

Dealing with sortal ambiguity of nominalizations by underspecification.

JeNom5, Barcelona

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June 18, 2013

1 Introduction

1.1 Outline

- Focus on the semantics of German *-ung* nominalizations.
- As a semanticist, I take ambiguity to be pervasive in natural language.
- Based on data from German *-ung* nominalizations, I argue that selection restriction tests are not suitable as linguistic tools for ontological disambiguation.
- Consequently, I question the significance of ontology as a starting point for linguistic theorizing.
- Instead, I argue for an underspecified account of the ontology of nominalizations, in which disambiguation loses its central role in the commerce with ambiguity.

1.2 Ontology of German *-ung* nominalizations

1.2.1 Sortal Ambiguity

- (1) a. *Die Polizei sperrt die Botschaft ab.*
The police cordons the embassy.ACC off.
- b. *Die Abspernung der Botschaft (durch die Polizei)*
The cordon.UNG.NOM of the embassy.GEN (by the police)

Lees (1960); Vendler (1967b) proposed that (1a) and (1b) are closely related:

- “The nominals [...] which we shall study herein are not themselves sentences but rather they are noun-like versions of sentences” (Lees, 1960, p. 54)
- “the device of nominalization transforms a sentence into a noun phrase” (Vendler, 1967a, p. 125)

Nominalizations can be embedded into other sentences as noun phrases:

- (2) *Die Absperrung der Botschaft (durch die Polizei) ist erfolgt.*
 The cordon of the embassy.GEN (by the police) has happened.

Embedding is restricted:

- (3) a. **Das Absperrren wird bemalt.*
 The cordon.INF.NOM is painted.
 b. *Die Absperrung wird bemalt.*
 The cordon.UNG.NOM is painted.

Vendler set out to provide an explanation of these restrictions:

- “What are the restrictions governing the insertion of a nominalized sentence into the host sentence”? Vendler (1967a)[p. 125]
- Vendler proposed to identify the restrictions on nominalizations with tests based on the assumption that “container sentences are selective hosts”.

According to Vendler’s hypothesis, *wird bemalt* (is painted) is a container that selects for a certain property of nominalizations, a property which *Absperrung* possesses but not *Absperrren*. Vendler took this property to pertain to an **ontological** distinction in the denotation of nominalizations. Vendler’s ontological interpretation of container selectivity assumes that the container *bemalen* (to paint) selects for a physical thing to be painted. Consequently, if *Absperrren* can’t be inserted into the *bemalen*-container, then it doesn’t denote a physical object. In turn, because *Absperrung* can be inserted into the *bemalen* container, it denotes a physical object.

The main verb *absperrren* (to cordon off) of sentence (1a) involves reference to an event, an agent of this event, a state caused by this event and an object brought into existence by this event. This **verbal** ontology is preserved in the *-ung* nominalized sentence (1b). Consequently, *Absperrung* is ontologically ambiguous (while the base sentence (1a) is not) - ambiguous between an event, state and object denotation because the ontological configuration expressed by (1a) is now packed into one formally identical word, the *-ung* nominalization *Absperrung*, where the agent of the event is optionally realized with a *durch*(by)-PP .

If container sentences are ontologically selective for the nominalizations that they host, it is nearby to assume that the selection restrictions of containers can not only be used to explain restrictions on the embedding of nominalizations into container sentences but that selection restrictions can also be used to disambiguate sortally ambiguous nominalizations. According to this assumption, in (4), the denotation of *Absperrung* is disambiguated when embedded into different container sentences.

- (4) a. *Die Absperrung der Botschaft wurde angestrichen.*
 The cordon.OBJECT of the embassy.GEN was painted.
- b. *Die Absperrung der Botschaft wurde behindert.*
 The cordon.EVENT of the embassy.GEN was impeded.
- c. *Die Absperrung der Botschaft wurde aufgehoben.*
 The cordon.STATE of the embassy.GEN was lifted.

1.2.2 Ambiguity of adjunct interpretation

In the literature on *-ung* nominalizations (e.g. the seminal Ehrich and Rapp (2000)), it is commonly assumed that there are three basic interpretation possibilities of the genitive adjunct that an *-ung* nominalizations can host: (a) a non-argument interpretation as e.g. a possessive (5a) (b) theme interpretation (5b), (c) agent (5c) or theme (5d) interpretation.

- (5) a. *Die Absperrung der Botschaft *(durch die Polizei)*
 The cordon.UNG.NOM.OBJECT of the embassy.POSS.GEN *(by the police)
wurde angestrichen.
 was painted.
- b. *Die Absperrung der Botschaft durch die*
 The cordon.UNG.NOM.EVENT of the embassy.THEME.GEN by the
Polizei wurde behindert.
 police.AGENT was impeded.
- c. *Die Kündigung des Kunden *(durch die*
 The cancellation.UNG.NOM.EVENT of the customer.AGENT.GEN *(by the
Verwaltung) wurde bestätigt.
 administration) was approved.
- d. *Die Kündigung des Vertrags durch den*
 The cancellation.UNG.NOM.EVENT of the contract.THEME.GEN by the
Kunden wurde bestätigt.
 customer.AGENT was approved.

What determines the interpretation of the genitive adjunct?

The basic distinction underlying answers to this question is due to Grimshaw (Grimshaw, 1990, p. 53): “nouns with a complex event interpretation have an argument structure, . . . , and other nouns do not.”. In order to establish the **ontological** difference between complex events and other entities, Grimshaw employs adverbs like *constant* and *frequent* that select for verbs denoting a complex event and argues that these adverbs do a similar job when applied to nominalizations in that these adverbs separate argument-taking from non-argument taking nominalizations. (It should be noted that Grimshaw’s other tests for argument structure in nominalizations (e.g. plural/indefinite/intentional subjects) have been argued to be not applicable to German (e.g. Bierwisch (1989)). Consequently, Ehrich and Rapp (2000) use only container tests for the denotation of nominalizations in their classification of *-ung* nominalizations.)

1.3 Ontology in Linguistics

Tests involving container restrictions have become a standard in the explanation of nominalizations in general and *-ung* nominalizations in particular. Here’s a small selection of literature that take ontological distinctions established by container tests as a starting point.

I already mentioned Grimshaw:

- Ontology of the nominalization: “nouns with a complex event interpretation have an argument structure, . . . , and other nouns do not.” (Grimshaw, 1990, p. 53)

But ontology has also been used to motivate the interpretation of the genitive of *-ung* nominalizations.

- Ontology of the *-ung* nominalization: While event *-ung* nominalizations allow only for the theme theta role, process nominalizations allow also for the agent theta role. (Ehrich and Rapp, 2000, cf. p. 268)
- Ontology of the base verb: For telic base verbs of *-ung* nominalizations, the genitive relation is preferably interpreted as theme, atelic base verbs allow for theme and agent interpretation of the genitive relation. (Bücking, 2012, cf. p. 171)

E.g. to motivate the prediction of the formation of nominalizations:

- Ontology of the nominalization: “It has been noted in the literature that across languages event nominals are, when derived from transitive predicates, ‘passive’ and not transitive and that they are derived from unaccusative predicates, but not from unergative ones” (Alexiadou, 2001, p.78)
- Ontology of the base verb: “-ung formation constraint: A verbal construction has an -ung nominalization if and only if the verb is constructed bi-eventively.” (Rofßdeutscher, 2010, p. 106)

2 Ontological selection restrictions as tools for linguistic disambiguation?

In this talk, my investigation of the ontology of *-ung* nominalizations begins with the following question:

How reliable are the **ontological** distinctions established by container tests from a **linguistic** point of view?

