

Nominalization – Lexical and Syntactic Aspects

1. The Issue

The main tenet of the present paper is the thesis that nominalization – like other cases of derivational morphology – is an essentially lexical phenomenon with well defined syntactic (and semantic) conditions and consequences.

More specifically, it will be argued that the relation between a verb and the noun derived from it is subject to both systematic and idiosyncratic conditions with respect to lexical as well as syntactic aspects. Familiar cases like (1) and (2) illustrate the point:

- (1)(a) Daß Eva nach Bern fuhr, überraschte uns.
(That Eva drove to Bern, surprised us.)
- (b) Evas Fahrt nach Bern überraschte uns.
(Eva's drive to Bern surprised us.)
- (2)(a) Daß Peter die Regeln erklärte, war nützlich.
(That Peter explained the rules, was useful.)
- (b) Peters Erklärung der Regeln war nützlich.
(Peter's explanation of the rules was useful.)

While the choice of morphological markers is lexically determined and highly idiosyncratic – *fahren/Fahrt* (*drive/drive*) vs. *erklären/Erklärung* (*explain/explanation*)-, syntactic combination follows general rules: the verb assigns nominative and accusative case to the subject and direct object, the derived noun systematically requires genitive case for both complements. These observations exhaust neither the idiosyncratic nor the systematic properties of nominalizations, but they highlight the central issue of the present paper: The relation between lexical entries that enter into verbal and nominal constructions, respectively, can neither be captured in purely syntactic terms, nor can it be reduced to lexical properties, ignoring the systematic syntactic (and semantic) conditions and consequences. This raises the question how the systematic and idiosyncratic conditions of nominal and verbal constructions are represented, and how they interact.

In what follows, concrete examples of idiosyncratic, lexically determined properties characterizing derivational relations will largely be taken from German, although the type of phenomena is of course not restricted to a particular language.

2. Preparatory Remarks

As Alexiadou (2006) points out, the major controversy between different approaches to nominalization concerns the role of syntactic as opposed to lexical conditions or processes. In other words, different proposals differ with respect to the question whether lexical information is involved in or excluded from the conditions that determine the nominal or verbal character of the constructions in question. This

question is intimately related to general assumptions about lexical structure and the organization of grammar.

To begin with, lexical items must be assumed to combine at least phonetic form with conceptual structure. For the time being, it is sufficient to consider both the phonetic form and conceptual structure as arrays of features or primitive elements of some sort. Now, the crucial point is the question, whether lexical items are generally specified for morphological and syntactic properties or consist – as e.g. Borer (2003) claims – of phonetic and conceptual information exclusively, except for items of functional categories, whose rationale is just the need to provide the relevant syntactic information. If major lexical items are devoid of syntactic information, then nominalization, verbalization and related processes cannot be lexical phenomena *a fortiori*, but must be strictly extra-lexical, i.e. essentially syntactic phenomena¹. However, for reasons that go far beyond problems of nominalization, the inclusion of morpho-syntactic information in lexical items seems to be indispensable. Look for instance at a familiar case of the syntax of German, exemplified in (3) vs. (4), where lexical properties of the synonymous verbs *anfang-* vs. *begin-* (begin) lead to different syntactic consequences in the main clause (a) and the subordinate clause (b):

- | | | |
|-----|-------------------------------------|--------------------------------------|
| (3) | (a) Denn das Konzert fängt spät an. | (For the concert begins late.) |
| | (b) Da das Konzert spät anfängt. | (As the concert begins late.) |
| | (c) Der späte Anfang des Konzerts. | (The late beginning of the concert.) |
| (4) | (a) Denn das Konzert beginnt spät. | (For the concert begins late.) |
| | (b) Da das Konzert spät beginnt. | (As the concert begins late.) |
| | (c) Der späte Beginn des Konzerts. | (The late beginning of the concert.) |

The point is that verb-movement, which relates (a) to (b), treats *anfang-* as a phrase, applying only to the stem *fang* (or *fängt*, for that matter), thus separating it from the particle *an*, while the verb *begin-* in (4) is moved as a unit, which includes the prefix *be-*. Notice that *anfang-* and *begin-* must be integrated lexical items with practically identical conceptual representation, whose components can in no way be related to the morphological constituents. Their different syntactic behavior is the consequence of a property that must be lexically marked and cannot be reduced to the conceptual or phonetic information². A different aspect of lexical information shows up in the nominal variant in (3c) and (4c) compared to the cases in (5b) and (6b). Again, *aufhören* and *enden* (end) are conceptually (almost) identical, denoting the counterpart of *anfangen* and *beginnen*. But while both *anfang-* and *begin-* support nominal realizations, this option holds only for *enden*, but is strictly excluded for *aufhören*, as indicated in (6b)³.

¹ Notice that the converse exclusion does not hold, i.e. nominalization could well be a post-lexical, syntactic phenomenon, even though lexical items provide syntactic information. As a matter of fact, post-lexical phonology like e.g. assimilation across word boundaries is of this type: it is extra-lexical, but does actually presuppose lexical entries providing phonetic information.

² Although German prefixes like *be-* and particles like *an-* differ systematically with respect to lexical stress, it would be misleading to construe the different behavior exemplified in (3) vs. (4) as a consequence of a phonetic feature distinguishing *anfang-* and *begin-*, because then syntactic operations would depend on phonological features, which would be just another way to lexically encode syntactic conditions. As a matter of fact, the different stress pattern is a natural consequence of the relevant syntactic property.

³ It should be noted that (6b) indicates that no nominal realization by whatever morphological marker is available for *aufhör-*. This does not exclude the nominal use of the infinitive, as shown in (i), which is available for every verbal base:

(i) Das späte Aufhören des Konzerts.

- (5) (a) Das Konzert endet spät. (The concert ends late.)
 (b) Das späte Ende des Konzerts. (The late ending of the concert.)
 (6) (a) Das Konzert hört spät auf. (The concert ends late.)
 (b) *Das/Die späte Aufhör/Aufhörung des Konzerts.⁴

Hence, even if nominalization is not a lexical process, but the effect of some functional category which determines the nominal or verbal character of a construction as supposed e.g. by Borer (2005) or Alexiadou (2001, this volume), it is clear that lexical items are available for the relevant functional categories only if they are appropriately marked. To this effect *enden* and *aufhören* must exhibit different syntactic information. Yet another type of lexically specified syntactic properties is exemplified by (7) – (9):

- (7) (a) Das Konzert begann später. (The concert began later.)
 (b) Er begann das Konzert später. (He began the concert later.)
 (8) (a) Das Konzert endete später. (The concert ended later.)
 (b) *Er endete das Konzert später
 (9) (a) *Das Konzert beendete später
 (b) Er beendete das Konzert später. (He ended the concert later.)

However the distinction between causative and un-ergative constructions is to be implemented syntactically, the fact that *beginnen* allows for both of them, whereas *enden* excludes the causative construction and *beenden* the intransitive one, can only be due to their different lexical properties.

Instead of adducing further evidence for the position that lexical entries must indicate specific morpho-syntactic properties alongside with phonetic and conceptual information, I will briefly characterize the types of information to be recognized in this respect. The traditional view, first proposed in Chomsky (1965), distinguished at least two types of conditions, viz. categorization and sub-categorization. Categorization classifies an expression in terms of morpho-syntactic features, while sub-categorization determines the complements it requires or admits. Sub-categorization turned out to be captured more appropriately by what is called *argument-structure* or *thematic grid*, specifying the role and properties of optional or obligatory complements of an expression. Hence the general organization of a lexical entry E combines a phonetic form PF(E), specifying the conditions E ultimately imposes on the articulatory and perceptual realization, with a semantic form SF(E), determining the conceptual distinctions contributed by E, and a grammatical form GF(E), which consists of the categorization and the argument structure of E. Schematically:

(10)	Phonetic Form	Categorization	Argument Structure	Semantic Form
		1 4 4 4 4 4 4 4	2 4 4 4 4 4 4 4 3	
		Grammatical Form		

Some general remarks must be added to this schema:

⁴ Note that (6b) indicates the exclusion of *aufhör-* from any nominal realization, irrespectively of the morphological marker. It does not exclude, however, the nominal use of the infinitive, shown in (i), which is always available for every verbal base:

(i) Das späte Aufhören des Konzerts. (The late ending of the concert)

First, the overall format of lexical entries is essentially that of linguistic expressions in general, specifying their phonetic, morpho-syntactic, and semantic properties. This follows from the necessity that lexical information contributes to all aspects of linguistic structure, and it corresponds to the fact that different types of linguistic expressions can pick up idiosyncratic features, thereby creating fixed phrases or idioms, which become lexical items just because of their unpredictable properties.

