

# Constraining nominalization: function/form competition\*

ANDREJ L. MALCHUKOV

## *Abstract*

*The present article deals with constraints on transcategorial processes such as nominalization. In particular, it addresses the issue whether one can predict the order in which verbal categories are lost and nominal categories are acquired in nominalization. It is argued that the disruption/acquisition of categories in transcategorial processes is determined by functionally based hierarchies of nominal and verbal categories, as suggested in the functional-typological literature. The hierarchy constraints in turn are shown to arise from the interaction of FUNCFAITH constraints forcing decategorization/recategorization and LEXFAITH hedging these processes. Structural factors such as morpheme order and category cumulation can also interfere with the hierarchy constraints. These structural factors can be derived from conditions on output-output correspondences (OOCs) between the morphological structure of nominalizations with that of finite verbs, on the one hand, and nonderived nouns, on the other. Thus the outcome of nominalization processes is determined by an interaction of the function-based hierarchy constraints and OOC-related structural constraints.*

## **1. Introduction**

Among transcategorial (word class-changing) operations nominalization is the best studied (see Comrie and Thompson 1985; Noonan 1985; Mackenzie 1987; Lehmann 1988; Croft 1991; Koptjevskaja-Tamm 1993; Dik 1997; Cristofaro 2003; Koptjevskaja-Tamm 2003). Although the traditional view is that nominalization involves both the loss of verbal properties and the acquisition of nominal properties, it has only recently been terminologically acknowledged that transcategorial operations such as nominalization involve both decategorization and recategorization. The term “decategorization” was introduced by Hopper and Thompson

(1984) who showed that verbs or nouns, when not used in their primary functions, tend to lose some of the morphosyntactic properties associated with their primary functions of reporting events and referring to terms, respectively. For example, when a (nonreferential) noun is incorporated it usually loses its ability to inflect for number and case, and to take definite articles. Equally important is another facet of the transcategorial processes, which has been aptly termed by Bhat (1994) as “recategorization”. This term is used to describe situations when an item that is used in an extended function acquires some of the properties of those categories to which this function properly belongs. For example, a verb used as a referring expression, apart from losing some of its verbal trappings, usually also acquires a number of nominal properties such as case, determiners, etc. Thus a traditional term like “nominalization” actually conflates two distinct operations; “deverbalization” and “substantivization”. In what follows I shall use the term “nominalization” in this broad sense: it is not confined to lexical nominalizations<sup>1</sup> but equally pertains to other cases when a verb used in an NP function shows signs of decategorization and recategorization. The latter characteristic is arguably more important as nominalizations revealing deverbalization but no signs of recategorizations are difficult to distinguish on formal grounds from infinitives (see Koptjevskaja-Tamm 1993: 33–42 for discussion of cases when this distinction is problematic). On the other hand, both decategorization and recategorization can be invoked to set nominalizations apart from “dependent moods” (subjunctives and the like) used in complement clauses, as the latter display no signs of either deverbalization or substantivization (this again does not exclude existence of problematic intermediate cases, as examples from Ngiyambaa and Abkhaz mentioned in Section 6 below illustrate).

What is the driving force behind decategorization and recategorization involved in transcategorial operations? This question is related to another, more general question: what is the motivation for lexical categorization in natural languages? According to Croft (1991) there are two main motivations for parts of speech differentiation: the pragmatic function of a lexical item and the semantic class of a lexical root. For example, a distinction between nouns and verbs is related, on the one hand, to the distinction in discourse functions of reporting an event and referring to event participants, as originally suggested by Hopper and Thompson (1984). On the other hand, this distinction is related to a distinction in the semantic class of a lexical root: nouns typically denote objects, while verbs typically denote actions (Croft 1991: 50–53). In Croft’s view the unmarked combination of the lexical class and pragmatic function (action words in the predicative function for verbs, and objects used in the

argument function, in case of nouns) gives rise to lexical differentiation between prototypical nouns and verbs. The marked combination of function and lexical class are marked on the morphological level as well (hence verbs that function as terms usually contain nominalizers, and nouns that function as predicates often combine with a copula). Most importantly in the present context, Croft's theory also predicts that morphosyntactic trappings of nouns and verbs would show up (if available in a particular language) on the prototypical items displaying a harmonic combination of lexical class and discourse function, while the marked combinations will be impoverished with respect to these features.

Within the framework of Optimality Theory (Prince and Smolensky 2004), these two factors contributing to lexical categorization can be considered as two constraints (or rather two families of constraints, as we will see below) on morphosyntactic marking of lexical categories:

*FUNCFAITH: Assign (morphological) categories to a lexical item in accordance with its discourse function;*

*LEXFAITH: Assign (morphological) categories to a lexical item in accordance with the semantic class of a lexical root.*

While in the case of the unmarked (harmonic) combinations of the discourse function and the semantic class of a lexical item both constraints are (vacuously) satisfied, in the case of a mismatch between the two as in case of nominalization, these constraints are in conflict. The outcome of the conflict will depend on the ranking of the two constraints:

FUNCFAITH >> LEXFAITH  
LEXFAITH >> FUNCFAITH

With regard to nominalization, the first ranking will result in "strong" nominalizations, which show all the nominal properties and are devoid of verbal properties. The other ranking yields weakly nominalized sentential complements hardly showing any nominal properties.

Note that in case of a mismatch between a lexical class and pragmatic function one cannot fully satisfy both constraints since they are in conflict and lead to conflicting outcomes. For example, with regard to deverbalizations FUNCFAITH predicts that a nominalized verb will not show any verbal categories since it is no longer used as a predicate, while LEXFAITH predicts that the verbal categories will be retained in accordance with the semantic class of the root. However, given that there is a large set of nominal and verbal categories, it is perfectly possible that some of the verbal categories will be lost due to FUNCFAITH, while some other will be retained due to LEXFAITH. In what follows we shall consider this possibility in more detail.

## 2. Previous research on “category mixing” in nominalization processes

Given that the processes of decategorization and recategorization are both independent of each other and gradual (for example, a nominalized verb may lose some of its properties, e.g., tense, while retaining some other property, e.g., voice), the outcome of nominalization processes may be quite diverse. In the light of this observation, the central question we may ask is whether there is any ordering of the features that are acquired and lost during nominalization. Although this question has not been answered in full, there do exist a number of proposals that have been presented in the typological literature (see in particular, Comrie and Thompson 1985; Noonan 1985; Lehmann 1988; Mackenzie 1987; Croft 1991; Koptjevskaja-Tamm 1993; Dik 1997; Cristofaro 2003; Koptjevskaja-Tamm 2003). Thus, Comrie and Thompson (1985) note that aspect and voice may be retained in lexical nominalizations, tense rarely so and mood and verbal agreement virtually never. Another generalization, originally due to Comrie (1976), concerns the syntactic typology of nominalizations. It was noted that among verbal arguments, the subject is the first candidate to receive possessive (genitive) encoding. That is, both S and O may retain sentential encoding or both may be genitivized but if only one argument is genitivized, it will be S while O may retain its sentential marking. Consider the much discussed case of the gerund form in English: note that the “verbal gerund” in (1a) takes the object in the sentential and the subject in the possessive form, while the “nominal gerund” in (1b) takes both arguments in the possessive form:

- (1) a. My horse's winning the race was no surprise
- b. My horse's winning of the race was no surprise

Importantly in the present context, there are concomitant morphosyntactic differences between the verbal and nominal gerund constructions: in particular, while the verbal gerund allows for aspectual distinctions and adverbial modification as a finite verb, the nominal gerund allows for neither (for further discussion of the gerund constructions see e.g., Pullum 1991; Zucchi 1993).