Given that container tests have become basic methodical inventory in modern linguistics, the answer to this question may seem trivial at first glance, but it is not. Vendler’s collection of articles introducing container tests is entitled “Linguistics in Philosophy” and not “Philosophy in Linguistics”. It is decidedly about “the gradual introduction of a new technique into analytic philosophy” (Vendler, 1967b, p. vii) and not about the introduction of methods from analytic philosophy (i.e. ontology) into linguistics. Vendler used container tests to account for philosophical problems: e.g. the question for the ontological status of facts (Vendler (1967a)) or the ontology of epistemic attitudes (Vendler (1957)). Shifting the application and usage domain of Vendler’s container tests from a philosophical to a linguistic domain requires to justify the assumption that Vendler’s tests do not only have a **philosophical** significance but also a **linguistic** significance. But the linguistic significance of container-based ontological disambiguation must be justified on the basis of the potential of container disambiguation to deal with linguistic problems, e.g. argument structure, anaphora binding, word formation, theta role assignment, whereas Vendler only intended a justification of selection restrictions with respect to philosophical problems.

The **linguistic data** that I present in the following strongly suggests that container tests fail to provide a suitable conception of ontological disambiguation in the linguistic domain and that the ontological distinctions established with container tests are not a reliable basis for linguistic theorizing.

Please don’t get me wrong at this point: I do not argue against the significance of container restrictions as tests for a linguistic ontology (i.e. as instruments of natural language metaphysics in Bach (1986)’s sense), but I doubt that linguistic ontology is a reliable starting point for linguistic theorizing itself.

3 The linguistic significance of container disambiguation

3.1 Interpretation of the genitive DP

Again, what is the grammatical status of the genitive DP in German *-ung* nominalizations?

According to Grimshaw, the basic distinction between the obvious non-argument status of the genitive DP in (6a) and the argument status of the genitive DP in (6b) is a matter of the ontological difference between object denotation of the simple noun in (6a) and complex event denotation in (6b). But if this ontological distinction is relevant to grammatical status and syntactic analysis, how should we determine the relevant ontological difference in cases where no sortal disambiguation is available as in (6c)? The container verb *verschieben* selects both complex events (6d) and physical objects (6e), and *Absperrung* is ambiguous between denoting a complex event and a physical object. Examples like (6c) are cases in which no ontological disambiguation can be achieved with selection restrictions and consequently no predictions on argument structure in the Grimshawian framework can be made.

- (6) a. *Der Zaun der Botschaft wird verschoben.*
the fence.OBJECT of the embassy.GEN.POSS is moved.
- b. *Die Räumung der Botschaft wird verschoben.*
the evacuation.UNG.NOM.EVENT of the embassy.GEN is postponed.
- c. *Die Absperrung der Botschaft wird verschoben.*
the cordon.UNG.NOM.EVENT\OBJECT of the embassy.GEN.THEME\POSS is moved\postponed.
- d. *Die Absperrung der Botschaft wird auf morgen verschoben.*
the cordon.UNG.NON.EVENT of the embassy.GEN.THEME is to tomorrow postponed.
- e. *Die Absperrung der Botschaft wird um zwei Meter verschoben.*
the cordon.UNG.NOM.OBJECT of the embassy.GEN.POSS is for two meters moved.

3.2 Anaphora resolution

Even if an ambiguous *-ung* nominalization can be disambiguated with selection restrictions at the sentence-level as in (6d) or (6e), the imposed restriction can be overridden at the discourse level. Hamm and Solstad (2010) present data in which selection restrictions imposed on *-ung* Nominalization are overridden in the course of anaphora resolution if the selection restriction imposed on

the anaphora differs from the selection restriction imposed on the antecedent (“transsentential sort clash”).

- (7) *Die Absperrung des Rathauses wurde vorgestern von Demonstranten*
The cordon of the townhall was the day before yesterday by protesters
behindert. Wegen anhaltender Unruhen wird sie heute aufrecht erhalten.
impeded. Due to continuing unrest, is it today sustained.

The cordon of the townhall was impeded by protesters the day before yesterday. Due to continuing unrest, it is sustained today as well.

With respect to the question for argument structure in nominalizations, in examples like (7) argument structure is not fixed until the whole discourse is processed. According to Grimshaw’s hypothesis, in examples like (7) the genitive DP has argument status in the first sentence because *Absperrung* denotes a complex event. But the same genitive DP has no argument status with respect to the second sentence because anaphora resolution requires *Absperrung* to denote a state, which according to Grimshaw does not involve the projection of argument structure.

3.2.1 Dealing with transsentential sortal ambiguity

How should we deal with the phenomenon exemplified by (7)? None of the existing proposals captures the data right (detailed discussion: Pross (2012)).

- Naive approach to disambiguation: disjunction deletion. But: if the state denotation in (7) is deleted by disambiguation in the first sentence, then the state denotation is not available for pronoun binding in the second sentence
- Lazy approach to disambiguation: ignore the ambiguity. But: this predicts that pronoun binding is possible in (8a)
- Logic Programming (Hamm and Solstad (2010)): non-monotonic inference to the sort which was deleted in disambiguation. But: this predicts that pronoun binding is not possible in (8b)
- Coercion approach (Pustejovsky (1998); Asher (2011)): head typing principle. But: there’s no local type clash to trigger a coercion in (7) and there’s a methodological problem with substantial change (8c).

- (8) a. **Die Absperrung des Rathauses wurde heute angestrichen. Sie war gestern*
The cordon of the townhall was painted today. It has yesterday
behindert worden.
impeded been.

The cordon was painted today. Yesterday, it has been impeded.

- b. *Die Absperrung des Rathauses wurde gestern von Demonstranten verhindert.*
The cordon of the townhall was yesterday by protesters prevented.
Sie wird heute mit massivem Polizeieinsatz durchgesetzt.
It will today by massive police operation enforced.

The cordon of the townhall was prevented by protesters yesterday. Today, it will be enforced with a massive police operation.

- c. *Die Absperrung des Rathauses wurde gestern von Demonstranten zerstört.*
The cordon of the townhall was yesterday by protesters destroyed.
Sie wird heute wieder aufgebaut.
It will today rebuild.

The cordon of the townhall was destroyed by protesters yesterday. Today, it will be rebuild.

More examples, where the antecedent requires an event denotation and anaphora resolution an object denotation:

- (9) *Die Absperrung des Regierungsviertels erfolgte direkt nach der gestrigen*
The cordon of the government district took place immediately after the yesterday
Terrorwarnung. Nachdem sich herausgestellt hat, dass die Warnung unbegründet
terror warning. After it became apparent, that the warning unfounded
war, wird sie heute wieder abgebaut.
was, will it today disassembled.

The cordon of the government district took place immediately after yesterday's terror warning. After it became apparent that the warning was unfounded, it will be disassembled today.

- (10) *Die Abrechnung des Stromverbrauchs erfolgt zum Ende des*
The billing of the electricity consumption takes place at the end of the
jeweiligen Monats. Sie kann bei Bedarf in ihrem Kundencenter
respective month. It can if necessary in your customer care center
eingesehen werden.
inspected be.

The billing of the electricity consumption takes places at the end of the respective month. If necessary, it can be inspected in your customer care center.

3.3 Unergative nominalizations

While container restrictions are too weak to fix the ontology of *-ung* nominalizations (and consequently argument structure) in discourse, they are too strong to fix the ontology (and consequently argument structure) of *-ung* nominalizations formed from unergative verbs.