Second, lexical items are based on universal principles of linguistic structure and controlled by conditions and rules of their respective language. This allows them to be underspecified, consisting only of specifications that are not predictable by general rules and principles. Thus, the lexical entries of a language are in fact the place of all and only its idiosyncratic information.⁵

Third, all lexical items consist of each of the four components noted in (10), even if their content is more or less predictable according to general conditions and hence lexically unspecified. Thus major entries do not only determine their contribution to the phonetic and semantic form, but also their categorization and argument structure, even if they appear not to select complements in the narrower sense, like *walk*, *jump*, or *tanz* (dance), as by default verbs select a subject, and nouns provide a referential *argument position*. More generally, all entries will be assumed to exhibit a categorization together with a pertinent *argument structure*.⁶

Finally, in addition to the major lexical categories like verb, noun, and adjective, the lexical system is usually assumed to contain functional categories like complementizer, determiner, tense, and affixes of derivation and inflection. Although details of these elements and their specific properties are matters of dispute, there is general agreement that they play a crucial role in the combinatorial computation of linguistic expressions.⁷ And there is no doubt that functional categories do have characteristic properties of their own in several respects. Thus, they are likely to use systematically restricted repertoires of basic elements of PF and SF, and they can be void of the phonetic or semantic component altogether. This would allow for the "invisible" elements that merely determine the morpho-syntactic conditions of the elements they combine with and the properties of the resulting combination.

The next section will spell out the components of the overall schema (10) and the dependencies among them in slightly more detail in order to reasonably deal with lexical and syntactic aspects of nominalization.⁸

⁵ See Jackendoff (1997, 2002) for instructive discussion of these points.

⁶ This has important consequences for the analysis of nominalizations, as I will not distinguish, like e.g. Grimshaw (1990) and especially Alexiadou (this volume), between nominalizations with AS and referential nominals without AS. I will rather argue that they differ essentially by making different use of their respective *argument structure*. I will return to these matters in more detail below.

⁷ Functional elements are sometimes assumed to completely determine the non-universal aspects of the computational structure of language, i.e. those morpho-syntactic properties that depend on individual experience and must be learned. Notice that this assumption must not be construed as implying that language particular information is restricted to functional categories and hence excluded from other elements. It rather maintains that language particular morpho-syntactic properties are necessarily determined by functional elements and thus dependent on lexical information, a view that has interesting consequences for theories of acquisition of grammatical knowledge.

⁸ The following sketch of the structure of lexical items is essentially based on proposals discussed in Bierwisch (1997, 2006).

3. Grammatical Information of Lexical Entries

To begin with the interface level PF, no points beyond standard assumptions about phonetic form need to be made here. In other words, PF(E) should be construed as a redundancy-free array of (presumably binary) phonetic features with little dependency on other components of E.⁹ The interpretation of PF-features and their combination belongs essentially to the systems of articulation and auditory perception. Things are by far less uncontroversial with respect to the other interface level, viz. the content of SF. There is little doubt that the elements and combinations of this structure must be interpreted by (or are drawn from) elements and relations usually called conceptual structure, which is just an abbreviation for the conceptually organized representation of practically all aspects of experience. The wide range of questions raised by this assumption is to be left aside here. It seems to be sufficient to agree about three points.

First, there must be a minimal ontology in terms of which representations are organized. I will assume that two types of conceptual constituents are indispensable: entities – including individuals, substances, events – and situations or states of affairs, in which entities participate. Second, whatever combinations the basic conceptual constituents might enter according to various types of conditions, the resulting conceptual configurations must be systematically structured in one way or another. The most neutral proposal in this respect is to assume combinations that lead to hierarchical dependencies among entities and situations. Third, lexical items, providing building blocks for such configurations, must on the one hand fix certain conceptual conditions as their constant contribution to conceptual configurations, and on the other hand provide variable positions for entities and situations to which these conditions apply. Hence SF must be assumed to consist of constants and variables, which together determine the conditions according to which they combine with other elements. There are various ways to flesh out these three assumptions, but I will leave it at that, filling in further assumptions, if need arises.

Turning next to the components called *grammatical form* in (10), we notice that the *categorization* Cat (E) and *argument structure* AS (E) do not only determine different kinds of properties, but are also of rather different formal character. First, Cat (E) is a structured set of binary features which specify the syntactic and morphological classification of E. If E becomes the head of a complex expression E' by merging with a complement or adjunct Y, then Cat (E) becomes the categorization of E'.¹⁰ In other

⁹ One type of dependency that might be noted, though, turns on language particular conditions imposed on PF by certain features of categorization. The different stress in cases like [_V com'pound] vs. [_N compound] is a well known example, the different properties of German particles as opposed to prefixes noted earlier is another case in point.

¹⁰ It seems to me that this is after all the rationale underlying Chomsky's proposal (1995) with respect to the operation *merge*, according to which a complete copy of the head X becomes the label – actually the categorization – of the combination [X, Y], if X merges with a constituent Y, thus generating the configuration [X, [X, Y]]. Intuitively as well as formally, however, the projected property which the head shares with the resulting complex is its categorization, rather than the complete array of phonetic and semantic features (which become part of the resulting combination anyway.) In other words, the label a phrase like *eat an apple* inherits from its head *eat* is the categorization of the verb, rather than a duplication of all its phonetic and semantic properties.

words, the categorization of a complex expression E' is that of its head, whether E' is a lexical item or not. This turns out to play a crucial role in nominalization.

The *argument structure* AS(E) on the other hand is not just a further collection of morpho-syntactic features, but rather a different type of information, which in part uses the same features as Cat, though in a different guise. AS (E), as already noted, consists of argument positions or thematic roles by means of which an item selects its complements. This selection has two aspects, called semantic or *s-selection* and categorial or *c-selection*. Although fairly different views about the nature of thematic roles can be found in the literature¹¹, there is general agreement that thematic role establishes semantic relation between the lexical item and its complement, and that it is associated with morpho-syntactic conditions the complement in question must meet. Hence two types of information are tied up in an argument position: the semantic aspect, which must be connected in some way to the information provided by SF, and the morpho-syntactic aspect, which refers to the information in terms of which the complement's categorization is specified. Formally, an argument position can be construed as an operator that has access to a variable in SF, thereby determining the relation that the head assigns to the complement in question¹². On this account, s-selection is determined by the conditions SF imposes on the designated variable, while c-selection is imposed by a set of morpho-syntactic features associated with the operator that constitutes an argument position. Thus AS (E) is a kind of interface between the semantic and morpho-syntactic conditions combined in E. It identifies semantic variables which are available for further specification by the pertinent complements, and it defines the morpho-syntactic conditions these complements must meet.

The assumptions discussed so far may be illustrated by means of a somewhat simplified entry for the verb *begegnen* (meet, encounter) as given in (11), where the SF-configuration [x MEET y] abbreviates the condition that some entity provided by x encounters an entity provided by y, and [e INST p] indicates that an event e instantiates the condition p, here the condition of x's encounter with y:

(11)	/ be - gegn /	[+V, ...]	λy	λx	λe	[e INST [x MEET y]]
			[Dat]			
	1 4 2 4 3	1 4 2 4 3	1 4 4 2 4 4 3			1 4 4 4 4 2 4 4 4 3
	PF	Cat	AS			SF
		1 4 4 4 4 4 2 4 4 4 4 3				
		GF				

Concerning PF, non-trivial properties of the prefix /be/ in *begegnen* must be captured, but can be left aside in the present context. The feature [+V] in Cat abbreviates the classification of *begegnen* as a verb. As to AS, *begegnen* – like *meet* – is a transitive verb that licenses a subject and an object. They satisfy the positions represented by

¹¹ See e.g. Reinhard (2002) for subsequent discussion, and Bierwisch (2006) for different views.

¹² Technically, the operator in question is an abstractor, which can formally be treated as a lambda operator, if the format of SF-representations is build up correspondingly. For details to this effect, see Bierwisch (1997) and related work. For the sake of explicitness, I will rely here on lambda operators to represent argument positions for reasons that will become clear as we proceed. A slightly different proposal has been developed in Jackendoff (1990) and subsequent work. Accordingly, Jackendoff considers an argument position as something like an empty slot within the semantic representation of an expression.

λx and λy , respectively.¹³ Unlike regular transitive verbs, however, *begegnen* assigns dative case to its object, which is indicated by the condition [Dat] attached to λy . The operator λe identifies an argument position that provides the basis for a number of specific properties of verbs, among them the integration of tense and event reference. This rather simplified illustration must be supplemented by a number of comments.

