELATUM's termination as its delimiting point this reading would have to be excluded. We conclude that *seit* – but not *nach* – may take the RELATUM's onset as its delimiting point quite naturally.

Again, we have to ask ourselves whether the *seit*-construction is really ambiguous – instead of being just vague. The negation test and the use of „extending adverbs" prove very clearly that there are indeed only **two** readings, e.g. two delimiting points:

(51) a. Seit der Verfolgung Öcalans gab es keine Demonstration mehr hier.
Since the persecution of Öcalan there were no more demonstrations.

b. Seit der Auswertung der Akten rauchte der Büroangestellte ununterbrochen.
Since the evaluation of the files the employee smoked non-stop.

The onset reading means that there were no demonstrations since the beginning of the persecution, the termination reading that there weren't any after the end of this persecution. Intermediate readings are not possible.

We conclude that – in contrast to *nach* – *seit* is ambiguous when used with protracted RELATUM events. Now, quite obviously, the unmarked interpretation relates to event structure properties. Activities and states (*Verfolgung* 'persecution', *Duldung* 'toleration') do not have a structurally prominent termination – hence, it is clear that they are good candidates for an onset reading. For accomplishments (*Auswertung* 'evaluation'), on the other hand, the culmination point is most salient in event structure: It follows that the termination interpretation is quite natural for them. However, the actual choice of the delimiting point can vary according to discourse and / or situative context. In (52a,b) we would presumably take the onset of *Ferien* 'holidays', *Frühstück* 'breakfast' as delimiting point, in (52c,d) it is the termination:

(52) a. Seit den Ferien hat sie keinen ihrer Schüler mehr gesehen.
Since the holidays she has not seen any of her pupils.

b. Seit dem Frühstück sitzt Jonathan im Speisesaal.
Since breakfast J. is sitting in the dining room.

c. Seit den Ferien zeigt er ein viel besseres Lernverhalten.
Since the holidays he shows a much better behaviour in studying.

d. Seit dem Frühstück joggt er.
Since breakfast he is jogging.

World knowledge tells us that it is normal to be sitting in the dining room but uncommon (albeit not impossible) to be jogging while having breakfast. We naturally interpret (b) and (d) as saying that Jonathan was sitting in the dining room from the beginning of his breakfast, but that he started jogging after having finished breakfast. Similar reasoning holds for (a) and (c): it is common not to see one's pupils during the holidays but it is less common to be learning during the holidays; thus we assume the onset reading for (a) and the termination reading for (b). To sum up, prepositional *seit* offers two anchoring points in the case of protracted RELATA. According to the event structure one of these points is more salient; however it depends on contextual and pragmatic reasons which one is actually chosen. Temporal *nach* on the other hand is always restricted to the terminal closure reading.

Apart from looking at the nominalizations it is also interesting to look at the clausal counterparts introduced by temporal conjunctions *nachdem/seit(dem)*. *Nachdem* obligatorily selects a resultative tense, e.g. a perfect or a past perfect (c.f. Herweg 1990:217ff.). The anchoring point always corresponds to the terminal closure of the RELATUM. This holds for any Aktionsart:[12]

[12] As Herweg notes, *nachdem* sometimes combines with a state in a non-resultative tense; however, he proves that these examples have to be reinterpreted: Either the preposition assumes a non-temporal, causative meaning (i) or the state assumes an ingressive reading, e.g. it refers to an immediately preceding event (ii), sometimes lexically indicated by an adjectival passive (iii):

(i) Nachdem du jetzt Klavier lernen willst, verkaufe ich deine Flöte wieder.
After (=as) you want to learn the piano now, I sell your flute again.

(ii) Nachdem er an der frischen Luft war, fühlte er sich besser. (Herweg 1990:218 (3))
After he had breathed fresh air, he felt better.

(iii) Nachdem die Bilder befestigt waren, kümmerten wir uns um die Spiegel.
After the pictures were fixed we looked after the mirrors.

(53) a. ??/*Nachdem sie das Angebot ablehnte,
After she refused the offer,

a'. Nachdem sie das Angebot abgelehnt hatte,
After she had refused the offer,

b. ??/*Nachdem er die Straße überquerte, brach er zusammen. (Herweg 1990:224 (10a))
After he crossed the street, he broke down.

b'. Nachdem er die Straße überquert hatte, brach er zusammen. (Herweg 1990:224 (11a))
After he had crossed the street, he broke down.

c. ??/*Nachdem er schwamm, brach er zusammen.
After he swam, he broke down.

c'. Nachdem er geschwommen war, brach er zusammen.
After he had swum, he broke down.

d. ??/*Nachdem das Gebiet drei Monate lang abgesperrt war, ...
After the area was blocked off for some months, ...

d'. Nachdem das Gebiet drei Monate lang abgesperrt gewesen war, ...
After the area had been blocked off for some months, ...

In contrast to this, conjunctional *seit(dem)* can refer to the onset or to the termination of a protracted RELATUM:

(54) a. Seitdem er in Berlin gewohnt hat, ist er viel netter.
Since he had lived in Berlin, he is much nicer.

a'. Seitdem er in Berlin wohnt, ist er viel netter.
Since he is living in Berlin, he is much nicer.

b. Seitdem er bei Daimler gearbeitet hat, ist er reich.
Since he had worked at Daimler, he is rich.

b'. Seitdem er bei Daimler arbeitet, ist er glücklich.
Since he is working at Daimler, he is happy.

c. Seitdem sie dieses Buch gelesen hat, ist sie sehr bedrückt.
Since she had read this book, she is very depressed.

c'. Seitdem sie dieses Buch liest, ist sie sehr bedrückt.
Since she is reading this book, she is very depressed.

The termination reading requires a perfect/past perfect, the onset reading a simple tense.[13] Note that the onset reading needs to be interpreted in a progressive manner. In the case of punctual RELATUM events, onset and termination coincide. This excludes a progressive reading, hence they always require a perfective tense:

(55) a. Seitdem er aus dem Haus getreten war, beobachtete ich ihn.
Since he had left the house I was watching him.

a'. *Ich beobachtete ihn, seitdem er aus dem Haus trat.
I was watching him since he left the house.

b. Seit(dem) sie das Angebot abgelehnt hatte, ...
Since she had refused the offer, ..

b'. *Seit(dem) sie das Angebot ablehnte, ...
Since she refused the offer, ..

We conclude that the conjunctions *nachdem* and *seit(dem)* behave like their prepositional counterparts: *nach(dem)* is restricted to the termination reading, whereas *seit(dem)* can have the onset and the termination reading. To sum up, *nach(dem)* is not really informative as it never goes inside the event structure of the RELATUM. *Seit(dem),* on the other hand, shows us that the onset of the RELATUM is always salient: It can be picked up as a delimiting point though the termination would be closer to the THEME event.

4 Conclusion

The SF-representation of temporal prepositions specifies their invariant meaning, e.g. the relation between the THEME event in question and a specific period in time. *Während* expresses the inclusion of the THEME in a protracted period, *vor* and *bei* lexicalize anteriority with respect to a delimiting point, *nach* and *seit* posteriority. If the RELATUM of the preposition is an event or state nominal, the required period or point in time has to be inferred. As we have shown with respect to *ung*-nominalizations, this inference procedure gives us important insights into the event structure of the RELATUM.

First of all, our investigation supports the claim that the event structure of the base verb is preserved in *ung*-nominalizations. This is quite clear in the case of *während*: requiring a protracted time span it can be combined with those *ung*-nominals which inherit a protracted event structure from their base, e.g. activities, accomplishments or states – but not achievements. *Vor*, *bis* and *seit*, on the other hand, also show that the difference between accomplishments, achievements, activities and states is not neutralized in *ung*-nominalizations. The temporal ambiguities are always restricted to specific Aktionsarten: *seit* yields an ambiguity if combined with nominalizations based on durative verbs, *vor* and *bis* are only ambiguous if combined with nominalizations based on accomplishment verbs. Hence, the data presented in this paper are in a line with Ehrich/Rapp (2000), where it was claimed that eventive *ung*-nominals preserve the event structure of their base verb.

Furthermore, the temporal prepositions which require a point in time as their RELATUM give us important insights into the relative prominence of event structure. *Vor* and *bis* need a right side boundary. Normally, the initial closure of the event – as the nearest point – is selected. The interesting thing is that, in the case of accomplishments, we can also take the termination point. This is impossible for activities and states: the termination of an

[13] In contrast to these examples Herweg (1990) claims that – like *nachdem* – the temporal conjunction *seitdem* always requires a perfective tense.

event is only prominent if it is a culmination point. *Seit*, on the other hand, needs a left side boundary: it is obvious that we can take the termination point of the RELATUM event. But the interesting thing is that for all protracted events we can also take the onset – obviously, because it is always prominent in event structure. In sum, ambiguities arise if there is a prominent point in the event structure which is not identical to the next boundary acessible. In the case of activities and states this only holds for *seit*: Here, the next delimiting point is the termination, but the most prominent point in event structure is the onset of the activity/state. In the case of accomplishments, *vor*, *bis* and *seit* yield an ambiguity. This is due to the fact that both the onset and the culmination point are salient in the event structure of accomplishments; hence there is always a prominent point which does not correspond to the next delimiting point required by the preposition.

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Nominalization and Argument Structure in Early New High German*

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Abstract

Recent work on argument selection couched in a lexical decomposition approach (Ehrich & Rapp 2000) postulates different linking properties for verbs and nouns, challenging current views on argument inheritance. In this paper, I show that the different behavior with respect to verbal and nominal linking observed for Present-Day German does not carry over to *ung*-nominals in Early New High German. Deverbal nouns and corresponding verbs rather behave alike with respect to argument linking. I shall argue that this change is motivated by the growing rift between *ung*-nominals and their verbal bases both focussing on different parts of their lexicosemantic structure in Present-Day German. Evidence for the verb-like behavior of *ung*-nominals in Early New High German comes from the regular meaning relation between verbs and corresponding derived nouns, the actional properties of event-denoting nouns, and the patterning of *ung*-nominals with nominalized infinitives. Even their syntactic behavior reflects the verbal character of *ung*-nominals during that period of the German language. The diachronic facts can be accounted for in a straightforward way once we adopt a lexical decomposition approach to argument selection.

1 Introduction

In this paper, I shall be concerned with the relationship between *ung*-nominals and their verbal counterparts in Early New High German (ENHG). In particular, I shall be looking at the linking properties of deverbal nouns and their verbal bases.

Data like (1) suggest a systematic relationship between the argument structures of verbs and nouns, respectively:

(1) a. Paul züchtet solche Schnecken.
'Paul is breeding such snails'

b. Pauls Züchtung solcher Schnecken
'Paul's breeding of such snails'

Morpho-syntactic accounts describe the relationship between the verb in (1a) and the argument taking noun in (1b) in terms of argument inheritance: the derived noun inherits the internal argument of its verbal base with verbs and nouns displaying different case assignment porperties, i.e. accusative and genitive case, respectively. Thematic roles of arguments are supposed to play no role with respect to argument inheritance.

In a recent paper, Ehrich & Rapp (2000) challenge current views on argument inheritance, stressing that morpho-syntactic accounts fail to provide an explanation for the contrast displayed in (2) and (3):

(2) a. Die Verfolgung des Verbrechers war nicht erfolgreich.
'the trailing of the criminal was not successful'

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b. Keiner entgeht der Verfolgung der Polizei.
'nobody escapes the trailing by the police'

(3) a. Die Vollendung eines menschlichen Klons steht kurz bevor.
'the completion of a human clone is fast approching'

b. Die Vollendung des Wissenschaftlers steht kurz bevor.
'the completion of the scientist is fast approaching'

Though both *verfolgen* 'trail' as well as *vollenden* 'complete' are transitive verbs, only *verfolgen* allows its external argument to surface as a genitive complement of the deverbal nominal (cf. (2b)). Interpreting the genitive complement of *Vollendung* 'completion' as the external argument, however, is excluded, cf. (3b). To account for the data given in (2) and (3), Ehrich & Rapp suggest an explanation in terms of a lexical decomposition approach, assuming different linking properties for verbs and deverbal nouns.

Although Ehrich & Rapp's account of nominal linking seems to capture the data in Present-Day German (PDG) in a straightforward way, I am going to show that it fails to make the right predictions for *ung*-nominals in ENHG. I consider this to be a result from language change: In earlier periods of German *ung*-nominals are recategorizations of verbs only in a syntactic sense, sharing with their verbal stems linking properties and sortal interpretation. Regarding the latter properties, deverbal nouns evolve a more noun-like character not until a fairly recent stage in the history of German.

The outline of this article is the following: In section 2, I briefly sketch the account for verbal and nominal linking as proposed by Ehrich & Rapp (2000). I present the ENHG data in section 3, paying particular attention to the argument structure of *ung*-nominals. Section 4 deals with other respects of their linguistic behaviour in ENHG, providing further evidence for the verbal character of *ung*-nominals. Section 5 is an attempt to ascribe the changes determining the history of *ung*-nominals since the 17th century to a nominalization process with 'nominalization' taken literally. Section 6 gives a conclusion.

The following discussion is based on data mainly collected in newspapers of the 16th and 17th century. Newspapers provide a data base that is appropriate in two respects: first, they show stylistic variation, since they include a number of different registers, such as documents, letters, and so on. Second, newspapers exhibit dialectal variation, since each issue of the newspaper includes contributions from a number of scribes from different dialect areas. The data base is also huge enough to ensure the reliability of the proposed analysis (381 types, 2109 tokens of *ung*- nominalizations).

2 Verbal and nominal linking in Present-Day German

2.1 Verbal linking

Following current views on the structure of the lexicon (Bierwisch 1983, 1996; Jackendoff 1990, Wunderlich 1997), Ehrich & Rapp (2000) assume that the lexical meaning of verbs can be decomposed into basic predicates indicating thematic structure as well as event structure of verbs. Argument structure is derived from this lexicosemantic structure by means of λ-abstraction. Ehrich & Rapp argue that it is only thematic structure that determines verbal linking,[1] illustrated in (4) for semantic verb classes denoting different sorts of entities, namely activities, states, and events. The referential arguments are represented by variables such as *r*, *s* and *e*:

[1] In this respect they crucially differ from accounts deriving linking properties from event structure, cf. Grimshaw (1990) among others.

(4) a. Sie verfolgt den Einbrecher.
'she trails the burglar'
λy λx λr [DO ((x, y) r)] x = θ1, y = θ2

b. Er bewundert die Altistin.
'he admires the alto'
λy λx λs [POSS ((x, y) s)] x = θ1, y = θ2

c. Sie erreichten den Gipfel.
'they reached the top of the hill'
λy λx λe [BEC ((APPL ((x, y) s)) e)] x = θ1, y = θ2

d. Sie vollendeten den menschlichen Klon.
'they completed the human clone'
λy λx λe [DO ((x, y) r) & BEC ((BE ((y) s)) e)] x = θ1, y = θ2

The lexicosemantic structure of the activity verb in (4a) as well as the state verb in (4b) consist of only one basic predicate, namely DO and POSS(ESS). The individual arguments of both predicates (x and y) are linked to the positions of subject and direct object, respectively. With respect to events, we have to distinguish at least between two types of events:[2] accomplishments denote events having both a development portion and a culmination point. In contrast, achievements refer to events lacking this development portion, they are instantaneous events. The lexical semantic structure of achievements is said to be complex, because the predicate BEC(OME) selects another predicate (and not individual arguments). The predicate selected by BEC is APPL(ICATION), with APPL expressing a local relation between its thematic arguments x and y, cf. (4c). The accomplishment in (4d) comprises three basic predicates: besides the BEC predicate selecting for BE with a single thematic argument, we find the BEC predicate related to a DO predicate by means of conjunction:[3] the first conjunct refers to the activity bringing about the change of state expressed by the second conjunct. With respect to argument selection the achievements and accomplishments given in (4) behave as activities and states: both thematic arguments are linked to subject and object position, respectively.

Linking conflicts arise as soon as the BECOME predicate embeds a two-place predicate, as illustrated in (5) for causative accomplishments such as *leihen* 'lend' and *besprühen* 'spray':

(5) a. Er lieh ihm sein Fahrrad.
'he lent him his bike'
λy λz λx λe [DO ((x, y) r) & BEC ((POSS ((z, y) s)) e)] x = θ1, y = θ2, z = θ3

b. Sie besprühte die Wand mit roter Farbe.
'she sprayed the wall with red paint'
λy λx λe [DO ((x, y) r) & BEC ((APPL ((z, y) s)) e)] x = θ1, y = θ2

In (5a) the first arguments of both the DO and the POSS predicate compete with respect to the subject position: since the first argument of the DO predicate obviously wins the linking conflict, the experiencer argument is realized as a dative object. In (5b), competition arises between the first arguments of the DO and the APPL predicate with respect to the subject position: in contrast to (5a) the first argument of the embedded predicate cannot be realized as a

[2] Rapp (2001a:197) assumes a four-way distinction: (i) non-causative achievements (*einschlafen* 'fall asleep'), (ii) causative achievements (*erschlagen* 'strike dead'), (iii) non-causative accomplishments (*verblühen* 'fade'), and (iv) causative accomplishments (*verbiegen* 'buckle).

[3] Conjuncts in a lexicosemantic structure are assumed to be causally related; cf. Wunderlich (1997) for the following redundancy rule: P1 ((...) v1) & P2 ((...) v2) ⊃ CAUSE ((v1, v2) v2).

dative object, because the position labelled θ3 is generally assumed to be confined to arguments with typical experiencer properties. Hence, the first argument of the APPL predicate either remains implicit or is realized as a prepositional phrase (as an argument adjunct in the sense of Grimshaw 1990). Ehrich & Rapp emphasize the fact that with respect to linking conflicts the arguments of the DO predicate always win over the arguments embedded under the predicate of the second conjunct.

2.2 Nominal linking

On the assumption that nouns have an argument structure as verbs do, Ehrich & Rapp observe the following differences regarding argument selection with nominals:

(i) Nominal arguments are optional.
(ii) Thematic and event structure of nouns determine the nominal argument structure as the thematic and event structures of verbs do.
(iii) With respect to event-denoting nominals, nominal linking favors the state part of the lexicosemantic structure over the DO part.

In particular, Ehrich & Rapp state the following two rules governing argument linking with deverbal nouns:

(6) *Argument Structure of* ung*-nominalizations*
  (a) If and only if the lexical semantic structure contains no change of state part, all thematic arguments appear in the argument structure, otherwise
  (b) the nominal argument structure is restricted to the lowest affected argument of the lexical semantic structure.

(7) *Nominal linking*
  (a) Each thematic argument of the argument structure may be realized as a post-nominal NP_{GEN}.
  (b) No thematic argument has to be realized.

To see how the particular clauses work, consider the examples under (8). The bracketing of λ-operators indicates the optionality of thematic arguments.

(8) a. Verfolgung 'trailing' (λy) (λx) λr [DO ((x, y) r)]

  b. Bewunderung 'admiring' (λy) (λx) λs [POSS ((x, y) s)]

With process and state nominals all arguments of the lexicosemantic structure are also part of the noun's argument structure, as indicated by clause (6a). Apart from the optionality of arguments the nominal argument structure parallels the argument structure of the corresponding verbs. With event nominals, however, systematic differences characterize the linking properties of verbs and nouns: according to clause (6b) only arguments embedded under BEC may appear in the noun's argument structure, while arguments of the DO predicate remain implicit. In case the predicate BEC embeds a two-place predicate (cf. (9b)), only the lowest argument becomes part of the noun's argument structure.

(9) a. Vollendung 'completing' (λy) λe [DO ((x, y) r) & BEC ((BE ((y) s)) e)]

  b. Erreichung 'reaching' (λy) λe [BEC ((APPL ((x, y) s)) e)]

Deriving nominal argument structures as proposed by Ehrich & Rapp (2000), makes the right predictions for the interpretation of the noun's complements under (10): only process and state nominals as in (10a) and (10b) are ambiguous between a subject and an object reading.

(10) a. die Verfolgung des Mannes
'the trailing of the man'

b. die Bewunderung des Filmemachers
'the admiration of the film-maker'

Mann 'man' as well as *Filmemacher* 'film-maker' can be interpreted as both the subjet or the object argument of the DO and the POSS predicate in the nominal lexicosemantic structure. With events, however, the interpretation of genitive complements is unambiguous. Event nominals only allow for the lowest affected argument of the lexicosemantic structure to appear in the argument structure.

(11) a. die Erreichung des Gipfels
'the reaching of the summit'

b. *die Erreichung der Bergsteiger
'the reaching of the climbers'

(12) a. die Vollendung eines menschlichen Klons
'the completion of a human clone'

b. *die Vollendung des Wissenschaftlers
'the completion of the scientist'

Hence, the only reading available for a post-nominal genitive complement seems to be the object reading. Whereas (11b) is ruled out for semantic reasons, we might understand (12b) as the completion of a cloned scientist, not however, as the scientist's completion of some project. In contrast, genitive complements of event nominals based on one-place predicates always get a subject reading.

(13) die Erstarrung der Lava
'the fossilizing of the lava'
(λx) λe [BEC ((BE ((x) s)) e)]

Though *ung*-nominals share the event structure with their verbal counterparts in many cases, as the examples given above for process, state and event nominals illustrate, nominals based on accomplishments offer a whole range of sortal interpretations: *ung*-nominals derived from accomplishments exhibit state or object readings besides an event interpretation. The examples below (taken from Ehrich & Rapp 2000:267) show the array of interpretations related to only one *ung*-nominal:

(14) a. Nach der Bemalung der Wand mit Farbe sind die Kinder weggelaufen.
after the painting of the wall with paint have the children run off
'after painting the wall, the children ran off'
(λy) λe [DO ((x, y) r) & BEC ((APPL ((z, y) s)) e)]

b. Die Bemalung der Wand besteht unverändert fort.
the painting of the wall continues unchanged
'the painted wall continues unchanged'
(λy) λs [DO ((x, y) r) & BEC ((APPL ((z, y) s)) e)]

c. Der Hausmeister hat die Bemalung der Wand entfernt.
the janitor has the painting of the wall removed

'the janitor has removed the painting at the wall'
(λy) λz [DO ((x, y) r) & BEC ((APPL ((z, y) s)) e)]

According to the individual predicates in their lexicosemantic structure, event nominals as *Bemalung* 'painting' can refer to (i) events, focussing on both conjuncts of the complex predicate, (ii) states, focussing on the target state, and (iii) concrete and abstract objects resulting from the activity in question. Given the appropriate context, an *ung*-nominal derived from an accomplishment may even be interpreted as denoting a process, stressing only the DO predicate in its lexical semantic structure, cf. (15a), with the process reading also licensing the realization of the DOer argument, cf. (15b):

(15) a. Er ist bei der Bemalung der Wand vom Stuhl gefallen.
he has while the painting of the wall the chair down fallen
'while painting the wall, he has fallen down a chair'
(λy) (λx) λr [DO ((x, y) r)]

b. Die Bemalung des Künstlers hat großes Aufsehen erregt.
the painting of the artist has great sensation caused
'the artist's painting has caused a great sensation'

According to Ehrich & Rapp, the process reading of accomplishment-based nominals is restricted to nominals derived from particular verb classes denoting modifications of entities such as *bemalen* 'paint' (cf. (14)), as well as verbs such as *kürzen* 'shorten' and *umgestalten* 'alter'.[4]

Considering the linking properties of nouns and verbs, a crucial difference arises with respect to event nominals: whereas verbal linking conflicts suggest that verbs favor the DO part over the change of state part of the predicate, thus highlighting the dynamic aspect of the verbal category, the argument structure of event nominals indicates that deverbal nouns rather focus the change of state part in their lexical semantic structure. As I am going to show in the following section, these differences with respect to argument linking are not met by the ENHG data.