- (11) a. *Die Wirkung* *der* *Tablette* **durch-PP*
 The effect.UNG.NOM.PROP of the tablet.GEN *by-PP
 b. *Die Blutung* *der* *Wunde* **durch-PP*
 The bleeding.UNG.NOM.PROP of the wound.GEN *by-PP

Unergative *-ung* nominalizations (UNUV) pass container tests for complex event structure:

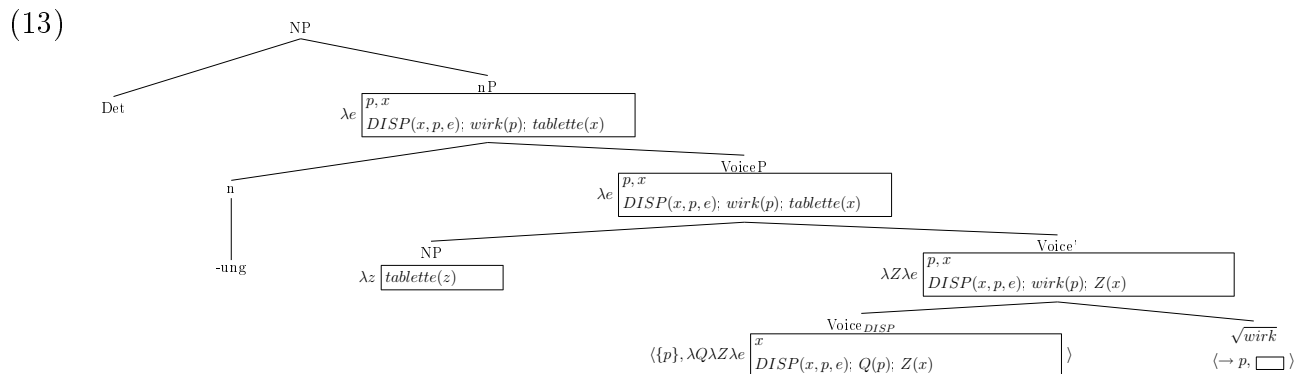
- (12) a. *Die Wirkung* *der* *Tablette* *wird durch* *Alkohol*
 The effect.UNG.NOM.EVENT of the pill.GEN.AGENT is impeded.
 behindert.
 b. *Die Blutung* *der* *Wunde* *wird gestoppt.*
 The bleeding.UNG.NOM.EVENT of the wound.GEN.AGENT is stopped.

The underlying base verbs in (11a) - (11b) are “mono-eventive” Levin (1999) unergative intransitive verbs. No theme interpretation of the genitive adjunct is possible and no agent or causer can be introduced with a *durch-PP*. The genitive adjuncts of UNUVs have argument status because UNUVs have a complex event reading as shown by the possibility of aspectual modification according to Grimshaw (1990); Ehrich and Rapp (2000). The existence of UNUVs constitutes a serious challenge to established theories of nominalization in general and *-ung* nominalization in particular. Lexicalist approaches to *-ung* nominalization (e.g. Ehrich and Rapp (2000); Bücking (2012)) crucially rely on the assumption that a theme interpretation of the genitive argument of eventive *-ung* nominalizations is always possible, whereas word-syntactic approaches claim that “across languages, event nominals are [...] derived from unaccusative predicates, but not from unergative ones” (Alexiadou, 2001, p.78) and that a “verbal construction has an *-ung* nominalization if and only if the verb is constructed bi-eventively.” (Roßdeutscher, 2010, p. 106).

We propose a word-syntactic analysis of UNUVs by arguing that UNUVs pass tests for complex event structure accidentally, i.e. without actually denoting events. Instead, we propose that UNUVs denote dispositional properties, where an object - somewhat simplified - is disposed to realize a property *p* given a stimulus event *e* iff it would *p* if it were the case that *e*. Dispositions have been argued in the philosophical literature to function as “inference-tickets, which license us to predict [...] states.” (Ryle, 1949, p. 124). Actually, Ryle (1949) argued at length that e.g. unergative *to hibernate* and its nominalization *hibernation* - which was an english counterpart to UNUVs before the computer age - denotes a dispositional property. We apply Ryle (1949)’s conception of dispositions to the analysis of German UNUVs, where the disposition denoted by the UNUV acts as an

inference-ticket for the prediction of a result state from a mono-eventive verb. E.g., we propose that in (11a) *Wirkung* refers to the dispositional property of the pill to take effect if ingested. But if *Wirkung der Tablette* is combined with *behindern* as in (12a) in order to test for complex event denotation, the selection restriction of *behindern* for a complex event enforces - instead of selecting - an event denotation of *Wirkung*: *behindern* presupposes the instantiation of the dispositional property and once instantiated, dispositional properties are complex events. On the one hand, the ontological distinction between dispositional properties and events allows to maintain Alexiadou (2001)'s generalization because UNUVs do not fall under the category of event nominalizations. On the other hand, the mono-eventive base verbs of UNUVs are semantically special in that they provide the possibility to infer a dispositional result state which makes them in fact resemblant to bi-eventive verbs, thus rehabilitating Roßdeutscher (2010)'s hypothesis.

Tests for complex event structure do not distinguish between conditional (dispositional) and unconditional (actual) causal powers and so does Kratzer (1996)'s conception of Voice, which does not distinguish between the unconditional causal powers naturally expressed by verbs and the conditional causal powers that are usually expressed by adjectives denoting dispositions (e.g. *fragile*) and which, contrary to expectations, surfaces in UNUVs. Consequently, in our implementation of UNUVs at the syntax-semantics interface, we assume that there is a dispositional flavour of Voice which projects the object of which the inferred dispositional property p denoted by the UNUV is predicated into the external argument position. Accordingly, we get the data right: agent/causer introduction with *durch*-PPs is blocked and the agent theta role is assigned to the genitive argument. But this comes for a price: UNUVs must not incorporate an event-identifying verbalizer v , as this would cause the UNUV to denote an event instead of a property and consequently, we would not be able to distinguish event nominalizations from disposition nominalizations. (13) gives an exemplary derivation of the UNUV *Wirkung* in (11a). For ease of presentation, we represent the conditional structure of dispositions as a predicate $DISP(x, p, e)$: x has the disposition to p iff e , where the stimulus e is specified at a level above NP. The dispositional property p is introduced as a presupposition of the application of dispositional Voice. The presupposition is satisfied by redeeming the conditional discourse referent $\rightarrow p$ representing the inference-ticket of the root \sqrt{wirk} .



4 Underspecification

The representations that I am going to devise are inspired by Underspecified Discourse Representation Theory (UDRT, Reyle (1993)). The radical underspecification of ontology is not just a technical alternative to other approaches to sortal ambiguity. Like theories of semantic underspecification (van Deemter and Peters (1996)), it implies a radically different conception of the relation between ontology and ambiguity. In terms of Peter Ludlows categorization of positions on ambiguity (Ludlow (1997)), I am an apostate about ambiguity who claims that we have thoughts that are ambiguous, and we communicate and reason with those ambiguous thoughts without the necessity of disambiguation.

4.1 From disjunctions to underspecification

I develop my proposal for an underspecified approach to ontology against the anaphora resolution examples from section 3.2. I restrict myself to the discussion of the ontological interaction between sortally ambiguous *-ung* nominalizations and verbs. For the sake of convenience, I base my proposal on the lexical entry (14) for *Absperrung* given by Hamm and Solstad (2010). However, nothing hinges on that particular representation format as long as the representation language is rich enough to distinguish between predications pertaining to events, states and things.

$$(14) \quad \langle \alpha, \left. \begin{array}{l} z \\ \alpha = e \overset{\dagger}{\vee} \alpha = s \overset{\dagger}{\vee} \alpha = y \\ \textit{Absperrung}(\alpha) \\ e \textit{ CAUSE } s \\ s : \textit{have}(y, z) \\ \textit{function} - \textit{as} - \textit{barrier}(y) \end{array} \right\rangle$$

In (14), the sortal ambiguity of *Absperrung* at the NP-level is represented with a (special) disjunction operator $\overset{\dagger}{\vee}$ (Reyle et al. (2007)) which prompts for disambiguation of α at the VP-level via selection restrictions of the verbal container.

How can we get rid of the disjunction and the necessity for disambiguation in favour of an underspecified representation of *Absperrung* that provides a suitable basis for the processing of the anaphora resolution examples?