First, features of Cat as well as c-selectional features of AS are drawn from presumably universal options, but according to language particular conditions. Differing from basic elements of PF and SF, which identify distinctions in extralinguistic mental domains, morpho-syntactic features represent conditions on mainly language-internal relations and operations. Two types of features with fairly different properties are usually distinguished: syntactic features classify major lexical categories – nouns, verbs, adjectives, etc. –, morphological features introduce specific distinctions within these categories. They are realized according to largely language particular conditions, leading to inflectional categories like case, gender, number etc. For the syntactic features, I will provisionally assume, essentially following Wunderlich (1997), that items of major lexical categories are classified by features that primarily distinguish dependent vs. independent referential capacity and strong vs. weak argument positions, as indicated in (12):

(12)		Noun	Verb	Adjective	Preposition
	Dependent	–	–	+	+
	Strong AS	–	+	–	+

In other words, adjectives and prepositions are referentially dependent on the items they combine with, while nouns and verbs have independent referential capacity. The common property of verbs and prepositions is the fact that their argument positions are strong, i.e. they must be saturated syntactically, unless explicitly indicated otherwise, while those of nouns and adjectives are weak or optional and need not be saturated syntactically, except for the designated or external argument.

To illustrate the morphological features realized in German, the following preliminary distinctions for case and gender might be considered without further comment:¹⁴

(13)		Nominative	Accusative	Dative	Genitive
	Oblique	–	–	+	+
	Subordinate	–	+	+	–

(14)		Masculine	Feminine	Neuter
	Feminine	–	+	–
	Neuter	–	–	+

¹³ For systematic reasons, to which I will return below, the syntactically closer arguments precede the more remote ones in AS. Thus in (11), λy provides the position of the grammatical object, which in AS precedes the position λx of the grammatical subject.

¹⁴ There is a large literature about the categories to be assumed and the features by which they are distinguished. This discussion need not be taken up here, though, because of nominalization it is sufficient to assume that morphological features of this sort are available, while particular case or gender features are not at issue. For convenience, I will therefore continue to write [+Dat] for [+Obl,+Sub], [+V] for [–Dep,+Str] etc, whenever feature notation is not decisive.

It must be added that morphological features, although determining conditions of language internal computation, may still be related in some way to conceptual distinctions. Thus tense and number must be connected to time and countability, while case can at best partially be tied to semantic content, although strong efforts have been made to identify semantic content of case features.¹⁵ Conditions for features of syntactic categorization will be taken up below.

The next comment concerns the different aspects of underspecification of lexical items. First, there are conditions that hold within the components of (10), due to which predictable feature values can be left unspecified. This applies to Cat in much the same way as to PF or the conditions fixed in SF: only features or components that do not follow from general rules and principles are lexically specified.¹⁶ Second, underspecification can be due to conditions that hold between different components of a lexical item. Thus features of c-selection are largely predictable for different argument positions, depending on the categorization of the item: The highest argument of verbs (the subject position) assigns nominative case in German, the lowest structural argument (the direct object) assigns accusative case, a position in between (the indirect object) would assign dative case. Hence the c-selectional case features in AS are specified, only if they are at variance with these general conditions (as noted for *begegnen* in (11)), but not for regular transitive verbs like e.g. *treffen* (meet, encounter, hit).¹⁷ The crucial point here is the systematic dependence of c-selectional conditions in AS on the categorization fixed in Cat. Thus the same thematic role assigned by a verb to its subject is realized as an adnominal genitive in the corresponding noun, as shown in (1) and (2) above. On this background, the lexical information of *schlaf_* (sleep) could be assumed to automatically provide the c-selection [+Nom] for λx of the Verb *schlafen* in (15a), and [+Gen] for the Noun *Schlaf* in (15b).¹⁸

- (15)(a) / schlaf / [+V , +Strong, ...] $\lambda x \lambda e$ [e INST [SLEEP x]
 (b) / schlaf / [+N , +Masc, ...] $\lambda x \lambda e$ [e INST [SLEEP x]

Examples like (15) highlight a particular effect of underspecification: features without lexical specification do not simply save redundant information, but are open for

¹⁵ Hjelmslev (1935) and Jakobson (1936) are paradigmatic examples of this interesting enterprise, the merits and limits of which cannot appropriately be dealt with here. The intricacy of the matter can be seen from the fact that tense is a well established field of systematic semantic explanation, while case is highly problematic, and gender seems to be something in between: sometimes the male/female contrast clearly corresponds to sex, as in *Bruder* (male, brother) vs. *Schwester* (female, sister), but the majority of cases do not allow for a semantic interpretation at all, as *Löffel* (male, spoon) vs. *Gabel* (female, fork) and lots of other entries demonstrate.

¹⁶ A further step in this direction will emerge, if the asymmetry between marked and unmarked values of features is taken into account, such that only marked feature values are lexically specified. As there are intricate issues to be clarified in this respect, I will not deal with these options, although they play, no doubt, a crucial role in nominalization and in derivational and inflectional morphology in general.

¹⁷ See Bierwisch (1997) and Wunderlich (1997a) for further details. It is an important issue of lexical and morphological structure to specify the form and content of the rules and principles from which the dependencies in question would follow. For the time being, I will simply presuppose the rules and principles in question without worrying about details. It should be clear, however, that here universal principles of lexical and syntactic structure must be filled with language particular conditions on morphological categories and their overt realization.

¹⁸ This illustration is in need of explanation and completion in various respects: [+Strong] is a provisional hint at the inflectional paradigm of *schlafen*, [+Masc] indicates the Gender of *Schlaf*. Furthermore, the Argument Position λx of the Noun will automatically be optional, while the corresponding position of the Verb is obligatory – a point to which I will return shortly.

different values according to different conditions. Thus both the subject and the object of a regular transitive verb like *kritisieren* (criticize) can be realized by genitive undernominalization, such that *die Kritik der Studenten* (the critique of the students) is ambiguous, a possibility that is usually blocked for lexically specified conditions on c-selection, such that e.g. the object of *begegnen*, which requires dative, as indicated in (11), cannot become adnominal genitive under nominalization. Hence, *die Begegnung der Studenten* (the meeting of the students) can only mean that the students are the agent of the encounter. This distinction between unspecified, predictable as opposed to lexically marked conditions results in non-trivial consequences for argument positions, inherited in derivational processes.

Another aspect of AS's dependence on Cat has already been noted with regard to the feature [\pm Strong AS]. As a characteristic effect, the feature [–Strong AS] of nouns and adjectives makes positions in AS optional (with exception of the highest position). By this condition, complements of verbs and prepositions are automatically obligatory, such that explicit information is required for cases of optionality, as e.g. in so-called pseudo-intransitive verbs: *er liest die ganze Zeit* (he is reading all the time)

As already noted, AS is in some way the intersection of semantic and syntactic information. Hence, besides conditions by which aspects of AS depend on Cat, there are conditions by which AS depends on SF. This applies not only to the "content" of argument positions, but also to the structure of what is sometimes called *thematic grid*, notably its hierarchical organization. There are two views about the origin of this dependency. One considers the hierarchy of positions in AS as determined by their content – agent, theme, recipient etc. –, the other view derives it from the ranking of variables within the SF-configurations.¹⁹ In any case, the hierarchy in AS is closely related to the content of SF. Lexical specifications in this respect are needed only if the hierarchy of Positions in SF deviates from the semantically required ranking – an interesting problem, that cannot be pursued here.

It must finally be noted that it cannot be sufficient to construe Cat as a (systematically organized) set of features. The deficit is already obvious in simple cases like *anfangen* vs. *beginnen* (begin), mentioned earlier, more generally in the distinction between prefix vs. particle verbs in German, illustrated in (3) and (4). Verbs like *anfangen* must in fact be represented as lexical items that carry along their specific phrase structure, which differs from that of prefix verbs like *beginnen*, such that verb-movement can apply to the relevant constituent. Hence Cat must be assumed to be integrated with PF, such that Cat labels the item as a whole, but parts of it carry further Cat-features, representing the computation of the syntactic structure:

(16) (a) [[_P / an /] [_V / fang /]] [+V] (b) [/ be / [/ ginn /]] [+V]

This is a rather provisional illustration which needs relevant underpinning in order to get the necessary results. It is obvious, though, that to the extent to which idioms must be treated as lexical items because of their unpredictable properties elaboration in the direction suggested by (16) is indispensable. For the time being, though, I will stick to the organization of lexical items illustrated in (11).

¹⁹ See e.g. Grimshaw (1990) for the first view, Bierwisch (1997) and Wunderlich (1997a) for the second view, both of which are compared in Bierwisch (2006). Although the two perspectives are not incompatible, the assumption that the hierarchy in AS mirrors somehow the organization of SF seems to me correct. As the issue is not decisive in the present context, it might be left open.