3 Linking properties of *ung*-nominals in Early New High German

Ung-nominalization seems to be a very productive word formation pattern in ENHG, as suggested by the large number of tokens found in texts from the 17th and 18th century. By far the most attested examples are *ung*-nouns denoting eventualities, whereas object readings do not occur very frequently.[5] Some examples are listed in

(16) Behausung 'housing'
Besoldung 'paying'
Festung 'fortress'
Kleidung 'clothing'
Nahrung 'nourishment'
Ordnung 'order'
Wohnung 'apartment'

In the remainder of this paper, my focus will be on the overwhelming number of *ung*-nominals denoting eventualities, i.e. *ung*-nominals with an internal temporal structure.

[4] Ehrich & Rapp (2000:290) refer to these verbs as 'Bearbeitungs-' und 'Modifikationsverben', respectively.
[5] Though object readings are restricted to a small number of *ung*-nominals regarding types, the few attested nominalizations are used quite frequently, thus providing for a larger number of tokens.

Ung-nominalizations based on atelic verbs as activities and states yield process and state nominals with genitive phrases co-occuring with process nominals either interpreted as the underlying subject or the underlying object.

(17) a. Von Constantinop. hat man/ demnach der Rebell. Joseph Bassa [...]/
from C. have we, after the rebel Joseph Bassa

des Veziers Musterung vernommen/ hat er sich mit 12000. Mann
the vizier's inspection heard/ has he himself with 12000 men

an ein sichern Ort begeben/ (A 209.14)[6]
to a safe place betaken

'as far as we know from Constantinople, the rebel J. B. has betaken to a safe place with 12.000 men after hearing from the vizier's inspection'

b. was vnd so viel die Musterung der gemeinen Landts Vnterthanen betrifft
what and how much the inspection of the common subjects concerns

'concerning the common subjects' inspection' (AC 13.9)

In (17a), the underlying subject *Veziers* 'vizier's' appears as an argument of the process nominal; in (17b) it is the underlying object that figures as the deverbal noun's argument. In contrast to PDG, the pre-nominal occurrence of genitive complements is not restricted to proper names, kinship terms and some pronouns. All arguments of a deverbal noun are free to either precede or follow the head noun, as shown for the object of the process nominal *beratschlagung* 'discussing'.

(18) a. Zu Preßburg wil man zu beratschlagung der Proposition nicht schreiten/
in Preßburg will one with discussing of the motion not proceed

es werde dann zuuor ein Palatinus erwehlt/ (A 342.7)
there will then before a Palatinus elected

'one will not proceed with discussing the motion in Preßburg'

b. weil die aus den Ständen [...] / ohne resolvierung vnnd erörterung
because these from the estates without resolution and discussion

gedachter Puncten zu der Proposition Berahtschlagung zugreiffen
of the above mentioned points to the motion's discussing advance
(A 273.16)

'because members of the estates [...] advance to discuss the motion'

Further instances of argument linking along these lines are attested with the following process nominals:

(19) begleitung 'accompagnying'
belägerung 'besieging'
bemühung 'endeavouring'
continuierung 'continuation'
erhebung 'raising'
streiffung 'roaming'

[6] Given is the short name of the source text, including the page number and the line indicating the beginning of the historical example.

versamblung	'assembling'
versterckung	'reinforcing'.

Ung-nouns based on state verbs pattern with process nominals regarding argument selection: genitive complements express either the external or the internal argument of the verbal base.

(20) a. Es continuirt Frater F. / mit grossem Eifer vnd <u>menniglichs verwunderung</u>
it continues Frater F. with great enthusiasm and a good many's astonishing

die Evangel. Lehr/ [...] / in die Hertzen der Zuhörer zu imprimirn/ (A.103.17)
the Protestant teachings in the hearts of the audience to stamp

'Frater Fulgentius continues to stamp the Protestant teachings in the hearts of his audience with great enthusiasm and a good many's astonishment'

b. welcher jne dargegen/ <u>in erwegung außgestandner gefahr/</u> mit 600. Cr. begabet
who him therefore, in considering endured danger, with 600 cr. endowed
(AC 197.11)

'considering however endured danger, he endowed him with 600 Crowns'

The subject argument of the state verb is realized pre-nominally ((20a)), whereas the object argument follows the deverbal noun in (20b). Further instances of state nominals exhibiting similar linking properties are given below:

(21)	bedenckung	'considering'
	beschirmung	'schielding'
	beschauung	'looking at'
	bewahrung	'protecting'
	er-, vnderhaltung	'supporting'
	rühmung	'praising'
	verhütung	'preventing'
	vermeydung	'avoiding'
	verwarlosung	'neglecting'.

So far, we observe no differences between argument linking in PDG and ENHG with respect to deverbal nouns: process nominals as well as state nominals pattern with their PDG counterparts. Recall, however, that *ung*-nominals denoting processes and states share the argument structure with their verbal stems.

Ung-nominalizations based on telic verbs display a quite different picture. In PDG, the linking properties of the respective *ung*-nominals exhibit systematic differences as compared to the linking properties of their verbal bases. Since event nominals focus the state of change predicate in their lexical semantic structure, only the lowest affected argument is mapped to argument stucture, i.e. the genitive complement of an event nominal will always get an object reading with the exception of one-place event nouns such as *Verdunstung* 'evaporation' or *Erstarrung* 'fossilization' where the genitive is restricted to a subject reading. How do the event nominals of the 17th and 18th century fit in this picture? I begin by looking at event nouns derived from accomplishments. In contrast to PDG, event nominals combine as easily with the object-denoting as with the subject-denoting participant, as illustrated for *Abfertigung* 'dealing with' in (22) as well as *Berufung* 'summoning' in (23):

(22) a. Man tractirt starck <u>von abfertigung</u> <u>der Türck: Botschafft</u>
they negotiate intensively about the dealing with the Turkish ambassadors
(A 333.32)

'the dealing with the Turkish ambassador is intensively dealt with'

b. Brieff auß Pariß melden/ das die 2. Graffen von Solms/ wie der Graff von
letters from Paris report that the 2 Counts of S. and the Count of

Hohenzollern/ noch daselbsten auff des Königs abfertigung warten. (A 308.31)
Hohenzollern still there for the King's dealing with wait

'As reported through letters from Paris, that both Counts of Solms as well as the Count of Hohenzollern are still waiting there for the King to deal with them'

(23) a. Es sollen die geheime Räht/ die allher beruffung des Ertzhertzogs Leopoldi
it should the privy councils the hither summoning of the Archduke Leopoldi

vnnd Beyerfürsten/ […] sehr befrembden (A 147.25)
and Bavarian Prince […] very much displease

'the privy councils are said to be rather displeased by summoning the Archduke and Bavarian Prince Leopoldi here'

b. er wird aber heut oder morgen vff beruffung Jhrer Mayst. wieder
he is however today or tomorrow upon summoning of His Majesty again

zu rück von Gretz allhero verwart (A 75.2)
back from Gretz here expected

'he, however, is expected to be back from Gretz today or tomorrow upon summoning by His Majesty'

Whereas the (a)-examples in (22) and (23) represent deverbal head nouns with the genitive complement expressing the underlying object, the genitive complement in (22b) and (23b) have to be interpreted as underlying subjects. Both arguments, the underlying subject as well as the underlying object may either precede or follow the deverbal head noun, as shown by the above examples. The linking properties of event nouns thus suggest that the argument structure of *ung*-nominalizations is build up by the same arguments as the argument structure of the verbal bases with the agent argument included in the noun's argument structure, cf. also example (24), to emphasize this particular property of event nominals in ENHG:

(24) Als Graff Moritz von Nassaw / […] zum Haag wider ankommen / hat er
when Count Moritz v. N. […] at Haag again arrived has he

mit schmertzen befunden / das sein Schwester/ mit des Don Antonij di Portugall
regretfully discovered that his sister to Don Antonij di Portugal's

Schmeisch / auß anstifftung etlicher Geistlicher Ehelich verlobt / (AC 180.23)
Schmeisch upon putting up of some clergymen maritally engaged (was)

'when Count Moritz of Nassau arrived at Haag again, he discovered to his great sorrow that his sister was married to Don Antonij di Portugal's Schmeisch upon putting up by some clergymen'

In PDG, the agent only co-occurs with accomplishment-based nominals exhibiting a process reading. As far as I understand the data in (22b), (23ab) and (24), such a reading is not available for the *ung*-nominals in question. The appearance of the agent argument rather suggests that accomplishment-based nominals have an additional argument in their argument structure in ENHG as compared to their counterparts in PDG.

(25) fertigung 'making' (λy) (λx) λe [DO ((x, y) r) & BEC ((BE ((y) s)) e)]

Co-occuring with either the subject and/or object complement are also event nominals such as the following:

(26)			
	verbs of creation:	erbawung	'building'
		fertigung	'making'
		vollendung	'completion'
	verbs of transformation:	außbawung	'extending'
		befestigung	'fortifying'
	verbs of destruction:	erseuffung	'drowning'
		niederreissung	'pulling down'.

However, there are two cases to consider where the agent argument lacks with event nominals based on accomplishments. Regarding first event nominals with a two-place predicate embedded under BEC, the linking rules suggested by Ehrich & Rapp for PDG predict that only the theme argument should figure in the noun's argument structure.[7] Probably due to the limits of a restricted data base, this prediction is also borne out for the ENHG data:

(27) a. Dem Visconte de Tauanes. welcher mit dem Gran Prior. Gubernatore in Auuergnia
the Visconte de Tauanes. who with the Gran Prior Governor of Auvergne

[...] / in vbergebung etlicher Stätt in Auuergnia. in gleicher Conspiration gewesen/
in handing over of some towns in Auvergne in same conspiration been (has)

[...] / hat der König von Franckreich/ das Haupt abschlagen lassen. (AC 119.24)
has the King of France the head cut off had

'the Visconte de Tauanes. who has been in conspiration with the Gran Prior. Governor of Auvergne in handing over some towns in Auvergne'

b. Die 50000. Thaler zu der Türckischen Present weiln solche nicht auffzubringen/
the 5000. Thaler to the Turkish present because those not to raise (were)

hat sich der Jllishaskij gegen einraumung der Herrschafft Vngarisch Altenburg
has the Jllishaskij against conceding of the domain Hungarian Altenburg

herzugeben erbotten/ welche jhme bereit solle zugesagt sein. (R 27.22)
to contribute volunteered that him already should promised be

'J. has volunteered to contribute the missing 5000 Thaler to the Turkish present [...]upon conceding him the domain of Hungarian Altenburg'

Consider nominals denoting target states next. Their argument structure is derived from the lexicosemantic structure of accomplishments according the rules suggested by Ehrich & Rapp for PDG. With event nominals they share the property that only the lowest affected argument becomes part of the noun's argument structure. Target state nominals differ from event nominals with respect to their sortal interpretation. The historical data suggest that they have the

[7] According to Eisenberg (1998:267), verbs taking a dative object are excluded as potential bases for *ung*-nominalizations for structural reasons (**Helfung* 'helping', **Dankung* 'thanking', **Gefallung* 'pleasing', ...). He ascribes this restriction to the fact that nominals do not select for dative phrases. As shown by the ENHG data, however, we find verbs as *einreumen* 'concede', *vberantworten* 'place sth in sb's hands', *vbergeben* 'present', *vberreichen* 'hand over', and *vbertragen* 'assign' figuring as bases for *ung*-nominals. All *ung*-nominals based on dative verbs only select for a theme argument as far as the data base tells. Neither the DOer argument nor the experiencer argument of these three-place verbs are attested – as expected on Ehrich & Rapp's approach. But *ung*-nominals derived from two-place dative verbs are not an issue in Ehrich & Rapp's (2000) proposal.

same argument structure as they do in PDG, namely lacking the agent, as shown for the ENHG nominal *versperrung* 'locking':

(28) a. wie dann beyde Herrn von Collonitsch/vnd Bucheimb/ sich noch Gestern
as then both lords of Collonitsch and Bucheimb REFL already yesterday

auß der Stadt begeben/ vnd jhres Gegentheils vor der Stadt gewart /
out of town betook and for their party outside of the town waited

welche aber wegen der versperrung der Thor/ nicht erscheinen können.
who however because of the locking of the gates not appear could
(A 293.12)

'both the lord of Collonitsch and the lord of Bucheimb then betook out of town yesterday, waiting for their negotiating party outside the town gate, who, however, couldn't appear because of the locked gates'

b. versperrung 'locking' (λy) λs [DO ((x, y) r) & BEC ((APPL ((z, y) s)) e)]

Let us now turn to event nominals derived from achievements, i.e. verbs denoting a single change of state. Only a few instances are attested (cf. *empfangung* 'receiving', *verlierung* 'losing'). The deverbal noun combines with the theme argument in almost all examples, illustrated with *verlierung* 'losing'.

(29) und straffet die tochter seer bey verlierung seiner huld,
and (he) punishes the daughter hard with losing of his grace

wo sy des edelmanns nit mu:essig gange (WR 131)
if she the nobleman not alone leave

'in case she wouldn't leave the nobleman alone he is going to punish his daughter hard by withdrawing his grace'

One single example in the corpus might be interpreted as showing at the same time the subject and the object of the single change of state verb *verlieren* 'lose' with both arguments appearing in a post-nominal position

(30) Diese tag haben J. Keys. M. ernstliche vnd scharffe Mandata außgehen
these days have His Imp. Majesty serious and tough decrees sent out

vnd publicirn lassen/ daß bey verlierung der protestirenden Stendt/ Haab vnd
and published had that with losing the protesting estates' possessions'

Güter/ jhre Zusamenkunfft auff der Newstadt wieder einstellen sollen/
their meeting in the new town again discontinue should
(A 115.31)

'these days His Imperial Majesty have had serious and tough decrees sent out and published, namely that the protesting estates should discontinue their meeting in the new town, losing their possessions otherwise',

where *die protestirenden Stendt* 'the protesting estates' refer to the subject and *Haab und Gut* 'possessions' to the object of *verlierung* 'losing'. Note that in PDG a genitive complement must appear adjacent to the head noun, either preceding or following it.[8]

[8] The postnominal position of both genitive complements probably suggests another reading of (30) where the *protesting estates* are the possesssor argument of *possessions*, cf. the preceding example (29) with a possessive pronoun. But cf. also (31c) indicating that adjacency of genitive complements is not obligatory in ENHG.

One-place achievement predicates clearly outnumber the two-place achievements as verbal bases of *ung*-nominals in ENHG. Regarding their linking properties, the deverbal nouns behave as expected: the genitive complement always gets a subject reading.

(31) a. Wegen abbleibung deß Bischoffs zu Bisilo in Calabria vacirt,
due to deceasing of the bishop of Bisilo in Calabria is vacant

derselben Kirchen einkommen von 1500. Cronen. (R 108.7)
this church's income of 1500 crowns

'due to the decease of the bishop of Bisilo in Calabria, the curch's salary [...] is vacant'

b. Aus Ambsterdam hat man/ daß daselbst vnd ander Orten in Niderland
from Amsterdam gets one that at that place and at other places in the Netherlands

ein sehr grosse Springflot vnd erhebung des Meers gewesen sey/ (A 61.29)
a very big spring tide and rising of the sea been has

'as one gets from Amsterdam, there has been a verry big spring tide and rising of the sea'

c. welche nach vmbkommung beyderseits viel Volcks in die Flucht gebracht/
who after perishing on both sides lots of people to flight put
(R 172.22)

'who have been put to flight after lots of people were killed on both sides'

As indicated by (31c), a local adjunct may intervene between a head noun and its genitive complement, hence no adjacency requirement seems to govern the position of nominal complements in ENHG.

More instances of one-place event nominals include the following nominalizations:

(32) besserung 'recovering'
endigung 'ending'
umstürzung 'overturning'

I last consider a class of verbs including psychological causatives as *beleidigen* 'offend', *begeistern* 'inspire', *enttäuschen* 'disappoint' etc. Following Rapp (2001b), I assume that psychological causatives pattern with verbs such as *gefährden* 'endanger' and *behindern* 'obstruct' regarding their linking properties. In the literature they are sometimes called stimulus-subject verbs (Wechsler 1995). As with complex changes of state, the lexicosemantic structure of stimulus-subject verbs consists of two conjuncts, illustrated for *gefährden* in

(33) gefährden 'endanger' $\lambda y\, \lambda x\, \lambda s$ [P (...x ...), BE ((y) s)].

Stimulus-subject verbs denote a state as indicated by the referential argument *s* in their argument structure, with the first conjunct P remaining unspecified with respect to its sortal classification. The argument structure of derived nouns is restricted to the theme argument of the embedded BE predicate as in[9]

(34) a. die Gefährdung der Skifahrer/*der Lawinen
the endangering of the skiers/of the avalanches

[9] Rapp (2001b:20) suggests to extend the notion of affected argument to capture the linking properties of stimulus-subject verbs. Her version of Ehrich & Rapp's (2000) nominal linking rule is as follows:
All arguments are affected that
(i) are embedded under BECOME and/or
(ii) appear in the second conjunct of a causative lexical semantic structure.

b. die Behinderung des Verkehrs/*der Schafe
the obstructing of the traffic/of the sheep,

while realizing the stimulus argument yields ungrammatical results (cf. Rapp 2001b). The lexicosemantic structure of an *ung*-nominal hence has the following representation:

(35) Gefährdung 'endangering' (λy) λs [P (...x ...), BE ((y) s)].

In contrast to PDG, the stimulus argument appears as genitive complement of deverbal nouns in ENHG.

(36) Der Sigmundt Bathori/ Fürst in Siebenbürgen/ welcher ein zeitlang zu Lipochowitz
the Sigmundt Bathori prince in Transylvania who for some time at Lipochowitz

gewohnt/ vnd wegen seiner hergeliehenen grossen Geldtsumma auff die
lived and because of his giving a huge amount of money to the

Herrschafft Cromaw verwiesen/ [...]/ jhme aber wegen böser finantzischer Räht
domain Cromau bestowed [...] him however due to malevolent financial officials'

verhinderung nicht Glauben gehalten worden/ ist vor wenig Wochen gar
obstructing not word kept been has a few weeks ago completely

vnuermerckter Sachen/ [...]/ heimlich aus diesem Königreich geschieden/ (A 193.15)
unnoticed [...] secretly this kingdom departed

'Sigmundt Bathori, prince in Transylvania, who lived for some time at Lipochowitz, bestowed to the domain Cromau because of the huge amount of money he has given, has secretly departed this kingdom, because word has not been kept to him due to an obstruction caused by malevolent financial officials'

The historical facts suggest that no systematic differences hold between nominal and verbal linking with respect to argument selection in ENHG. Regarding their linking properties, *ung*-nominals and their verbal counterparts rather behave alike. This is shown in particular by the linking properties of event-denoting nominals and nominals derived from stimulus-subject verbs with the agent and the stimulus argument being mapped to the nominal argument structure only in ENHG, while deverbal nouns in PDG do not select these arguments. The conclusion to be drawn from the historical data is that *ung*-nominalizations are recategorizations without any systematic effect on the derived nominal's lexicosemantic structure. Recall that verbs are supposed to stress the dynamic part, while deverbal nouns rather focus on the change of state or state part (including the stimulus-subject verbs) of a predicate in PDG.

4 The word formation pattern in Early New High German

In this section, I shall provide further evidence for the verb-like behavior of *ung*-nominals and hence the close relationship between deverbal nouns and their verbal bases in ENHG.

4.1 The relation between verbs and deverbal nouns

The relation between deverbal nominals and their verbal counterparts seems to be rather productive in ENHG. *Ung*-nominalizations show no restrictions with respect to potential verbal bases, in particular, no semantic restrictions are attested, as illustrated below with *verkaufen*

'sell', a verb referring to a change of possession. Note that verbs of this semantic class are excluded as bases of *ung*-nominalization in PDG (cf. (37b)).[10]

(37) a. Die Buch-Verkauffer in Pariß sollen wegen Verkauffung unangenehmer Bücher
the book-sellers in Paris should because of selling unpleasant books

auff 20. à 25. reduciret werden. (M 123.1)
to 20 or 25 reduced be

'on account of selling unpleasant books, the book-sellers in Paris are supposed to be reduced to 20 or 25'

b. Der Verkauf/ *die Verkaufung von Tickets an der Abendkasse läuft gut
the sale/ *the selling of tickets at the box office is going well

It is commonly assumed (cf. Esau 1973, Wellmann 1975, Ehrich 1977, Bartsch 1985, Oh 1985, Ehrich 1991) that verbs expressing states as well as verbs referring to the beginning or the repetition of a situation do not function as bases for *ung*-nominals either, as shown in (38a) through (38c).

(38) a. *Glaubung 'believing'
*Sehung 'seeing'
b. *Aufleuchtung 'lighting up'
*Loslachung 'bursting out laughing'
c. *Hüstelung 'giving a slight cough'
*Streichelung 'stroking'

As for verbs referring to a change of possession, instances of these verb classes are well attested in the ENHG corpus. The list given under (39) further shows that *ung*-nominals derived from the verb classes in question, have been replaced by nominalized infinitives in PDG.

(39) a. ansehung > Ansehen 'looking at'
begehrung > Begehren 'desiring'
vertrawung > Vertrauen 'trusting'
verbleibung > Verbleiben 'remaining'
wünschung > Wünschen 'desiring'
b. erschreckung > Erschrecken 'frightening'
loßbrennung > Losbrennen 'start burning'
c. murmelung > Murmeln 'grumbling'
wexelung > Wechseln 'changing'

We might conclude from the historical record that the word formation rule deriving *ung*-nominals from verbs had a wider scope in ENHG than it has in PDG, i.e. the word formation pattern was more productive in earlier stages of German.

Assuming that *ung*-nominalizations are closely related to their verbal bases, we expect the meaning of derived nouns to be predictable from the meaning of the corresponding verb. As a matter of fact, the meaning of *ung*-nominals in ENHG seems predictable to the extent that they are always able to receive an interpretation in terms of eventualitites aside from other possible interpretations. Hence, we can predict the actional properties of deverbal nouns from the meaning of the corresponding verb, as illustrated for *Rüstung* 'arming'.