In representations of the type exemplified by (14) *Absperrung* is **identified** by different (but standardized) representational means:

- thing (i.e. physical thing): identified via its properties/functions

function – *as* – *barrier*(*y*)

- event (i.e. temporal entity): identified via its causal relationships

eCAUSEs

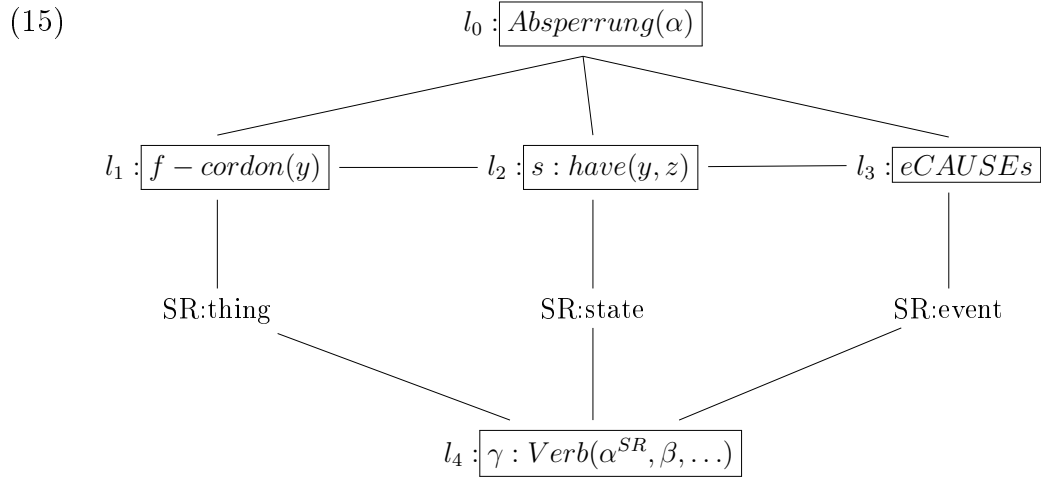
- state (i.e. properties): identified via its relating things and events with properties

$s : have(y, z)$

The dual function of DRS-conditions as truth-conditional predicates and ontological identifiers of discourse referents can be employed to detach the ontological denotation of *Absperrung* from its semantic representation as follows:

- Break up the DRS into single identification conditions for α .
- Arrange the identification conditions for α in an algebraic structure with a top and bottom element.
- Determine the algebraic structure according to the ontological relations in which the identification conditions stand.
- One such basic ontological relation is causation: an event causes a state and that state is attributed to an object.

The separation of the sort of denotation of the nominalization from its identification possibilities results in a structural underspecification of the ontological identification of the nominalization. An underspecified representation of *Absperrung* is given in (15). In the following, I call the nodes l_1, l_2, l_3 representing the selection restrictions of the container the **access points** of the algebra. The additional nodes $SR : sort$ are only displayed for the sake of presentation.



4.2 Selection restrictions

If an underspecified representation of an *-ung* nominalization is combined with a verb, the selection restrictions of the verb determine possible structural and thus ontological specifications of α . That is, as in UDRT, the language of ontological underspecification imposes **meta-level constraints** on

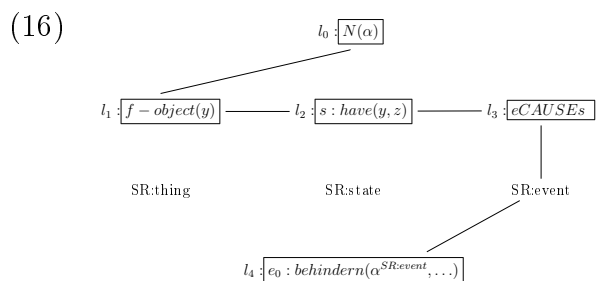
the ontological identification possibilities of an *-ung* nominalization. Consequently, in the present framework, selection restrictions appear as meta-level constraints on ontologically underspecified DRSs:

Constraint 1: Selection restrictions constrain possible identifications of the ontological sort of the arguments of the verb.

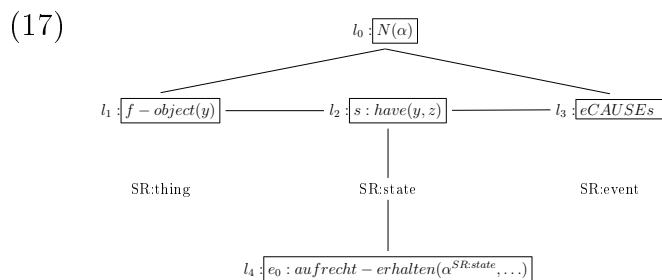
Selection restrictions are modelled via **templates** (substructures of the underspecification algebra) that represent possible identifications of an *-ung* nominalization. It should be noted that things can be identified in a functional or a physical way (i.e. by its causal role or its properties). If the thing is accessed as the result of an event or state identification, it has a functional identification represented as $f - object(y)$, otherwise a physical object identification $object(y)$.

4.2.1 Simple templates

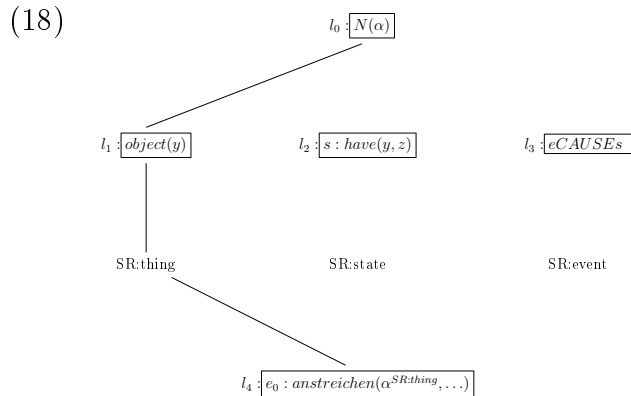
behindern *behindern* (to impede, (16)) selects for an event denotation of the nominalization. It identifies an event, the state it causes and a thing of which the function expressed by the state is predicated.



aufrecht erhalten *aufrecht erhalten* (to sustain, (17)) selects for a state denotation of the nominalization. The state can be identified in two ways (the identification expressed by the template is ambiguous). First, the state may be identified with respect to a thing which holds that state then no reference to the event causing that state is involved. Second, the state may be identified with respect to the event which causes the state, then there is no reference to the holder of that state.



anstreichen *anstreichen* (to paint, (18)) selects for a physical object denotation of the nominalization. No reference to temporal structures is involved in the identification.



4.3 DRS dumps

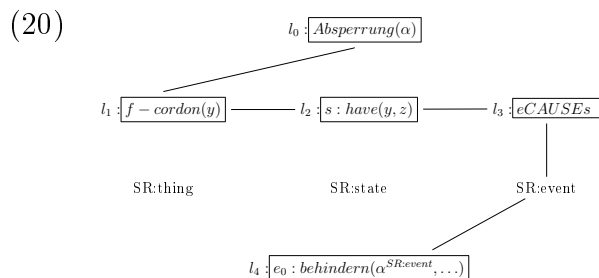
When applied to an ontologically underspecified DRS, templates specify **identification paths** (resp. sets of paths if the identification is ambiguous). For each application, the conditions occurring at an identification path constitute a **DRS dump**.

Constraint 2: Selection restrictions constrain the set of appropriate semantic representations: DRS dumps can be constructed by collecting conditions and identifications of α occurring on identification paths.

Consider the following sentence (19):

- (19) *Die Absperrung des Rathauses wurde gestern von Demonstranten behindert.*
 The cordon of the town hall was yesterday by protesters impeded.

Application of (16) to (15) results in (20):



Collecting the DRS conditions and instantiations of α along the path specified by the template (20) gives us the DRS dump in (21):

$$(21) \quad \begin{array}{l} \alpha, z, e, y, e_0, e_1, s \\ eCAUSEs \\ s : have(y, z) \\ f - cordon(y) \\ e_0 : behindern(e_1) \\ e_1 = e \\ e = \alpha \\ Absperrung(\alpha) \end{array}$$

4.4 Reidentification and anaphora binding

In discourse settings, several templates are applied to one and the same underspecified representation of sortal ambiguity. I call the iterated application of templates a **reidentification** of an underspecified algebra and a DRS dump K_2 resulting from a reidentification of a DRS dump K_1 the **extension** of the DRS dump of K_1 .