Many issues raised by Comrie and Thompson (1985) have been elaborated on in subsequent literature (see Malchukov 2004 for further discussion and references). Comrie's syntactic typology of nominalizations has been refined and extensively documented by Koptjevskaja-Tamm (1993). Lehmann (1988) and Mackenzie (1987) are two representative accounts pertaining to deverbalization and substantivization aspect of nominalizations, respectively:

- Lehmann’s (1988) “Desentialization Scale” (>represents a “prior to” relation).  
Constraints on/loss of illocutionary elements > constraints on/loss of mood/modal elements > constraints on/loss of tense and aspect > dispensability of complements > loss of personal conjugation/conversion of subject into oblique > no polarity > conversion of verbal into nominal government > dispensability of subject/constraints on complements
- Mackenzie’s (1987) nominalization hierarchy (>represents an entailment relation):  
acquisition of noun features (number/gender, combinability with adjectives) > encoding arguments as genitives/obliques > case marking of nominalization > conversion to nonfinite form

Although functional-typological research has yielded a number of important inductive generalizations, no principled account has been suggested so far that would allow us to predict the order in which verbal features are lost and nominal categories acquired. Returning to the case of verbal and nominal gerund in English (as illustrated in [1a] and [1b] above), any analysis should be able to account for the fact why the former allows for adverbial modification and can take aspect markers, while the latter does not. Furthermore, the proposed generalizations are not always compatible with each other. For example, while Lehmann’s (1988) or Croft’s (1991) deverbalization hierarchies predict that TAM categories are lost prior to AGR, Noonan’s (1985) scale for decategorization in complement clauses will predict that tense/aspect will be lost after subject agreement and mood (but prior to loss of object agreement). In the following sections I shall suggest that such predictions can be based on hierarchies of verbal and nominal categories as suggested in the functional typological literature. This is reminiscent of certain proposals in generative literature that derive distribution of nominal and verbal properties in nominalizations from the fact that nominalization can apply on different phrasal levels (cf. Abney 1987; Pullum 1991; a.o.).

### **3. Theoretical preliminaries: category hierarchies and transcategorial operations**

In this section I shall argue that deverbalization processes are constrained by the semantically based hierarchies of verbal and nominal categories. Such hierarchies have figured prominently in the functional-typological

literature. For example, different versions of the hierarchy of verbal (or clausal) categories have been proposed by Foley and Van Valin (1984); Bybee (1985); Dik (1989); Hengeveld (1992); Van Valin and LaPolla (1997). The ranking of features in the hierarchies is determined by the relative scope of particular categories (as in the Functional Grammar and Role and Reference Grammar traditions), or by a more general principle of the semantic “relevance” of a given category to the (verbal) stem, as suggested by Bybee (1985). For example, tense is taken to be ranked higher than aspect in the verbal hierarchy since tense operators have scope over aspect (locating an aspectually profiled predication within one of the temporal planes) and are considered to be less “relevant” than aspect (i.e., tense affects the meaning of the verb stem less directly than aspect does).

Following the earlier suggestions in the functional-typological tradition, I assume the following hierarchy of verbal (respective, clausal) categories (a full list of the abbreviations used in the figures and examples is listed in the Appendix):<sup>2</sup>

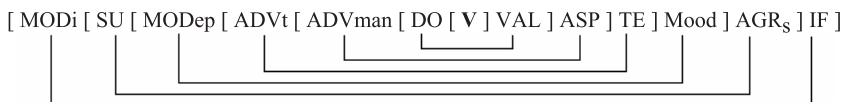


Figure 1. *Hierarchy of verbal categories*

On the one hand, I assume, along with FG and RRG grammarians, a matching relation between grammatical categories (“operators”) and their syntactic correspondents (“satellites”). (The “horizontal bracketing” in the representation above indicates a matching relation between operators and satellites within a certain layer in a manner familiar from Functional Grammar literature (see, e.g., Rijkhoff 2002: 216–224). For example, adverbial satellites of manner and frequency are taken to refine distinctions that in some languages are expressed by corresponding aspectual operators. On the other hand, I assume, with Bybee, an “extended” version of the hierarchy by including agreement and valency/voice categories.<sup>3</sup> The innermost layer hosts valency and voice operators, as well as direct object and object agreement markers. The next layer hosts aspectual operators and adverbial satellites expressing aspectual values (e.g., manner adverbs). The next two layers introduce tense and (epistemic) mood operators with corresponding adverbial satellites (tense and modal adverbs). The two outermost layers introduce subject agreement (AGR<sub>s</sub>) matched with the clausal subject and illocutionary force (IF) markers pertaining to speech act distinctions.

Further, in the line of Rijkhoff (1992, 2002) and Van Valin and Lapolla (1997) (cf. Lehmann and Moravcsik 2000) I assume the following hierarchy of nominal categories<sup>4</sup>:



Figure 2. *Hierarchy of nominal categories*

The innermost layer, called Quality Layer by Rijkhoff (1992, 2002), hosts qualitative operators (“nominal aspect” markers) pertaining to individuation such as singulative/collective markers or noun classifiers, as found in a number of languages. The nominal class (gender) markers may also be assigned to that layer, as long as they are expressed by overt markers on the head (as in Bantu languages) and have semantic import rather than being assigned purely on formal grounds.<sup>5</sup> Adjectives are satellites within the quality layer. Rijkhoff’s Quantity Layer hosts number markers (operators) and numerals (satellites). The next two layers, roughly corresponding to Rijkhoff’s Location and Discourse Layers, introduce possessive agreement markers (matched with genitive satellites) and determiners, which may be fully grammaticalized operators (articles) or not completely grammaticalized demonstratives etc. Finally, I propose to expand the nominal hierarchy by the Relational Layer hosting case operators (which may be rendered by adverbial relators or coverbs in languages lacking the case category). Again, as in the case of the verb feature hierarchy, internal categories in the noun hierarchy (e.g., noun class) are (more) relevant to the meaning of the stem, while external categories (e.g., case, determiners) are (more) relevant to syntax and discourse.

It should be emphasized that the idea of hierarchical structure of verbal (respectively, clausal) and nominal (respectively, NP) categories is not theory-internal and pertinent exclusively to Functional Grammar or Role and Reference Grammar. It is also consistent with the current generative approach, which treats morphological categories as functional categories “licensing” lexical specifiers.<sup>6</sup> The architecture of clausal categories with *AGR<sub>S</sub>* having scope over tense is accepted in some versions of generative grammar (cf. Chomsky 1995). In a similar way, the proposed hierarchy of nominal categories is similar to the hierarchy of functional projections within the determiner phrase as suggested by Abney (1987) and much subsequent generative literature.<sup>7</sup>

Clearly, many of the categories represented in the hierarchies allow for further decomposition (see, e.g., Cinque 1999 for a radical decomposition

of tense/aspect/mood categories). Perhaps, this is most obvious with regard to the domain of mood and modality, where at least four modal layers need to be distinguished (listed here in the order of increasing scope): root modality, epistemic modality, evidentials, illocutionary force markers (cf. Van Valin and LaPolla 1997; Dik 1997; van der Auwera and Plungian 1998). Similarly, within the valency layer valency-changing categories (such as causative and applicative) arguably rank lower on the hierarchy than voice (cf. Bybee 1985), and among AGR categories subject AGR ranks high (above the tense/aspect layer), while object AGR ranks low (cf. Rice 2000). Also in the domain of nominal categories some finer distinctions may be necessary (e.g., for languages that distinguish between inalienable and alienable possessive markers). These issues, which pertain to the inventory of categories and their rank on the functionally based hierarchies, will not be pursued here due to space limitations (but see Malchukov 2004 for further discussion). It should be noted, however, that the relevant level of decomposition of verbal categories may depend on structural properties of the language under investigation. Thus, many (fleclional) languages do not consistently distinguish between TAM categories, which on structural grounds (mutual incombinability of TAM grammemes) can be subsumed under a single category. For example, languages that consistently distinguish between tense and (epistemic) mood categories such as Korean (cf. example [14] below) are rather an exception than the rule. Valency markers are notoriously difficult to distinguish from voice in many languages.<sup>8</sup> Even the ranking of subject and object AGR can be problematic in languages, where they are expressed cumulatively (see Section 7 for further discussion). The same point can be made with respect to the nominal hierarchy. Thus, “determiner possessor” languages such as English do not consistently distinguish between determiners and possessors (Lyons 1986), which arguably compete for the same structural position (witness their incompatibility in *\*the my house*).

Above I have followed Bybee (1985) in her view that the presented hierarchies are based on the functional principle of semantic relevance. Note, however, that while the internal categories in the hierarchies (e.g., valency in the verbal hierarchy) are (more) relevant to the semantics of the root, external ones (e.g., agreement, illocutionary force) are (more) relevant to syntax and/or pragmatics. These two dimensions of relevance have been explicitly recognized in Hansjakob Seiler’s functional-typological approach (Iturrioz 2001: 541). Thus the ranking of individual categories in the verbal and nominal hierarchies with regard to semantic and discourse relevance can be represented as follows (satellites are disregarded in this representation):





This constraint hierarchy should be interpreted as follows: FUNCFAITH compels all verbal categories to be lost since the (nominalized) verb is not used as a (finite) predicate.<sup>10</sup> Yet retention of an external category (e.g., agreement), which is directly associated with FUNCFAITH, incurs a more serious violation than retention of an internal category.

Consider next the LEXFAITH constraint hierarchies for deverbalization in (3), which is a mirror image of the constraint subhierarchy in (2).