(40) a. der lasse auch viel 1000. Wägen Kriegs munition vnd Proviant in die Moßkaw
who have also many 1000 waggons ammunition and supplies to Moscow

[10] For further details concerning morphological, syntactic and semantic restrictions of the word formation pattern in PDG cf. Demske (2000) and the references quoted there.

zuführen/ [...] daher die Moßkowiter auß forcht dieser Rüstung
bring [...] therefore the Muscovites for fear of this arming

alle offene örtter verlassen (R 82.21)
all public places leave

'therefore, the Muscovites leave all public places for fear of this arming'

b. Dieser Tagen haben die Gül: Reuter ein Karren mit Rüstung/ [... vmbringet/
these days have the J. cavalrymen a waggon with arms surrounded
(A 299.18)

'these days the J. cavalrymen surrounded a waggon of arms'

The noun *Rüstung* 'arming' in (40a) has a process reading just as the verbal base does. As shown in (40b), the nominal *Rüstung* also appears with an instrument reading in ENHG. In PDG, *Rüstung* has lost the eventuality-interpretation, it is only able to refer to concrete objects. The regular meaning relationship between the derived noun and the verb holds for the majority of *ung*-nominalizations in ENHG. Only a few *ung*-nominals lack an actional interpretation altogether (cf. the examples in (16) above).

Thus, the lack of semantic restrictions on *ung*-nominals as well as the predictability of their meaning supports the idea that *ung*-nominals are nouns in a syntactic but not a semantic point of view.

4.2 Actional properties

While accomplishment-based nominals focus on the change of state predicate in their lexico-semantic structure in PDG, their counterparts in ENHG productively refer to either the activity predicate or the change of state predicate in their lexical semantic structure depending on the context in question. Recall that only a subclass of these nominals, namely verbs expressing locative alternation (*besprühen* 'spray') and verbs denoting modification (*kürzen* 'shorten'), exhibit this context-dependency with respect to their interpretation in PDG.

Temporal prepositions, for one, provide an appropriate context to test the different interpretations available for *ung*-nominals in ENHG: in (41) the prepositions *in* 'while'[11] and *nach* 'after' trigger both readings attested for *emfahung* 'receiving':

(41) a. Darauff sich der König verkleid in Pilgrambß weiß/ vnd also in empfahung
then himself the King disguised in pilgrim's way and so while receiving

eines Allmosens/ sich der alten Princessin zuerkennen geben/ (A 351.18)
alms' himself to the old princess revealed

'the King then disguised himself in pilgrim's way, and while receiving alms he revealed himself to the old princess'

b. vnd da der Gesand mit gutem willen/ nach empfahung der Key: Resolution
and since the envoy with good will after receiving of the imp. resolution

vnd Present/ von hinnen nicht reysen wolte/ so wolle er demselben Küchen vnd
and present from here not leave wanted so want he the same kitchen and

Keller zuschliessen/ [...] lassen. (A 312.30)
cellar closed/ [...] to have

[11] Note that though a durative interpretation for the preposition *in* is rather rare in PDG (cf. *in den Sommersemesterferien* 'during the summer break'), it frequently occurs in ENHG.

'and, because the envoy did not want to leave this place with good will, he would order to clause this envoy's kitchen and cellar'

As a complement of the preposition *in* 'while', *empfahung* gets a process reading, whereas the preposition *nach* 'after' triggers an event reading of its complement. Further suitable contexts for process interpretations of event nominals are provided by verbs as *fortfahren* 'continue' or modifiers as *während* 'lasting'.

(42) dann die von Seeland nit lenger verziehen wollen/
because these of Sealand not longer wait want

sondern [...] fahren fort mit außrüstung jhrer Kriegsschiff [...] (R 127.4)
but continue with equipping of their war-ships

'because the people of Sealand do not want to wait any longer but continue with equipping their war-ships, [...]'

Accomplishment-based nominalizations thus behave as the corresponding verbal bases in comparable contexts do:

(43) a. Während er die neu angekommenen Gäste empfängt, [...]
while he the newly arrived guests receives,
'while receiving the newly arrived guests'

b. Nachdem er die neu angekommenen Gäste empfangen hat, [...]
after he the newly arrived guests received has,
'after receiving the newly arrived guests'

(44) Er fährt fort, seine Mannschaft mit roten Socken auszurüsten.
he continues his team with red socks to equip
'he continues to equip his team with red socks'

The historical data in (41) and (42) suggest that deriving an *ung*-nominal from a verbal base does not imply a shift from a lexicosemantic structure rather stressing the dynamic part to a lexicosemantic structure focussing on the change of state part as observed by Ehrich & Rapp (2000) for PDG. *Ung*-nominals and the corresponding verbs behave alike as far as their actional properties are concerned.

4.3 *Ung*-nominals and nominalized infinitives

There is no doubt that nominalized infinitives are closely related to the corresponding verbal forms in PDG: (i) All verbal infinitives have a nominal counterpart, and (ii) the meaning of the nominalized infinitive is predictable from the meaning of the verbal form.[12]

In ENHG, *ung*-nominals pattern with nominalized infinitives with respect to their distribution. Both nominals appear in prepositional phrases expressing that one proposition is immediately followed by the other:[13]

(45) a. ist jhnen das predigen von jhrer May: wider erlaubt worden/
has them the preaching by His Majesty again allowed been

[12] Though there are some instances of lexicalized nominal infinitives: *Unternehmen*, for example, doesn't mean 'undertaking' but 'enterprise', and *Ansehen* has to be translated with 'standing' not 'looking at'.

[13] Note that in PDG this construction is wellformed neither with *ung*-nominals nor with nominalized infinitives, but requires a participial phrase. The participle, however, may never occur as complement of a preposition.
Die Folgen ihres Tuns realistisch einschätzend, trat sie von ihrem Amt zurück.
'realistically assessing the consequences of her actions, she stepped down'

mit vermeltung/ dass sie [...] (R 87.9)
announcing that they

'the preaching has again been allowed to them by His Majesty, announcing that [..]'

b. jhre May. aber solches passiren zulassen nicht bedacht/ mit vermelden das [...]
His Maj. however this pass to let not considered announcing that
(A 300.10)

'His Majesty, however, didn't consider to let this pass, announcing that [...]'

Moreover, both deverbal nominals may appear as conjuncts in a coordination structure, as illustrated by the data in

(46) a. in ansehen vnd betrachtung der obberürten stattlichen interceßion vnd Fürbitten
'while looking at and viewing the above mentioned intercessions and prayers' (A 26.21)

b. sie hetten dem Bapst, Machomet, Schrifftgelehrten, Künstlern und Sophisten,
they had the Pope, Machomet, scribes, artists and sophists

besser in die Woll gegriffen und ihr hülffreichs gemüht nicht nuhr
better fought and their helpful nature not alone

mit seufftzen und wünschung der Consumation erwiesen.
with sighing and wishing the consumation's proved (FF 21.29)

'they better had proved their helpful nature not alone with sighing and wishing the consumation, but [...] '

with both verbs sharing their sortal interpretation.

Regarding argument selection by nominalized infinitives in ENHG, they behave as *ung*-nominals: Underlying subjects as well as underlying objects appear as genitive complements irrespective from the sortal interpretation of the deverbal nominal. Examples for event nominals are given in

(47) a. In Candia sitzt eine Person gefangen/ welche den Marquis de Villa
in Candia is a person captured who the Marquis de Villa

auff des GroßVeziers anstifften hat ermorden wollen. (M 148.2)
upon the Great-Vizier's putting up has kill wanted

'somebody is captured in Candia who has wanted to kill Marquis de Villa upon putting up of the Great-Vizier'

b. Zu Wißmar soll den Reformirten das Auffbauen einer Kirchen seyn
at Wismar should the reformists the building a church's has

erlaubet worden. (M 343.19)
allowed been

'the buildung of a church is supposed to have been allowed to the members of the Reformed Church at Wismar'.

As *ung*-nominals share a number of properties with nominalized infinitives in ENHG, I conclude that they are as closely related to their verbal bases as nominalized infinitives are.

4.4 Syntactic properties of *ung*-nominals

So far, *ung*-nominals have been considered as recategorizations of verbal stems sharing semantic properties with their derivational bases. With non-deverbal nouns *ung*-nominals have in common (i) that they combine with determiners (including the negative *kein*), (ii) that they are modified by adjectives, (iii) that they appear as complements of prepositions and (iv), that their arguments are expressed by genitive phrases.[14] Examples for this noun-like behavior are displayed under

(48) a. Hingegen ist man über die WiederErlassung unserer in Seeland arrestirt
however is one about the realising of our at Sealand kept hold of

gewesener Schiffe widererfreuet. (M 30.6)
been ships again delighted

'one is, however, delighted about the release of our ships being kept hold of at Sealand'

b. da nun der Raht keine fürsehung gethan/ (R 15.13)
if now the council no provisions made

'if the council had not made any provisions now'

c. wie man sonst vernimbt/ ist in der Türckey grosse Theurung/ (R 93.25)
as one otherwise hears is in Turkey great increasing of prices

'there is a great increase of prices in Turkey as is otherwise heard of'

d. Was des im Hertzogthum Bremen angekommenen Frantzösischen Gesandten
what the in the dukedom Bremen arrived French ambassador's

Verrichtung sey/ ist nicht zu vernehmen. (M 5.2)
performing be is not to hear

'it is not heard of what the French ambassador's performing might be in the dukedom of B.'

e. was vor Zimmer- oder Bauholtz zu Wieder-Erbauung der abgebrandten
what kind of timber to re-constructing of the burnt down

Stadt Londen/ soll gebrauchet werden/ (M 12.26)
city of London shall needed be

'what kind of timber would be needed to reconstruct the burnt down the city of London'

In other respects, however, *ung*-nominals act as verbs: First, there are some instances of *ung*-nominals being modified not by an adjective but by an adverb such as *oft* 'frequently':

(49) vnd daß J. M. auff seine offt Erinnerung der Parteyen Sachen nicht/
and that His Majesty upon his frequently reminding of the party's affairs not

oder je gar langsam vnterschrieben (A 274.5)
or really slowly signed

[14] The occurrence of plural forms is often adduced in the literature as a further argument for the noun-like behavior of *ung*-nominals. In the corpus under investigation, plural forms *ung*-nominals are restricted to the rather rare instances of object nominals as *festungen* 'fortresses' or *besatzungen* 'occupying forces' being not an issue in the present study.

'and upon reminding him frequently of the party's affairs, His Majesty either did not or did really reluctantly sign '

While the adverb *oft* 'frequently' indicates the verbal character of the *ung*-nominal, the possessive pronoun preceding the adverb simultaneously stresses the nominal character of the phrasal head. According to recent work about nominalization (cf. Fu et al. 2001 among others), the occurrence of adverbs within a deverbal noun indicates a syntactic structure where a verbal structure is embedded in the noun phrase. Moreover, grammaticality contrasts such as (50) provide evidence that the embedded verbal structure is a VP and no propositional phrase (i.e. CP or IP), at least not in Present-Day English. The examples are taken from Fu et al. (2001).

(50) a. His removal of the evidence deliberately resulted in obscuring the case.
b. *His removal of the evidence presumably promised a lengthy trial.

Whether an analysis along these lines carries over to deverbal *ung*-nouns in ENHG is at least questionable: As noted earlier, there is strong evidence for the assumption of a nominal structure. Furthermore, there are too few instances of adverbs occuring within nominals to argue on good grounds for the presence of a VP in a nominal structure. By far more interesting, also in number, are examples with the negative marker *nicht* 'not' attested in the corpus:

(51) a. Gedachte Fürsten haben wider des Keysers Comissarij
aforementioned princes have against the emperor's plenipotentiaries

zu Disteldorff angeschlagenes Patent ein anders anhefften lassen/ sich
at Düsseldorf's recruitment poster another put up let themselves

der nicht erscheinung entschüldigt/ vnd seyn beyde Fürsten gen Cleve gezogen/
the not appearing's excused and have both princes to Kleeve moved
(A 181.3)

'aforementioned princes have [...] apologized for their non-appearance'

b. Die gemeine Gerüchte lauffen annoch also/ daß man in Engeland über
the common rumours are still going around/ that one in England about

die nicht Annehmung des vorgeschlagenen Haages übel zu frieden sey.
the non-passing of the proposed H. badly content be
(M 176.21)

'there is said to be dissatisfaction in England about the proposed H.'s not passing'

c. weilen die Unterthanen in nicht Verkauffung ihrer Weine und anderer Wahren
because the subjects in not selling their wines and other goods'

sehr traurig seyn/ daher auch die grossen Banqueroten entstehen. (M 227.9)
very sad are therefore also the great bankruptcies arise

'because the subjects are very sad about not selling their wines and other goods'

Examples as in (51) are of particular interest, because the negative marker *nicht* 'not' is commonly assumed to indicate that the co-occurring *ung*-nominals do not represent nominalizations of eventualities but of propositions (cf. Zucchi 1989, Ehrich 1991 among others).

(52) a. Lotta bedauert ihre Bewerbung.
'Lotta regrets her application'
b. Lotta bedauert, dass sie sich beworben hat.
'Lotta regrets that she has applied'

In (52), the *ung*-nominal alternates with a *dass-* 'that' clause as complement of a factive verb, indicating the propositional nature of the deverbal noun. With examples like (51) the question arises whether we have to assume a propositional phrase within the noun phrase structure (capturing the appearance of adverbs as well). Restrictions of space prevent me from going into this topic in more detail, but provide more support for the verbal character of *ung*-nominals in ENHG.

Further support that *ung*-nominals are verb-like also in syntactic terms is provided by the frequent lack of either determiners and/or modifying adjectives in nominal phrases with a deverbal head. Many of these *ung*-nominals appear as complements of prepositions, as

(53) a. Auff 3 diß ist zu Genova ein so erschrecklich Wetter/mit Wind/
on the 3rd of this month has at Genoa a so frightening storm with wind

Donner/ Plitz vnnd Regen gewest/ welches vmb dieselbe gegend
thunder lightning and rain been that in this region

mit einreissung der Bäum vnd Heuser grossen schaden gethan/ (R 164.23)
with pulling down of the trees and of houses big damage caused

'a very frightening storm with wind, thunder, lightning and rain has raged the 3rd of this month in Genoa, causing a big damage by pulling down trees and houses

b. Das er [...] den Grafen von Lowenstein vnd Werthein an empfahung seiner
that he the Count of Löwenstein and Wertheim from receiving his

behenden Lehen/ vnd anderer Rechten mercklich gehindert. (A 208.30)
both fieves and other rights noticably prevented

'that he noticably prevented the Count of Löwenstein and Wertheim from receiving his both fieves and other rights'

The prepositional phrases in (53) display different functions: whereas the PP in (53a) functions as a modifier, the PP in (53b) expresses the verbal complement of *hindern* 'prevent'. Both phrases, however, are headed by an *ung*-nominal denoting a proposition. Note that we have to use either a participial or an infinitival clause to translate the ENHG examples into PDG.[15] Since the *ung*-nominals denote propositions it comes as no surprise that we observe something like a control effect in both instances. The implicit subject argument of the complex event nominals is interpreted with respect to a noun phrase in the matrix clause: In (53a), it is the subject *ein so erschrecklich wetter* 'a so frightening storm' that controls the underlying subject of *einreissung* 'pulling down'; in (53b), it is the object *den Grafen von Lowenstein vnd Werthein* 'the Count of Löwenstein and Wertheim' that controls the underlying subject of *empfahung* 'receiving'. Data like (53) therefore further corroborate the assumption that the agent argument is part of the noun's argument structure (though it remains implicit).

Ung-nominals show a heterogeneous syntactic behavior in ENHG. Though they have the grammatical structure of a noun phrase, they act as a verb in some respects allowing for adverbial modifiers and the negative marker *nicht* 'not'. It is a matter of further study whether deverbal nouns include a propositional phrase in their otherwise nominal structure.

[15] *Ung*-nominals behave in that respect as the English *ing*-forms, with participial clauses used as adjuncts and verbal gerunds as complements. The respective arguments of these *ing*-forms, however, are lexicalized as verbal objects:
(i) While climbing the mountain, we decided that we would go only part of the way up. (Portner 1994)
(ii) I just couldn't believe her singing this song so sweetly! (slightly modified from Parsons 1994:133)

5 Summing up the changes

The historical record suggests a number of changes affecting the derivation of *ung*-nominals between the 18th century and today's German:

- While the linking properties of event nominals in PDG crucially differ from the linking of their verbal counterparts, no such differences are observed with respect to the linking properties of verbs and event nominals in ENHG.
- In contrast to PDG, there is a regular meaning relation between deverbal nouns and their verbal counterparts in ENHG. Hence, no semantic restrictions govern the derivation of *ung*-nominals in earlier periods of German.
- Nominals based on accomplishment-verbs exhibit process readings productively in ENHG, depending on the context. Process readings of *ung*-nominals are rather marked in PDG as noted by Ehrich & Rapp (2000); this observation holds for both *ung*-nominals derived from accomplishment-verbs as well as for *ung*-nominals derived from activity-verbs.
- As compared to the historical record, we observe a clear difference between *ung*-nominals and nominalized infinitives in PDG: the coordination of both nominalization patterns yields ill-formed results as opposed to earlier periods of German where structures as the following are frequently attested:

(54) das Stadische Kriegsvolck hat vergangen wochen diser orten dem Land
the estates' soldiery has last week here the country

vnd wandersleuten mit plündern vnd Brandschatzung grossen schaden gethan
and wayfarers with raiding and pillaging a lot of damage caused
(R 43.9)

'last week, the estates' soldiery has caused a lot of damage to the country and some wayfarers by raiding and pillaging'

Translating the ENHG coordination structure into PDG, we have to use the nominalized infinitive in both conjuncts, hence *mit Plündern und Brandschatzen* 'with raiding and pillaging' instead of the ill-formed *mit Plündern und Brandschatzung*. The ill-formedness suggests that *ung*-nominals and nominalized infinitives no longer have a common distribution in PDG with the *ung*-nominal developing a more noun-like semantics.[16]

- With respect to their syntactic properties, *ung*-nominals allow for adverbial modifiers as well as the negative marker *nicht* 'not' in ENHG. Likewise, many instances of the deverbal noun lack determiners and/or adjectival modifiers. This particularly holds for *ung*-nominals acting as complements of prepositions. Though some relicts of this use can still be found, it is no longer a productive pattern. Typically, they are confined to particular registers.

(55) Sie fasst ihren Entschluss unter Berücksichtigung aller Fakten.
'she is making her decision upon taking into account all facts'

[16] As a matter of fact, many contexts allow for the nominalized infinitive but not the corresponding *ung*-nominal in PDG:

(i) Lotta kommt ins Erzählen/*in die Erzählung.
'Lotta starts telling'

(ii) Im Laufen/*in der Laufung bindet Elsa ihre Schuhe zu.
'Going, Elsa laces up her shoes'

The data in (i) and (ii) differ with respect to the temporal interpretation they trigger: While the context in (i) marks the beginning of a process, (ii) expresses the simultaneity of two processes, one of which is realized by a deverbal noun. Obviously, *ung*-nominals are excluded in both type of contexts. For a detailled discussion of the different distribution of *ung*-nominals and nominalized infinitives, cf. Ehrich (1991).

I consider the historical changes we observe in the history of *ung*-nominals since the 18th century to be best captured in terms of a change affecting the lexical semantic structure of *ung*-nominals, i.e. a change shifting the focus from the first part of a complex predicate to its second part, that is, from the activity to the change of state or state part, respectively. Thus, we are able to account for the changes concerning the linking properties of event nominals as well as of nominals derived from stimulus-subject verbs. We can furthermore explain why the derivation of *ung*-nominals is governed by semantic restrictions in PDG, and why process readings are rather marked with *ung*-nominals based on verbs denoting either activities or accomplishments in PDG. To express processes in actual German with a deverbal noun, we use the nominalized infinitive or, taking into account propositional uses, participial or infinitival clauses. The gradual nominalization process of the word formation pattern – in the literal sense of nominalization – also shows with respect to its syntactic properties: as long as *ung*-nominals share important semantic properties with corresponding verbs, they may still act verb-like in syntactic respects. Whether we have to account for these syntactic properties by assuming a propositional phrase within the nominal structure in ENHG, is pending further study.[17]

Relating changes with respect to argument linking to a change in the lexicosemantic structure of *ung*-nominals raises the question why we observe such a nominalization process with *ung*-nominals but not with nominalized infinitives in the history of German, in particular in view of the fact that no such nominalization process is attested with *ing*-nouns in the history of English. We rather use *ing*-formations to translate the ENHG data into Present-Day English.[18] What nominalized infinitives in German and *ing*-nominals in English have in common is their simultaneous use in nominal as well as verbal environments. While the verbal use of the infinitive is straightforward, it is only since the 14th century when phonological changes motivated the replacement of the inflectional suffix *-ende/-inde* by *-inge* in building the form of the present participle (cf. Wik 1973, Nehls 1988 among others) that the verbal use of *ing*-formations has been established. It is obviously due to this change that *ing*-nominals are prevented from a gradual shift in terms of nominalization throughout the history of English.

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[17] I do not see how an approach in terms of thematic roles, as proposed for example by Barker & Dowty (1993), would account for the diachronic properties of *ung*-nominals. To capture the behavior of nouns with respect to argument selection, Barker & Dowty suggest to distinguish between verbal and nominal proto-roles. While proto-roles as Proto-Agent and Proto-Patient govern verbal argument selection, proto-roles as Proto-Part and Proto-Whole predict the linking properties of nouns:

(i) Elsa vernichtet die Unterlagen.
'Elsa destroys the documents'

(ii) ein Kapitel dieses Buches
'a chapter of this book'

The argument *Elsa* is syntactically expressed as subject-NP in (i), because this argument satisfies properties ascribed to the Proto-Agent such as causing an event and bringing about a change of state. The object-denoted participant *Unterlagen* 'documents' on the other hand entails a crucial property of a Proto-Patient, i.e. it is undergoing a change of state. *Kapitel* 'chapter' and *Buch* 'book' in (ii) figure as Proto-Part and Proto-Whole. To account for argument selection properties of deverbal nouns, Barker & Dowty assume that the distribution of nominal and verbal proto-roles is independent from the ontological type of predicates: just as deverbal nouns entail verbal proto-roles, stative verbal predicates (cf. *contain*, *surround*) may entail nominal proto-roles.

Evaluating this approach only with respect to the historical record of deverbal *ung*-nouns, I see no way to capture the changes with respect to argument structure by means of a framework using thematic roles. Since the changes neither affect the verbal or nominal status of particular roles (the proto-roles linked to deverbal nouns continue to be verbal throughout history) nor the inventory of proto-roles, the historical facts favor accounts of argument selection in terms of lexical decomposition over accounts using thematic roles.