The underspecified algebra can be employed for the control of reidentification. Previously identified DRS conditions unlock access points for reidentification and it is only via these access points that reidentification can be processed. A violation of this constraint results in a failure of anaphora resolution in the DRS dump.

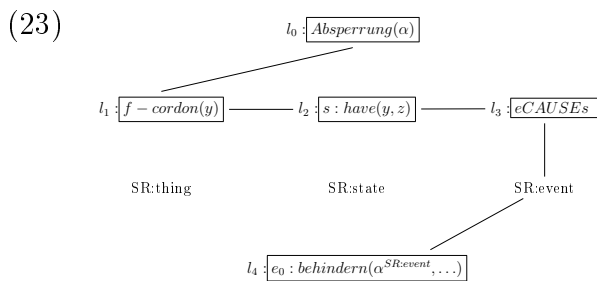
Constraint 3: Reidentification is constrained by the availability of access point DRS conditions.

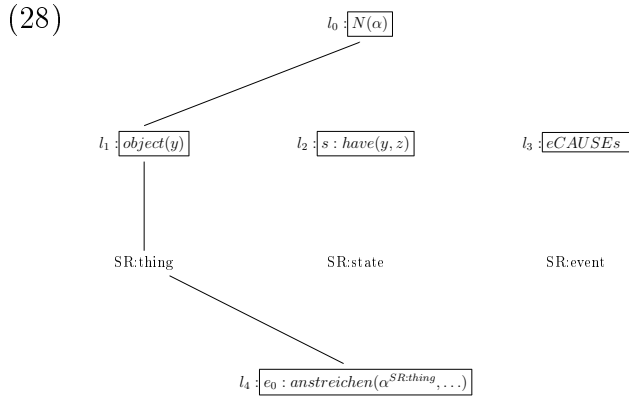
4.5 Examples

4.5.1 Antecedent: event; Anaphora: state

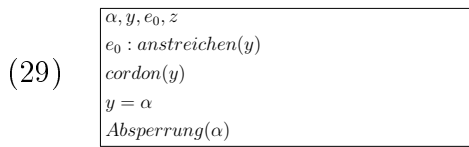
- (22) *Die Absperrung des Rathauses wurde gestern von Demonstranten behindert.*
 The cordon of the town hall was yesterday by protesters hampered.
Wegen anhaltender Unruhen wird sie heute aufrecht erhalten.
 Due to continuing unrest, is it today sustained.

Application of (16) to (15) results in (23:)

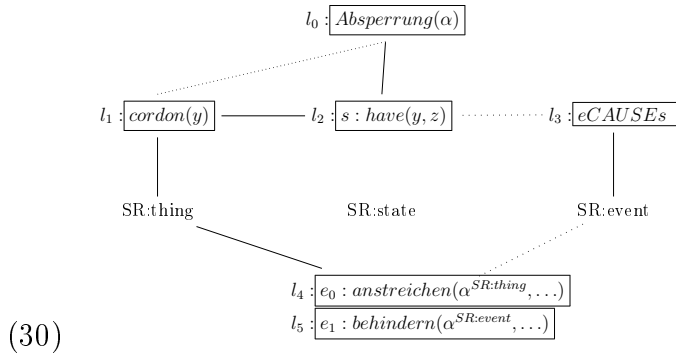




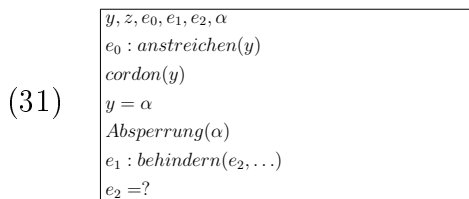
DRS dump:



Application of (16) to (28) leads to a reidentification failure. Because no event has been identified with *anstreichen*, there is no eventive DRS access point through which *behindern* could reidentify *Absperrung*.



The violation of the reidentification constraint results in an extended DRS Dump in which the anaphora can not be resolved:

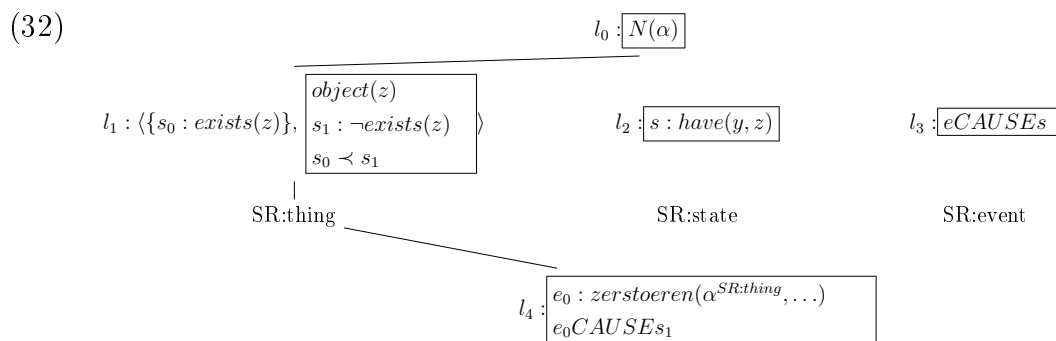


4.6 More examples

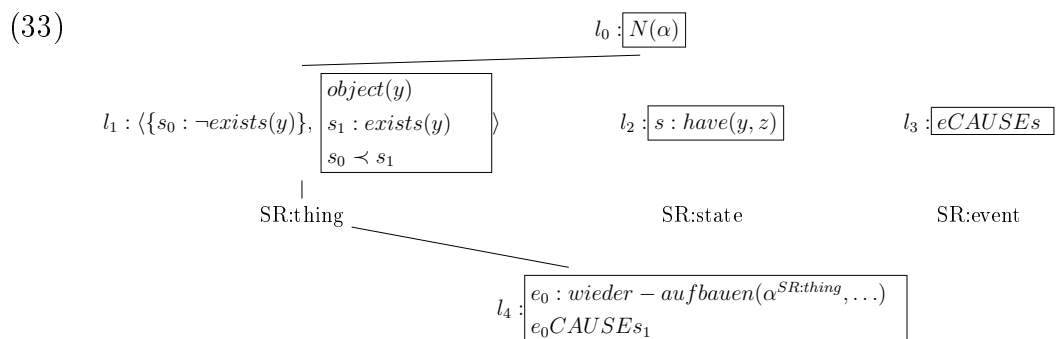
4.6.1 Complex templates

There is a close relation between ontology and lexical semantics. Some verbs do not only select for a certain ontology but they also modify a given ontological configuration with respect to ontological categories such as existence, possibility, time, space etc.. This is the basic assumption underlying lexical semantics.

zerstören *zerstören* (to destroy, (32)) selects for a physical object and presupposes a state in which this object exists. It then adds a condition to the effect that following the existence state there is a state in which the object does not exist.



aufbauen *wieder aufbauen* (to rebuild, (33)) is, from an ontological point of view, the inverse ontological operation to *zerstören*. It presupposes a state of non-existence and adds a condition to the effect that the object exists in a state following the non-existent state.