4. Some Examples of German Derivational Morphology

Before dealing with the systematic aspects of nominalization in German, I will briefly consider a number of accidental, but characteristic cases of derivational relations, in order to emphasize the idiosyncratic aspects of derivational morphology, which are not a side-issue that might be ignored if systematic structures are at stake. To slightly overstate the point, irregularity is the rule in derivational morphology. If this is correct, at least two important consequences emerge. First, the computational system as a whole must provide means to represent the conditions of irregularity. Second, the way in which these conditions determine the derivational process producing the effect of systematic and idiosyncratic properties must be made explicit. If we stick to the assumption that the place of idiosyncratic information is the lexicon, these requirements lead to the conclusion that derivational processes are dependent on lexical information, which is the input to computational operations anyway.

The following examples of idiosyncratic relations and partial regularities merely demonstrate the phenomena in question; they do not suggest any systematic presentation of the relevant relations.

To begin with an arbitrary example, one might notice a kind of sub-regularity, which has a background in language history, due to which many verbs of the strong inflection class that includes *fallen*²⁰ do have a lexically fixed event nominal of the sort shown in (15) above. In (17) and (18) a selection of two types of these cases is listed, including "strong" past tense and past participle:

(17) (a) schlafen	- schlief	- geschlafen	Schlaf	(sleep)
(b) fallen	- fiel	- gefallen	Fall	(fall)
(c) raten	- riet	- geraten	Rat	(advise)
(d) fangen	- fing	- gefangen	Fang	(catch)
(e) laufen	- lief	- gelaufen	Lauf	(run, walk)
(f) rufen	- rief	- gerufen	Ruf	(call, shout)
(18) (a) beißen	- biß	- gebissen	Biß	(bite)
(b) reiten	- ritt	- geritten	Ritt	(ride)
(c) streiten	- stritt	- gestritten	Streit	(quarrel)
(d) leiden	- litt	- gelitten	Leid	(suffer)
(e) treiben	- trieb	- getrieben	Trieb	(drive, push)

It must be stressed, that these cases are at best semi-regular for various reasons. First of all, the existence of a noun alongside with a verb does by no means hold for strong (or irregular) verbs in general, as plenty of cases would easily demonstrate. But even where the correspondence holds, several idiosyncrasies are to be observed. Thus, basic verbs are often polysemous in ways that the event nouns do not share. For instance, *raten* means "guess, solve (a riddle)" in addition to "advise", while *Rat* means only "advise". The noun *Fall* on the other hand has the additional meaning "case", which the verb cannot support. The gender of *Leid* is idiosyncratically marked for neuter, while normally the nominals under consideration

²⁰ The ablaut-class in question derives from what is called "reduplicating" for historical reasons, which need not concern us here.

are masculine. And *Trieb* in (18e) – instead of the expected *Treib* – is semantically isolated from its source, since it means "instinct" and "sprout". Furthermore, the nominal version of the stem is not generally attested even for the class illustrated here: *reiben* – *rieb* – *gerieben* (rub) is of the type exemplified in (18), but instead of the expected *der Reib*, the corresponding noun is the regular derivation *die Reibung* (friction). Similarly *schreiben* – *schrrieb* – *geschrieben* is accompanied by *die Schrift*, which is not the event nominal of the verb.

A notorious type of unpredictability is bound to complex expressions build up by means of particles and prefixes as indicated in (16). The specific properties of these combinations cannot be pursued here. It might only be noticed that German particles and prefixes never determine the categorization of the combination they are part of, differing thereby from derivational suffixes which project their categorization²¹. In what follows, verbs like those in (19) and (20) will simply be considered as complex lexical items, to which nominal counterparts may be attested or missing:

(19) (a) <i>fallen</i>	(fall)	Fall	(fall, case)
(b) <i>befallen</i>	(befall, affect)	Befall	(being taken)
(c) <i>zerfallen</i>	(crumble,	Zerfall	(disintegration)
(d) <i>verfallen</i>	disintegrate)	Verfall	(decay)
(e) <i>entfallen</i>	(decay)	* Entfall	
(f) <i>gefallen</i>	(fall out)	* Gefall	
(g) <i>überfallen</i>	(please)	Überfall	(attack)
	(attack)		
(20) (a) <i>abfallen</i>	(fall off, decrease)	Abfall	(rubbish, fall off)
(b) <i>auffallen</i>	(be conspicuous)	* Auffall	
(c) <i>umfallen</i>	(tumble)	* Umfall	
(d) <i>wegfallen</i>	(be abolished)	Wegfall	(abolition)

The syntactic properties of the un-separable prefix in (19) and the separable particle in (20) are those illustrated above with respect to *beginnen* vs. *anfangen*. Besides more or less subtle semantic irregularities, the idiosyncratic stress in (19)(g) is to be noted: the particle in *überfallen* is unstressed, in line with normal conditions, while the corresponding noun has a stressed prefix *über* – possibly another semi-regularity in view of cases like *übernehmen* (accept, take over) with unstressed *über* vs. *Übernahme* (acceptance) with stressed *über*.

Another gap to be mentioned here is the fact that the noun *Unfall* (accident), which combines *fall* with the prefix *un*, systematically lacks the corresponding verb **unfallen*, since *un* can only combine with nouns and adjectives.

A wide range of idiosyncrasies, semi- and sub-regularities and completely erratic relations show up, if further categories and derivational processes are taken into account. For the sake of illustration, a number of cases are listed here without any further comment²²:

²¹ Syntactically, prefixes/particles behave like adjuncts, rather than as complements or heads, but even this is only a provisional characterization.

²² The glosses given in (21) – (26) are highly provisional. In many cases, they merely give a hint, as proper correspondences do not exist.

- (21) Buch [N] (book) ==> buchen [V] (book) ==> Buchung [N] (booking)
 verbuchen [V] (book, enter)
 umbuchen [V] (transfer) ==> umbuchbar [A] (transferable)
- (22) wenden [V] (turn) ==> wendig [A] (nimble) ==> Wendigkeit [N]
 (nimbleness, agility)
 verwenden [V] (use) ==> Verwendung [N] (use)
 ==> verwendbar [A] (usable) ==> Verwendbarkeit [N] (usability)
 hinwenden [V] (turn, direct) ==> Hinwendung [N] (turn)
 abwenden [V] (avert)
 ==> Wende [N] (turn)
 ==> Wendung [N] (turn)
- (23) Norm [N] (norm) ==> normen [V] (standardize) ==> Normung [V]
 (standardization)
 ==> normieren [V] (standardize) ==> Normierung [N]
 (standardization)
 ==> normal [A] ==> normalisieren [V] ==> Normalisierung [N]
 (normal) (normalize) (normalization)
 unnormal [A] (anomalous)
 ==> Normalität [N] (normality)
- (24) Form [N] (form, shape) ==> formen [V] (form) ==> Formung [V] (shaping)
 umformen [V] (transform) ==> Umformung [N] (transformation)
 verformen [V] (deform) ==> Verformung [N] (deformation)
 ==> formal [A] ==> formalisieren [V] ==> formalisierbar [A]
 (formal) (formalize) (formalizable)
 ==> Formalität [N] (formality)
 ==> Format [N] ==> formatieren [V] ==> Formatierung [N]
 (format) (formatize) (formatization)
 ==> formatierbar [A]
 (formatizable)
 unformatierbar [A]
 (unformatizable)
- (25) Raum [N] (room, space) ==> räumen [V] (remove) ==> Räumung [N]
 (removing)
 umräumen [V] (rearrange)
 aufräumen [V] (clear away)
 wegräumen [V] (clear away)
 ==> räumlich [A] (spatial) ==> Räumlichkeit [N] (locality)
 verräumlichen [V] (spatialize)
- (26) schreiben [V] ==> Schrift [N] ==> schriftlich [A] ==> Schriftlichkeit [N]
 (write) (writing) (written) (literacy)
 verschreiben [V] ==> Verschreibung [N] ==> verschriftlichen [V]
 (misspell, order) (prescription) (create literacy)
 überschreiben [V] (overwrite)
 anschreiben [V] (write down) ==> Anschreiben [N] (attachment)
 ==> Schreibung [N] (spelling)

These illustrations, which could be multiplied at will, are neither systematic nor complete in any slightest respect. I must also refrain from any attempt to even sketch

the semantic (ir)regularities, but I will take up some of the more perspicuous relations below. To conclude this illustration, the derivational steps in a non-trivial case might be indicated in (27), showing the categorial determination of the process by the respective suffixes.

$$(27) \quad [\text{norm}]_N \implies [[\text{norm}]_N [\text{al}]_A]_A \implies [[\text{norm al}]_A [\text{isier}]_V]_V \implies \\ [[[\text{norm al}] [\text{isier}]]_V [\text{ung}]_N]_N \\ \\ [[[\text{norm al}] [\text{isier}]]_V [\text{bar}]_A]_A \implies [[[[\text{norm al}] \text{isier}] \text{bar}]_A [\text{keit}]_N]_N$$

5. General Properties of Derivational Morphology

The generalization to be derived from these observations is twofold: on the one hand, derivational morphology establishes well defined, systematic relations among the expressions involved with respect to their PF, SF, and GF. On the other hand, idiosyncratic conditions and effects can interfere with almost all aspects of these relations.