[18] Both German *ung*-nominalizations and English *ing*-nominalizations evolve from a common source. Old English productively uses both forms of the derivational affix, cf. *freming* 'Vollbringung', *bodung* 'Predigen' (the distribution depending on the verbal inflection class, cf. Quirk/Wrenn 1955), while the use of *-ing* in Old High German is restricted to the Ripuarian dialect area with *ung*-nominals abounding otherwise (s. Wilmanns 1896:374).

6 Conclusion

My examination of *ung*-nouns in ENHG has revealed the different nature of the word formation pattern in earlier periods of German where the derivation of *ung*-nominals means a mere syntactic recategorization of verbal bases. At that period in the history of German, the derivational process has no effects whatsoever on the lexicosemantic structure of the verbs in question. Hence, no differences between deverbal nouns and their verbal counterparts arise with respect to argument linking.

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Word Order Patterns in Greek Nominals: Aspects of Diachronic Change[1]

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Abstract

In this paper I investigate a change in the word order patterns of Greek nominalizations that took place from the Classical Greek (CG) period to the Modern Greek (MG) one. Specifically, in CG both the patterns in (A), with its two subtypes, and (B) were possible; the MG system, on the other hand, exhibits only the (B) pattern. The difference between the two systems is that agents can only be introduced in the form of prepositional phrase in MG nominals in a position following the head noun, while they could appear in a prenominal position bearing genitive case in CG. Moreover, the theme genitive, i.e. the objective genitive, could precede the head nominal in CG; this is no longer the case in MG, where the theme genitive follows the head noun obligatorily:

(A) i) Det-(Genagent)-Nprocess-Gentheme / ii) Det-Gentheme-Nprocess

(B)Det-Nprocess-Gentheme (PPagent)

I argue that the unavailability of (A) in MG is linked to the nature and the properties associated with a nominal functional projection contained within process nominals and to other related changes in the nominal system of Greek.

1 The problem: argumental genitives in the history of Greek

In MG the agent of a process nominal surfaces obligatorily as a PP (1a):

(1)	a.	i	katagrafi	ton	stihion		apo	tus	ipalilus
		the	writing-down	the	evidence-gen		by	the	employees-acc
	b.	i	katagrafi		ton	stihion	ton		ipalilun
		the	writing down		the	evidence-gen	the		employees-gen

(1b) is impossible on the reading that (1a) has, i.e. 'the employees were the ones that wrote the evidence down'. The sentence is fine if the second genitive is interpreted as the possessor of the object, i.e. the evidence that belongs to the employees. Moreover, (1a) is the only possible order the arguments of the noun can surface in. The examples in (2), where either the genitive or the PP appear in prenominal position, are both ungrammatical:

(2)	a.	*i	ton	stihion	katagrafi	apo	tus	ipalilus
		the	the	evidence-gen	writing down	by	the	employees-acc

[1] Preliminary versions of this paper were presented at the workshop on Nominalization at the University of Tübingen in April 2001, and at the workshop on DP-internal relations at the University of Thessaloniki in September 2001. I would like to thank the participants for their comments. Many thanks to Jane Grimshaw, Melita Stavrou and Ilse Zimmermann for discussions.

b.	*i	apo	tus	ipalilus	katagrafi	to	stihion
	the	by	the	employees-acc	writing down	the	evidence-gen

Note that fronting of the argumental genitive is possible, resulting in focalization of the fronted argument (cf. Horrocks & Stavrou 1987):

(3)	ton	stihion	i	katagrafi	apo	tus	ipalilus
	the	evidence-gen	the	writing down	by	the	employees-acc

CG differs from MG in the following ways. First, alongside with (4), the MG pattern, two genitives signaling different relations to the same noun were possible, see (5)-(7):

(4)	h	men	empempsis	ths	stratias	hupo Lakedaimonio_n
	the	prt	sending	the	army-gen	by Spartans-gen
	'the sending of the army by the Spartans'					Th. 4.85.1

(5)	thn	ge	emfrono_n	zhthsin	tou mellontos
	the	prt	wise-gen	search	the future-gen
	'the search of the future by the wise ones'				Pl. Phrd. 224c

(6)	hê	Phaia_kôn	proenoikêsis	tês	Kerku_ra_s
	the-nom	Phaecians-gen	occupation-nom	the-gen	Corcyra-gen
	'the Phaeacians' occupation of Corcyra'				T. 1.25.

(7)	hê	tou Lachêtos	tôn	neôn	archê
	the-nom	Laches-gen	the	fleet-gen	command-nom
	'Laches' command of the fleet'				T. 3.115

Second, while in MG the objective genitive cannot precede the noun, cf. (2a), this was possible in CG:

(8)	th	to_n	echthro_n	timo_rian
	the	the	enemies-gen	punishment-acc Lys. 2.16

In CG even PPs (9) and adverbs could appear in pre-nominal, post-determiner position, as reported in Manolessou (2000). This is no longer possible in Modern Greek, cf. (2b) and (10):

(9)	ai	es	thn Attikhn	esbolai	Peloponnhsio_n	*CG*
	the	into	Attica	invasions	Peloponnesians-gen	

(10)	*i	ktes	katastrofi	tis	polis	*MG*
	the	yesterday	destruction	the	city-gen	

Before I entertain a hypothesis concerning the CG patterns, the following remarks are in order. The examples in (5)-(6) seem reminiscent of certain nominal constructions found in other languages. These are shown in (11). (11a) is a transitive nominalization in English. (11b) is a similar construction in Russian containing a possessive adjective (PA) in the function of the agent, and (11c) is a transitive nominalization in Italian, where the agent again appears in the form of the possessive adjective:

(11) a. the barbarian's destruction of the city

b.	Petino	ispolenenie	Šopena		*Russian*
	Petja-PA-N	performance	Chopin-gen		
	'Petja's performance of Chopin'				
c.	la	sua descrizione	della	citta	*Italian*
	the	his description	of the	city	

(8) seems similar to passive nominalizations in English illustrated in (12):

(12) the city's destruction

Since MG lacks all these patterns, the question that arises is whether the CG patterns could receive a similar analysis to that of (11)-(12). Thus it could be the case that whatever accounts for the difference between MG and the other languages is responsible for the differences between MG and CG. However, matters are not that simple. As we will see, the change observed is a result of various morpho-syntactic factors affecting the functional domain within process nominals, and it cannot be straightforwardly attributed to the factors causing MG nominals to differ from e.g. their English counterparts.

The paper is structured as follows. In section 2 I present my assumptions concerning the structure for process nominals. In section 3 I outline a way to deal with synchronic variation among language and types of nominalizations, showing that these reduce to properties of functional projections inside the DP. Finally, in section 4 I offer a journey through the history of Greek nominalizations. I associate the differences between MG and CG to properties of a functional projection, labeled FP in section 3. The changes are further related to other morpho-phonological changes within the Greek DP.

2 The structure of process nominals

It is typically assumed that there is a small number of primitive, universal grammatical categories: N (noun), V (verb), A (adjective) and P (preposition). Each is taken to have a number of prototypical/distinct properties. Consider verbs as opposed to nouns. Their prototypical properties are listed in Table 1, as well as the range of inflectional elements they are associated with.

Table 1

Verbs	*Nouns*
denote events	are referential expressions
take arguments (participants in the event)	lack arguments (participants in the event)
are modified by adverbs	are modified by adjectives
inflect for tense, aspect, voice, mood, agreement	inflect for number, case, gender, definiteness

Derived nominals,[2] however, belong to a class of constructions referred to as *trans-categorial* or simply *mixed category* constructions, which do not fit well with the basic distinction in categories. These constructions involve elements that seem to be core members of more than one category simultaneously. Specifically, although they have the distribution of other common nouns, they retain verbal properties. For instance, derived nominals typically occur in

[2] Here I refer only to process nominals. For further discussion, see Grimshaw (1990) and Alexiadou (2001).

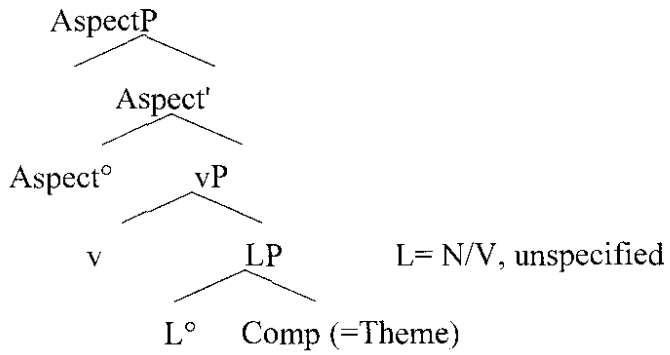
positions that generally admit nouns (13), but they seem to bear the same semantic relations to the NPs that accompany them as their related verbs do; non-deverbal nominals, e.g. *book*, do not have such properties (14).

(13) a. Why does John's criticizing the book/John bother you?
b. I believe that many authors wrote about the destruction of the city/human rights

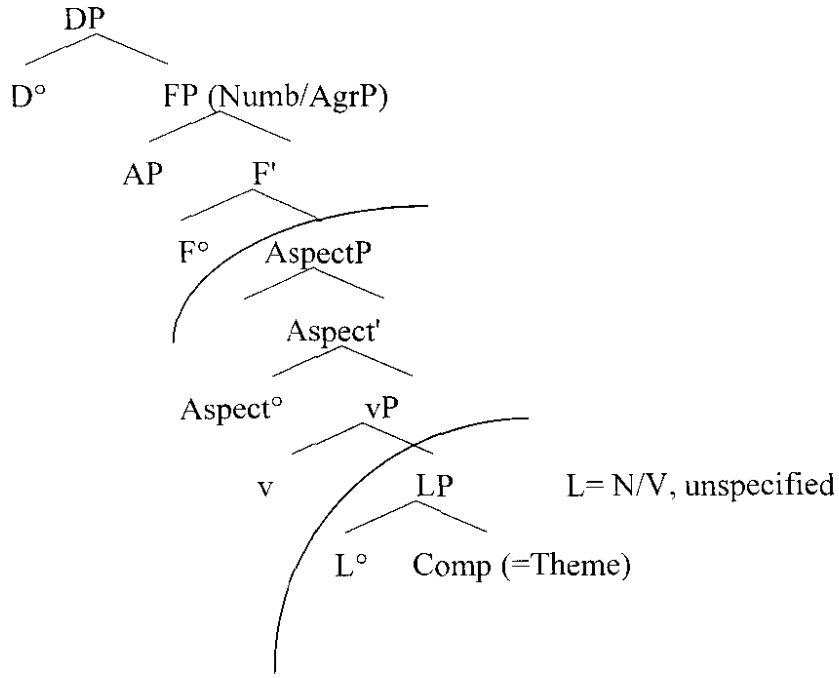
(14) a. John criticized the book
b. The barbarians destroyed the city

As argued for in detail in Alexiadou (2001), the verbal properties of nominals are accounted for by assuming that such nominals contain nominal as well as projections standardly associated with verbal clauses, namely vP and AspectP (Alexiadou 1999, 2001, van Hout & Roeper 1998, Borer 1999). Nominals lacking such verbal properties also lack such verbal projections. Hence nominal properties are attributed to nominal functional layers, while verbal properties are attributed to verbal projections. In particular the structure in (15a), containing an AspectP and a vP, constitutes an eventive environment which can be embedded in multiple environments, e.g. participles, verbal clauses and process nominals. Nominals, as shown in (15b), contain further nominal functional projections, which are responsible for the nominal properties of process nominals. In fact these nominal projections determine the category of the word (see Alexiadou op.cit. for discussion). In case (15a) is embedded under T, the result is a verbal clause.

(15) a.



b.



The functional heads in (15b) are associated with certain properties, briefly discussed here. In particular, D is the locus of definiteness. FP is a projection associated with gender/number (= nominal agreement) morphology (see section 3.2). The morphology of MG and CG nouns does not provide arguments for splitting these features in distinct projections. Rather noun endings are portmanteau morphemes, signaling number, gender and case (see Appendix). The verbal functional head v (Kratzer 1994, Chomsky 1995) is the locus of agentivity, i.e. of features relevant to the licensing and interpretation of external arguments. It contains Case features for the object, and features related to eventivity. It comes in two types: one that introduces an external argument, and one that does not. Finally, the verbal functional head Aspect further specifies event presentation.

As argued for in detail in Alexiadou (2001), the presence of verbal projections within certain types of nominals accounts for the licensing of arguments, cf. also Borer (1999), their event reading, and the fact that they manifest aspectual distinctions associated with Aspect. Moreover, the presence of these functional projections also accounts for the licensing of certain types of adverbs within these nominals. As has been noted in the literature, manner, and aspectual (frequency, interval denoting) adverbs are acceptable, while modal and speaker-oriented ones are not (cf. Borer 1993, Hazout 1995 for Hebrew, Alexiadou & Stavrou 1998, Alexiadou 2001 for Greek among others). On the view that Aspectual adverbs are linked to an Aspect Phrase, while manner adverbs bear a tight relation to Voice Phrase (cf. Alexiadou (1997), Cinque (1999)), this distribution is explained. The lack of sentential adverbs is accounted for if the structure contains only a sub-section of the verbal clause and does not include projections like Tense, which are responsible for the licensing of 'higher' adverbs. Finally, in several languages there is an overt morphological reflex of Voice and Aspect, as in e.g. Turkish or Slavic languages (Alexiadou 1999, 2001 for further discussion).

In the system put forth in Alexiadou (2001) the variation found with nominalization types across languages and within a language depends on the type and the number of the verbal as well as of the nominal projections in (15b). In the next section, I give an illustration of this view.

3 Variation in nominalizations

The various types of nominals encountered across languages and within a language are accounted for in terms of variation depending on the number of functional projections included in the structure, i.e. whether both Aspect and v are present or not and the type, i.e. the feature specification, of the verbal and nominal functional projections. On this view, the semantic-syntactic as well as morphological properties of the various constructions are determined by the height of attachment of the various morphemes. That is certain affixes include Aspect, e.g. *-ing*, while others lack all verbal-like projections, e.g. *-ee*. Since both verbal and nominal projections form a derived nominal, variation is dependent on both 'sets'.

The following two tables summarize the results of Alexiadou (2001). Table 2 summarizes the variation in the number of projections contained within nominals. Table 3 summarizes the results concerning the feature specification of v.

Table 2: variation depending on number of projections

Type of Nominal	*Language*	*Structure*
Nominalized Clause	Greek	D embeds CP
Derived Nominals	Greek/Polish	D embeds AspectP
Gerunds	English	D embeds AspectP
-er nominals/certain derived ones	English/Greek/Russian	D embeds vP

Table 3: variation depending on the type of v[3]

v	*Language*	*Type of Nominal*
+ag, -tr	English	-er Nominals
+ag, +tr	English	Gerunds
-ag, -tr	Greek/Romance/Slavic	*Destruction*

For details the reader is referred to Alexiadou (2001).

The question that arises next is how we can use this system in order to deal with the word order change in Greek nominals. Given that the properties of CG nominals seem similar to that of MG nominals as far as the verbal part of the nominalization structure is concerned, I assume that CG nominal are also formed on the basis of (15a). Examples such as (4), repeated here, show that CG nominals are also 'passive':

(4)	h men	empempsis	ths	stratias	hupo	Lakedaimonio_n
	the	sending	the	army-gen	by	Spartans-gen
	det	**Noun**	**Theme**		**PP**	
	'the sending of the army by the Spartans'				Th. 4.85.1	

In other words, both in CG and in MG nominals v is [-transitive] and do not introduce agents.

Recall the differences once more. CG nominals are like their MG counterparts in that the internal argument bears genitive and the agent is introduced by a PP, but differ in that they also permit constructions where the agent bears genitive and appears in prenominal position. In this respect they are like English 'transitive' nominalizations or their Romance/Slavic transitive nominalizations with possessive adjectives. The relevant data are repeated in (16).

(16)	a.	John's destruction of the city			
	b.	la sua descrizione	della	citta	*Italian*
		the his description	of the	city	
	c.	Petino ispolenenie	Šopena		*Russian*
		Petja-PA-N performance	Chopin-gen		
		'Petja's performance of Chopin'			

Moreover, CG nominals, like their English counterparts, permit passivization, i.e. prenominal placement of the objective genitive. In Alexiadou (2001) the availability of transitive as well as passive nominalizations in English was linked to the nominal part of the structure. I briefly summarize these findings in the next sub-section.

3.1 Transitivity/Passivization depending on the status of Spec,DP

In Alexiadou (2001) I argued that English nominalizations are transitive, not because v is [+tr] but because agents in these nominalizations are located in Spec,DP, which is an A-position in English (Abney 1987). An argument in favor of analysing Spec,DP in English as an A-position is the fact that it does not tolerate expletives.

(17) *there's destruction

In MG DP corresponds to CP, as argued for in detail in Horrocks and Stavrou (1987). Consider (18):

[3] ag = agentive, tr = transitive.

(18) a. i kritiki tu vivliu
the review the-gen book-gen

b. tu vivliu i kritiki

In the (b) example the interpretive effect of fronting is one of focalizing. This is reminiscent of the fronting of constituents that takes place in sentences for the purpose of bringing a particular constituent into prominence (see Tsimpli 1995):

(19) a. edhose to vravio tis Afrodhitis
gave-3sg the prize-acc the-gen Aphrodite-gen
'he gave the prize to Aphrodite'
b. tis Afrodhitis edhose to vravio
c. to vravio edhose tis Afrodhitis

(20) illustrates the interaction between *wh*-movement at the clausal level and DP-internal *wh*-movement.

(20) a. mu ipes oti diavases [to vivlio tinos]
me told-2sg that read-2sg the book whose
'You told me you read whose book?'
b. mu ipes oti diavases [tinos$_i$ [to vivlio t$_i$]]
c. tinos$_i$ mu ipes oti diavases to vivlio t$_i$
d. [tinos$_j$ [to vivlio t$_j$]]$_i$ mu ipes oti diavases t$_i$
e. [to vivlio tinos]$_i$ mu ipes oti diavases t$_i$

As a result, agents and as well as theme genitives can appear in pre-nominal position in English but not in Greek. Following Grimshaw (1990), I assumed that Spec,DP is not linked with any specific thematic role, i.e. it does not introduce agents only. Hence DPs other than agents can appear in this position.

Could we attribute the difference between CG and MG to the properties of Spec,DP? The answer is negative. The 'transitivity' of CG nouns cannot receive a similar explanation to the one just outlined for the transitivity of English nominalizations. Spec, DP is an A'-position in CG as well, see Taylor (1990). Moreover, the order of constituents is Det-Gen-N, suggesting that the genitive is not in Spec,DP. This is very similar to the situation we find in Slavic, where PAs follow demonstratives (21), which are assumed to be situated in Spec,DP:

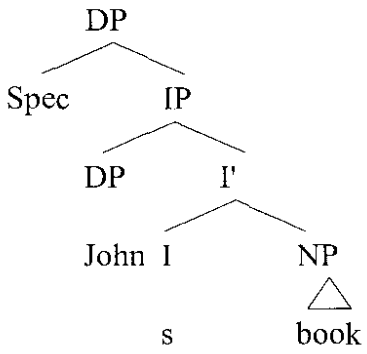
(21) etu moju/Vasinu rabotu
this mine/Vasja-PA work

In the next sub-section I entertain the hypothesis that the transitivity of CG nominalizations is related to the other nominal projection, namely FP.

3.2 On the properties of FP

Szabolcsi (1994), Ritter (1991), and Zribi-Hertz (1998) among others have argued that the FP in (15b) is very similar to Infl; the labels attributed to this projection vary from author to author, Nominal Infl, Number or AgrP have all been suggested. On this view, FP is similar to IP introducing the subject of the verbal clause. It hosts possessors, which are taken to be like subjects of verbal clauses (22). For arguments that such a projection is present within Greek nominals as well, see the Appendix and the references in Alexiadou (2001):

(22)



Empirical support for the suggested parallelism between possessors and subjects is given by the following Hungarian data. As (23b) shows, the possessed noun agrees with the possessor bearing nominative case in number and person, much like the subject agrees with the verb in (23a):

(23)	a.	Mi	iru	b.	mi	titku
		1pl-nom	write-1pl		1-pl-nom	secret-sg-1pl

Recent literature also assumes that this FP is a projection in which possessors and 'nominal' agents are located. For instance, Schoorlemmer (1998) argues that possessors are situated in FP and in languages like English, where these do not-occur with determiners, they move to D. On the other hand, when they co-occur with determiners they remain situated in Spec,FP (cf. (24a vs. 24b) and Cardinaletti 1998 for prenominal possessors in Romance):

(24) a. $[_{DP}$ article $[_{FP}$ Possessor Fo $[_{XP}$]]]

a'.	la	sua	casa
	the	poss.adj	home

b.	$[_{DP}$	Possessor D° $[_{FP}$ t_{Poss} Fo	$[_{XP}$	]]]
b.'		John's		book

Pesetsky & Torrego (2000), like Schoorlemmer, assume that the prenominal genitive is in a lower position, but maintain that in English the D position remains empty.

(25) $[_{DP}$ article $[_{RP}$ Mary $[_{R}$ s] $[_{XP}$ criticism of Sue]]]

The above structures provide a way to account for the CG patterns, especially if one considers their properties and their development through time in more detail. I argue that the genitive in CG, both the theme genitive as well as the agentive one in the transitive nominalization, are located in Spec,FP. MG can only host agreeing elements in this position for reasons that will be discussed in section 4.

4 The diachronic variation

Recall the word order patterns once again.

(A) i) Det (Genagent)-Nprocess-Gentheme / ii) Det-Gentheme-Nprocess

(B) Det-Nprocess-Gentheme (PPagent)

The two issues, namely the 'transitivity' and the internal position of the theme genitive are obviously related. That is the genitive, subjective or objective, occupies the same position in both instances of (A).

In what follows I offer an answer to these two questions I examine the two patterns through the historical periods of the Greek language in order to determine when the (B) pattern became more frequent. Before doing that, I briefly summarize in section 4.1 the historical periods of the Greek language.

4.1 Periods

The Greek language is subdivided in the following periods:

(i) Ancient phase: 14th-6th century. This is subdivided into Mycenaean period (texts in syllabic script attested from the 14th/13th century BC to 8th century) and Archaic (8th-6th century)
(ii) Classical phase: 5th-4th centuries
(iii) Hellenistic and Roman phase: 4th century BC to 4th century AD (*Koine*)
(iv) Byzantine phase: 5th to 15th century AD
(v) Modern phase: 15th century AD to present day

Two things should be kept in mind: (a) Greek splits into several dialects, both Ancient and Modern (Ancient: *Doric, Ioanian, Attic, Phocian etc,* Modern: *Pontic, Cypriot, Tsakonian, Cretan, Peloponnesian, Nothern, South Italian*). I try to abstract away from such distinctions. (b) Very early on, the phenomenon of *diglossia* emerges (in Antiquity, Byzantium and modern period) i.e. two parallel registers/grammars exist, one that attempts to stay faithful to Classical Attic (especially in written form), and one that develops in a 'natural' way. The grammar of the learned written language changes very slowly, if at all (see the discussion in Horrocks 1997). Hence what is relevant for our discussion is the development of pattern (B) in the texts which do not follow the formal register.