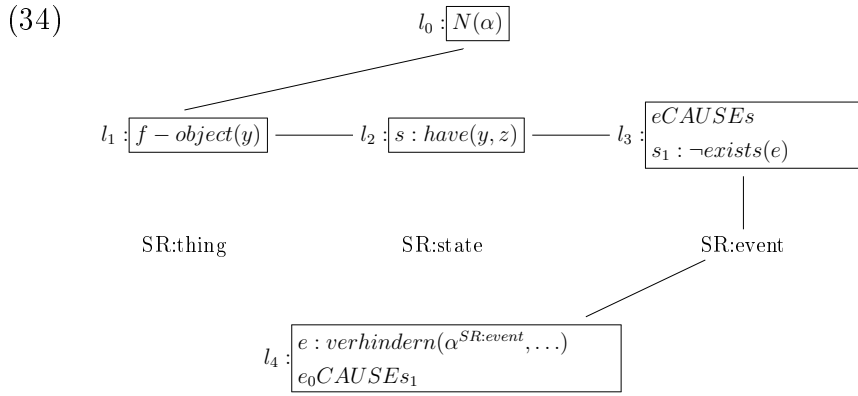


verhindern Similar to modifications of the existence of objects, verbs can deny or presuppose the existence of events. The ontological consequences of event negation are, however, more complex than for object negation. The complexity results from the fact that an event is inseparably tied to its causes but in turn these causes depend on the existence of the event. If the event is negated, then it has no causes. But in order to identify the negated event, we must assume that it would

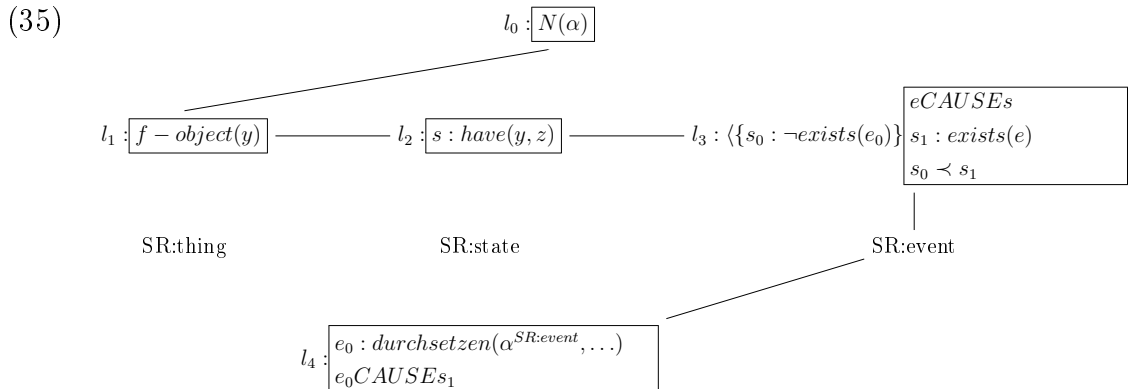
have had causes if it happened. Consequently, even a negated event comes with a full identification path explicated by the template for e.g. *verhindern*.

What a serious implementation of the causal consequences of event negation would require is a mechanism that allows to propagate the causal chain reactions that result from events through the ontological dependency algebra: if no event of cordoning-off has happened, then there is no cordon. However, it must be ensured, that **this** (intended) cordon can be realized at a later point. In the following, I present a simple account of the problem, where causal chain reactions are captured by distinguishing between locked and unlocked access points. An access point can be locked by the lexical semantics of a verb which explicitly denies the existence of the access point. A negated access point must be explicitly unlocked by the ontological presupposition of a template in order to be accessed for reidentification.

verhindern (to prevent, (34)) adds a condition to the algebra to the effect that the event which *verhindern* takes as an argument has not been realized. It locks access to the event identification.



durchsetzen *durchsetzen* (to enforce, (35)) is the ontological inverse to the operation specified by *verhindern*. It presupposes that the execution of an event has been prevented or hampered and thus unlocks the access to event identification by updating the previous ontological status of the event.

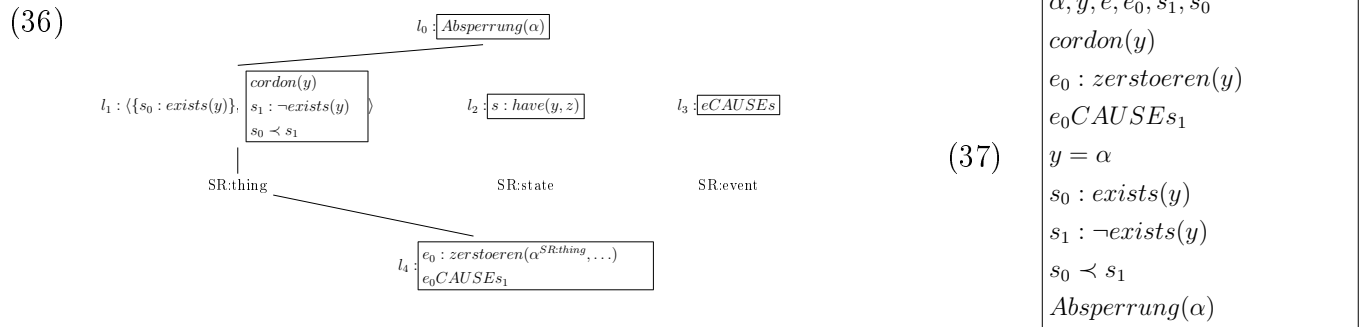


4.7 Complex examples

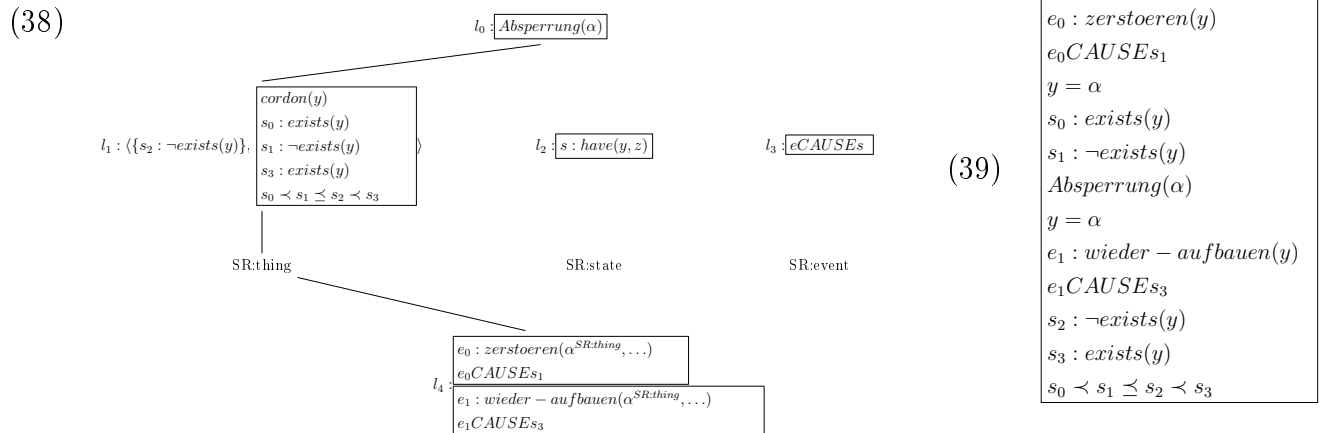
4.7.1 Antecedent: non-existing object; Anaphora: existent object

- (8c) *Die Absperrung des Rathauses wurde gestern von Demonstranten zerstört. Sie wird heute wieder aufgebaut.*
 The cordon of the townhall was yesterday by protesters destroyed. It will today rebuild.

Apply (32) to (15):



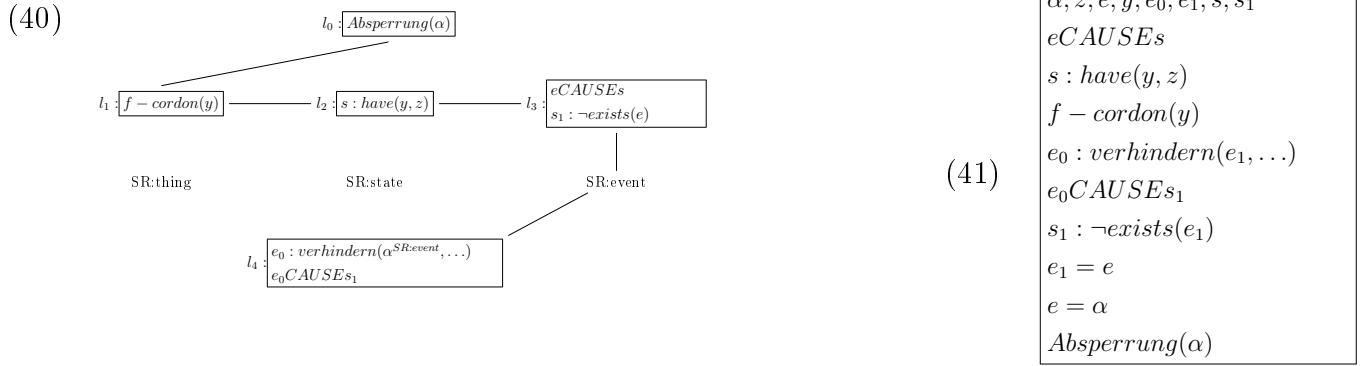
Apply (33) to (36). The presupposition of (33) unlocks the object access point.