- (3) \*-VAL >> \*-VOICE >> \*-ASPECT >> \*-TENSE >> \*-MOOD >> \*-AGR<sub>S</sub>  
>> \*-IF

The hierarchy in (3) demonstrates that LEXFAITH prescribes all verbal categories be retained on action words, but loss of an internal category (e.g., valency) incurs a more serious violation than loss of an external category.

Thus, the resultant set of verbal categories on a nominalized verb can be seen as resulting from interaction between conflicting FUNCFAITH and LEXFAITH constraints. If a FUNCFAITH constraint (e.g., \*TENSE) outranks a corresponding LEXFAITH constraint (\*-Tense) the category in question will be lost, otherwise it will be retained. The set of verbal categories retained depends on the point at which LEXFAITH constraints are interpolated in the FUNCFAITH hierarchy. For the sake of concreteness, consider the following constraint hierarchy:

- (4) \*IF >> \*AGR<sub>S</sub> >> \*MOOD >> LEXFAITH >> \*TENSE >> \*ASPECT >>  
\*VOICE >> \*VALENCY

This constraint hierarchy reflects a situation when all categories up to mood are lost on the nominalized verb due the fact that FUNCFAITH constraints forcing the loss of these categories outrank the corresponding LEXFAITH constraints prohibiting the loss of the categories. In the segment of the hierarchy lower than mood the situation is reverse: LEXFAITH constraints dominate the corresponding FUNCFAITH constraints, hence all categories lower than mood are retained. On this view, generation of the candidate set is conceived as the instantiation of all possible combinations of (verbal) categories available in this language on the competing nominalization patterns, while evaluation is implemented through interaction of FUNCFAITH and LEXFAITH constraints.

The situation for substantivization can be similarly captured through conflicting FUNCFAITH and LEXFAITH constraint subhierarchies, which are represented in (5) and (6), respectively:

- (5) \*-CASE >> \*-DET >> \*-POS >> \*-NB >> \*-CL  
(6) \*CL >> \*NB >> \*POS >> \*DET >> \*CASE

The hierarchy in (5) reflects the fact that FUNCFAITH compels the marking of nominalization — in accordance with its argument function — for all nominal categories available, and it does this to a greater degree the more external (function related) the categories in question are. So, a nominalization incapable of taking case/adposition incurs a more severe hierarchy violation than nominalization incapable of taking determiners or possessors. On the other hand, LEXFAITH prohibits the use of corresponding nominal categories on nominalization, since the root of the nominalized verb does not refer to an object. Also in this case FUNCFAITH is a driving force behind substantivization, while LEXFAITH is used as a “hedging device” preventing an item from (full) recategorization. Consider an abstract case when LEXFAITH constraints are interpolated between \*-DET and \*-POS constraints of the FUNCFAITH family.

- (7) \*-CASE >> \*-DET >> LEXFAITH >> \*-POS >> \*-Nb >> \*-CL

This hierarchy would correspond to a situation where a nominalized form acquires case and determiners, since the corresponding FUNCFAITH outrank LEXFAITH, while the lower categories are not acquired, since the ranking of corresponding FUNCFAITH and LEXFAITH constraints for those categories is reversed.

In the following sections I illustrate the role of hierarchy constraints for nominalization drawing on my crosslinguistic study of transcategorial operations (Malchukov 2004), as well as the earlier literature. No systematic presentation of the evidence for hierarchy constraints will be attempted in this article though (for such evidence from a sample of 50 languages see Malchukov 2004), since the focus here is rather on providing an optimality-theoretic account of the crosslinguistically attested nominalization patterns. The cited examples, coming from a selection of languages, are intended to exemplify various cut-off points on the hierarchies. The role of hierarchy constraints in deverbalization and substantivization processes will be examined separately in Section 5 and Section 6, respectively. Like Koptjevskaja-Tamm (1993), I shall mostly focus on nominalizations with an actional/propositional meaning (rather than agent nominals, result nominals, etc.) since they are most similar to verbs in terms of their argument structure (cf. Grimshaw 1990). However, as already noted in the introduction, I do not restrict myself here to lexical nominalizations (derived nouns with action meaning) to the exclusion of “clausal nominalizations” that retain (to some extent) features of the finite verb. Instead, lexical nominalizations and clausal nominalizations are viewed as two different points on the noun-verb continuum (see Comrie and Thompson 1985 for a similar approach).

## 5. Deverbalization cline

Before proceeding with the presentation of the deverbalization cline, involving a gradual loss of verbal trappings as one moves down the verbal hierarchy, some qualifications concerning the presentation of the data are in order. (These equally pertain to the presentation of the substantivization cline below). First, the cited examples are intended to represent the cut-off points on the hierarchies, they are less committed to the availability of other categories (that may be lacking in a language altogether). Availability of particular categories if not obvious from the examples, is indicated as stated in the sources. Second, regarding the retention (or acquisition) of a category, we shall allow for a possibility that retention (or acquisition) may be partial (e.g., only some tense forms are maintained on a nominalization or only certain case forms acquired). Third, a category may be retained in a modified form, as in case when TAM distinctions are expressed through the use of special forms of participles. These cases will qualify as cases of retention provided that they allow for the use of concomitant sentential (adverbial) satellites. Similarly, special forms of agreement (e.g., on subjunctives) will count as retention inasmuch as they license the use of the subject in the sentential (e.g., nominative) form. Of course, if special forms of agreement (e.g., possessive agreement, as found on nouns) provide for the use of satellites in a nominal (genitive) form, it will count as acquisition of the nominal category (possessive markers), rather than retention of the verbal (agreement) category.<sup>11</sup> Finally, disruption of verbal categories (respectively, acquisition of nominal properties) need not go in parallel in syntax and morphology. Thus, an operator may be lost in a transcategorial process while the corresponding satellite is maintained (this is captured by the “Operator Satellite Asymmetry Principle [OSAP]” in Malchukov 2004). For example, nominalizations in some languages may lose the verbal agreement or tense markers but retain sentential marking of arguments as well as combinability with adverbs. In this article, however we shall be mostly concerned with morphological categories, since they are more idiosyncratic and therefore more instructive for the study of the interaction of functional and structural factors. Admittedly the distinction between operators and satellites may be blurred in the case of (isolating) languages that lack bound morphology (see the examples from Fijian and Nama cited below).

In what follows, the deverbalization cline derived from hierarchy constraints is presented. As argued above, the typology of deverbalization is derived by gradual demotion of LEXFAITH constraints along the FUNCFAITH constraint hierarchy.

*Constraint ranking 5.1.*

LEXFAITH >> \*IF >> \*AGR<sub>S</sub> >> \*MOOD >> \*TENSE >> \*ASPECT >>  
\*VOICE >> \*VALENCY

If LEXFAITH dominates all FUNCFAITH constraints, all verbal categories including illocutionary force (IF) markers are kept on a nonfinite form. This pattern has been reported, for example, for nonfinite tenses in Abkhaz, which are used in different types of subordinate clauses, for example, in complement clauses of indirect speech:

- (8) Abkhaz  
S-cò-z-ma (h°a) də-s-à+z+c'aa-yt'  
I-go-NFIN.IMP-Q (saying) he-it-about-ask-FIN  
'He asked me if I was going.'  
(Hewitt 1979: 32)

Note that the nonfinite form retains the illocutionary force marker (the question particle) in (8). Some other IF markers are, however, lost on nonfinite tenses (e.g., politeness markers in indirect commands are found only in direct quotes with *h°a* 'saying'), which indicates an incipient process of deverbalization.

*Constraint ranking 5.2.*

\*IF >> LEXFAITH >> \*AGR<sub>S</sub> >> \*MOOD >> \*TENSE >> \*ASPECT >>  
\*VOICE >> \*VALENCY

If LEXFAITH is ranked a step lower and dominates all FUNCFAITH constraints except for \*IF, only IF markers are lost. The first stage of deverbalization, where the illocutionary force markers are eliminated while sentential AGR<sub>S</sub> as well as the clause structure is retained, has been reported for clausal nominalizations in a number of languages. This can be illustrated by nominalization in Nama as in (10). Note that nominalization in (10) differs from the finite clause in (9) (apart from the presence of the nominalizer *-s*) solely in terms of the lack of the illocutionary (declarative) marker.