Let me now consider the word order in Greek nominalizations through these periods in some detail.

4.2 Word order patterns from Homer to MG[4]

In Homeric Greek there is not much clear evidence with respect to the word order patterns, since both GN and NG occur. At this stage, it is not clear which one of the two is the basic order, since both could be derived. The reason for this is that the definite article was used as a demonstrative pronoun in Homer, and only in CG did it develop to a definite article, as we know it from MG.

In CG, as has been already mentioned, both (A) and (B) are found. In fact, there is more variation. When only one genitive is present, it surfaces in the following positions:

(I) Det-N-Gen, cf. (4):

(26) h men empempsis ths stratias hupo Lakedaimonio_n
the sending the army-gen by Spartans-gen
'the sending of the army by the Spartans' Th. 4.85.1

(II) Gen-Det- N
(III) Det-Gen- N, cf. (8):

[4] cf. Taylor (1990), Manolessou (2000).

(27) th to_n echthro_n timo_rian
the the- enemies-gen punishment-acc Lys. 2.16

(IV) Det-N-Det-Gen

At this period, the definite article comes into general use. Now it is clear that the G-D-N order is derived, and is parallel to the cases of *tu Jani to vivlio* 'the John-gen the book' discussed in Horrocks & Stavrou (1987).

Both D-G-N and D-N-G are very common, as the following figures from Manolessou's work suggest.

(28)

	Postnominal(I)	**Internal (III)**
Herodotus	35,41%	36, 51%
Thucydides	41,37%	38, 49%
Xenophon	63,33%	26,66%
Aristophanes	53,85%	26,92%
Lysias	32,7%	55,77%
Demosthenes	20,75%	58,49%

Variation in word order depends largely on the type of text. But in general it seems to be the case that subjective genitives prefer pattern (III), while objective genitives pattern (I). All authors show very low percentages for the (IV) position, which is why I leave it aside in my discussion.

One could suggest that the D-Gen-N pattern correlates with other ordering patterns in the language, e.g. the order of V with respect to O. In other words, at this stage we could be dealing with a language that was OV. Thus the change from Gen-N to N-Gen correlates with the change from OV to VO. However, in CG both GN and NG are found, relative clauses always follow the noun, adjectives precede the noun. It has also been argued that while Homeric Greek was OV, the change to a VO grammar happened already in the pre-classical period (Taylor 1990), although the word order is relatively free. This suggests that texts from Classical period already show a mixed system as far as the position of the genitive with respect to the noun is concerned.

When two genitives occur with the noun, the subjective one is in prenominal position, while the objective one follows, as in (5)-(6) above, repeated here:[5]

(29) hê Phaia_kôn proenoikêsis tês Kerku_ra_s
the-nom Phaecians-gen occupation-nom the-gen Corcyra
'the Phaeacians' occupation of Corcyra' T. 1.25.

(30) thn ge emfrono_n zhthsin tou mellontos
the wise search of the future
'the search of the future by the wise ones' Pl. Phrd. 224c

According to Manolessou (2000), the internal position is characterized by a number of semantic restrictions. The genitives appearing in this internal position share some common characteristics: they denote human entities, and they must be definite. Frequently they are proper names. The subjective genitive has a clear preference for this position, but the restriction holds for the subjective and objective genitive alike. Note here that possessive

[5] The pattern Det-Gensubj-Genobj- Noun- is found only in Thucydides (Manolessou 2000), hence I do not discuss this pattern either.

adjectives in e.g. Slavic, Dutch, German are also limited to proper names (data from de Wit & Schoorlemmer 1996):

(31) Petino ispolenenie Šopena *Russian*
Petja-PA-N performance Chopin-gen
'Petja's performance of Chopin'

De Wit & Schoorlemmer label 's genitives in Dutch and German PAs as in e.g. *Peters Behandlung seiner Mutter* 'Peter's treatment of his mother', *Jans behandling van de arts* 'Johns' treatment of the doctor'. As is the case with CG internal genitive, when both arguments are present the PA bears the agent role:

(31') *Chopin's performance of Petja

In the absence of another genitive the PA in Slavic, German and Dutch can also bear the theme role:

(32) Jans ontslag *Dutch*
Jan-PA dismissal

Unlike PAs in Romance (33) or Slavic, genitives in CG cannot co-occur with adjectives. Examples are rare, and the genitive cannot be assigned a fixed position with respect to the adjective, a fact which led Manolessou (2000) to conclude that the two compete for the same position:

(33) *le* ***sue*** *goffe* *reazioni* *immediate* *alla* *tua* *lettera*
the his/her clumsy reactions immediate to-the your letter
(Cardinaletti 1998)

In New Testament Greek/Koine, both (A) and (B) are found, but Taylor (1990) points out that the D-Gen-N order is on the decrease, as there are very few cases in Koine Greek.

Table 4

	Classical Greek		*Koine Greek*	
D-G-N	41	46%	2	2%
G-D-N	32	36%	2	2%
D-N-G	16	18%	98	96%
Total	89		102	

This is also supported by Manolessou's study, where she states that in this period we observe strong preference for post-nominal position. In the Hellenistic papyri, the internal position is still maintained, with the same semantic restrictions as the ones observed in CG. Manolessou takes the papyri texts to be more reliable, as the New Testament Greek could be argued to be under strong Semitic influence.

In the Byzantine Phase/Mediaeval Greek, again we find both (A) and (B), but in early mediaeval (5-10th c.) texts, pattern (A) is still possible; however, the postnominal position recedes. Internal genitives are still present in the higher registers, even in later centuries. Internal genitives in vernacular texts have been limited to proper names and pronouns. But

they only appear together with an attributive adjective to support them, as in (34) from Manolessou (2000).

(34) ta eugenika tu Halepe korasia
the kind-pl the Halepe-gen girls

Only in late texts (14-15th c.) do we establish the complete disappearance of the internal genitive.

In MG only (B) is found, but the presence of an internal genitive is tolerated with clitics in the presence of an adjective only:

(35) i ksafniki tus apohorisi
the sudden their departure

Interestingly, there are a number of semantic restrictions with internal clitics in MG (Alexiadou & Stavrou 2000). Consider (36):

(36) a. to paljo **mu** aftokinito vs. to paljo aftokinito **mu**
the old my car
'my former car (the car I used to own)'

b. to kenurjo mu forema vs. to kenurjo forema **mu**
the new my dress
'my newly bought dress (the dress I just bought)'

When the clitic is attached to the adjective, it reveals only one of its original meanings. In particular, the adjective *paljo* ('old') can mean either 'used', 'in bad condition', or formerly possessed; *kenurjio* ('new') means either newly obtained or in good condition. Both meanings are available when the clitic is postnominal.

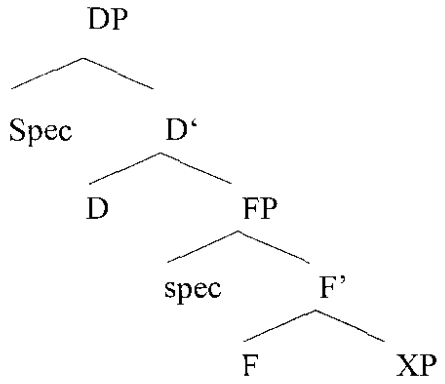
Moreover, the authors point out that there is an animacy restriction depending on whether the clitic is attached to the prenominal adjective or to the noun. The post-adjectival position of the clitic then cannot be the same as the post-nominal one, where no such restrictions apply, and it must therefore be located at a different position.

(37) a. o trelos odhigos tu
the crazy driver- it
'its crazy driver/the crazy driver of the lorry'

b. *o trelos-tu odhigos
the mad-his driver

Alexiadou & Stavrou (2000) argue that the special interpretation of the clitic is associated with FP in (15b), repeated below, on the specifier of which the adjective is generated. The possessor cliticizes to it.

(38)



This FP has a similar though not identical function to TP in the sense that it anchors person/animacy features. In some languages, nominal tense does have an overt morphological reflex. Halkomelem, a Salishian language spoken on the Northwest Coast of North America, has overt past tense marking on nouns. The tense marker on nouns is the same as that on verbs. With verbs the past tense marker occurs on a pre-verbal auxiliary, as illustrated in (39a). The same past tense marker *lh* is also found on Ns as illustrated in (39b-c):

(39) a. i-lh ímex tel sí: le
aux-past walk my grandfather
'My grandfather walked'

b. tel sí:le
my grandfather
'my grandfather'

c. tel sí: lalh
my grandfather-past
'my late grandfather'

Davis (1998) has argued that the locus of person features is identified as T in the verbal domain. Following Davis, one could suggest that FP within DP has a similar function. Thus, the temporal readings and the person/animacy restriction are linked with FP, assuming as in Davis (2000) that T in nominals establishes reference and not location in time.

To summarize, the internal position within Greek DPs stops being available for genitive arguments round the 15th century. MG can tolerate only clitics in this position, as long as there is an adjective to support them. Since in earlier periods the adjective cannot co-occur with a genitive, one can conclude that the adjective in MG and the genitive in earlier stages of Greek occupy the same position, namely FP. The MG clitics, when in internal position, show a number of restrictions similar to the ones observed with the internal genitive in earlier stages of Greek. Hence one can conclude that they are located in the same projection. The following section offers an account of these facts.

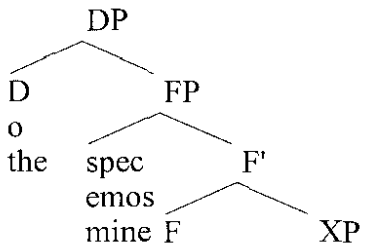
4.3 Accounting for the diachronic change

In the previous section I argued that FP has a role similar to TP, namely it anchors person/animacy features. Hence I propose that in earlier stages of Greek the genitive argument, irrespective of its function, as well as possessive adjectives across languages, appear in this position. This means that both the clitics in MG and the internal genitive (agent/theme) in CG are associated with the same projection. This view accounts for the semantic restrictions observed both with genitives in CG, and clitics in MG.[6]

[6] Manolessou (2000) proposes that genitives in CG and adjectives in MG are located in FP. According to her, FP needs to be identified. This is done either via the genitive in CG, or via the adjective in MG. Manolessou,

In fact this account brings CG nominals close to the analysis of PAs in Slavic proposed in de Wit & Schoorlemmer (1996). Note here that CG had PAs (40), which are also arguably located in FP in agreement with the remarks made in sections 3.2, and 4.2:

(40)



Two questions remain. First, why does this position not host phrasal genitives in MG, since it preserves the residue of the CG system? Second, how does MG and CG differ from English?

Concerning the first issue, clearly the semantic features/function associated with FP remain intact, as is shown by the use of clitics in MG. In order to account for the ban on phrasal, non-agreeing, elements, I examine some related changes in the nominal system of Greek.

The determiner becomes a clitic element, which is in itself in need of a host. While in CG the determiner could host second position particles, as seen in some of the examples here, e.g. (4)-(5), this is no longer possible. In other words the determiner is merely an agreement marker. This change may have triggered a ban on the presence of phrasal non-agreeing elements, with the exception of adjectives. A related change occurs in the possessive system. Note that in CG the genitive of the demonstrative, reflexive and reciprocal pronoun stands generally in prenominal position, while the genitive of the weak form of personal pronouns stands in postnominal position. These prenominal genitives are in complementary distribution with the possessive adjectives.

(41) a. to toutou vivlion
his book

b. to vivlion mou
the book my

But two changes occur. First, the development of the weak forms for the third person pronouns takes place: 'auton' -> 'ton'. The formation of the reduced/weak forms of pronouns (clitics) continues and is completed in the Byzantine period. Second, the decline of the use of the possessive adjective which is replaced by the weak form of personal pronouns for all persons: *mou* 'my', *sou* 'your' and *tou* 'his'. In a system such as the one put forth in Cardinaletti & Starke (1999) whenever there is a choice between a so called weak element, which (certain) possessive adjectives arguably are (see Cardinaletti 1998), and a clitic the clitic form is always preferred. This entails that the development of the possessive clitics has as a result that these replace the possessive adjectives.

Given that these elements become clitics, they need a host. Since they are specified as enclitics, they need to cliticize on an element that can function as a host. Clearly, the determiner does not qualify as such, since it has become a clitic itself. One could imagine that the condition specifying the host of the (poss.) clitic is related to morphological properties

however, does not discuss the properties of internal clitics in MG, which reflect the CG system. Moreover, FP is not always filled, that is DPs without clitics and adjectives also occur, e.g. *to vivlio* 'the book'. If FP were subject to an identification requirement, it is not clear how it would be identified in such cases.

along the lines proposed in Sadock (1991), especially if the properties are related with definiteness/animacy.

(42) X may be X-cl only if X= X-Qgender/number

This means that they can either cliticize on the head nominal as in (37a) or they can cliticize on the adjective as in (36a). The internal position is not possible for the clitic, unless an element is present that satisfies the condition in (42). Since Romance and Slavic do have PAs, they can still form transitive nominalizations of the type described above for CG.

Second, the morphology-syntax of process nominals changed. First, in Koine the endings *-ma/mo* forming verbal nouns are very much preferred. In fact in early Byzantine period, during the 5th and 6th century, the new deverbative suffix *-simo* is on the rise replacing *-si* nouns and the articulate infinitive. *(S)m-* is a suffix which could be seen as related to middle/passive formation. We find the same suffix in passive participle formation e.g. *-menos* (note that middle at the time of New Testament Greek starts collapsing morphologically with the passive). As a result, nominal formations are generally interpreted as passive, something that helps avoiding the transitive counterpart within the nominal, and construct strings which are similar to verbal passives. Second, Koine shows a general preference for the use of prepositional phrases which take over functions of the grammatical cases, e.g. the partitive genitive is now expressed via a prepositional phrase. The same holds also for datives denoting the agent. Moreover, the use of genitive declines in general. As a result, agents are projected noun internally in the *hypo*+gen/*apo* + acc form necessarily.

Now how is CG and MG different from English? Recall the analysis of English transitive nominals. They include genitives in Spec, DP. Evidence that the genitive is in Spec,DP and not in Spec,FP, as Pesetsky & Torrego (2000) propose, comes from the fact that English genitives, unlike Slavic PAs, and CG genitives do not show the same semantic restrictions. Hence strings like *yesterday's journal* etc. are possible in English but not in e.g. Slavic. If the semantic restrictions on internal genitives are related to the feature specification of FP this means English genitives make use of Spec,DP, which is not subject to such restrictions. Note that person/animate genitives could be generated/located at some stage in the derivation in Spec,FP even in English, but they necessarily move to Spec,DP (see Schoorlemmer 1998 for discussion). Otherwise, English could be argued to lack Spec,FP altogether.

5. Summary

In this paper I examined a word order change within Greek nominalizations. The relevant change is repeated below:

(A) i) Det-(Genagent)-Nprocess-Gentheme / ii) Det-Gentheme-Nprocess

(B) Det-Nprocess-Gentheme (PPagent)

It was shown that in CG the genitive preceding the head noun occupied a position external to the NP labeled FP here. Changes in the syntax of the possessive system had as a result that this position is only occupied by agreeing elements, namely adjectives. This in connection with the changes in the determiner system blocks the prenominal and post-determiner position for the argumental genitive.

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Appendix

(1) Formation of Process nominals

Generally, the noun is formed via the addition of certain affixes to the stem of the related verb.

(1)	-i	katastrefo	->	katastrof-i	MG
		destroy		destruction	
	-ma	diavazo	->	diavas-ma	

		read		reading	
	-si	paratiro		paratiri-si	
		observe		observation	
(2)	ä	klepto	->	klope	CG (see Chantraine 1933)
		steal		stealing	
	-ma-	phobeo	->	phobema	
		fear		object of fear	
	-sis	lyo	->	lysis	
		release		releasing	
	-sia	dokimazo	->	dokimasia	
		test		testing	

(2) Nominal Structure

In MG never can gender marking be clearly dissociated from number or, for this matter, case marking:

(3) a. *anthrop-**os***
man-ms:sg:nom
b. *anthrop-**i***
man-ms:pl:nom

Similarly in CG:

(4) a. he hodos
the street-fm.nom.sg.

b. tes hodous
the street-fm.gen.sg

This contrasts with e.g. Spanish:

(4) muchach-**o(-s)** 'boys' muchach-**a(-s)** 'girls'

The situation supports an analysis according to which Greek nominal architecture contains one and Spanish two nominal functional projections below D:

(5) a. [D [FP ... Greek

b. [D [FP [FP ... Romance

The Interface of Lexical Semantics and Conceptual Structure
Deverbal and Denominal Nominalizations

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Abstract

Nominalizations can refer to events, instances of events or participants in an event. The particular reference is determined by the lexical semantics of the base and the suffix, and by the conceptual structure of the base. The comparison between deverbal and denominal nominalization in *-ata* in Italian reveals that the conceptual structure plays a crucial role in determining the reference of a nominalization. Italian nominalizations of *-ata* are productively derived from verbal and nominal bases. Derivations from verbal bases refer to a single event denoted by the base. Derivations from a nominal base *N* denote events or results corresponding to a limited number of patterns, such as *a hit by N, a characteristic action of N, a period of N, a quantity that is contained in N*, etc. The paper argues that the function of the suffix operates on the lexical meaning of the base, but the composition of the lexical meaning of the base with the lexical meaning of the suffix is restricted by the conceptual properties of the base.

1 Introduction*

Italian nominalizations with *-ata* can be derived from verbal or nominal bases. They form single individuated events that are expressed by their bases, as illustrated in (1). The nominalization *telefonata* is derived from the denominal *telefonare*, documented in 1918 for the first time (see Sabatini & Coletti 1997). Derivations in *-ata* from a nominal base N denote single events or results according to certain patterns or "templates". They can denote single events of *a hit by N*, as in (2); events that are *characteristic for N*, as in (3); *a period of N*, as (4), a result in form of *a capacity that is contained in N*, as in (5); to name only four out of a longer list of productive patterns for *-ata* (see section 3.2 for a more comprehensive list):

(1)	*telefonata* (< *telefonare* "to call by telephone")	"telephone-call" (1918)
(2)	*ombrellata* (< *ombrello* "umbrella" (1841))	"event of hitting with an umbrella"
(3)	*bambinata* (< *bambino* "child" (18th cent.))	"event typical for a child"
(4)	*giornata* (< *giorno* "day" (13th cent.))	"time of a day"
(5)	*forcata* (< *forca* "fork" (15th cent.))	"forkful"

A single derivation in *-ata* can be assigned different meanings. For example, *fermata* can denote the event of stopping, the place of stopping or the time period of a stop, as in (6); and *barcata* may either refer to the load that can be carried by a boat or to a large quantity in general, as in (7). Even if these differences in meaning can be derived by general principles of meaning variation or meaning change, such as metonymy, figurative use, construals or coercion, the two meanings of *forcata* in (8) cannot be derived from each other. Rather, they must follow from two independent patterns, namely the ones illustrated in (2) and (5): (i) *a hit by N* and (ii) *a capacity that is contained in N*. Besides lexicalized forms, the suffix *-ata* very

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productively forms new nominalizations from verbal as well as from nominal bases, as illustrated in (9) and (10):

(6)	*fermata* (< *fermare* "to stop") (17th cent.)	(i)	"the event of stopping"
		(ii)	"the location where a stop is usually done"
		(iii)	"the time period of a stop"
(7)	*barcata* (< *barca* "boat") (18th cent.)	(i)	"boatload" ("quantity that can be carried by a boat")
		(ii)	"large quantity"
(8)	*forcata* (< *forca* "fork") (15th cent.)	(i)	"stroke with a fork"
		(ii)	"forkful" (quantity that can be carried by a fork")
(9)	deverbal acceptable new forms		*aggirata* < *aggirare* "to revolve"
			analizzata < *analizzare* "to analyze"
(10)	denominal acceptable new forms		*abitata*< *abito* "habit, custom"
			amantata< *amante* "lover"

While nominalizations from verbal bases generally denote an instance of an event described by the meaning of the base, derivations in *-ata* from nominal bases have much greater variety of denotations. They can follow one of the above mentioned patterns, but they are also free to denote another kind of pragmatically salient type of event. However, it seems that they always denote an instance of an event. I, therefore, assume that there is a common function or common *lexical meaning* of the suffix *-ata*, which can be described as *forming a single event.* Besides this core meaning, the *conceptual structure* of the base restricts the particular meaning of the derived nominalization.

The meaning of a non-lexicalized form not only depends on the lexical meaning of the suffix, but also on the pragmatic and contextual circumstances. While the pragmatic and contextual information is to be described for each utterance separately, this paper investigates the contribution of the suffix to the meaning of the derivation and its interaction with the conceptual information of the base. In particular, I address to following questions with respect to the suffix *-ata*:

- Is there a core lexical meaning of the suffix *-ata* for all different patterns?
- How can we describe the differences between the derivations from nominal bases?
- Which conceptual properties of the base determine the particular meaning of the derived nominalization?

The paper is organized as follows: In section 2, I discuss the historical origin of the suffix *-ata* in Italian, which is of Latin origin and can also be found in other Romance languages. In section 3, I present more descriptive data on the derivations in Italian and the different groups of derivations as well as the discussion of the form of the suffix. In section 4, I describe the conceptual information of the base in terms of selectional restrictions, and in section 5, I present a compositional process in which the representations of the bases are combined with different patterns of the suffix. Sorted variables in the representation for the different patterns must match with the selectional restrictions of the base. Section 6 gives a short summary.

2 The diachronic development

2.1 The suffix *-ata* in Romance languages

The suffix *-ata* in Italian is a common suffix in Romance languages, such as in Italian, Occitan, Spanish, French, Catalan, etc., as illustrated in (11). Parallel derivations in these languages can undergo similar meaning shifts, as illustrated in the shift from the event-

reading ("entering") to the result-reading ("entry") of it. *entrata* (13th cent.) and its equivalents in other Romance languages, as in (12):

(11)	it.	*andata* "going, journey"	*chiamata* "call"
	occ.	*arribada* "arrival"	*casada* "hunt"
	spa.	*buscada* "search"	*llamada* "call"
	fr.	*echappée* "escape"	*traversée* "the crossing, traverse"[1]
(12)	it.	*entrata*	"entering" > "entry"
	fr.	*entrée*	
	spa.	*entrada*	

We find different patterns in nominalized forms from nominal bases: in (13a), the derivation refers to an amount that can be transported by the base, in (13b) the derivation refers to the time period of a day, while in (13c) the nominalization describes an event of a knife/sword-stabbing:

(13)	a.	fr. *bouchée*, it. *boccata*, spa. *bocada*	"mouthful"
	b.	fr. *journée*, it. *giornata*, spa *jornada*	"day long"
	c.	it. *coltellata*, spa. *cuchillada*, occ. *coltelada*,	"stab with a knife"
		cat. *espadada*	"stab with a sword"

2.2 The Latin source of the suffix

It is uncontroversial that the common Romance suffix goes back to a Latin form. Yet it is controversial how its form and its function developed. There are two main positions: Meyer-Lübke (1890) assumes that *-ata* has developed from the perfect participle by change of the semantic function. On the contrary, Collin (1918) argues that the suffix *-ata* has taken over the functional load from the Latin suffix *-tus*, while changing the form *-tus* into the form *-ata* by some intermediate steps.