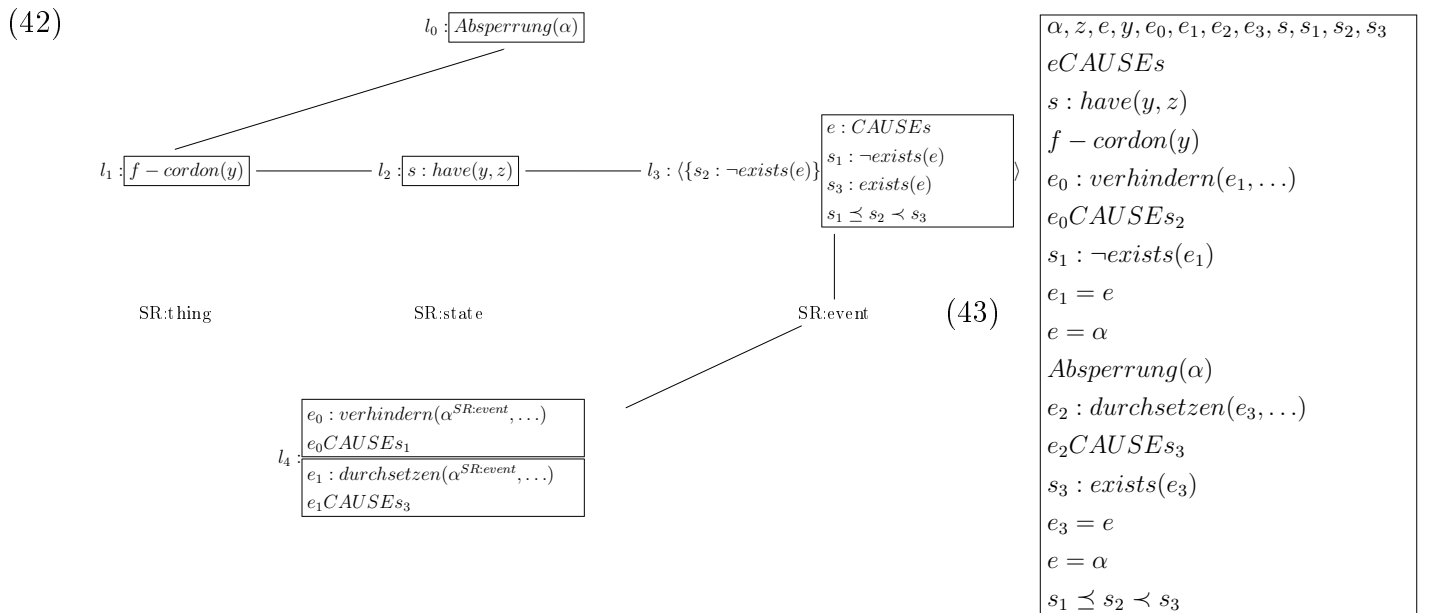
4.7.2 Antecedent: non-existing event Anaphora: existing event

- (8b) *Die Absperrung des Rathauses wurde gestern von Demonstranten verhindert. Sie wird heute mit massivem Polizeieinsatz durchgesetzt.*
 The cordon of the townhall was yesterday prevented by protesters. It will today with massive police operation enforced.

Application of (34) to (15) locks the event access point.



Application of (35) to (40) unlocks the event access point via the presupposition of (35).



5 Summary

- The data on sortally ambiguous *-ung* nominalizations suggests a departure from the principle of disambiguation with selection restrictions.
- I argued for an underspecified approach of ontology in *-ung* nominalizations.

This is all that I am going to present in this talk, however, you may have noticed that I attached an outlook section and probably some of your urgent questions concerning the consequences of underspecification for the analysis of nominalizations may find a preliminary answer in this outlook. Underspecification of ontology is not only a radical shift of the perspective on ambiguity. It is closely related to a similarly radical shift of the perspective on lexical semantics. Because

lexicalist approaches stand and fall with the linguistic significance of container disambiguation, this paper can be considered a strong argument for pursuing lexical semantics in the framework of contemporary word-syntactic approaches like Distributed Morphology (Halle and Marantz (1993); Marantz (1997)) - and this is what the outlook spells out in some more detail.

6 Outlook

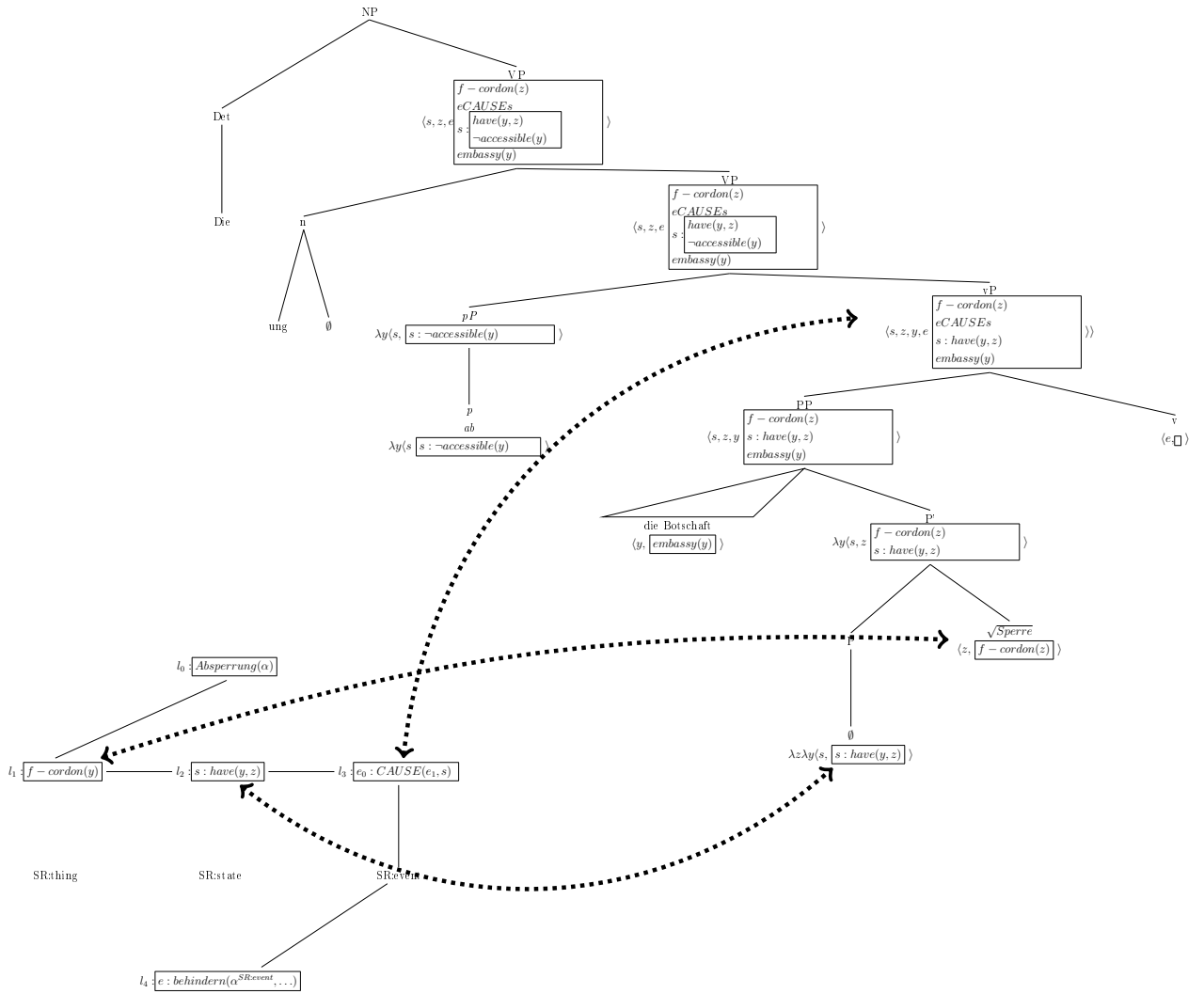
6.1 Sortal ambiguity and Distributed Morphology