- (9) Nama  
Tiíta ke //nãatí kè ≠ 'aj hãa 'ií  
I DC this.way PST think PST.PFV  
'I had thought that way.'  
(Hagman 1973: 235)
- (10) Nama  
Tiíta //nãatí kè ≠ 'aj hãa 'ií-s  
I this.way PST think PST.PFV-NZR  
'my thinking/that I had thought that way.'  
(Hagman 1973: 235)

These Nama examples are instructive since IF markers are otherwise obligatory. (Admittedly this example is less felicitous inasmuch as the distinction between operators and satellites is blurred in this isolating language). Similarly, in Quechua the use of illocutionary force clitics (“validators”), which is possible in verbal sentences and even obligatory in nonverbal sentences lacking a copula, is excluded in noun clauses (Cole 1982: 165). More similar examples showing that IF markers are lost earliest in desententialization processes can be found in Lehmann (1988).

*Constraint ranking 5.3.*

\*IF >> \*AGR<sub>S</sub> >> LEXFAITH >> \*MOOD >> \*TENSE >> \*ASPECT >> \*VOICE >> \*VALENCY

Demotion of LEXFAITH below \*AGR<sub>S</sub> results in a pattern when finite AGR<sub>S</sub> is lost but TAM markers retained. This pattern is exemplified by the Fijian nominalizations in (21) below, where the subject marker (clitic), as found in finite clauses, is replaced by a corresponding personal possessive pronoun. The clause structure remains otherwise unchanged, with all verbal categories, including tense and aspect markers (e.g., past *aa*/future *na* in [21]), being retained (Dixon 1988: 132). A similar pattern is reported from Krongo. In Krongo, nominalizations are marked by the prefix *t-* replacing the subject AGR prefix of the independent conjugation. While a pronominal subject is expressed by encliticized pronouns following the pattern of dependent conjugation (see [11]), a nonpronominal subject is marked by the possessive case (see [12]). Verbal categories of tense/aspect and valence/voice are, however, retained:

- (11) Krongo  
 N-á-tàasà            à?àŋ    t-óshó-ó-ko-n-tú                            'naama  
 1,2-PRET-want    I            NZR-PRET-cook-BEN-TR-2SG thing  
 à?àŋ  
 me  
 ‘I want (that) you cook for me.’ (lit. your cooking for me)  
 (Reh 1985: 333)
- (12) Krongo  
 N-á-tàasà            à?àŋ    t-úmúnò                            kà-Sárrà à?àŋ  
 I-IMPV.want    I            NZR-IMPV.help POS-Sara me  
 ‘I want that Sara helps me.’ (lit. Sara’s helping me)  
 (Reh 1985: 333)

The retention of TAM marking in a modified form is more common, as attested in many Altaic languages that do not consistently differentiate between participles and nominalizations. Thus in Even (Tungusic) TAM

is retained in a modified form (cf. the perfect participle in [13]), but AGR<sub>S</sub> is lost and replaced by a noun-style possessive agreement:

- (13) Even  
 D'ajučin' min-u med-uke-t-če-vu-n  
 secretly I-ACC learn-CAUS-IMPV-PERF.PART-ACC-3SG  
 d'oŋčiram  
 remember.AOR.3SG  
 'I remember her warning me secretly.'  
 (Own fieldnotes)

Many similar examples of participial nominalizations showing retention of tense/aspect distinction in combination with the loss of the sentential subject marking are documented in Koptjevskaja-Tamm 1993 (see, in particular, Table 6.1. summarizing the data on "possessive-accusative" nominalizations in Koptjevskaja-Tamm 1993: 124–125).

*Constraint ranking 5.4.*

\*IF >> \*AGR<sub>S</sub> >> \*MOOD >> LEXFAITH >> \*TENSE >> \*ASPECT >> \*VOICE >> \*VALENCY

Further demotion of LEXFAITH below \*MOOD in the hierarchy describes a pattern found in Korean. In Korean, the "factive" nominalization in *-(u)m* loses the "sentence enders" expressing illocutionary force as well as mood markers, but retains tense forms (as well as lower categories of voice/valence):

- (14) Korean  
 Na-nun apeci-ka o-si-ess-um-ul al-ass-ta  
 I-TOP father-NOM come-SH-PST-NZR-ACC know-PST-DC  
 'I knew that father came.'  
 (Sohn 1994: 55)

Korean is rather exceptional in consistently treating tense and mood as separate categories, as well as making finer distinctions between several categories in the domain of modality; note that verbal agreement is lacking though.

*Constraint ranking 5.5.*

\*IF >> \*AGR<sub>S</sub> >> \*MOOD >> \*TENSE >> LEXFAITH >> \*ASPECT >> \*VOICE >> \*VALENCY

Demotion of LEXFAITH one step further yields a nominalization pattern where tense is lost, but aspect retained. This is again a widespread pattern, as shown by Comrie and Thompson (1985) and most recently by Cristofaro (2003). Below this pattern is illustrated by Eskimo (West

Greenlandic), where *-niq* nominalizations retain the numerous aspectual markers, while agreement and mood categories are lost. Temporal distinctions are usually rendered by “nominal tense” markers such as *-ssa-* “future X” as demonstrated in the following example (Fortescue 1984: 276).

- (15) Eskimo  
 Umiarsu-up qassi-nut            tikin-ni-ssa-a  
 ship-REL    how.many-ALL arrive-NZR-NOM.FUT-its  
 nalunngil-ara  
 know-IND.1s->3  
 ‘I know when the ship will arrive.’  
 (Fortescue 1984: 45)

Note that in Eskimo both subject agreement and object agreement, which are expressed cumulatively on finite verbs, are lost on *-niq* nominalizations. Other languages, however, show evidence that subject AGR is lost prior to object AGR on nominalizations (cf. Noonan 1985: 57; Koptjevskaja-Tamm 1993: 256). For example, loss of subject agreement on nominalizations under retention of object agreement has been reported for nonfinite verbs in Lango and Quechua.<sup>12</sup>

*Constraint ranking 5.6.*

\*IF >> \*AGR<sub>S</sub> >> \*MOOD >> \*TENSE >> \*ASPECT >> LEXFAITH >> \*VOICE >> \*VALENCY

The next stage in deverbalization is attested in Abkhaz, where the verbal noun (called “masdar”) loses all of its TAM categories, including productive aspectual markers (e.g., iterative *-la-*), but retains voice and valency categories (reflexive, reciprocal, causative); cf. the use of the reflexive prefix in (16).

- (16) Abkhaz  
 A-ç-š-rà            ø-yə-taxə-wp’  
 the-self-kill-NZR it-he-want-STAT  
 ‘He wants to kill himself.’  
 (Hewitt 1979: 84)

*Constraint ranking 5.7.*

\*IF >> \*AGR<sub>S</sub> >> \*MOOD >> \*TENSE >> \*ASPECT >> \*VOICE >> LEXFAITH >> \*VALENCY

This constraint hierarchy as above yields a nominalization pattern with only valency markers retained. Such a pattern has been attested for “strong nominalizations” in many languages. It may also be instructive to compare several types of verbal nouns within a single language. For



example, in Fula the infinitive/nominalization and participles regularly express voice (active, passive and reflexive-middle) and valency (benefactive, associative, causative) categories. On deverbal nouns, such as the action nominalization with the suffix *-l*, by contrast, the voice opposition is lost, along with certain productive valency markers (e.g., benefactive), other valency-changing categories are retained though (Arnott 1970: 364).

*Constraint ranking 5.8.*

\*IF >> \*AGR<sub>S</sub> >> \*MOOD >> \*TENSE >> \*ASPECT >> \*VOICE >> \*VALENCY >> LexFaith

The final stage of deverbalization conditioned by low ranking LEXFAITH is attested in Ket. The infinitives/verbal nouns not only lose the inflectional slots of the polysynthetic verbal form, but they lose derivational categories as well (Werner 1997: 175). For example, the infinitive in (17) cannot take the derivational valency and aspectual affixes (causative, resultative, etc.).

- (17) Ket  
 Is'           qas'-ku-tn'  
 eat.INF want/-2s-/want  
 'You want to eat/eating.'  
 (Werner 1997: 249)

The Ket case is of special interest since finite verbs in this language show a heavy polysynthetic structure, while the nominalizations are stripped of all verbal categories. Of course, examples of strongly nominalized deverbal nouns lacking all verbal characteristics can be cited from many other languages.

## 6. Substantivization cline

In this section a hierarchy of substantivization will be presented. As in the case of deverbalization, the typology of substantivization is derived by gradual demotion of LEXFAITH constraints along the FUNCFAITH hierarchy.

*Constraint ranking 6.1.*

LEXFAITH >> \*-CASE >> \*-DET >> \*-POS >> \*-NB >> \*-CL

If LEXFAITH dominates all FUNCFAITH constraints, no nominal categories are acquired. This pattern is attested in Ngiyambaa, where a verbal form with the *-ba* suffix ("generalized subordinate clause" in terms of Donaldson 1980), cannot take case or any other nominal category.