2.2.1 Meyer-Lübke: the participial source of -ata

The formal identity of the suffix *-ata* with the feminine singular and the neuter plural of the perfect participle strongly suggest a close relation, even an identity. Therefore, Meyer-Lübke (1890), among others, suggested that the nominalizing suffix *-ata* was derived from the participle by syntactic ellipsis and some change of the semantic function of this form. Simplified, he argues that the adjectival use of participle *collecta* in *collecta pecunia* ("collected money") in (14) developed into a nominal use when the syntagma lacked its head noun, which had only little semantic content.[2] In a second semantic shift, the function of the perfect participle was changed step by step. Generally, the perfect participle denotes a perfective or resultative state in the passive: *collecta* "that what was collected". First the form lost the passive aspect and then the perfective one, forming verbal nouns of the type "collecting", as in (15):[3]

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[1] In French, the original suffix *-ata* changed to *-ée*, as illustrated in (i):
(i) lat. *armata* > *armede* > *armee* > nfr. *armée* cf. it. *armata*, spa. *armada*
It was only in the 15th and 16th century that loan words from Italian and Occitan with the suffix *-ade* entered French again. Some native forms were replaced by the loan forms as in *crevade* (instead of an already established *crevee*), *ambassade* (*ambassee*), *boutade* (*boutee*), etc. (Collin 1918, 13f.).

[2] Other head nouns with little or no semantic content are lat. *res* or *causa* ("thing", "cause"). Compare also it. *cosa* "thing" (p.c. Ilse Zimmermann).

[3] Meyer-Lübke (cited in Collin 1914, 456): "Ital. *veduta* bedeutet also zuerst 'das Gesehene', dann durch Zeitverschiebung: 'das, was jederzeit gesehen wird', und man erhält anstatt des Begriffes der vollendeten Handlung den Begriff des Präsens. Zuletzt, in dem 'der eigentlich passivische, objektive Sinn' verloren geht und durch einen subjektiven, aktivischen ersetzt wird, bedeutet es nicht nur 'die Ansicht', d.h. was gesehen wird, sondern auch das Gesicht, d.h. zunächst die Art, wie man sieht, und schließlich die Thätigkeit des Sehens."

(14) Ellipsis of the head noun
lat. *collecta pecunia* > *collecta* Ø > *collecta*
"the collected money" > "the collected (one)" > "the collected"

(15) Loss of passive and perfective marking
lat. *collecta* "the collected" > "collecting"

2.2.2 Collin: the transformation of -tus into -ata

Collin (1918) criticizes the participle approach as too complicated in the shift of meaning described above. He argues that the suffix *-ata* fills exactly the functional load of the old Latin suffix *-tus*. Thus, he concludes that *-ata* replaces *-tus* in its function by some intermediate steps of formal changes that are well motivated. Originally, Latin had two suffixes to form event nominals from verbal bases: the suffix *-(t)io* formed verbal nouns with feminine gender, and *-tus, -sus* which formed verbal nouns that were masculine in the 4th declension. In earlier times there was a semantic difference between the two forms: while derivations of *-(t)io* primarily denoted events, those of *-tus* tended to refer to results.[4] However, in later times both derivations were used in the same way, thus producing parallel forms, as illustrated in (16). Collin assumes three steps of changing the form of *-tus* to *-ata* while keeping the semantic function. In the first step, the gender of the *-tus* forms was reanalyzed as neuter. Most nouns of the 4th declension used to be masculine (thus ending in *-tus*), with a small minority being neuter (ending in *-tum*). However, the similarity of the neuter forms of the 4th declension with the neuter form of the 2nd declension (cf. *abortum*) motivated a reanalysis of the original masculine forms towards neuter form. This reanalysis is also supported by the same form in the accusative singular for masculine and neuter. An additional motivation was the neutral singular of the perfect participle and the supinum:

(16) *abortio - abortus/abortum* "miscarriage"
accessio - accessus/accessum "approaching, approach"
cantio - cantus/cantum "singing, song"

(17) Shift of the gender and declension class
abortio [fem.] - *abortus* [masc., 4th decl.] / *abortum* [neutr., 4th decl. ⇒ 2nd decl.]

A second step is constituted by the common usage of the neuter plural instead of the singular, but with a collective or singular meaning. In a third step it is assumed that the neuter plural (with its singular meaning) is reanalyzed as a feminine singular of the first declension yielding the suffix *-ata* as feminine singular for forming event nominals, like the older forms of *-tio* and *-tus, -sus*. (Collin 1914, 1918).[5]

(18) Shift of grammatical number and reanalysis as feminine singular
lat. *promissum* > *promissa* > fr. *la promesse* "promise"
lat. *debitum* > *debita* > fr. *la dette*, span. *la deuda* "debts"
lat. *responsum* > *responsa* > fr. *la résponse* "response"

[4] Derivations of *-(t)io* outnumbered those by *-tus* by 5 to 1 in classical texts. This was partly because *-(t)io* was the first choice for forming loan-translations from Greek in academic writing. Ruh (1956, 83) notes that the Greek words *eulogia, epistrophê, empneusis, sympatheia* were translated into Latin *benedictio, conversio, inspiratio, compassio*. Cicero complained about the large number of new forms in Latin, even though he himself contributed a large list of new loan-translation (cf. Lindquist 1936, 40). Collin (1918) notes that *-tus* was quite common in vulgar speech, as it can be seen from inscriptions.

[5] Appel (1883, 42; cited in Collin 1918, 47): "Eodem modo, quo illa collectiva, alia neutra, cum pluraliter saepe usurparentur, in femina ideo conversa sunt, quod, quae proprie ex multis partibus constabant, *in unam notionem coaluerunt*. Ad hoc genus pertinent: *dicta, promissa, responsa*."

2.3 The origin of denominal forms of *-ata*

The suffix *-ata* is productively used for forming event nominals from verbal bases from the very beginning of the Romance languages. It forms event nouns that denote one instance of the verbal action: "la fonction primitive de suffixe en roman a dû être d'exprimer l'action verbale d'une façon absolue: de former des *nomina actionis*" (Collin 1918, 125).

This pattern is very productive, and it can be formed from a great variety of verbal bases.[6] Thus the verb *camminare* allows a nominalized form *camminata*, which then can be combined with a light verb meaning more or less what the base verb means. The form *entrata* from the verb *entrare* "to enter" has an event meaning, but also shows a more resultative reading ("entry"), as illustrated in (20):

(19)	*camminata*	"walk"
	fare una camminata	"to go for a walk"
(20)	*entrata* (13th cent.)	"entry, entrance"
	ha fatto un'entrata trionfale	"He entered with triumph"
	l'entrata dell'albergo	"the entrance to the hotel"

Besides this very productive pattern, an additional derivational pattern came into existence: the suffix *-ata* started to form nominalizations from nominal bases. This derivation developed by reanalysis of forms that either might have been derived from a denominal verb or directly from the nominal base of that verb, as in (21) and (23). In the next step, it was possible to derive directly from a nominal base, as in (22) or (24), where the same pattern is used: *a hit with N* and *the amount of Y transported by N.*[7]

(21) it. *martellata* (14th cent.) "hammerblow"
< *martellare* "to hammer" (< *martello* "hammer" (14th cent.))
< *martello* "hammer"

(22) it. *ombrellata* (19th cent.) < *ombrello* "umbrella"
**ombrellare*

(23) it. *beccata* (14th cent.) (i) "peck", (ii) "beakfull"
< *beccare* "to peck" (<*becco* "beak" (14th cent.)) or
< *becco* "beak"

(24) it. *boccata* (14th cent.) "mouthful"
< *bocca* "mouth"
**boccare*

Additional patterns for the suffix *-ata* developed: *a space of time*, as in (25), *an iteration of an architectonic detail*, as in (26), *a meal based on the referent* of the nominal base, as in (27), and *an action typical* for that group of persons described by the nominal base, as in (28):

(25) it. *giornata* (13th cent.) "daytime" < *giorno* "day"
(26) it. *arcata* (14th cent.) "arcade" < *arco* "arc"
(27) it. *cipollata* (15th cent.) "meal prepared from onions" < *cipolla* "onion"
(28) it. *ragazzata* (16th cent.) "childish action" < *ragazzo* "child"

---

[6] Certain verbs do not allow nominalizations of *-ata*. See Mayo et al. (1995, 912).

[7] This development can also be stated for other Romance languages, such as French in (i) and (ii) (Collin 1918):
(i) fr. *montée* "ascending slope" < (i) ofr. *monter* or < (ii) ofr. *mont*
(ii) ofr. *buce* (ca 1120) > *buchiee* > nfr. *bouchée* "mouthful, bite"
ofr. *puing* (ca 1180) > *poignee* > nfr. *poignée* "fist-ful"

The deverbal derivation with *-ata* shows a quite coherent function: it forms nominalized derivations that denote "one instance of the event described by the verbal base". However, the denominal use of *-ata* exhibits a large variety of functions, as illustrated in (21)-(28) (see also section 3.2). It is not obvious that there is one basic function. The discussion in the literature, rather assumes that the denominal nominalization suffix *-ata* shows the same variety of functions as the derivation of denominal verbs. Collin (1918, 134) summarizes: "Pour moi, je crois plutôt que la grande variété de sens de netre suffixe s'explique par le rôle varié joué par le radical dans les verbes dénominatifs qui ont donné naissance à la formation analogique." In connection with denominative verbs, Collin (1918, 135) quotes Behaghel (1900, 1): "Sie [= denominative verbs] dienen im allgemeinen zur Bezeichnung der Handlung, des Vorgangs, der bei Erwähnung des vom Hauptwort bezeichneten Begriffs am leichtesten ins Bewusstsein eintritt." and Bladin (1911, 57): "Every action can be designated by a verb derived from the very noun, the idea of which most easily enters the mind of the person wanting to state the fact."

It is interesting to note, that Clark & Clark (1979, 787, (23)) formulate very similar conditions for forming denominal verbs (their "INNOVATIVES"):

(29) The INNOVATIVE DENOMINAL VERB CONVENTION
In using an innovative denominal verb sincerely, the speaker means to denote
(a) the kind of situation
(b) that he has good reason to believe
(c) that on this occasion the listener can readily compute
(d) uniquely
(e) on the basis of their mutual knowledge
(f) in such a way that the parent noun denotes one role in the situation, and the remaining surface arguments of the denominal verb denote other roles in the situation.

3 Derivations of *-ata* in Italian

3.1 Productivity

The Italian suffix *-ata* forms substantives in the feminine (sg.: *-a*, pl.: *-e*) which denote a single or individualized event (*nomen vicis*) or certain types of resultatives. The derivations are easily set into the plural. The suffix is very productive both from verbal as well as nominal bases. There are lexicalized forms and spontaneous forms, which are either acceptable or not.[8] It seems that the main reason that *ata*-derivations from verbal bases are not acceptable due to lexical blocking.

(30) Deverbal nominalizations of *-ata* (=V-nominalizations)

i. lexicalized forms
abbassata "reduction" (1913) < *abbassare* "to lower"
allargata "widening" (18th cent.) < *allargare* "to widen"

ii. acceptable new forms
aggirata < *aggirare* "to revolve"
analizzata < *analizzare* "to analyse"

iii. non-acceptable forms
**abbandonata* < *abbandonare* "to abandon"

[8] Examples from Vieri Samek-Ludovici (1997), who extracted a list from the Lessico di frequenca dell italiano parlato (De Mauro, Mancini, Vedovelli, Voghera 1993). The judgements are his own (and not uncontroversial).

but: *abbandonamento* "abandoning"
**abilitata* < *abilitare* "to qualify, to pass"
but: *abilitá* "ability", *abilitazione* "qualification"

There are several suffixes that can derive nominalizations from verbal bases, as illustrated in (31).

(31) Possible nominalizations from verbal bases (Scalise 1986, 174)

	a	*ata*	*enza*	*zione*	*ura*	*aggio*	*mento*
revoca(re)	+	–	–	–	–	–	–
mangia(re)	–	+	–	–	–	–	–
preferi(re)	–	–	+	–	–	–	–
amministra(re)	–	–	–	+	–	–	–
arde(re)/arso	–	–	–	–	+	–	–
boicotta(re)	–	–	–	–	–	+	–
suggeri(re)	–	–	–	–	–	–	+

There are selectional restrictions on the derivations from verbal bases: static verbs, modal verbs, aspectual verbs, and certain types of "psychological" verbs cannot form *ata*-nominalizations (Mayo et al. 1995, 912).

(32) **avuta* "act of having" **dovuta* "act of needing"
**cominciata* "act of starting" **sentita* "act of perceiving"
**rallegrata* "act of cheering up" but: *pensata* "act of thinking"

The restriction for deriving nominalizations from nominal bases seems to be different. The pattern for denominal nominalizations are more restricted than for deverbal nominalizations. So it seems that blocking is less active here than lexical restrictions (see section 5):

(33) Denominal nominalization of *-ata* (=N-nominalizations)

i.	lexicalized forms	*bracciata*	i. "armful", ii. "armstroke" (14th cent.) < *braccio* "arm"
		barcata	i. "boatload", "large quantity" (18th cent.) < *barca* "boat"
ii.	acceptable new forms	*abitata*	< *abito* "habit, custom, tendency"
		amantata	< *amante* "lover"
iii.	non-acceptable forms	**accademiata*	< *academia* "academy"
		**aeroportata*	< *aeroporta* "airport"

3.2 The functions of *-ata* in Italian

As already noted, derivations in *-ata* exhibit different types of meaning. Deverbal nominalizations generally denote an individualized event, as in (34). This pattern is quite productive, and the derivation may shift its meaning to a more resultative meaning as in *fermata*. Denominal derivations can take different patterns, as listed in (35)-(41) (cf. Meyer-Lübke 1890, Collin 1918, Scalise 1986, Schwarze 1988, Samek-Lodovici 1997, Ippolito 1999 among others). Some irregular derivations are discussed in section 3.3.

(34) V-*ata*: *single event of V*

tandata, data, guardata , chiamata, entrata, cambiata, fermata, intesa, caduta, giocata, dormita, girata, aggiunta, levata, attaccata, controllata, firmata, lavata, durata, difesa, battuta, curata, corsa, fregata, derivata, coperta, figliata, bloccata, avviata, fumata, arrabbiata, camminata, adoperata, bevuta , chiarita, aggiornata, faticata, approfondita, condotta, cancellata, ...

(35) N-*ata*: event of hitting with N or *hitting with N*
librata, giornalata, linguata, frontata, lettata, bancata, codiciata, bigliettata, corpata, fotata, cavallata, fogliata, cassettata, gambata, corniciata, lenzuolata, cassata, aereata, fiancata, cassettata, discata, bibliotecata, cartellata, finestrata, camiciata, anellata, bicchierata, fedata, ballata, ditata, bottigliata, cartolinata, autata, ...

(36) N-*ata*: event or action typically performed by N or *act as N*
ragazzata, bambinata, Clintonata, Fellinata, gattata, animalata, agentata, caprata, adultata, amicata, amministratorata, arabata, artistata, autorata, bestiata

(37) N-*ata*: *quantity that can be carried by/in N*
aulata, armadiata, barcata, boccata, bracciata, borsata, bustata, camerata, camionata, cartellata

(38) N-*ata*: *period of time of N*:
giornata, annata, aprilata, dicembrata, gennaiata

(39) N-*ata*: *meal prepared on the base of N: fungata, carciofata, cipollata*

(40) N-*ata*: object constructed by the r*epetition of N*: *arcata, colonnata, facciata*
(41) N-*ata*: *weather verb*: *acquata, albata*

Scalise (1986, 209) presents the categorization (42) of the different patterns. He summarizes his observations: "Quando *-ata* si aggiunge a nomi presenta una grande varietà di parafrasi (6i-vi), ma quando si aggiunge a verbi ha solamente una parafrasi (6viii), che è diversa da quelle date per i nomi."

(42) Scalise (1986, 209)

(i)	*piede*	→	*pedata*	"colpo di N"
(ii)	*cucchiaio*	→	*cucchiaiata*	"quantità contenuta in N"
(iii)	*cretino*	→	*cretinata*	"atto da N"
(iv)	*cancello*	→	*cancellata*	"insieme di N"
(v)	*anno*	→	*annata*	"successione di N"
(vi)	*arancio*	→	*aranciata*	"prodotto di N"
(vii)	*guardare*	→	*guardata*	"singolo atto di N"

3.3 The form of the suffix

It is controversial if we have only one suffix for verbal and nominal bases, or if there are two suffixes, *-a* for the verbal bases, and *-ata* for nominal bases. The latter position is taken by Scalise. If we assume that there is only one suffix, it is not so clear what its form looks like: *-ata, -ta* or only *-a*. I first present the analysis for the derivations from the verb and then I discuss the approaches to derivations from nominal bases.

3.3.1 Analysis of V-nominalizations[9]

V-nominalizations are formed by suffixing a feminine *-a* suffix to the past participle of the verb, yielding a feminine nominal form, as illustrated in (43):[10]

(43) Derivation of V-nominalizations

1. Base (+ theme vowel)	V	*ferm-a*
2. Past participle	$[[V] +PP]_{pastpart}$	*fermat-*
3. Deverbal nominalization	$[[[V] +PP]_{pastpart}+a]_N$	*fermata*

The analysis is supported by the fact that V-nominalizations of this type follow the form of the participles in the different conjugation classes of Italian, as illustrated in (44), and also the irregular forms, as illustrated in (45) (for more discussion see Samek-Lodovici 1997, Ippolito 1999):

(44) Past participle and nominalization in "*-ata*"

conj.	verbal base	past participle	nominalization
-are	*sal-a-re* "to salt"	*sal-at-o*	*sal-at-a*
-ere	*batt-e-re* "to beat"	*batt-ut-o*	*batt-ut-a*
-ire	*dorm-i-re* "to sleep"	*dorm-it-o*	*dorm-it-a*

(45) Irregular past participle and nominalization in "*-ata*"

verbal base	past participle	nominalization
compar-i-re "to appear"	*compar-s-o*	*compar-s-a*
corr-e-re "to run"	*cor-s-o*	*cor-s-a*
prend-e-re "to take"	*pre-s-o*	*pre-s-a*

I am not totally convinced by this argument since the irregular forms go back to the Latin forms, and they might probably be determined by phonological rules that apply to verbal as well as nominal forms.

3.3.2 Analysis of N-nominalizations

There are two options for the analysis of N-nominalizations in *-ata*: the first option is taken by Scalise (1986), who assumes that the V-nominalizations are formed by a suffix *-a,* while the N-nominalization are formed by a different suffix *-ata*. However, this analysis would separate the nominalizations into two subtypes with two different derivational processes.[11] Therefore, Samek-Lodovici (1997), Ippolito (1999), among others, have suggested that N-nominalizations are derived by the same suffix *-a* as the V-nominalization. They assume an additional derivation from the nominal base to a (virtual) verbal base, according to the following schema (46) and the examples (21)-(24), repeated in (47): for the derivation of *martellata,* we assume a nominal base *martell(-o)* ("hammer"), which is then transformed into a verbal base *martell*$_V$. This is also documented by the verb *martellare* "to hammer". Then the perfect participle is formed: *martellat*, the N-nominalization is formed, and finally the feminine agreement marker *-a* is attached to it. The same derivation holds for *beccata*. We assume the same steps for the derivation *bocc-ata*, even though the intermediate verbal forms are not documented nor do they seem to be accepted forms of Italian.

(46) Derivation of N-nominalizations

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[9] This section is based on Samek-Lodovici (1997, 3-4).

[10] Alternatively, the suffix *-a* could be simply analyzed as the inflexion or agreement feature for [+fem], rather than as derivational suffix (p.c. Christoph Schwarze). This would mean that the derivation from the participle to the nominalization is not represented by an overt suffix.

[11] Samek-Lodovici (1997, 22): "Italian a-nominalizations constitute one of the strongest challenge to Aronoff's (1979) Unitary Base Hypothesis, because they productively allow for both verbal and nominal bases. This work argues that contrary to appearance, every morphological step within the derivation of a-nominalization satisfies Aronoff's Unitary Base Hypothesis."

1. Base	N
2. Derivation to V (+ theme vowel)	$[N]_V$
3. Past participle	$[[N]_V$ +PP$]_{pastpart}$
4. Deverbal nominalization	$[[[N]_V$ +PP$]_{pastpart}$+a$]_N$

(47)

1. N	*martell*$_N$- "hammer"	*becc*$_N$- "beak"	*bocc*$_N$- "mouth"
2. V	*martell*$_V$- *(martellare)*	*becc*$_V$- *(beccare)*	*bocc*$_V$- *(*boccare)*
3. Vpp	*martell-at- (martellato)*	*becc-at- (beccato)*	*bocc-at (*boccato)*
4. Nom	*martell-at-a*$_N$ "hammerblow"	*becc-at-a*$_N$ (i) "peck" (ii) "beakfull"	*bocc-at-a* $_N$ "mouthful"

To sum up, there are different analyses of the nominalizations in *-ata*. I do not take a position here, rather I follow Mayo et al. (1995, 913):

> "We can either assume, between the base noun and the derived noun, an intermediate derived verb and its participle – even if this verb is not lexicalized, as in (87) – or we can assume that the derivation is more direct, as in (88), and that the corresponding verb, if already lexicalized, is derived independently. Then we would have, as examples:
>
> (87) [telefono]$_N$ -> [telefonare]$_V$ -> [telefonato]$_P$ -> [telefonata]$_N$
> [occhio]$_N$ -> [?occhiare]$_V$ -> [?occhiato]$_P$ -> [occhiata]$_N$
> (88) [telefono]$_N$ -> [telefonata]$_N$
> [telefono]$_N$ -> [telefonare]$_V$
> [occhio]$_N$ -> [occhiata]$_N$
>
> It is not necessary here to decide between the alternatives (they are indeed two parallel paths to the same goal in the case of *telefonata*). For the sake of simplicity we shall assume the more direct derivations shown in (88), using a single derivational operator that leads directly from a noun to an event."

Still, we have to account for the contribution of the suffix *-ata* to the meaning of the derivation. I investigate this contribution at the level of argument structure and different lexical representations.

4 Conceptual patterns and selectional restrictions

Nominalizations of *-ata* are quite productive: formed from verbal bases, they denote an instance of an event described by the verb. Formed from a nominal base, they show a great variety of meanings. This variety is comparable to the meaning variations of denominal verbs. However, lexicalized forms follow a closed set of patterns, as illustrated in section 3.2. This closed set of patterns also influences the production and the interpretation of spontaneous new forms, as it will be shown below.