According to more or less standard assumptions, the characteristic properties of derivational morphology are due to affixation, i.e. merging of a derivational affix with an appropriate base, where the affix is the head, which projects its categorization, and the base is its complement, as roughly indicated in (27). Because of their special character, the affixes in question might be assumed to belong to the particular lexical subsystem of functional categories.²³ The relevant properties of derivational affixes are twofold. First the result of merging head and complement belongs to the level of words, a condition, which intuitively seems clear and simple, although it is not easily spelled out in formal terms. I will not make any particular efforts in this respect. The second property concerns the behavior of affixes with respect to the argument structure of their complement. The crucial point here is usually considered as the inheritance of argument positions. Although again the intuitive aspect to this effect appears fairly clear, its technical treatment is controversial. The proposal I want to make here is rather a natural consequence of the basic assumption that discharging an argument position (i.e. assigning a theta role) to an appropriate complement is tantamount to functional application, by which a functor combines with its argument. More technically, if a position λx in the AS of the head H is discharged to a complement C, then λx disappears from the AS of H, while C (or rather its SF) acquires the relation specified for the variable x in the head. The basic notion is illustrated in (28) with the preposition *in* as head and the proper name *Paris* as its object. The SF of *in* indicates that the individual y is located internally to x, and the SF of *Paris* is simply an individual constant that represents the speakers' knowledge about Paris. In order to avoid unnecessary detail, the entry for *Paris* is supposed to have a vacuous argument structure, as it cannot discharge an argument position to any complement. The categorization of *in* in (28a) is projected to the PP *in Paris*

²³ For the time being, affixes can be considered as entries that meet the standard conditions on lexical items discussed above. No special assumptions need to be made here – except those that will be discussed immediately. – Whether and in which way suffixes and other types of affixes are formally different, can be left open here. I will simply assume that in German, derivational heads are suffixes.

(32) / trink-bar / [+A] λz [$\exists e$ [POSS e : [e INST [X [DRINK z]]]] x e]

Notice in particular, that the argument position λz , which started out as the object position *trinken* in (30), is preserved in (32), where it has automatically been turned into the designated position of the adjective.²⁶ In other words, the resulting adjective inherits an argument position from the base of the derivation and turns it into the designated argument of the derived expression. Which arguments are inherited and which derived position they eventually occupy, depends, as we will see, completely on the derivational affix, just like the resulting categorization, although in rather different ways.

This leads to the third factor to be noted about derivation: the categorization projected from the affixal head determines the category-specific properties of the derived AS, including the predictable conditions on c-selection. Thus the only position in the AS of *trinkbar*, which is inherited from the verb, where it used to be the position of the optional direct object, is now obligatory and cannot be associated with [+Acc] for c-selection. This is a general consequence of the categorization by [+A], indicating that [+Acc] cannot be lexically fixed, like the [+Dat] in e.g. *helfen* (help), which does not allow for the adjectivization **helfbar*.

To summarize the general properties discussed so far, the following conditions have been identified:

- (33) Derivational morphology is essentially determined by lexical properties of derivational affixes. derivational affixes are lexical items which
- (a) are heads that project their categorization to the resulting combination;
 - (b) combine with their base by functional composition, thereby possibly inheriting argument positions from their base;
 - (c) determine the predictable properties of the resulting AS.

These conditions are not arbitrary, isolated stipulations. They rather belong to the independently motivated assumptions about the structural and computational properties of language, notably the organization and role of lexical items. More specifically, (33)(a) and (c) must be assumed independently of the considerations about derivational morphology. Thus only the condition (b) about functional composition looks like a special stipulation. This might well be correct if derivational morphology does in fact have special properties. If, however, functional composition is recognized as a natural - in fact the more general - option for computational processes (see fn. 24) once an appropriate framework for argument positions is established, then derivational morphology would cease to need particular stipulations. The effect of functional composition would rather be determined by the specific argument positions of derivational operators, and the c-selection assigned to them.

²⁶ This creates the passive-like effect, which is visible in the close paraphrase

(i) Der Wein ist trinkbar. (The wine is drinkable.)
(ii) Der Wein kann getrunken werden. (The wine can be drunk.)

(b) /be-rechen-bar/ [+A] $\lambda z [\exists e [\text{POSS } e : [e \text{ INST } [x \text{ CALCULATE } z]]]]$

(c) /be-rechen-bar-keit/ [+N, +Fem]
 $\lambda z \lambda e'' [e'' \text{ INST } [\exists e [\text{POSS } e : [e \text{ INST } [x \text{ CALCULATE } z]]]]]$

The result (43c) might look unnecessarily clumsy with its double instantiation of states of affairs, distinguished here as *e* and *e''*. Notice, however, that first the representation is derived in fully regular steps, such that both instantiations are independently motivated. And second, there are in fact two layers of instantiation involved in nominalizations like *die Berechenbarkeit des Stroms* (the calculability of current): the possible instantiation of calculation, and the reference to the situation, in which this possibility holds.

Another regular option for de-verbal nouns are agent-nominalizations like *Arbeiter* (worker), *Sucher* (searcher), etc. The suffix *-er*, on which this operation rests, turns the verb's subject-position into the referential position of the noun. Besides the relevant changes in AS (absorption of the referential and inheritance of the other positions), the suffix *-er* adds to SF the condition that the activity specified by the verb is construed as a habitual, rather than an actual property of the agent: *Der Fahrer wartet* (The driver is waiting) refers preferably to a person with the disposition to drive, not to one actually driving. These considerations lead to the entry (44a), which composes with *lenken* (steer, direct) in (44b), to derive the noun *Lenker* (44c).

(44) (a) /-er/ [+N, +Masc] $\lambda Y [\text{DISPOSITION } [Y \ e]]$
 [+V]

(b) /lenk/ [+V] $\lambda z \lambda u \lambda e [e \text{ INST } [u [\text{DIRECT } z]]]$
 1 4 4 4 4 4 2 4 4 4 4 4 4 3
 Y

(c) /lenk-er/ [+N, +Masc] $\lambda z \lambda u [\text{DISPOSITION } [e \text{ INST } [u [\text{DIRECT } z]]]]$

This rather provisional analysis of agent-nominalization illustrates another phenomenon that shows up in derivational morphology, but not only there: The natural interpretation of *der Lenker des Wagens* may be the driver of the car, but is more likely the car's steering wheel. As is well known, agent nominals may refer either to an (habitual) actor or to an instrument. Whether this is to be treated as a systematic ambiguity or an idiosyncratic property of the derived noun is by no means obvious. It must be added at this point, that similar phenomena show up with event nominalizations. *Die Lenkung des Wagens* for example may refer to the situation of steering the car, but more likely to the relevant means for steering it, very much like *der Lenker des Wagens*. I will return to these intricate matters in section 8.

7. Affix Selection

The most robust aspect of idiosyncratic variation in derivational morphology concerns the choice of affix. (45) is a sample of possibilities for event nominalization:

(45) (a) spring-en (jump)	--- Sprung-ø	[+ Ablaut]	[+Masc]
(b) fall-en (fall)	--- Fall-ø		[+Masc]
(c) spiel-en (play)	--- Spiel-ø		[+Neut]

(d) glaub-en (believe)	--- Glaub-e	[+Masc]
(e) such-en (search)	--- Such-e	[+Fem]
(f) fahr-en (drive, ride)	--- Fahr-t	[+Fem]
(g) mein-en (mean)	--- Mein-ung	[+Fem]
(h) ab-sorb-ier-en (absorb)	--- Ab-sorp-tion	[+Fem]
(i) konsultier-en (consult)	--- Konsult-at-ion	[+Fem]
(j) blam-ier-en (discredit)	--- Blam-age	[+Fem]
(k) denk-en (think)	--- Ø	

This list is neither systematic nor complete, but it indicates the range of idiosyncrasy with respect to phonological shape as well as to conditions of interpretation. One might also wonder whether cases of "zero-derivation" like (a), (b) and (c) must be considered as the result of derivation or just as lexical items, and whether and where a proper boundary between derivation and inflection is to be drawn. Moreover, cases like (45k) indicate that idiosyncratic conditions do not only determine the choice of an affix, but may also exclude nominalization altogether.