## (18) Ngiyambaa

Ɖadhu dhi:rba-nha ngana-gal guɽuŋa-nha-ba  
 I.NOM know-PRES that.ABS-PL swim-PRES-SUB  
 'I know that they are swimming.'  
 (Donaldson 1980: 303)

Since clauses of this type occupy an NP (complement) position, but lack any nominal characteristics, it is more difficult to argue that we are dealing with nominalization here rather than with a "dependent mood" form. The distinction between nominalizations (on the broad interpretation of this term adopted in Section 1 that also pertains to "clausal nominalizations") and dependent moods is not always easy to draw though. A borderline case is provided by nonfinite tenses in Abkhaz, as illustrated in (8) above, which combine only with a subset of postpositions (called "conjunctive postpositions" by Hewitt 1979).

*Constraint ranking 6.2.*

\*-CASE >> LEXFAITH >> \*-DET >> \*-POS >> \*-NB >> \*-CL

This ranking yields clausal nominalizations that acquire case but not other categories, as attested in another Australian language, Mangarayi:

## (19) Mangarayi

Ya-ø-yaŋ-gu-wana wa-ŋa-ŋaya-wu  
 SUB-3sg-go-INT-ABL IRR-1sg->3sg-cook-INT  
 'After he goes I want to cook it.'  
 (Merlan 1982: 21)

It should be noted, however, that Mangarayi employs cases only sporadically; nor does it acquire a full set of case markers. Of course, in many other languages nominalizations even at more advanced stages of deverbalization and substantivization processes may display a reduced case paradigm or semantic peculiarities in the use of case markers (see, e.g., Cheremisina 1986 on idiosyncrasies of "predicative declension" of participles in Altaic languages).

*Constraint ranking 6.3.*

\*-CASE >> \*-DET >> LEXFAITH >> \*-POS >> \*-NB >> \*-CL

The pattern obtained under this constraint ranking is found in many Amerindian languages, such as Diegueño, that use determiners/articles to nominalize clauses.<sup>13</sup> Additionally, it can take case affixes (case suffixes in Diegueño), or combine with adpositions as in many other Amerindian languages, which lack morphological case. Note that the possessive morphology is not acquired, though. The verb retains its sentential AGR<sub>S</sub> marking.

- (20) Diegueño  
 [Me-xap]-pu nya'wach ny-uuiw  
 2-enter-DEM we.SUBJ 1,2-see.PL  
 'We saw (that) you come in.'  
 (Miller 2001: 219)

*Constraint ranking 6.4.*

\*-CASE >> \*-DET >> \*-POS >> LEXFAITH >> \*-NB >> \*-CL

This pattern is found in Fijian, which is reported to have nominalizations that do not combine with numerals (in the quantifying “*e*+number construction”), but take possessors, articles and case markers (postpositions); cf. Dixon (1988: 132, 143):

- (21) Fijian  
 au tadra-a [a o-mu aa/na la'o mai]  
 1sg dream-TR ART CLASS-your PAST/FUT come here  
 'I dreamt that you had/will come.'  
 (Dixon 1988: 131)

*Constraint ranking 6.5.*

\*-CASE >> \*-DET >> \*-POS >> \*-NB >> LEXFAITH >> \*-CL

*Constraint ranking 6.6.*

\*-CASE >> \*-DET >> \*-POS >> \*-NB >> \*-CL >> LEXFAITH

It is more difficult to find clear cases of nominalizations, which acquire all nominal categories including number except for gender/class.<sup>14</sup> For the sake of simplicity I shall treat languages with nominalizations that acquire number and class/gender marking together here. Most instructive in this respect are African languages such as Babungo, Fula and Hausa, which have overt noun class systems and have action nominals assigned to a particular noun class. For example, in Fula the infinitive when used as an action nominal takes the class marker *-ki* (the class marker of the noun class No. 19) and controls class agreement of its modifiers:

- (22) Fula  
 duudu-ki bel-ki ki'i  
 pipe-INF sweet.CL CL.the  
 'this sweet piping'  
 (Arnott 1970: 372)

Of course, many other languages, which lack an overt noun class system, have “strong nominalizations”, that reveal all properties of nonderived nouns, thus instantiating the pattern resulting from ranking of LEXFAITH below all the FUNCFAITH hierarchy constraints.

## 7. Structural factors and hierarchy violations

The proposed model that bases its predictions on the functionally based hierarchy constraints correctly captures many generalizations that have been proposed in the literature. Thus, the different susceptibility of tense, aspect and mood categories to deverbalization, as originally suggested by Comrie and Thompson (1985) and Lehmann (1988), is reflected by their different ranking on the deverbalization cline. Another well-known generalization to the effect that S-arguments genitivize prior to O-arguments (Comrie 1976; cf. Koptjevskaja-Tamm 1993), is also predicted by the model. As noted above, subjects (linked to subject agreement) rank higher on the hierarchy of verbal categories than objects, and are therefore “affected” (converted to possessor or lost) by transcategorial operations before objects (pertaining to the voice/valency layer) can be “affected”. By way of illustration, consider how my model accounts for the systematic differences between nominal and verbal gerunds in English discussed in the outset of the article. Since the nominal gerund takes the object in the possessive form, the innermost voice/valency layer is disrupted, hence aspectual forms and adverbial modification pertaining to the “higher” layers in the hierarchy are excluded. Verbal gerund, by contrast permits both, as it takes the object in the sentential form. In a similar way, hierarchy constraints account for the order in acquisition of nominal categories, as represented by Mackenzie’s (1987) nominalization hierarchy in Section 2.

It should be noted, however, that the outcome of transcategorial operations cannot be predicted solely on the basis of the function of a particular category but it should also take into account how this category is expressed. In this section I shall discuss some of the structural factors contributing to the outcome of nominalization and discuss their interaction with the function-based hierarchy constraints. For reasons of space I shall confine myself to discussion of violations of the deverbalization hierarchy, which can be attributed to the interfering structural constraints (see Malchukov 2004 for discussion of violations of substantivization hierarchy caused by structural factors).

Within the OT approach adopted here, structural constraints to be discussed can be viewed as constraints on output-output correspondences (OOC) of Prince and Smolensky (2004), or as constraints derived from OOCs. It has long been noted (Comrie and Thompson 1985; Koptjevskaja-Tamm 1993, 2003)<sup>15</sup> that nominalizations rarely have grammatical categories peculiar to themselves. Rather they draw from the available resources in a particular language, combining categories, as found on prototypical (finite) verbs and prototypical (nonderived) nouns. So, OOCs

would require that verbal categories available for the nominalization would be identical to that of a finite verb, while nominal categories would be the same as on the nonderived noun. Furthermore, OOCs will pertain both to the number of categories in question (precluding nominalization from having categories peculiar to themselves), their exponence (precluding existence of special forms),<sup>16</sup> and their linear order (precluding change in the order of affixes).

One structural factor frequently invoked in the discussion of decategorization processes is the distinction between derivational and inflectional categories. That is, it is assumed that derivational categories can be retained in transcategorial operations, while inflectional categories are lost. However, I shall avoid these terms in the discussion of transcategorial operations since the distinction between derivation and inflection involves a cluster of different properties, some of which pertain to function, some to form (Bybee 1985; Plank 1994; Haspelmath 2002; among others). The functional factors such as semantic relevance (i.e., change of lexical meaning of the base) characteristic of derivation, and syntactic relevance characteristic of inflection have been captured by the LEXFAITH and FUNCFAITH constraints and in this way incorporated into hierarchy constraints.

One formal characteristic attributed to derivational categories as opposed to inflectional concerns the irregularity of expression. A distinction between regular and irregular forms is relevant in the present context insofar as irregular, idiosyncratic forms tend to be unaffected by transcategorial operations. This can be captured by a constraint IRREGAFF preventing an idiosyncratic affix to be lost in deverbalization processes (or acquired in substantivization processes). The role of this factor is most evident when it causes a split within a single category in deverbalization. For example, in Babungu, nominalizations retain only the less regular ("circumstantial") aspect suffixes (Schaub 1985: 225). In Fula deverbal nouns are reported to lose regular valency markers, but retain idiosyncratic markers (Arnott 1970: 364). Although idiosyncratic morphology usually survives in transcategorial operations, it does not mean that IRREGAFF is an inviolable constraint: as shown above, it is violated in Ket where the infinitive/verbal noun as in (17) lacks verbal categories altogether, both inflectional and derivational.