While the same syntactic engine is assumed to be at work below and above the word level in Distributed Morphology, there is a wide conceptual gap between semantics below and above the word-level: sentences are true or false, words are not. The meaning of sentences can be defined in terms of truth-conditions Frege (1983); Tarski (1956) and words do have a meaning only in the context of a sentence. Consequently, if we are to consider the meaning of words in isolation and without reference to truth, a different conception of meaning has to be invoked below the word-level (This fact is often omitted in attempts to provide DM with a semantics, e.g. Harley (2013)). Traditional lexical semantics assumes that the meaning at the word-level pertains to ontology and following this assumption the ontological meaning of words is determined by the semantic interpretation of the syntactic rules according to which the word is formed.

Consequently, the interpretation of DM-like word-syntax is to be spelled out in terms of ontological configurations introduced, modified and determined by syntactic building blocks of word meaning. In our research group led by Antje Rossdeutscher we have gone some way towards identifying the ontological interpretation of syntactic building blocks of word meaning (e.g. for v building blocks (Rossdeutscher (2011, 2012b,a)), for p building blocks (Rossdeutscher (2013)), for n building blocks (Rossdeutscher (2010); Rossdeutscher and Kamp (2010))). An immediate consequence of this view on lexical semantics is that the role of ontology in linguistics is turned upside down: ontology is not the starting point but the result of linguistic analysis.

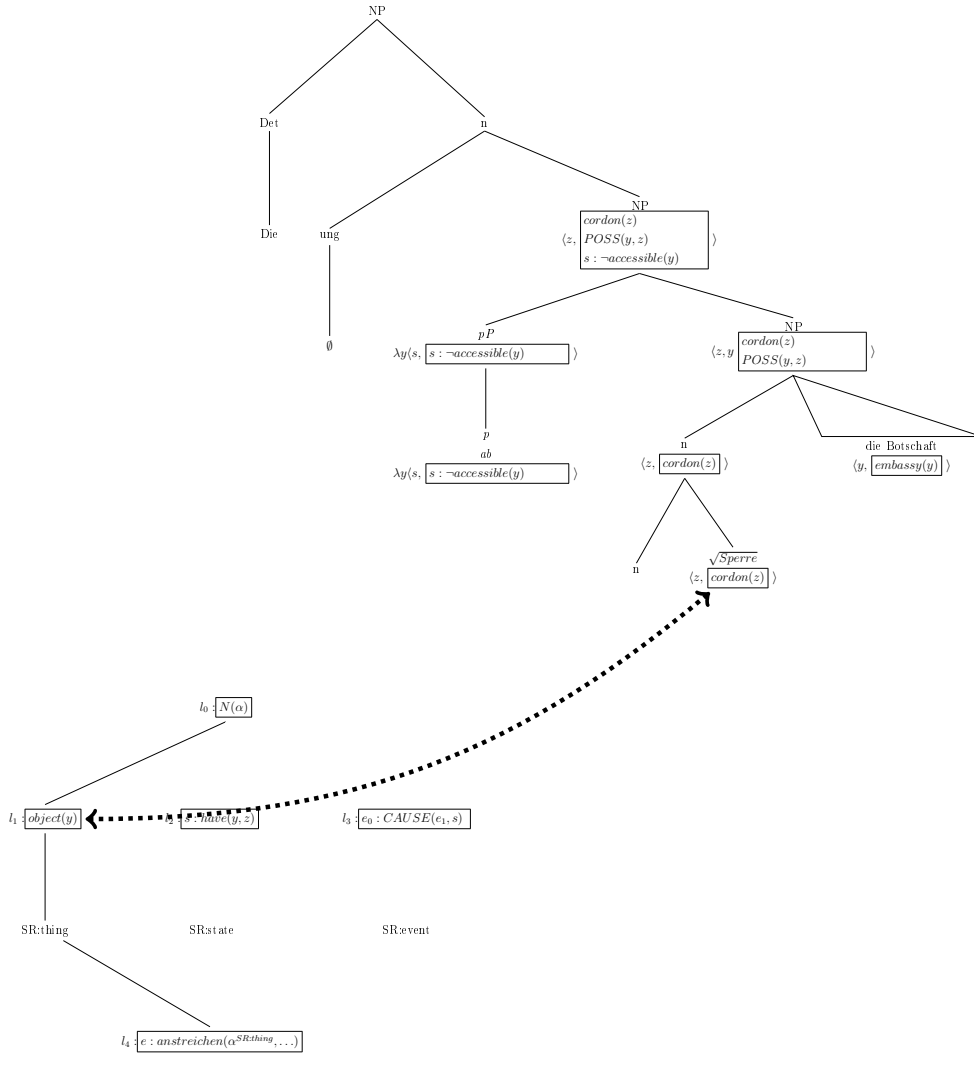
However, what is still missing are general principles according to which ontologically interpreted syntactic building blocks of word meaning interact with each other in the constitution of word meaning and with ontological constraints imposed at the discourse level. For the time being, here is a simple example of what I have in mind. We propose a DM/DRT derivation of *Absperrung* as in (44). Note that the semantic representation derived in (44) is more complex than the representations with which I illustrated the underspecified account of ontology. What we intend to invoke in order to explain the interpretation of *-ung* nominalizations is the relation between the underspecified ontology of *Absperrung* and the syntactic reconstruction of *Absperrung*. That is, the specification of the underspecified ontology determines the syntactic structure of the nominal-

ization.



(44)

Accordingly, the ontological difference in non-eventive identification leads to a different syntactic analysis in the non-argument analysis of the genitive as in (45).



(45)

6.2 Towards a sublexical semantics

Taking into account the close relation between syntax and ontology, the sortal ambiguity of nominalizations boils down to a syntactic ambiguity of word-syntactic reconstruction of *-ung* nominalizations: different syntactic analyses of a word lead to a different ontological denotation. This bottom-up process is complemented (and in fact governed) by the top-down processing of ontological restrictions imposed by container sentences that host the nominalization. Consequently, because the difference in analysis is triggered by the selection restrictions of the container sentence, the ontological meaning of a word is not only underspecified but also dynamic in that its configuration of syntactic building blocks and the consequent ontological interpretation depends on its supra-lexical context. (This implies that the meaning of a root not only depends on the local context in which it is inserted but also on the global context, because the local context is defined by the global context).

The formulation of general principles according to which the building blocks of syntax, ontology and truth interact below the word-level and above the word-level is a phenomenon that has not yet drawn much attention from syntacticians and semanticists. I hope that the underspecified account of ontology in nominalizations presented in this paper is one reasonable step towards this goal. However, any serious attempt to move further towards a semantics for word-syntax has to provide a reasonable answer to main question concerning the parallel exploration of semantics below and above the word-level: What is the ontological equivalent to truth?

It is the development of such a notion which is required for the definition of a notion of compositional interpretation of DM-structures and which is central to the account of ontology in nominalizations proposed in this paper.

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