Further, various types of sub-regularities are to be noted. As shown in (45) for cases like *Fall*, *Lauf*, *Ruf* etc., classes of ablaut-verbs might play a role, while other cases, like e.g. *Konsultation* (consultation), *Destruktion* (destruction) etc. are bound to non-native items. Central types of derivation are furthermore to be distinguished from marginal ones, with *-ung* as in (45g) at one end and *-age* as in (45j) at the other end of the scale.

The main problem emerging from these observations is the question, where and how idiosyncratic conditions, including sub-, semi-, and irregularities, are to be specified. An obvious fact in this respect are the dependencies in cases like (45), which are clearly bound to the base of the derivation, i.e. to the stem on which the nominalization is based. It seems to be evident, that the a verb like *stören* (disturb) determines the choice of *-ung* in *Störung*, but not the suffix *-ung*, the choice of the stem *stör_*. The most robust support for this view comes from the quantitative asymmetry between stems and affixes: the determination relates a highly restricted set of suffixes to a large number of stems. Hence it seems natural to suppose that e.g. *fahren* (drive) selects the suffix *-t*, while *stören* (disturb) selects *-ung* leading to *Fahrt* (drive) and *Störung* (disturbance) respectively.

This would be at variance, however, with the general and uncontroversial notion that the affix is the head, which projects its categorization and selects the stem as its complement. In other words, the complement would select the head if the determination of the suffix by the stem were indeed a matter of c-selection.

This apparent paradox disappears, however, if the choice of the affix is construed as the effect of a specific feature which belongs to the categorization of the stem and matches with a corresponding feature included in the c-selectional conditions of the affix. For the sake of illustration, suppose a feature [+F] be included in Cat of every stem that can be nominalized by means of *-ung*, and [+F] is also introduced into the c-selectional condition of *-ung*, such that the entry (39) for *-ung* is changed to (46), with a corresponding extension of Cat in verbs like *lenken*, *berechnen*, etc. as illustrated in (47). It is easily verified that the combination of (46) and (47) gives *Berechnung* as before, repeated here as (48), except that the verb now meets the c-selection of *-ung* specifically with respect to the feature [+F].

(46) / -ung / [+N, +Fem] λY [Y]
 [+V,+F]

(47) / be-rechn / [+V, +F...] $\lambda x \lambda y \lambda e$ [e INST [y CALCULATE x]]

(48) / be-rechn-ung / [+N, +Fem] $\lambda x \lambda y \lambda e$ [e INST [y CALCULATE x]]

This assumption makes only sense, of course, if corresponding features are selected by other suffixes, as illustrated in (49) – (51):

(49) / -t / [+N, +Fem] λY [Y]
 [+V,+F']

(50) / fahr / [+V, +F'...] $\lambda y \lambda e$ [e INST [TRAVEL x]]³⁰

(51) / fahr-t / [+N, +Fem] $\lambda x \lambda e$ [e INST [TRAVEL x]]

Notice that the feature [+F] in (47), like [+F'] in (50), belongs to the categorization of the verb; it contributes to its classification (as a verb that nominalizes with *-ung*), but it does not c-select the suffix. In (46) and (49), on the other hand, [+F] and [+F'] are part of the c-selection of the affix, such that now the head selects the stem, as desired, although the stem is categorized by the feature that expresses the relevant condition.

It must be stressed that the feature [+F] is not just a notational trick, introduced in order to preserve the formal requirement that the Head selects the complement under the peculiar conditions of derivational morphology. Rather, [+F] and [+F'] illustrate a specific type of features with well-motivated properties, which can only be hinted at here. The central role of the features in question is to relate stems to potential derivational affixes. They indicate so to speak the address of derivational elements. In this sense, they reflect the structure of a specific lexical sub-system. The difference between central and marginal types of suffixation is directly manifest in the features under discussion. It provides a natural basis for the distinction between more and less complex or costly features: [+F] addressing *-ung* is less complex than [+F'], the address of *-t*. Finally, what has been discussed with respect to event-nominalization holds in much the same way for other cases of derivation: German de-verbal adjectives like *zöger-lich* (reluctant) , *wend-ig* (versatile, agile) , *folg-sam* (obedient) are an obvious case in point.

The type of features discussed in this section is a natural and in fact indispensable means to account for one particular aspect of idiosyncratic phenomena in derivational morphology. This includes unpredictable peculiarities as well as sub-regularities, which will be reflected by systematic properties of the feature system to which [+F] and [+F'] belong.³¹ For further discussion of this proposal see Bierwisch (1989). With

³⁰ I am ignoring here the fact that *fahren*, like *drive*, has a causative and intransitive reading, with the event noun *Fahrt* being restricted to the intransitive variant: *seine Fahrt* can only mean "the event of his travel", hence, **seine Fahrt des Wagens* is ungrammatical.

³¹ It is an open, and in fact intriguing question which sub-regularities are to be captured in which way. The morphological categorization of verbs with respect to inflectional classes is a possibility already mentioned. Another type of condition might be related to the observation that verbs with accusative

respect to the main tenet of the present paper, it is an interesting observation, that – if these considerations are on the right track – derivational processes are controlled not only by particular features of individual lexical items, but in a sense by the organization of the lexical system as a whole.

8. Conceptual Shift and Related Phenomena

Presumably the most extensive and most intricate domain of idiosyncratic properties infecting the result of derivational processes is the conceptual interpretation and the grammatical conditions related to it. Leaving aside totally erratic cases like *Zeitung* (newspaper), *Achtung* (respect), or *Richtung* (direction), which look like nominalizations, but cannot be traced to any reasonable derivational basis, or cases like *Anstand* (manners), whose interpretation is based on complete lexical isolation, there are still all sorts of unpredictable variation and fixation even for obvious instances of regular derivation. Ubiquitous cases like *Aussicht* (view), *Umstand* (circumstance) illustrate the phenomena, which are of course not just chaotic, but still not due to systematic and general conditions of linguistic computation. I do not have to say here anything about idiosyncratic cases of this sort, and will restrict the subsequent discussion to phenomena that have been considered as systematically related to nominalization.

According to the observations discussed in Grimshaw (1990), taken up in slightly modified form in Alexiadou (this volume), a three-way distinction of de-verbal nouns like *construction* seems to be indicated:

- (52) (a) Event nominals with regular derived argument structure
(b) "Simple" event nouns without argument structure (allowing only adjuncts)
(c) Result nouns

The main difference between the cases in (a) as opposed to those in (b) and (c) is that they do not only inherit the complete AS of the verb, but also prevent plural-formation, while the cases in (b) and (c) do not inherit argument positions, but admit plural formation. The difference between the cases in (a) and (b) as opposed to those in (c) is, that complete as well as simple event nominals refer to events or states, while the cases in (c) refer to the result of the event (often, but not necessarily an object). Thus (a) differs from (b)/(c) primarily by grammatical conditions, while (c) differs from (a)/(b) by semantic conditions. Both distinctions have further consequences (or presuppositions).³²

(52) is, of course, not a complete list of differences in de-verbal nominalizations nor does it seem to be correct with respect to the distinguishing properties – at least not in German. I will in fact argue that the classification is dubious and rests on

object opt for *ung*-nominalization, hence they are marked [+F] by default. These are rather preliminary hints, however.

³² Alexiadou (this volume) lists nine properties by which R(eferential) nominals differ from AS-nominals, noting however that the distinctions in question have repeatedly been challenged and that they are not sharp and clear-cut, but allow for various sorts of intermediate and borderline cases. The following discussion casts doubts on the distinction from a somewhat different perspective than the one pursued by Alexiadou.

problematic premises. To begin with, the claim about plural-formation fails, as the following cases show:

- (53)(a) Unsere Erkundungen der Insel dauerten jeweils bis zum nächsten Morgen.
(Our explorations of the island went on always to the next morning.)
- (b) Pauls Fahrten in die Schweiz waren immer erfolgreich.
(Paul's trips to Switzerland were always successful.)
- (c) Drei Untersuchungen der neuen Patienten dauern noch an.
(Three examinations of the new patients are continuing.)
- (d) Die Umzüge fanden meist pünktlich statt.
(Mostly, the removals took place in time.)
- (e) ??Die Bebauungen sind verlassen.
(The buildings are abandoned.)

Obviously, (53)(a) – (c) must be considered as complex event nominals, referring to repeated events, and they are well-formed in spite of the pluralized nominals. Things are less clear with (53)(d) and (e). Looking first at (53e), the result-interpretation of the noun derived from *bebauen* (cover with buildings) is not only possible and natural, but in fact cogent in view of the predicate *verlassen* (leave, abandon). The pluralization of *Bebauung* is nevertheless dubious, and in any case less natural than the plural of e.g. *Fahrt*. A different problem is related to (53d), where according to the conditions related to (52) the plural would be allowed, since *Umzüge* (removals) is a simple noun without complements. However, it could naturally be expanded into *die häufigen Umzüge der Studenten* (the students' frequent removals), where either the students cannot be the agent of *umziehen*, or *Umzug* ceases to be a simple event-noun. In any case, the claim that pluralization is excluded for event nominals with argument structure seems to be unwarranted.