Another formal property associated with the derivation/inflection distinction concerns the order of affixes: it is well-known that inflectional affixes tend to be placed further from the stem than derivational ones (Greenberg's universal Nr. 28). Importantly in the present context, affixes occupying outermost ranks tend to be more affected by transcategorial operations than those occupying word internal slots. This can be

illustrated by the case of nominalizations in Limbu. In this Tibetan (Kiranti) language, the nominalization with the *-be* suffix (also used as a participle) loses mood and aspect markers but retains tense distinctions. Note that in contrast to the finite verb (as in [23]), the nominalization, used in the complement clause in (24) and in the relative clause in (25), lacks the outermost aspect marker:

- (23) Limbu  
 Kε-ips-ε-tchi-ba-i  
 2-sleep-PRET-du.ABS-IPF-Q  
 ‘Have you been sleeping?’  
 (van Driem 1987: 90)
- (24) Limbu  
 Khej hopt-ε-ba                      nis-ε-tch-u-waŋ  
 that not.be-PRET-NZR see-PRET-du.A-3P-GER  
 ‘seeing that it was not there’  
 (van Driem 1987: 198)
- (25) Limbu  
 thuŋ-ε-tch-u-ge-bε-n                      thi  
 drink-PRET-duA-3P-EXCL-NZR-ABS beer  
 ‘beer that we drank’  
 (van Driem 1987: 196)

The loss of mood prior to tense is consistent with the proposed hierarchy constraints, but the loss of aspect prior to tense constitutes a hierarchy violation. It also provides a counterexample to the otherwise well-attested tendency for tense to be lost prior to aspect (see Comrie and Thompson 1985; Lehmann 1988; Cristofaro 2003). Arguably, this hierarchy violation can be attributed to structural factors. Note that the mood and aspect suffixes are outermost suffixes in the suffix string. It might be suggested that since aspect markers are — noniconically — external to tense they are the first to be lost. This is corroborated by the behavior of other non-finite forms in Limbu, such as the gerund, which loses the outermost aspectual suffix, but retains the structurally internal tense suffix (van Driem 1987: 149).

Another example of the role of affix order, this time from the domain of agreement morphology comes from Alamblak. In this Papuan language the nonfinite “general subordinate clause” retains the subject AGR suffix, but loses the outermost object AGR suffix, which is “displaced by the linking clitic” (Bruce 1984: 266). Again, this case constitutes a hierarchy constraints violation, since subject AGR that is higher on the hierarchy is expected to be lost prior to the object AGR. It also

runs counter to the general tendency for the subject AGR to be lost before object AGR (see Noonan 1985: 57; Koptjevskaja-Tamm 1993: 256), just as on the syntactic level sentential encoding of the subject is lost before sentential encoding of the object (Comrie's generalization). Thus in this case, as in the previous one ("early" loss of aspect prior to tense), a hierarchy violation should be attributed to structural factors (linear order of affixes).

Above we have seen that morphemes occupying outermost slots tend to be more affected by transcategorical operations than those occupying word internal slots. As in the previous case concerning irregularity of expression, the reason for this is that innermost slots are better morphologically integrated into the word structure, as compared to those in the outer slots.<sup>17</sup> Based on these observations we can formulate two linearity constraints:

- \*EXTAFF: *Affixes in outer(most) slots are lost in transcategorical operations*
- INTAFF: *Affixes in inner(most) slots are retained in transcategorical operations*

Of course, if the order of affixes (on nouns and verbs) is iconic there is no conflict between the hierarchy constraints and linearity constraints. However, when the order is noniconic as in Limbu these constraints are in conflict. The competition between some of the possible candidates in Limbu is shown in the following Tableau. Note that since we are concerned with the interaction of hierarchy constraints with linearity constraints, the candidates are represented here by a (sub)string of affixes rather than by an unordered set of (verbal) categories available in this language.

Tableau 1. *Loss of external aspect in Limbu nominalizations*

{V, Te, Asp...}	OOCLIN	*EXTAFF	LEXFAITH	*TENSE	*ASPECT
V-...Te-Asp		*!		*	*
ᵐᵐ V-...Te-...			*	*	
V-...-....-			**!		
V-...-....-Asp		*!	*		*
V-Asp-Te	*!	*		*	*
V-Asp-...	*!		*		*

Tableau 1 demonstrates how a hierarchy violation, loss of aspect before tense, comes about. It represents a segment of a deverbalization hierarchy, where LEXFAITH dominates both \*TENSE and \*ASPECT constraints of the FUNCFAITH family. Note that LEXFAITH dominates here both \*TENSE and \*ASPECT, otherwise retention of tense is unexplained. So aspect is lost prior to tense due to a higher ranking \*ExtAFF constraint penalizing retention of the outermost aspect marker. The last two candidates, which show another order of affixes in the nominalization as compared to the finite verb, are filtered out by the linearity condition on OOCs.

Of course, linearity constraints can be violated as well when they rank lower than hierarchy constraints. Consider the case of gerunds (“absolutives”) in Abkhaz (a Caucasian language), which lose the innermost (transitive) subject AGR slot but retain the object AGR markers in the outermost prefixal slot (Hewitt 1979: 30). Obviously, this is due to hierarchy constraints, which predict that AGR<sub>S</sub> is lost prior to AGR<sub>O</sub>. A similar illustration of the role of ICOP comes from Huichol (Uto-Aztecán): in this language with polysynthetic morphology all “mood” markers are lost simultaneously, even though they occupy different slots (Iturrioz 2001: 550).

While structural constraints pertaining to linear order and irregularity of expression are general, there are also language particular constraints. Consider the case of Lavukaleve, where the nominalization with the suffix *-i/-e* exhibits loss of TAM morphology under retention of AGR (Terrill 2003: 348–352). In this case, the loss of TAM suffixes is due to the “one suffix per verb” constraint, operative in this language. Importantly, not only the nominalizer suffix is incompatible with the TAM suffixes, but the markers of aspect, tense, mood as well as negation are mutually exclusive as well (Terrill 2003: 330, 335). AGR is however unaffected by this rule as it is expressed in a prefixal slot. This makes it possible to attribute the loss of TAM prior to AGR to a structural constraint \*MULTSUFF, which penalizes expression of TAM in the presence of another suffix (e.g., the suffixal nominalizer).

The case of Lavukaleve may serve to illustrate a further point. Note that all verbal suffixes occupying the same slot are lost simultaneously even though they rank differently in the verbal hierarchy. In Malchukov (2004) this structural factor is captured by the Isomorphism Principle (ISOP) that predicts that categories similarly encoded will be similarly affected in the course of transcategorial operations. One manifestation of ISOP illustrated by the case of Lavukaleve above, is that all categories that belong to the same paradigm (slot) will all be affected (i.e., lost or replaced)<sup>18</sup> Similarly, if two categories are expressed



cumulatively, they will both be retained or both be lost in transcategorial operations. This constraint (CUMFAITH), prohibiting “decomposition” of cumulative categories in transcategorial operations, can be derived from a condition on Output-Output Correspondences, requiring that verbal categories will have the same exponents in the finite and nominalized forms.

Note that in case of cumulative expression of categories that belong to different layers on hierarchies, a category cannot be unambiguously associated with a single rank in the hierarchy. Rather it can be associated with either of the ranks of the categories having cumulative exponence. For example, if subject and object agreement markers are expressed cumulatively on a verb, they can either be assigned a high rank in the hierarchy (with AGR<sub>S</sub>) or a low rank (with AGR<sub>O</sub>). In the former case they will be lost “early”, as is expected for AGR<sub>S</sub> markers, in the latter case they will be lost “late”, as is expected for AGR<sub>O</sub> markers. The former ranking is attested in Eskimo, where nominalizations retain aspect but lose AGR<sub>O</sub>, which cumulates with AGR<sub>S</sub> as well as mood (cf. [15] above). The latter case is illustrated below by nominalized clauses in Maricopa (Yuman) that retain transitive agreement marking while losing TAM morphology.