The question is which factors may restrict or determine the pattern applied. In the following I concentrate on four patterns, the *hit with N*, *act as N*, *capacity of N to transport*, and *meal made of N*. A simplified observation is that conceptual properties of the nominal base determine which of the potential pattern can be applied and which not. The conceptual properties, i.e. properties under which we perceive certain objects, are represented as semantic features of the lexical entries. We can now give a schematic representation of the different patterns, as in (48). E.g., the hit-pattern denotes an event that consists of the structure: *hit(e,x,y,N)*, where the base *N* is in the Instrument slot of that predicate (or event). The object we can hit with must be solid and not to large (otherwise we were not able to hit with it), therefore the base must have the semantic features [+solid] and [+small]. Similar observations lead to the characterization given in (48):

(48) The Structures of the patterns to form nominalizations with *-ata*

Pattern	predicate structure	semantic role of N	semantic features of N	referential argument
hit with N	hit(e, x, y, with N)	Instrument	+solid, +manageable	e (event)
act as N	act(e, x, as N)	Agens	+ human	e (event)
capacity of N	transport(e, x, y, with N)	Instrument (capacity)	-human, +capacity[12]	theme (amount that is carried)
meal made with/of N	prepare(e, x, y, with/of N)	Instrument / Base	+eatable	y: result of the event

It seems that we can assign to each pattern a characteristic set of semantic features. If this is correct, we should be able to predict from the semantic features of the base the potential pattern of an *ata*-nominalization. This is born out in (49), where I give the semantic features for *libro, ragazzo, bocca, fungo, becco* and *barca*, predicting the pattern of the nominalization. The prediction is confirmed by the lexicalized forms of these bases (see above section 3.2).

(49) Conceptual properties of nominal bases for lexicalized forms in *-ata*

base	human	eatable	capacity	solid	manage-able	Type of *-ata*
libro	-	-	-	+	+	hit
ragazzo	+	-	-	-	-	act
bocca	-	-	+	-	+	capacity
fungo	-	+	-	-	+	meal
becco	-	-	+	+	+	cap., hit
barca	-	-	+	+	-	capacity

In the next step I propose to make predictions for potential patterns for spontaneous forms (i.e. non-lexicalized forms). The base *sedia* "chair" has the semantic features +solid +small (or relative small or manageable). Therefore, one would expect that the form *sediata* denotes a "hit with a chair", as in (50):

(50) Conceptual properties of nominal bases for spontaneous forms in *-ata*

base	human	eatable	capacity	solid	manage-able	Type of *-ata*
sedia	-	-	-	+	+	hit

The result of an internet search has provided the following text (51), which confirms the predictions. This text is very informal and close to spontaneous speech.

(51) Road Dogg e Steve Blackman si affrontano per il titolo hardcore, azione molto violenta come sempre. **DDT di Dogg ma Blackman reagisce con una sediata in testa che gli vale il pin vincente**. X-Pac che commentava l'incontro con Jim Ross e Jerry Lawler, dice che lui e Road Dogg hanno discusso su chi sia il miglior wrestler singolo tra loro 2, e che dopo stasera, sfiderà Blackman a Smackdown per il titolo hardcore.
"(...) Dogg reacted to Blackman with a "sediata" on the head that was worth the victory-PIN...."
(Source: http://www.geocities.com/Colosseum/Track/5544/riw2407.html WWF Raw Is Review - By Erik Ganzerli, Edizione del 24.07.2000)

[12] Cf. Collin (1918, 189): "[...] le primitif est *un instrument d'une certaine capacité*."

It is interesting to note that there is an irregular *-ata* form from the verb *sedere*, namly, *seduta* "sitting, meeting":

(52) *seduta* "sitting, meeting" from *sedere* "to be seated, to be sitting"

5 Lexical representations

I assume that the suffix *-ata* has the following functions:

(i) it changes the categorial properties of the base to [N, fem.]
(ii) it shifts the referential argument to the event argument (or some resultative one)
(iii) it characterizes the event as a single event or an instance of an event[13]
(iv) it requires additional restrictions which are determined by the conceptual structure of the base[14]

The common function of the suffix *-ata* is to refer to a single event of the type of the base. This is best seen in the case of a verbal base, generally described in (53). An event *e* is called individualized (or "instance of P") if *e* does not overlap with another event *e'* that is a P. This property will be represented by a predicate INDIV that is predicated of the event variable *e*. So we can have two instances of entering or two instances of (making a) telephone call, but they do not overlap. They are rather distinguishable, and therefore we can count them.

(53) V-*ata*: "single event of V" or "individualized event of V"

In order to determine the lexical contribution of the suffix *-ata* to the derivation, we compare the lexical semantic representation of the verbal base with that one of the nominalized form. The intransitive verb *entrare* is assigned the lexical semantics in (54a): it describes events of the type that someone enters. The nominalized form *entrata* is assigned the semantics in (54b): it refers to individualized events of entering (I have suppressed other information such as the PP or the place that is entered). Under the assumption that the suffix *-ata* is applied to the verbal base by functional application, we yield the lexical semantics in (54c): the suffix takes a predicate and yields a nominalized form. (55) demonstrates the derivation for a transitive verb. The lexical representation of *-ata* has to take care of the transitive predicate.[15]

(54) a. *entrare* λx λe [enter(e, x)]
b. *entrata* λe [enter(e, x) & INDIV(e)]
c. *-ata* λP λe [P(e, x) & INDIV(e)]
(55) a. *lavare* λy λx λe[wash(e, x, y)]

[13] Cf. already Collin (1918, 153) and quotations therein (e.g. Meyer-Lübke 1890)

[14] Schwarze (2001, 15ff.) argues that *ata*-nominalizations are rather underspecified in their meaning. They need additional information from the conceptual system: "Dove trova il parlante la risoluzione delle variabili create dall'operatore *-ata*? Le informazioni necessarie a questo scopo non fanno parte del lessico definito come componente della grammatica mentale, bensì del sistema concettuale."

[15] In order to keep the representation as simple as possible, I have suppressed information about the nominal linking of arguments. The representation of the arguments that can be realized as genitive would be like (54') and (55'). However, in the remainder I will suppress them since they are not crucial to the argument here.

(54') a.*entrare*	λx λe [enter(e, x)]	(55') a.*lavare*	λy λx λe [wash(e, x, y)]
(54') b. *entrata*	(λx) λe [enter(e, x) & INDIV(e)]	(55') b. *lavata*	(λy) λe [wash(e, x, y) & INDIV(e)]
(54') c.-*ata*	λP (λx) λe [P(e, x) & INDIV(e)]	(55') c.-*ata*	λP (λy) λe [P(e, x, y) & INDIV(e)]

A general form for the suffix is (i), where the predicate takes n arguments (besides the event argument) Additionally, I assume that only the highest argument can be instantiated by a genitive.

(i) *-ata* λP (λx_n) λe [P(e, x_1, ...x_n) & INDIV(e)]

b. *lavata* λe [wash(e, x, y) & INDIV(e)]
c. *-ata* λP λe [P(e, x, y) & INDIV(e)]

Before I give the representation for the denominal nominalization, I first discuss the derivation via a verbal form, as for *martello* > *martellare* > *martellata* (cf. (21) above). The nominal base is a simple predicate that takes one (referential) argument. The transitive verb *martellare* is represented in (56b) as the event e in which x does (to) y and in which a hammer is involved (here as general relation R). Thus the verbalizing derivation must be described on the lines in (56c): it takes a noun *N* and creates a transitive verb where the noun restricts the event by some relation *R*.[16]

(56) a. *martello* λx [hammer(x)]
b. *martellare* λy λx λe[DO(e, x, y) & ∃z [hammer(z) & R(e, z)]]
c. [ ]$_N$ → [N]$_V$ λN λy λx λe[DO(e, x, y) & ∃z [N(z) & R(e, z)]]

In a second step we can derive the *ata*-form by applying its semantics (cf. (55c) = (57b)) to the verbal base, yielding the semantics for the nominalization in (57c). Here the predicate *P* comprises the more complex expression DO(e, x, y) & ∃z [hammer(z) & R(e, z)]. Alternatively, we can also derive the nominalized form directly from the nominal base, as in (58). The semantic representation of *-ata*$_I$ is composed from the semantics of the verbalization (56c) and the semantics of deverbal *-ata* (57b):

(57) a. *martellare* λy λx λe[DO(e, x, y) & ∃z [hammer(z) & R(e, z)]]
b. *-ata* λP λe [P(e, x, y) & INDIV(e)]
c. *martellata* λe[DO(e, x, y) & ∃z [hammer(z) & R(e, z)] & INDIV(e)]
(58) a. *martello* λx [hammer(x)]
b. *-ata*$_I$ λN λe [Do(e, x, y) & ∃z [N(z) & R(e, z)] & INDIV(e)]
c. *martellata* λe [Do(e, x, y) & ∃z [hammer(z) & R(e, z)] & INDIV(e)]

Note that the compositional semantics does not care if we account for the derivation in one or in two steps. The result is in both cases the same (or the other way around: we have determined the semantics of the derivational processes such that there is no semantic difference between these two ways of derivation.). So we can derive *ombrellata* from nominal *ombrello* either by one derivation, as in (59) or by an intermediate step (and a virtual verb), as in (60). At this point, semantics cannot decide for one way or other.

(59) a. *ombrello* λx [umbrella(x)]
-ata$_I$ λN λe [Do(e, x, y) & ∃z [N(z) & R(e, z)] & INDIV(e)]
c. *ombrellata* λe [Do(e, x, y) & ∃z [umbrella(z) & R(e, z)] & INDIV(e)]
(60) a. *ombrello* λx [umbrella(x)]
+ [ ]$_N$ → [N]$_V$ λN λy λx λe[DO(e, x, y) & ∃z [N(z) & R(e, z)]]
b. **ombrellare* λy λx λe[DO(e, x, y) & ∃z [umbrella(z) & R(e, z)]]
-ata λP λe [P(e, x, y) & INDIV(e)]
c. *ombrellata* λe [Do(e, x, y) & ∃z [umbrella(z) & R(e, z)] & INDIV(e)]

However, the problem with this analysis is that it is too general. *Martellata* means a hit with a hammer or a hammer blow, rather then an event related to a hammer, and *ombrellata* refers to a hit with an umbrella, rather than to an event with an umbrella. An event in which an umbrella is involved is typically one in which one uses the umbrella against rain, but not to hit someone. So the semantic representation must be more specified, as in (61a) and (61b),

[16] Ilse Zimmermann (p.c.) suggested this semantics to me.

instead of (57c) and(60c). Here we have specified the predicate *Do* by the more specific *Hit*, and the relation *R* by *Instr.*

(61) a. *martellata* λe [**Hit**(e, x, y) & ∃z [hammer(z) & **Instr**(e, z)] & INDIV(e)]
b. *ombrellata* λe [**Hit**(e, x, y) & ∃z [umbrella(z) & **Instr**(e, z)] & INDIV(e)]

The question that arises is where does this specification comes into the derivational process. If the nominalized form is derived from an underlying (and virtual) verbal base, as it is assumed for *ombrellata*, then the specification must have entered the semantics of the virtual verb. This however would either require *different* verbalization rules or a specification of an unattested (virtual) form. Both options are not very attractive and might lead to unwelcome consequences for the whole system. To be clear, I do not deny that denominal verbs can be derived by a general rule and then instantiated according to specific contexts (see Clark & Clark 1979), but this cannot be the case for unattested forms since they do not stand in any context.[17]

This means the only other option is that the direct derivation is more specified. Here again, it seems that we have two options: either we assume different specified derivation rules or a general rule and then specify the outcome in the context. The latter runs into a similar problem as before: if it is the context that finally decides on the specified meaning of the nominalization, it is hard to explain why we predominantly find certain patterns. On the other hand, different derivation rules would destroy the unity of the phenomenon (at least of the suffix). Therefore, I will present an alternative: I assume a general template that is sensitive to conceptual information of the base *N*. This conceptual information determines a certain specification and creates different particular templates. This means, I assume a general structure that is common to all templates and additional particular specifications that are determined by the conceptual semantics of the base. The relevant conceptual properties of the nominal base are represented as semantic features. The general form of the suffix is (62a) and (62b) in a simplified form where the predicate *P* comprises the underlined information in (62a). So we can give the semantic representation for the template for the *hit*-reading, as in (62c) or simplified in (62d):

(62) a. *-ata* λN λe [<u>P(e, x, y) & ∃z [N(z) & R(e, z)]</u> & INDIV(e)]
b. *-ata* λN λe [P(e, x, y; N) & INDIV(e)]
c. *-ata*$_{hit}$ λN λe [<u>Hit(e, x, y) & ∃z [N(z) & Instr(e, z)]</u> & INDIV(e)]
d. *-ata*$_{hit}$ λN λe [Hit(e, x, y, with(N)) & INDIV(e)]

Thus we get several patterns that differ in the way the predicate *P* is spelled out. The decisive factors are the thematic structure, the argument role of the base and the conceptual restriction on that argument (represented by selectional restrictions), as spelled out in (63)-(66) (in the simplified predicates *P* for the longer information):[18]

(63) (hit) N-*ata*: Event of hitting with N or "hitting with N"
P = hit(e, x, y, with N)
-ata: λN λe [hit(e, x, y, with N) & INDIV(e)]
N: +solid + small

a. *libr*$_{[+solid,+small]}$-*ata*
λx [book(x)] λN λe [hit(e, x, y, with N$_{[+solid,+small]}$) & INDIV(e)]
⇒ λe [hit(e, x, y, with book) & INDIV(e)]

[17] Another argument against a virtual verbal form is that once there is such a form it would allow for other derivations by other suffixes. However, this is not attested.

[18] (65) and (66) pose an additional problem since the referential argument is not the event-argument, but the second argument of the predicate. For the time being, I do not have to offer any account for this.

(64) (act) N-*ata*: Event typically performed by N or "act as N"
P = act(e, x, as N)
-*ata*: λN λe [act(e, x, as N) & INDIV(e)]
N: +human

a. *ragazz*$_{[+human]}$-*ata*
λx [child(x)] λN λe [act(e, x, as N$_{[+human]}$)) & INDIV(e)]
⇒ λe [act(e, x, as child)) & INDIV(e)]

(65) (capacity) N-*ata*: Capacity that can be carried by/in N
P = transp(e, x, y, with N)
-*ata*: λN λy [transp(e, x, y, with N) & INDIV(e)]
N:+container

a. *bocc*$_{[+container]}$-*ata*
λx [mouth(x)] λN λy [transp(e, x, y, in N$_{[+container]}$) & INDIV(e)]
⇒ λy [transp(e, x, y, in mouth) & INDIV(e)]

(66) (meal) N-*ata*. Meal prepared on the base of N
P = prep(e, x, y, with N)
-*ata*: λN λy [prep(e, x, y, with N) & INDIV(e)]
N:+eatable

a. *fung*$_{[+eatable]}$-*ata*
λx [mushroom(x)] λN λy [prep(e, x, y, with N$_{[+eatable]}$) & INDIV(e)]
⇒ λy [prep(e, x, y, with mushroom) & INDIV(e)]

6 Summary

Italian nominalizations in *-ata* are formed from verbal as well as from nominal bases. Derivations from verbal bases refer to a single event denoted by the base. Derivations from a nominal base *N* denote events or results corresponding to a limited number of patterns, such as *a hit by N, a characteristic action of N, a period of N, a quantity that is contained in N*, etc. The particular reference is determined by the lexical semantics of the base and the suffix, and by the conceptual structure of the base. The paper has argued that the function of the suffix operates on the lexical meaning of the base, but the composition of the lexical meaning of the base with the lexical meaning of the suffix is restricted by the conceptual properties of the base. In particular, the paper has addressed the following issues:

- The suffix *-ata* very productively forms nominalizations from verbal and from nominal bases.
- The suffix has a common function:
  - categorial function: nouns in the feminine gender
  - describing an individualized event or instance of an event
  - describing events in which the base is pragmatically salient
- The notion of "pragmatically salient" can be spelled out in certain patterns for denominal derivations.
- These patterns are generally found in lexicalized forms. But they are also prominent patterns for spontaneous derivations.
- The choice of such a pattern depends among other factors on the conceptual restrictions of the objects associated with the base.
- The conceptual restrictions of objects are encoded in semantic features associated with the base.
- A more complex conceptual structure, interaction with other items or relation between different items must be investigated.

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Process Nominalizations in Russian*

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Abstract

Within a minimalist framework of sound-meaning correlation, the present study concentrates on process nominalizations of Russian. It is shown how these constructions are built up syntactically and semantically and in which respects they differ from other types of nominalizations. The analysis follows a lexicalist conception of word formation and the differentiation of Semantic Form and Conceptual Structure.

1 Introduction

The present investigation is concerned with process nominalizations of contemporary noncolloquial Russian as in (1)-(2).

(1) vyzdorovlenie pacienta
recovery patient-gen
'the recovery of the patient'

(2) složnyi process usvoenija rebënkom jazyka
complex process acquisition-gen child-instr language-gen
'the complex process of the acquisition of the language by the child'

These expressions refer to processes in a strict sense. It will be shown how these constructions are built up with respect to their internal and external syntax and semantics. The particular questions to be raised are the following:
Which DPs with a deverbal noun as lexical head count as process nominalizations?
What are the characteristics of their containers?
How do process nominalizations differ from other types of nominalizations?

In the following section, I will characterize the theoretical framework of the analysis. Then, the structural properties of Russian nominalizations will be indicated. In section 4, a delimitation of process nominalizations will be aimed at. And in the end, I will summarize.

I restrict the considerations to constructions with a deverbal noun as lexical head which refer to situations (in short: to event nominalizations). Nominalizations referring to participants, circumstances or results are left aside.

* The paper refers to work I did on the syntax and semantics of nominalizations in Russian and German (Zimmermann 1967, 1983, 1988, 1991, 1996, to appear). I gained many insights from cooperation with Manfred Bierwisch, Ewald Lang and other researchers in the Arbeitsgruppe Strukturelle Grammatik in Berlin. The linguistic material I will consider stems from my work as a teacher of Russian at the former Pädagogische Hochschule in Potsdam. I collected the examples mainly from scientific texts. I am indepted to Natalja Gagarina for help with the translation of the examples into English. For stimulating discussion, I would like to thank the participants of the workshops on nominalization in the ZAS in Berlin in november 2000 and at the University of Tübingen in april 2001, where I presented parts of this investigation.

2 The framework

Within a minimalist framework of sound-meaning correlation (Chomsky 1995), the analysis follows a lexicalist conception of morphology (Stiebels/Wunderlich 1994, Wunderlich/Fabri 1995, Wunderlich 1997c) and the differentiation of Semantic Form and Conceptual Structure (Bierwisch 1983, 1987, 1997, Bierwisch/Schreuder 1992, Lang 1987, 199O, 1994, Dölling 1997). I assume Phonetic Form, Logical Form and Semantic Form as relevant grammatically determined levels of representation.

The semantic characterization of constituents can be underspecified. It is assumed that the Semantic Form of linguistic expressions involves parameters which are specified in Conceptual Structure (Dölling 1997).

Words as syntactic atoms enter syntactic representations with all affixes of word formation and inflection. With Bierwisch (1989) and Bischof (1991), I assume that nominalizations of verbs - at least in German and in Russian - are derived morphologically and do not constitute products of syntactic rules.[1]

My conception of syntax is very restrictive (Jacobs 1995). For sentences and DPs, I assume the structual layers in (3) and (4), respectively.

(3) CP MoodP TP NegP vP* VP

(4) DP FP nP* NP

In the base structure, argument expressions with structural cases of verbs and of the corresponding deverbal nouns are placed in SpecVP, SpecvP or in SpeNP, SpecnP, respectively. The verb raises to Mood or to C (Zimmermann 1999) and - in parallel to sentence structures - the deverbal noun overtly moves to a high functional projection F (Alexiadou 1999, this volume), so that all argument expressions of N will be to its right (Haider 1992). I will not discuss the nature of the category F. Possibly, it is a further n.

The syntactic configurations on the level of LF are the input for semantic interpretation. For functor expressions like verbs and their nominalizations this means that they are combined with their arguments semantically on the basis of LF configurations where chains with traces of moved argument expressions must be taken into consideration. In such derived structures, the head of the chain, the case bearing argument expression DP_i, occupies some derived position whereas the tail of the chain t_i is in the complement or specifier position of V, v, N or n.

The lexical entries for functor expressions like verbs and their nominalizations include in their argument structure grammatical requirements which must be fulfilled by the respective argument expressions. I call these requirements grammatical argument adresses G_i. They are associated with lambda operators λx_i which represent the argument positions of the respective functor expression.

The argument positions λx_i are ordered from right to left according to the relative depth of embeddedness of the arguments x_i in the predicate-argument structure. The highest argument of verbs and event nominalizations constitutes the referential argument (Williams 1981, Bierwisch 1989, Bischof 1991). For mnemotechnic reasons, I will represent it as s (referring to situations).[2] The other arguments constitute participant, propositional or predicate arguments.

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[1] In contrast to this position, see Schoorlemmer (1995) and Alexiadou (1999, this volume).

[2] I assume unsorted variables and do not differentiate between situation types in Semantic Form representations. In contrast see Ehrich/Rapp (2000) and Ehrich (this volume).

(5) λx_n ... $\lambda x_i \lambda s$ [... s ... x_1 ... x_n ...]
G_n G_1
argument structure predicate-argument structure
with $s \in e$, $x_i \in \{e, t, \langle e,t \rangle\}$

λx_i in (5) represents the argument position of the external argument, λx_n is the argument position of the lowest internal argument. For DP arguments, the grammatical features G_i are case requirements (Zimmermann 1967) which must be fulfilled by the corresponding DPs as heads in LF chains.

3 Structural properties of Russian nominalizations

According to Vendler (1967: 171), nominalizations fall into two categories: imperfect nominals where the verb is still alive and perfect nominals where the verb has become a noun. Harris speaks of half-domesticated and fully domesticated nominalizations.

Russian does not have any imperfect nominals within the spectrum of embedded sentences with a finite verb, infinitival phrases and perfect nominals (Vendler 1967, Koptjevskaja-Tamm 1993). There are no gerunds and no nominalized infinitives. Furthermore, there are no regular perfect nominals comparable to English of-ing gerunds (Abney 1987). One has to learn which verbs allow which nominalizing suffixes, as in German (Bierwisch 1989):

(6) pe-nie, otkry-tie, učast-ie, razrabot-ka, proizvod-stvo, prichod,
singing discovery participation working out production arrival

pobed-a
winning

Russian perfect nominals do not express temporal or modal differentiations. They are unspecified in these respects. To a large extent, this is equally true for aspect.

They do not allow the combination with the reflexive morpheme *-sja*, in contrast to Polish (cf. *formować (się) / formowanie (się)* 'form / formation').