The comment on (53d) indicates another problem of the classification (52). There is no formal, "visible" difference between complex, simple, and result nominalizations, hence the distinction between simple and complex nominals rests on the appearance of complements realizing argument positions. If however, argument positions of nouns are generally optional, as must be assumed for independent reasons, the distinction between the absence of a position in AS and an unrealized optional complement becomes spurious, and the distinction between simple and complex event nouns collapses.

With respect to semantic differences between event and result nominals, the question arises whether nominalizing suffixes, or at least some of them, must be analyzed as ambiguous. We notice first that the event/result alternation does not exhaust the possible semantic differences, as indicated in (54), and second, that it depends to a large extent on the meaning of the underlying verb, as (55) suggests.

- (54)(a) Die Leitung der Veranstaltung nahm der Direktor wahr. (event)
(The leading of the event was done by the director.)
- (b) Die Leitung des Hauses (*durch den Direktor) ist abwesend. (agent)
(The administration of the house (*by the director) is absent.)
- (c) Die Leitung ist an zwei Stellen gebrochen. (instrument)
(The pipes are broken at two points.)

- (55)(a) Die Konstruktion war bemerkenswert. (event, result, *agent)

- (The construction was remarkable.)
- (b) Der Sprung war erstaunlich. (event, ??result, *agent)
(The jump was astonishing.)
- (c) Die Kontrolle war ärgerlich. (event, ?result, agent)
(The inspection was harassing.)
- (d) Die Lenkung ließ viel zu wünschen übrig. (event, *result, instrument)
(The steering left much to be desired.)

It follows from these examples, which can be multiplied in various directions, that alternative interpretations cannot reasonably be reduced to lexical ambiguities of the relevant suffixes, nor to ad-hoc-properties of the underlying verbs. The natural assumption is rather that the expressions resulting from nominalization are subject to general principles of semantic interpretation. The principles in question have been discussed a.o. as *conceptual shift* in Bierwisch (1989) and *coercion* in Pustejovski (1995). The effect of conceptual shift is illustrated for the interpretation of (church) in (56):

- (56) (a) Die Kirche hatte damals wachsenden Einfluß. (institution, organization)
(The church had increasing influence at that time.)
- (b) Die Kirche wird renoviert. (building)
(The church is renovated.)
- (c) Er geht regelmäßig in die Kirche. (services)
(He regularly attends the service.)
- (d) Die Kirche hat ihre Meinung geändert. (institution, personnel)
(The church changed its opinion.)

Whether, to what extent and in which way variations of this sort are part of SF or belong just to the conceptual domain interpreting linguistic expressions is controversial. As far as the distinctions lead to grammatical consequences, it seems reasonable, or even mandatory, for them to be recognized in SF. One proposal to this effect assumes so-called *templates*, which are inserted into SF, but do not change the corresponding PF. In a way, templates can be construed as pseudo-affixes, i.e. affixes without phonetic content. As a simplified illustration, (57a) may be considered as the Template that would turn the organization reading of *Kirche*, abbreviated in (57b) into the item (57c), which refers to the church as a building.

- (57) (a) $\lambda X \lambda z [[\text{BUILDING } z] \wedge [[z \text{ LOCATION-OF } x] \wedge [X x]]]$
(b) / kirche / [+N, +Fem] $\lambda y [\text{CHURCH } y]$
(c) / kirche / [+N, +Fem] $\lambda z [[\text{BUILD } z] \wedge [[z \text{ LOCAT } x] \wedge [\text{CHURCH } x]]]$

Likewise, the result-template (58) would turn an event noun like *Berechnung* sketched in (48) above into a result noun as indicated in (59):

- (58) $\lambda X \lambda z [[z \text{ RESULT-OF } e] \wedge [X e]]$
- (59) / be-rechn-ung / [+N, +Fem]
 $\lambda x \lambda y \lambda z [[z \text{ RESULT-OF } e] \wedge [e \text{ INST } [y \text{ CALCULATE } x]]]$

According to this sketch, (58) shifts the reference to an event to that of its result, supporting an appropriate reading for cases like *seine Berechnung der Preise hat Fehler* (his calculation of the prices contains errors). Even though non-trivial details

have to be added, the basic idea should be clear that grammatically correct derivations are available for various shifts on the basis of principles that regulate semantic interpretation quite generally. The difference between simple and complex nominalizations is essentially a consequence of the optionality of nominal complement positions.

9. Syntactic and Conceptual Conditions on Argument Realization

These observations may contribute to an account for another problem involved in the argument structure of de-verbal nouns. The point is, that even if the argument structure of an underlying verb is obviously inherited under nominalization, its positions seem to have different chances and conditions to be realized within the resulting noun phrase:

- (60) (a) die Untersuchung der Studenten (the examination of the students)
 (b) die Zerstörung der Kirche (the destruction of the church)
 (c) die Beobachtung der Fahrgäste (the observation of the passengers)
 (d) die Tötung der Besiegten (the killing of the victims)
 (e) die Instruktion der Kandidaten (the instruction of the candidates)

In these constructions, the complement is preferably or even obligatorily interpreted as corresponding to the object, rather than the subject of the underlying verb. Hence the optionality of the inherited argument positions seems to be unequal. This asymmetry has been considered as a strong argument for the syntactic nature of nominalization, as the difference can be accounted for, if the underlying configuration is assumed to consist of a VP which includes the verb and its complement, but not the external argument of the verb. See Alexiadou (2006) for discussion of this proposal. This account would also include nominals based on unergative verbs like *verfallen* (decay), *ankommen* (arrive), whose subject is supposed to be VP-internal:

- (61) (a) der Verfall des Hauses (the decay of the house)
 (b) die Ankunft der Mannschaft (the arrival of the team)
 (c) die Austrocknung der Flüsse (the drying of the rivers)

However, in spite of various sub-regularities like those mentioned in note 31, the asymmetry is as spurious as the distinction between simple and complex event nouns, presumably not only in German³³. This is shown by cases like (62) and (63):

- (62)(a) Peters Verteidigung des Vorschlags (Peter's defense of the proposal)
 (b) Die Verteidigung Peters (the defense of Peter)
 (c) Die Verteidigung des Vorschlags (the defense of the proposal)
 (d) *Die Verteidigung Peters des Vorschlags
 (e) *Die Verteidigung des Vorschlags Peters (the defense of the proposal by Peter)
- (63)(a) Oskars Beleidigung der Gäste (Oskar's insulting of the guests)
 (b) Die Beleidigung Oskars (the insulting of Oskar)
 (c) Die Beleidigung der Gäste (the insulting of the guests)

³³ That there are serious problems for this analysis with respect to primary data not only in German is recognized in Alexiadou (this volume) and Harley (this volume).

- (d) *Die Beleidigung Oskars der Gäste
- (e) *Die Beleidigung der Gäste Oskars
- (f) Die Beleidigung der Gäste durch Oskar (the insulting of the guests by Oskar)

The main point to be noted here is the ungrammaticality of two post-nominal genitive NPs, a combination that is excluded by general constraints on the surface structure of German noun phrases³⁴. Thus, while the argument positions of transitive verbs like *verteidigen* (defend) or *beleidigen* (insult) are inherited under nominalization, their (optional) realization must be in accordance with the surface constraints in question. If only one complement shows up, its possible or preferred interpretation is primarily a matter of s-selection, i.e. of the meaning of the (underlying) verb and the complements, as discussed earlier. Thus (62b) is ambiguous – Peter might be the agent or the theme of the defense –, while (62c) is unambiguous, due to s-selection, because a proposal is not a possible defender. For (63), this sort of asymmetry does not hold, as both Oskar and the guests may be agents and targets of the insult. The ungrammaticality of (62)(d) and (e) disappears if one genitive-NP is turned into PP as in (62f). This applies equally to (63e). In much the same way, the decision between agent and goal interpretation of genitive in (64)(a) and (b) depends on the fact that *Güllen* is the name of the place the old lady comes to see:

- (64)(a) Der Besuch der alten Dame (The visit of the old lady)
- (b) Der Besuch Güllens (The visit of Güllen)
- (c) Der Besuch der alten Dame in Güllen (The visit of the old lady in Güllen)
- (d) Der Besuch Güllens durch die alte Dame (The visit of Güllen by the old lady)
- (e) *Der Besuch der alten Dame Güllens (The visit of the old Lady of Güllen)

As in (64) the agent as well as the goal can be realized by PP, there are two ways to by-pass the constraint against double post-nominal genitive-NP in (64e).