- (26) Maricopa  
 ‘Nym-ashuuham-sh waly-hot-ma-k  
 2->1-hit.NZR-SBJ NEG-good-NEG-REAL  
 ‘Your hitting me was wrong.’  
 (Gordon 1986: 230)

The following Tableau visualizes the evaluation of competing nominalization patterns in Maricopa and accounts for the Hierarchy Constraint violation caused by the loss of TAM prior to AGR<sub>S</sub>:

Tableau 2. *Retention of cumulative AGR on nominalizations in Maricopa*

{V, TAM, AGR <sub>S&amp;O</sub> ...}	CUMFAITH	*TAM	LEXFAITH	*AGR <sub>O</sub>
AGR <sub>S&amp;O</sub> -V-TAM		*!		*
...-V-TAM		*!	*	
☞ AGR <sub>S&amp;O</sub> -V- ...				*
...-V- ...			*!	
AGR <sub>O</sub> -V- ...	*!			*
AGR <sub>S</sub> -V- ...	*!		*	

As reflected in the Tableau 2, CumFaith prevents the cumulative AGR markers to be expressed separately on nominalization, ruling out the last two candidates. AGR is retained since it is associated with the “lower” AGR (AGR<sub>O</sub>) position and thus dominated by LEXFAITH. Since TAM dominates LEXFAITH this leads to a hierarchy violation, loss of TAM prior to AGR<sub>S</sub>. Thus, the hierarchy violation is conditioned by a possibility of the \*AGR<sub>S</sub> and \*AGR<sub>O</sub> constraints to “float” (rerank) with respect to intermediate constraints.

Note that following Noonan (1985) but in contrast with some earlier proposals (e.g., Croft 1991), I concluded that, unless structural factors intervene, subject agreement is lost prior to tense/aspect distinctions. This conclusion is however in need of qualification. First, like much of the previous literature,<sup>19</sup> I take into account the retention of TAM distinctions in either finite (unmodified) or a modified (e.g., participial) form, as the latter also license the use of concomitant adverbial satellites (cf., e.g., the use of the participle/nominalization with the adverbial modifier in [13]).<sup>20</sup> If one regards the retention of satellites, which are less idiosyncratic in behavior than morphological operators, as a decisive criterion, one must admit that the default option for AGR<sub>S</sub> would be to be lost prior to tense/aspect categories, just as subject is lost prior to adverbs. Indeed, most nonfinite forms can combine with adverbs but cannot by definition take the (sentential) subject. Another factor pertinent to the ranking of TAM vis-à-vis AGR categories, that cannot be discussed in this article but should at least be mentioned in this connection, is related to the distinction between “subject-oriented” and “subjectless” languages (see Kibrik 1997 on these terms). A canonical subject is traditionally viewed as a conflation of semantic (agency) and discourse (topicality) properties on the same NP (see Comrie 1989; Croft 1991; Kibrik 1997; among others). Now, if grammatical relations are determined by semantic roles alone, as is the case in “role-dominated” languages, we would not expect to find early loss of subject AGR or subject/object asymmetries with regard to deverbalization (see Malchukov 2004 for further discussion). On an OT account proposed here, this means that the FUNCFAITH constraint \*AGR<sub>S</sub> can rerank with regard to lower constraints depending on the degree of subject prominence in a particular language. Finally, an “early” loss of TAM (prior to subject AGR) may depend on other interfering factors, structural, as considered in this section, but also functional (see the next section on the role of economy).

Although it is more difficult to circumvent the structural factors in case of cumulation, it is not altogether impossible. One way to comply with the Hierarchy Constraint is to abandon the cumulative category marker, but reintroduce the lower (semantically more relevant) category in a

modified form. As illustration of the emergence of a modified form to as a result of a low ranking CumFaith consider Greek and Nenets that express voice (active/middle) distinctions cumulatively with agreement. Of course, if the valency/voice categories are noncumulative and occupy, iconically, the innermost slots, they will be normally retained (cf., e.g., the nominalization in Even in [13] that retains the causative morphology while finite agreement is replaced by the possessive agreement). It is therefore instructive to consider what happens to the active/middle opposition in nonfinite forms, which lack agreement morphology. In Nenets nonfinite forms (participles/gerunds/infinitives) lose agreement and by the same stroke voice distinctions are lost as well (cf. the infinitive *masa-s* ‘to wash’ [itr./tr.] and the finite [3<sup>rd</sup> p.sg. aorist] forms, transitive and middle: *Masa-da* ‘He washed [smb/smith]’, *Masy* ‘He washed [himself]’). Also in (Modern) Greek, the middle voice agreement morphology, as found on finite verbs, is lost on nonfinite forms (gerunds and participles). The voice distinction, however, is retained in a modified form — through the use of special medial forms of gerunds and participles (cf., e.g., the active form of the present participle in *-ōn* and its passive counterpart in *-ōmenos*). Thus, the use of the more internal category in a modified form may also be regarded as a result of demoting an OOC-based FAITHCUM constraint below LEXFAITH, as shown in Tableau 3.

Above we have seen how hierarchy violations in deverbalization processes can be accounted for in terms of conflicting structural constraints. In the next section I shall demonstrate that other functional factors can also interfere with the hierarchy constraints.

## 8. Economy

Above I have discussed the role of functional and structural factors for the outcome of transcategorial operations. The functional factors captured by hierarchy constraints can be argued to be iconically motivated,

Tableau 3. *Greek: inflectional voice in a modified form on participles*

{V, Voice, AGR...}	*AGR <sub>S</sub>	LEXFAITH	*VOICE	FAITHCUM
V-Voice&AGR	*!		*	
☞ V-Voice-...			*	*
V-AGR-...	*!	*		*
V-...		*!		

if one assumes with the proponents of Functional Grammar and Role and Reference Grammar that the layered structure of clauses and NPs reflects semantic compositionality (hence they are subsumed under the iconicity principle in Malchukov 2004). Another functional principle frequently adduced in the typological literature is economy. (For iconicity and economy as competing motivations see Haiman 1985.) The role of economy and Iconicity with regard to “deranking” (deverbalization) in subordinate constructions has been recently investigated by Cristofaro (2003). Building on the previous work of Noonan (1985) and Givón (1990), Cristofaro shows that those categories that are predetermined by the semantics of the matrix clause predicate tend to be unexpressed on the subordinate predicate. This principle has been invoked by Noonan (1985) (cf. also Givón 1980) who showed that predetermination of time reference on the part of certain predicates (e.g., modals) accounts for the fact that these predicates tend to combine with infinitives or subjunctives, which do not express tense distinctions. Cristofaro (2003) generalizes this principle (termed “principle of information recoverability”), demonstrating that the same holds for predetermination of modal (actuality value) and aspectual information, as well information on participants (argument sharing between the matrix and subordinate clauses).

Consider the following examples from Retuarã (Tucanoan; a Columbian language) cited by Cristofaro (2003: 68, 69), where a nominalization marked by the *-ri-* “deverbalizer” functions as infinitive:

- (27) Retuarã  
 Wa?a e?e-ri-ka ko-yapa-yu  
 fish get-NZR-3NS 3FS-want-PRES  
 ‘She wants to get fish.’  
 (Strom 1992: 160)
- (28) Retuarã  
 Wa?ia yi-e?e-ri-ka ko-yapa-yu  
 fish 1S-get-NZR-3NS 3FS-want-PRES  
 ‘She wants me to get fish.’  
 (Strom 1992: 160)

In both examples the tense of the embedded predicate is left unexpressed since it is predetermined by the semantics of the desiderative predicate. However, the person of the subordinate clause subject is not predetermined as strictly, even though the semantics of the desiderative predicate normally implies participant sharing. Therefore the subject agreement prefix may be lacking on the embedded predicate, which leads to the default interpretation implying coreferentiality of the main and subordinate clause subjects (see [27]), but must be retained in case of

Tableau 4. *Retuara: hierarchy violation in a different subject construction*

{V, Te, AGR...}	ECON	LEXFAITH	*AGR <sub>S</sub>	*TENSE
AGR-V-Te	*!	*	*	*
-V-Te	*!	*		*
☞ AGR-V-...		*	*	
-V-		**!		

noncoreferentiality (see [28]). Tableau 4 shows the role of a higher ranking economy constraint for the outcome of nominalization.

Note, incidentally, that in (28) predetermination of the temporal characteristics of the subordinate verb leads to the loss of TAM distinctions prior to AGR. Thus, in the domain of complementation economy will favor (at least for certain types of complement taking predicates such as desideratives) the loss of tense prior to AGR<sub>S</sub> and may interfere with hierarchy constraints.

Yet, in our discussion of nominalizations economy plays a minor role, since nominalizations, unlike infinitives and subjunctives, need not depend temporally and referentially on the matrix predicate. Since infinitives involve decategorization without recategorization, economy considerations are crucial in determining to what limits a verbal form can be decategorized without loss of information. On the other hand, the distinctive feature of nominalizations is recategorization (substantivization) rather than decategorization (deverbalization). Thus the role of economy is relevant to the present discussion of nominalization inasmuch as the same form may be used both as infinitive and nominalization, as attested in German, Ket and Abkhaz to name a few cases.<sup>21</sup> Like all other constraints, economy can be violated if dominated by a higher ranking LEXFAITH constraint that prevents loss of finite verb morphology. Such a situation is found for example in Arabic varieties that consistently use nonreduced finite forms in complementation even in the context of those matrix predicates (such as modal predicates) which predetermine both TAM values and participants of the subordinate event.