(7) prizemlenie vertolëta
landing helicopter-gen
'the landing of the helicopter'

Vertolët prizemlilsja.
Helicopter landed
'The helicopter landed.'

Russian perfect nominals do combine with negation (Zimmermann 1988):

(8) nesobljudenie ukazanij vrača
non-respecting recommendations-gen doctor-gen
'the non-respecting of the recommendations of the doctor'

Modifiers of Russian perfect nominals cannot appear in the adverbial form ending with -o. The corresponding adjectives agree with the noun in gender, number and case:

(9) častoe opazdyvanie Anny
often-agr being late Anna-gen
'Anna's often being late'

Anna často opazdyvaet.
Anna often is late
'Anna is often late.'

DPs with a deverbal noun as lexical head allow only possessive pronouns or possessive adjectives as prenominal arguments. They, too, agree with the noun.

(10) moë poseščenie muzeja
my-agr visiting museum-gen
'my visiting of the museum'

Serëžin neprichod ko mne
Serjozha-agr not coming to me
'Serjozha's not coming to me'

*Serëži neprichod ko mne
Serjozha-gen not coming to me
'Serjozha's not coming to me'

Except for possessive pronouns and possessive adjectives, all participant arguments occur on the right-hand side of deverbal nouns, with structural or lexical case marking. Arguments marked by the genitive need not be adjacent to the deverbal noun (cf. (2)).

Lexical case and the structural dative are inherited from the corresponding verbs. The lowest structural argument appears in the genitive. The highest structural argument of transitive verbs shows up in the instrumental (Zimmermann to appear).

In (11)-(14), we find some lexical entries for verbs and their nominalizations. I assume with Bierwisch (1989) that nominalizations of verbs referring to situations are formed - morphologically - by affixation and - semantically - by the identity function so that verbs and abstract deverbal nouns share the morphological basis and the Semantic Form.

The semantic representation of the lexical entries in (11)-(14) consists of an array of lambda operators, the argument structure, and of a very general indication of the semantic predicate-argument structure of the pertinent verb and its nominalization. Each position for structural arguments is associated with abstract case features ±hr (there is/is not a higher structural role) and ±lr (there is/is not a structural lower role) which predict admissable case forms of the corresponding argument expressions depending on the syntactic category of the governing head. In cases like (11)-(13) all this case information is systematic, redundant and therefore omissible. In contrast, the internal argument of the lexical entries in (14) idiosyncratically shows up in the instrumental. Here one has to do with unsystematic lexical case which must be learnt.

(11) vyzdorovet'/vyzdorovlenie, vozniknut'/vozniknovenie
recover recovery emerge emergence
λx λs [... s ... x ...]
-hr
-lr
V: nom
N: gen

(12) usvoit'/ usvoenie, znat'/ znanie
acquire acquisition know knowledge
λy λx λs [... s ... x ... y ...]
+hr -hr
-lr +lr
V: acc nom
N: gen instr

(13) soobščit'/soobščenie, vručit'/ vručenie
inform information hand in handing in
λz λy λx λs [... s ... x ... y ... z ...]
+hr +hr -hr
-lr +lr +lr
V: acc dat nom
N: gen dat instr

(14) obmenjat'sja/obmen
exchange exchange
λy λx λs [... s ... x ... y ...]
-hr
-lr
V: instr nom
N: instr gen

The following noun phrases with deverbal heads illustrate the case realizations of the pertinent argument expressions, in confrontation with infinitival phrases. The examples are given with normal word order. It is important to notice that Russian nominalizations preserve the order of the argument expressions relative to the lexical governor in its base position.

(1) vyzdorovlenie pacienta
recovery patient-gen
'the recovery of the patient'

vyzdorovet'
'recover'

(2) složnyj process usvoenija rebënkom jazyka
complex process acquisition-gen child-instr language-gen
'the complex process of the acquisition of the language by the child'

usvoit' jazyk
acquire language-acc

(15) nemedlennoe soobščenie institutami firme
immediate-agr information institutes-instr firm-dat

svoich zakazov
their orders-gen

'the immediate information by the institutes of their orders to the firm'

nemedlenno soobščit' firme svoi zakazy
immediately inform firm-dat orders-acc

(16) obmen tovariščej opytom
exchange comrarades-gen experience-instr
'the exchange of experience by the comrades'

obmenjat'sja opytom
exchange experience-instr

All these structural properties of Russian perfect nominals - except for negation - are independent of the situation type denoted by the deverbal noun. It does not matter whether we have to do with states, activities, accomplishments or achievements. Cf.:

(17) states: znanie, vladenie
knowledge mastery

activities: čtenie, trenirovka
reading training

accomplishments: starenie, izmenenie, uskorenie
becoming old change acceleraton

achievements: zaberemenenie
becoming pregnant

These differentiations concerning situation types are relevant with respect to the selectional properties of the deverbal nouns. They combine only with certain types of modifiers which are compatible with the respective situation type. And the DPs as a whole occur only in certain container classes, again depending on the DP's reference type.

4 The structure of process nominalizations

Certain containers and / or the noun *process* classify situations referred to by nominalizations as processes. The nominalization itself must be compatible with this qualification.

4.1 Examples

(18) V čëm sostoit process prevraščenija truda
in what consists process transformation-gen labour-gen

v pervuju žiznennuju potrebnost'?
into first living necessity

'What does the process of transformation of labour into the first living necessity consist of?'

Kakie faktory sposobstvujut ėtomy processu i kakie
which factors promote this process-dat and which

tormozjat ego?
inhibit it-acc

'Which factors promote this process and which ones inhibit it?'

(19) Issleduetsja složnyj process formirovanija
is investigated complex process development-gen

v gody sovetskoj vlasti novoj intelligencii.
during years Soviet sistem-gen new intellectuals-gen

'The complex process of the development of new intellectuals during the Soviet system is investigated.'

(20) V rabote rassmatrivaetsja process vozniknovenija,
in study is considered process emergence-gen

rascveta i upadka ėkzistencializma.
flourish-gen and degradation-gen existentialism-gen

'In the study the process of emergence, flourish and degradation of existentialism is considered.'

(21) Vnutri sistemy jazyka vsegda proischodit process
within system language-gen always takes place process

pojavlenija novych ėlementov i otmiranja
emergence-gen new elements-gen and dying out-gen

starych, process zameny odnich
old-gen process substitution-gen some-gen

ėlementov drugimi, process peregruppirovki
elements-gen other-instr process reorganization-gen

imejuščichsja ėlementov i ich pereosmyslenija...

existing elements-gen and their reinterpretation

'Within the system of language, the processes of emergence of new elements and of dying out of old elements, the process of substitution of some elements by other, the processes of reorganization of existing elements and of their reinterpretation always takes place.'

In (22) and (23) I simply enumerate container expressions and deverbal nouns found in constructions with process nominalizations.

(22) Narrow containers for process nominalizations:[3]

ubystrjat', zamedljat', oblegčat', tormozit',
escalate slow down ease inhibit

sposobstvovat', prepjatstvovat', pomogat'
promote hinder help

proischodit', idti, protekat', načinat'sja, prodolžat'sja,
take place go on run begin continue

končat'sja
finish

prochodit'
go through

ėtap, stupen', istorija, temp
stage step history pace

vo vremja, v tečenie
during in the course of

(23) Contained process nouns:

vozniknovenie, pojavlenie, skladyvanie, razvitie,
emergence appearance growing up development

narastanie, perechod, preobrazovanie, izmenenie,
increase transition reorganization change

obogaščenie, nakoplenie, matematizacija
enrichment accumulation mathematization

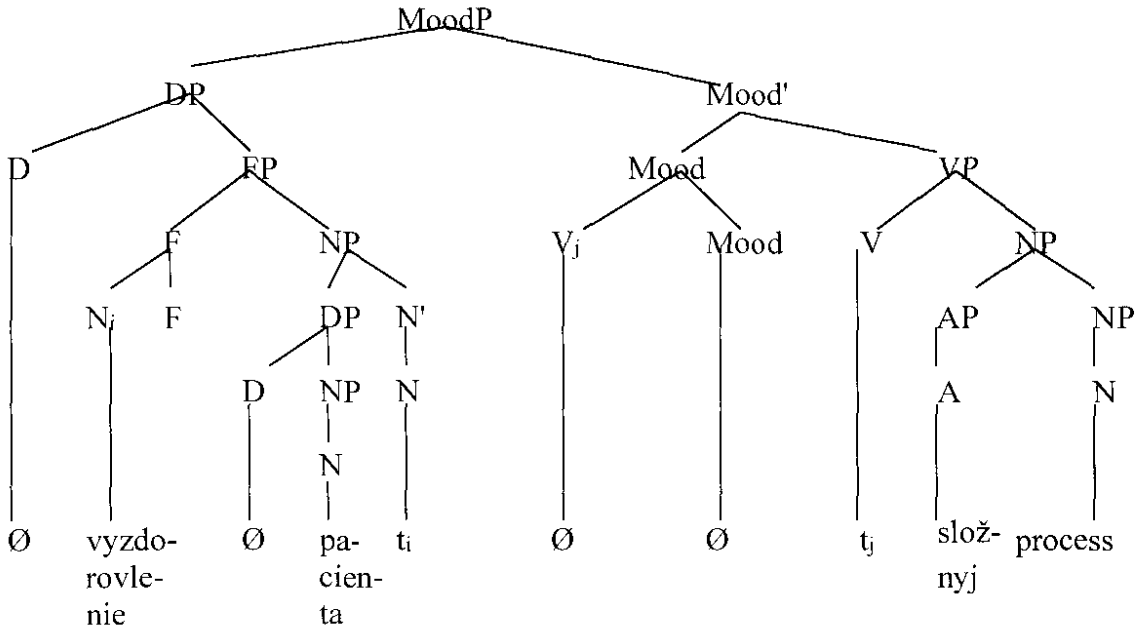
[3] Among the containers as selective hosts for different types of nominalizations Vendler (1967: 131f.) discriminates loose and narrow containers, i.e. contexts of lax or strict hospitality. The latter accept only perfect nominals whereas the former accept perfect as well as imperfect nominals. Cf.:
(i) The collapse of the Germans was gradual.
(ii) *That the Germans collapsed was gradual.
(iii) The collapse of the Germans is likely.
(iv) That the Germans will collapse is likely.

ponimanie, understanding	poznanie, cognition	ovladenie, acquisition	obnaruženie, detection	vybor, choice
obobščenie, generalization	izučenie, investigation	sravnivanie, comparing	različenie, differentiation	
rešenie, decision	proizvodstvo, production	perevod, transformation	zaučivanie, memorizing	
proslušivanie, listening	nazyvanie naming			
obščenie, communication	sbliženie, coming closer	obmen exchange		

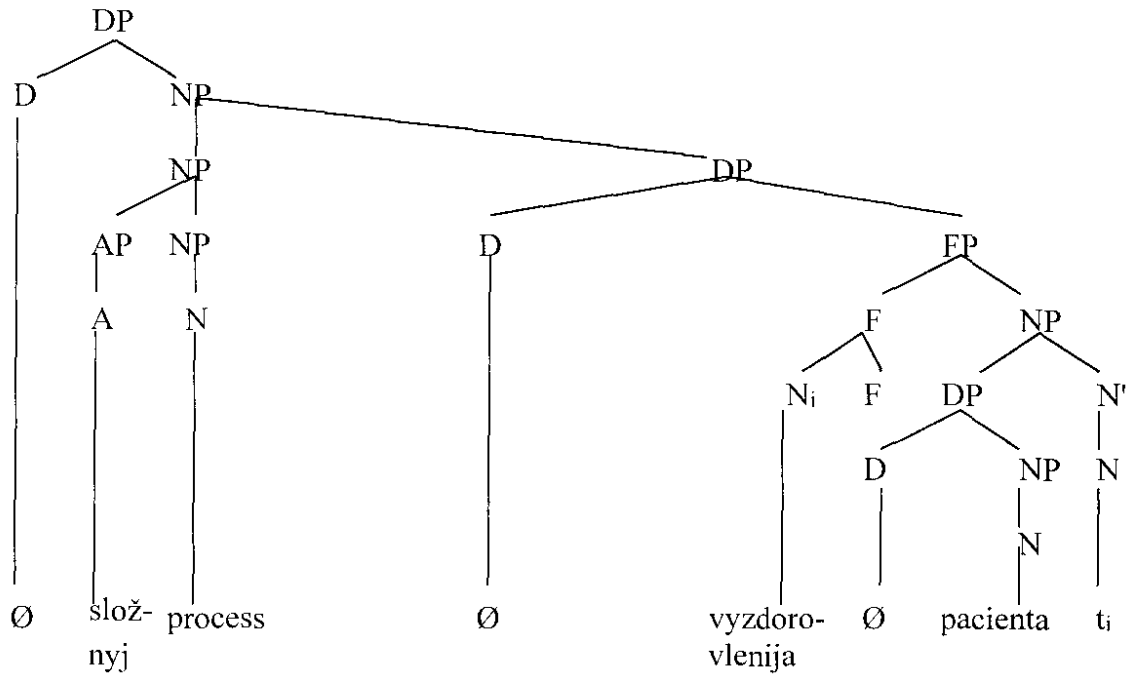
4.2 Structural ingredients of process nominalizations

In the following, two examples will be analysed according to my assumptions on the syntax and semantics of process nominalizations. In (24), we have to do with a copula sentence where the qualification of the nominalization as a process is expressed by a predicative NP. In (25) this characterization is part of a complex term expression.

(24) Vyzdorovlenie pacienta - složnyj process.
recovery patient-gen complex process
'The recovery of the patient is a complex process.'



(25) složnyj process vyzdorovlenija pacienta
complex process recovery-gen patient-gen
'the complex process of the recovery of the patient'



In (24), the layer of TP is ignored. The subject is in the topic position, i.e. in SpecMoodP (cf. Zimmermann 1999). The silent copula - like overt verbs - is adjoined to Mood. The predicative complement of the copula is analysed as NP. Semantically, it is a predicate expression.

In (25), the same NP is combined with a silent determiner. Here we have to do with a term.

In (24) and (25), the deverbal noun *vyzdorovlenie* has moved to F, and the external argument *pacienta* is placed in SpecNP, in parallel to the internal argument in the genitivus objectivus of transitive or ditransitive verbs (cf. (2), (15)). In general I assume that structural argument expressions figure in SpecXP whereas lexical argument expressions typically show up in the complement position of the pertinent lexical head.

In (25), there are two adjuncts of the abstract head noun *process*. Both have modifier function. This is reflected in the semantic representation (see (25') below).

The following lexical entries including zero morphemes and two shift operations are involved in the structure of (24) and (25):

(26) /process/
-V+N
λs [PROCESS s], PROCESS $\in \langle e,t \rangle$

This characterization of the noun *process* - in a sense - is the heart of my analysis of process nominalizations. I take such linguistic expressions like *process* 'process', *sostojanie* 'state' etc. literally, i.e. as elementary expressions classifying situation types. I assume that a system of axioms and definitions is at work at the level of Conceptual Structure which relate such very general qualifications as PROCESS to fine-grained characterizations of activities and accomplishments as proposed in the event calculus by Shanahan (see Hamm / van Lambalgen 2000, this volume), with nine distinguished predicates (hold, happen, initially, initiate, terminate, release, trajectory, clipped, declipped).

(27) /vyzdorovlenie/
-V+N
$\lambda x\, \lambda s$ [s INST [BECOME [WELL x]]], INST $\in \langle t, \langle e,t\rangle\rangle$, BECOME $\in \langle t,t\rangle$,
WELL $\in \langle e,t\rangle$

In (27), I follow Bierwisch (1987, 1989, 1997) in assuming that the referential argument of verbs and their nominalizations is introduced by the constant INST which relates propositions to situations.

(28) /pacient/
-V+N
λx [PATIENT x], PATIENT $\in \langle e,t\rangle$

(29) /složnyj/
+V+N
λx [COMPLEX x], COMPLEX $\in \langle e,t\rangle$

(30) /Ø/
+D +def
λP DEFx [P x], DEF $\in \langle\langle e,t\rangle, e\rangle$, P $\in \langle e,t\rangle$

Russian does not have overt determiners comparable to the German or English definite or indefinite article. I assume corresponding silent ones for Russian.

(31) /Ø/
+V-N
$\lambda P\, \lambda x\, \lambda s$ [T s $\supseteq$ t_0] & [s INST [P x]], P $\in \langle e,t\rangle$, T $\in \langle e,e\rangle$, $\supseteq \in \langle e, \langle e,t\rangle\rangle$
The silent copula is restricted to present tense and is in complementary distribution with the explicit forms of the copula *byt'* 'be'.

(32) /Ø/
+Mood
$\lambda P\, \exists s$ [P s], P $\in \langle e,t\rangle$

The unmarked semantic function of the functional category Mood consists in existential binding of the referential argument of verbs.

(33) $\text{SHIFT}_{\text{gen}}$: λy λx [x R_{gen} y], $R_{\text{gen}} \in \langle e, \langle e,t\rangle\rangle$
gen

I understand constructions like (25) as DPs with an explicative genitival adjunct (cf. Fabricius-Hansen/von Stechow 1989). A shift operation (cf. Zimmermann 1991, Partee/Borschev 2000) transforms a genitival term into a predicate which can function as a modifier. This shift operation introduces a parameter R_{gen} which can be interpreted as identity at the level of Conceptual Structure.

(34) MOD: $\lambda Q\, \lambda P\, \lambda x$ [P x] & [Q x], P, Q $\in \langle e,t\rangle$

The modification template MOD (cf. Zimmermann 1992) serves the unification of two predicates, of the modifier and of the modificandum. In (25), it is applied twice, firstly to the

combination of *složnyj* with *process* and secondly to integrate the explicative genitival phrase *vyzdorovlenie pacienta*.

With these ingredients we arrive at the Semantic Form of the examples (24)-(25).

(24') ∃s [[T s ⊇ t_0] & [s INST [[PROCESS DEFs' [s' INST [BECOME [WELL DEFx [PATIENT x]]]]] & [COMPLEX DEFs' [s' INST [BECOME [WELL DEFx [PATIENT x]]]]]]]]

(25') DEFs [[[PROCESS s] & [COMPLEX s]] & [s R_{gen} DEFs' [s' INST [BECOME [WELL DEFx [PATIENT x]]]]]]

4.3 Process nominalizations vs. fact nominalizations

Let us compare process nominalizations with fact nominalizations (cf. Zimmermann 1983).[4]

(35) Točnoe sobljudenie ukazanij vrača
exact-agr fulfilment recommendations-gen doctor-gen

sposobstvovalo vyzdorovleniju pacienta.
promoted recovery-dat patient-gen

'The exact fulfilment of the recommendations of the doctor promoted the recovery of the patient.'

Here, *točnoe sobljudenie ukazanij vrača* denotes a fact, whereas *vyzdorovlenie pacienta* refers to a process.

(36) Fakt točnogo sobljudenija ukazanij vrača
fact exact-agr fulfilment-gen recommendations-gen doctor-gen

sposobstvoval processu vyzdorovlenija pacienta.
promoted process-dat recovery-gen patient-gen

'The fact of the exact fulfilment of the recommendations of the doctor promoted the process of the recovery of the patient.'

Fact nominalizations can be paraphrased by sentences. Process nominalizations do not correspond to complement sentences.

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[4] I assume that the different interpretations of morphologically identical nominals as *the collapse of the Germans* in (i) and (ii) are due to the respective predicates (Vendler 1967: 123):
(i) The collapse of the Germans was an event.
(ii) The collapse of the Germans is a fact.
Predicates as *event*, *process*, *action* are classifiers of situations (Vendler 1967: 138). Whereas qualifications like *event*, *process*, *action* concern the very nature of the situation we refer to, predicates like *fact* and their kin characterize assumptions (judgements, presuppositions) about the existence of the described situation in the actual world (Vendler 1967: 143ff.)

(37) (Tot fakt/ to) čto točno sobljudalis' ukazanija vrača,
that fact that that exactly were fulfilled recommendations doctor-gen

sposobstvoval(o) vyzdorovleniju pacienta.
promoted recovery-dat patient-gen
'(The fact) that the recommendations of the doctor were exactly fulfilled promoted the recovery of the patient.'

Evidently, the selectional properties of the verb *sposobstvovat'* determine that its external argument must denote a fact while its internal argument refers to a process.

I assume with Dölling (1997) that selectional compatibilities are treated by axioms at the level of Conceptual Structure. Applied to *vyzdorovlenie pacienta* the respective axioms characterize this entity as compatible with the qualification expressed by *process* and as acceptable internal argument of *sposobstvovat'*.

The proposed analysis amounts to saying that process nominalizations are a special type of denotation for situations. Whether the emphasis is on this type or some other aspect of the nominalization involved depends on the selectional properties of the containers. Affirmation, negation, modalization, and questioning are operations which do not occur in process nominalizations. They can be involved in perfect nominalizations, but presuppose special containers.

4.4 Process nominalizations, aktionsarten and aspect

Finally, some considerations on the interrelations of process nominalizations, aktionsarten and aspect are in order. Deverbal nouns denoting activities and accomplishments are compatible with the qualification as processes. Sometimes deverbal nouns exhibit a suffix of secondary imperfectivization (*-va-*, *-yva-*) by which the process character of the denotation is expressed. Cf.:

(38) Informacia - èto oboznačenie soderžanija polučennogo iz
information that denotation content-gen received from

vnešnego mira v processe našego prisposoblenija k nemu
environment during process our adaptation-gen to it

i prisposablivanija k nemu naših čuvst.
and adaptation-gen to it our senses-gen

'Information is the denotation of the content received from the environment during the process of our adaptation to it and of the adaptation of our senses to it.'

Only some pairs of deverbal nouns express this differentiation. In contrast to verbs where the perfect aspect is the marked category, deverbal nouns with an imperfectivizing suffix are marked categories whereas the correspondents to perfect verbs are neutral with respect to the process character of the respective event.

(39) usvoenie / usvaivanie, sravnenie / sravnivanie,
acquisition learning comparison comparing

nakoplenie / accumulation	nakaplivanie, accumulating	poznanie / cognition	poznavanie, gaining knowledge
razrabotka / elaboration	razrabatyvanie working out		

5 Open ends

As is, fortunately, always the case, there remain many interesting open ends.
How do the axioms characterizing the various situation types look like?
What are the exact interrelations of aktionsarten, Russian aspect and process nominalizations?
Do we need type/sortal differentiations of events vs. fluents (cf. Hamm/van Lambalgen 2000, this volume)?
Where must we discriminate between event types and event tokens?
Which types of nominalizations put emphasis on a certain subsituation involved in complex situations (cf. Ehrich/Rapp 2000, Ehrich this volume)?
What is wrong or missing in the understanding of abstract deverbal nouns as conversions from verbs to nouns (cf. Bierwisch 1989, Bischof 1991, Stiebels 1997)?
What belongs to the system of axioms at the level of Conceptual Structure and what is given (expressed) in the structure of natural language, in the grammatically determined part of the meaning of a particular construction?

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