Further contextual conditions can influence the choice of the argument position, as shown by the following examples:

- (65)(a) Die Wahl des Präsidenten fiel auf seinen Bruder.
(The vote of the president was for his brother.)
- (b) Die Wahl des Präsidenten war eine langwierige Sache.
(The election of the president was a protracted affair.)

The president might be the agent or the patient of voting, *die Wahl des Präsidenten* is correspondingly ambiguous. If however the context prevents the president from being the target of the vote, as in (65a), then the interpretation is unambiguous. Hence the complement *des Präsidenten* realizes the subject position of the underlying verb.³⁵ Even more background knowledge is involved in (65b), whose interpretation is unambiguous, since the public election of the president, but not the presidents own vote, can naturally become a protracted event. Hence the

³⁴ In line with this restriction, (62e) is well-formed, however, if the genitive NP *Peters* is construed as a complement of *des Vorschlags* and not of *Verteidigung*, such that [*des Vorschlags Peters*] is the only complement of [*die Verteidigung*]. The same observation holds for (63e), which is grammatical if parsed as [*die Beleidigung [der Gäste Oskars]*].

³⁵ There is perhaps a different interpretation of (65b) – not fully legitimate, though – according to which *die Wahl des Präsidenten* would refer to the result of the vote, such that (65b) is construed as something like "His brother was elected a president." This would be a matter of conceptual shift, however, in addition to the interpretation of the argument position.

complement can only be construed as the object of the vote. Notice, incidentally, that this sort of encyclopedic knowledge does not affect the inherited argument structure of the noun *Wahl* (election/vote), but only the choice among equal possibilities.

As shown by cases like (62) to (64), the realization of argument positions is subject to syntactic surface constraints on complex noun phrases. Although these constraints cannot be dealt with here in necessary detail, it can easily be shown that they apply to noun phrases in general, not just to nominalizations. Besides the exclusion of more than one post-nominal genitive NP illustrated in (62) to (64), various other constraints must be recognized, including in particular restrictions on pre-nominal genitives, as shown in (66):

- | | | |
|----------|-----------------------------------|-------------------------------------|
| (66) (a) | Luthers Übersetzung der Bibel | (Luther's translation of the Bible) |
| (b) | Seine Übersetzung der Bibel | (His translation of the Bible) |
| (c) | Luthers Übersetzung | (Luther's translation) |
| (d) | ?Des Reformators Übersetzung | (The reformer's translation) |
| (e) | ??Der Bibel Übersetzung | (The Bibel's translation) |
| (f) | Ihre Übersetzung | (Its translation) |
| (g) | *Der Bibel Übersetzung Luthers | (the Bible's translation of Luther) |
| (h) | *Ihre Übersetzung Luthers | (Its translation of Luther) |
| (i) | Ihre Übersetzung von/durch Luther | (its translation by Luther) |

A crucial factor that plays a role for the privilege to occur in pre-nominal position seems to be a ranking that follows the definiteness hierarchy (67), which is relevant in various connections. See Jäger (2007) for recent discussion:

- (67) Possessive Pronoun > Proper Noun > Definite NP

Although the constraints in question are clearly in need of a more systematic analysis than can be provided here, it might still be emphasized that they are not bound to de-verbal nominalization. As shown in (68), relational nouns and their complements are subject to the same conditions as those illustrated in (66).

- | | | |
|----------|-------------------------------|----------------------------------|
| (68) (a) | Dürers Porträt seiner Mutter | (Dürer's portrait of his mother) |
| (b) | Sein Porträt seiner Mutter | (His portrait of his mother) |
| (c) | Dürers Porträt | (Dürer's portrait) |
| (d) | ?Des Künstlers Porträt | (The artist's portrait) |
| (e) | ??Seiner Mutter Porträt | (His mother's portrait) |
| (f) | Ihr Portrait | (Her portrait) |
| (g) | *Seiner Mutter Porträt Dürers | (His mother's portrait of Dürer) |
| (h) | *Ihr Porträt Dürers | (Her portrait of Dürer) |

10. Remarks on Nominal Infinitives

To conclude this incomplete discussion of de-verbal nominals, some remarks on nominalized infinitives are in place. As is well known, for any German verb the infinitive with the suffix *-en* functions as an event noun of neuter gender. The resulting nominal is always available; either alongside with the corresponding event nominalization (with more or less different semantic interpretation) or as the item that fills the gap idiosyncratically left by nominalizations. Examples are given in (69):

(69)(a) das Wählen	die Wahl	(voting)
(b) das Springen	der Sprung	(jumping)
(c) das Berechnen	die Berechnung	(calculating)
(d) das Kommen	∅	(coming)
(e) das Denken	∅	(thinking)
(f) das Treffen	∅	(meeting)
(g) das Einschlafen	∅	(falling asleep)
(h) das Leben	∅	(living)
(i) das Lachen	∅	(laughing)
(j) das Hören	∅	(hearing)

Two general remarks are to be made about these elements, which I will call nominalized infinitives. First, most but not all of these elements strictly exclude plural formation: although *die Treffen* (the meetings), *die Leben* (the lives) and a few others are idiosyncratically possible, **die Lachen*, **die Einschlafen*, **die Denken* and all others are impossible. Second, nominalized infinitives inherit in principle the AS of the verb, but with the usual conditions on nouns, i.e. structural arguments become optional positions assigning genitive:

(70)(a) das Berechnen der Werte	(the calculation of the values)
(b) Peters Lachen	(Peter's laughing)
(c) sein langsames Einschlafen	(his slowly falling asleep)
(d) das Kommen so vieler Leute	(the coming of so many people)

There are further systematic and idiosyncratic conditions these constructions are subject to, but this is not the place to discuss them³⁶.

The regular properties of these elements can be captured by an affix indicated in (71), which is similar to suffixes like (46), repeated here as (72), but differs in two crucial respects: nominalized infinitives don't allow plurals (exceptions must be idiosyncratically marked), and they are not restricted to particular classes of verbs by the address-feature F_i in their c-selection.

(71) / -en / [+N, +Neuter, -Plur] λY [Y]
[+V]

(72) / -ung / [+N, +Fem] λY [Y]
[+V,+F_i]

In addition to the nominalized infinitives in (70), German has a further possibility to create nominal infinitives, which is shown in (73):

(73)(a) das sich einer neuen Aufgabe Zuwenden	(the turning to a new task)
(b) das ihm die Arbeit Überlassen	(the leaving him the work)
(c) das alles überdenken Wollen	(the wanting to think it all over)

³⁶ Thus the standard realization of complements is not always possible.

(i) das Singen der Marseillaise (the singing of the Marseillaise)

(ii) ?? das Hören der Marseillaise (the hearing of the Marseillaise)

(iii) Das Anhören der Marseillaise (the listening to the Marseillaise).

It remains to be explored whether and which more general conditions (such as perception vs. activity verbs) might be at stake here.

and the operations applying to them. The other factor is the emphasis one puts either on the role of idiosyncratic information or on systematic structures and processes. Assuming that the role of idiosyncrasies tends to be underestimated, I have argued that they are not simply unavoidable, but are in fact a characteristic phenomenon in nominalization and must appropriately be taken into account.

The main point of the present discussion is the observation that nominalization must be recognized as drawing on systematic principles as well as on idiosyncratic information. More specifically, the lexical aspect of nominalization relates to the role of idiosyncratic information, but also to the conditions on underspecification, which crucially apply to lexical information. The syntactic aspect on the other hand comes in through the combination of heads and complements (or adjuncts) and its semantic consequences, but also through the surface conditions that control, among others, the realization of argument positions the lexical entries provide.

The format proposed for the representation of idiosyncratic information and its impact on derivational operations is crucially based on a specific type of features. These address features regulate the compatibility between major lexical items and derivational affixes. They do not merely represent item-specific combinatorial conditions by which derivational processes depend on individual lexical items, but by the same token they reflect aspects of the organization and functional architecture of the lexical system as a whole. In general, then, lexicon is not a separate component alongside with phonology, morphology, syntax, and semantics. It rather feeds and depends on all of them. It thus remains the locus of all idiosyncratic information, but is still not just a huge set of idiosyncrasies.

To sum up, nominalization has been proposed to be based on the following components:

- (78)(a) General principles of lexical information, including conditions allowing for underspecification;
- (b) Set of all entries providing all and only the idiosyncratic information;
- (c) General principles of syntactic combination (merge) and their semantic consequences (functional composition and application);
- (d) Syntactic conditions on surface realization.

These components and their interaction can be implemented in various ways. Borer (1998) discusses various frameworks in terms of which the present proposals could be couched.

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