## 9. Conclusion

Above I have shown that morphosyntactic properties of nominalizations arise from the interaction of constraints some of which are functional, some structural. On the functional side transcategorical processes are

constrained by hierarchy constraints on deverbalization and substantivization. The hierarchy constraints in their turn are shown to arise from the interaction of FUNCFAITH constraints forcing decategorization/recategorization and LEXFAITH hedging these processes. On the other hand, I showed how structural factors such as morpheme order and category cumulation can interfere with the hierarchy constraints. These structural factors can be derived from conditions on output-output correspondences (OOCs) between morphological structure of nominalizations with that of the finite verbs, on the one hand, and nonderived nouns, on the other hand. Thus, the outcome in the competition between nominalization patterns can be conceived as involving the generation of a set of verbal and nominal categories available in the language, with a subsequent evaluation of candidates through function-based hierarchy constraints and OOC-related structural constraints.

Clearly, this brief sketch of a typology of nominalization leaves a number of questions open. How are the nominal and verbal hierarchies related to each other? What is the relation between retention/loss of operators and satellites in transcategorial processes? Is the model general enough to be applied to other types of transcategorial processes, such as verbalization? These are some of the questions addressed in Malchukov (2004) where a general model for constraining transcategorial processes is proposed and its predictions are tested against a sample of languages.

*Received 19 February 2004*

*Radboud University Nijmegen*

*Revised version received*

*10 January 2006*

## **Appendix. Abbreviations**

Abbreviations used in the text are as follows:

A	agent
ABS	marker of agreement with the absolutive argument
ACC	accusative
ACT	active (voice)
ADJ	adjective
ADV	adverb
ADV <sub>man</sub>	manner adverb
ADV <sub>t</sub>	temporal adverb
AGR	agreement
AGR <sub>s</sub>	subject agreement
AGR <sub>O</sub>	object agreement
ALL	allative case

ASP	aspect
AUX	auxiliary
BEN	benefactive
CL	(noun) classifier
DAT	dative
DEM	demonstrative (pronoun)
DET	determiner ("article")
DO	direct object
DC	declarative
DU	dual
ERG	ergative
GEN	genitive
GER	gerund
HAB	habitual
IF	illocutionary force marker
IND	indicative
INF	infinitive
IPF	imperfective (aspect)
MED	mediopassive
MOD	modal adverb
MODep	adverb with epistemic function
MODi	adverb with illocutionary function
N	noun
NB	number
NEG	negation
NUM	numeral
NZR	nominalizer
O	object
P	patient
PASS	passive
PST	past (tense)
PERF	perfect
PART	participle
PFV	perfective (aspect)
PL	plural
POS	possessive
POT	potential mood
PRET	preterite (tense)
Q	question marker
REAL	realis mood
RE	(adverbial) relator
REL	relative case
RETR	retrospective mood
S	subject
SBJ	"subject case"

SG	singular
SH	subject honorific
STAT	stative (aspect)
TAM	tense/aspect/mood
TE	tense
TR	transitivizer
V	verb
VAL	valency
1→3	cumulative agreement marker of the 1 <sup>st</sup> person A acting on 3 <sup>rd</sup> person O

## Notes

- \* I am grateful to Helen de Hoop and to the anonymous reviewers for the helpful comments on the earlier version of this article. I acknowledge the Netherlands Organization for Scientific Research (NWO) for financial support (grant 220-70-003 for the PIONIER project “Case cross-linguistically”). Correspondence address: Max Planck Institute for Evolutionary Anthropology, Deutscher Platz 6, 04103 Leipzig, Germany. E-mail: Andrej\_Malchukov@eva.mpg.de.
1. Within the approach advocated by Comrie and Thompson (1985: 391–392) and Koptjevskaja-Tamm (1993: 49–52, 2003: 724–725) “lexical nominalizations” are opposed to “clausal nominalizations” in that the former are headed by the lexically derived noun while the latter are not. I further follow Comrie and Thompson and Koptjevskaja-Tamm in viewing the distinction between the two nominalization types not as discrete, but rather as gradient (equally gradient is the distinction between nominalizations which are verbal derivatives, on the one hand, and inflectional verbal forms, on the other hand; see Koptjevskaja-Tamm 1993: 263–266).
  2. The set of categories represented in the verbal hierarchy (as well as in the nominal hierarchy below) is, of course, not meant to be exhaustive: it includes crosslinguistically more common categories (for this reason subject AGR is explicitly mentioned in the hierarchy while object AGR is not). Some other categories such as negation are absent from the hierarchy as they have variable scope (cf. Dik 1997: 172–178 on negation). The terminology adopted here is fairly standard in typological studies (see e.g., Van Valin and LaPolla 1997 for a general discussion and definitions; see also Bybee 1985 on verbal categories; and Rijkhoff 1992 on nominal categories). Note that mood in the verbal hierarchy corresponds to Van Valin’s “status”, while CL (classifier) in the nominal hierarchy below stands for qualitative operators of Rijkhoff (1992, 2002).
  3. Bybee (1985) presents crosslinguistic evidence in support of this hierarchy, demonstrating that: a) internal — more relevant — categories favor lexical/derivational expression, while external categories favor an inflectional/syntactic expression; b) more relevant categories tend to reveal more fusion with the stem; c) more relevant categories tend to appear closer to the verb stem in an affix string.
  4. Unlike the verbal hierarchy discussed above, the hierarchy of noun categories is still in need of empirical justification. In Malchukov (2004), I present evidence for this hierarchy based on affix ordering in a 50-language sample.
  5. The gender assigned on formal (phonological or morphological) grounds is difficult to distinguish from declension class and cannot be located on the semantic hierarchy of nominal categories.



6. It may be noted however, that the presented model assumes a stricter functional isomorphism between functional and syntactic categories (operators and satellites), than some versions of generative grammar, which associate, for example, subject assignment with tense. See, however, Meinunger (2000: 106–114) for an extensive argumentation that subject case is licensed by (subject) agreement, which is consistent with the present approach.
7. See e.g., contributions to Alexiadou and Wilder (1998) which assume or argue for the (subparts) of the following architecture of nominal functional projections: [DetP[PosP[NumP[KindP[NP]]]]].
8. Traditionally, valency-changing categories are conceived as affecting semantic valency (e.g., adding a core argument as in case of causatives, or applicatives, or removing an argument, as in case of anticausatives), while voice proper concerns syntactic valency (or an alternative mapping between semantic and syntactic arguments to indicate a shift in perspective, as in the case of passives); see Bybee (1985: 20); cf. also Haspelmath's (2002: 210–213) distinction between event-changing and function-changing operations. Some languages, such as Fula mentioned in Section 5, do provide evidence for such a distinction, inasmuch as they represent the former categories derivationally and the latter inflectionally. Yet, a distinction between the two types of categories is often difficult to make, in view of a widespread polysemy among valency changing categories (e.g., the passive/anticausative polysemy). Further, in many cases application of a verbal category has both semantic, syntactic and pragmatic effects, and these functions cannot be easily disentangled (see Dixon and Aikhenvald 2000: 6). Therefore, some authors refrain from making a principled distinction between voices and other valency-changing categories (see Dixon and Aikhenvald 2000 for further discussion).
9. A similar suggestion relating (in)accessibility of particular verbal categories to loss in deverbalization processes to Bybee's Relevance has been recently made in Iturriz (2001) with regard to Huichol (Uto-Aztecan).
10. When a verb is used as a predicate, a FuncFaith constraint hierarchy (\*-IF >> \*-AGR >> \*-Mood >> \*-Tense >> \*-Aspect >> \*-Voice >> \*-Valency) penalizing absence of the respective categories on a finite verb, will reinforce LEXFAITH constraints rather than conflict with them.
11. Cases of mismatch between the expression of operators and satellites pertaining to the same layer are very rare. Thus, Koptjevskaja-Tamm (1993: 102, 256) reports one case in her sample (Huallaga Quechua) with the possessive AGR on the nominalized clause cross-referencing the sentential (nominative) subject, and one opposite case (Tabasaran) with the sentential AGR cross-referencing the subject in the genitive form.
12. In Quechua, it holds for the 1st person object marker *-wa-* which is retained in non-finite verbs along with the voice and valency markers (passive, reflexive, causative; Cole 1982: 160).
13. As noted by an anonymous reviewer, use of determiners is often obligatory in such clausal nominalizations. I take it to be a case of cumulation of a determiner with a nominalizer; note that a nominalizer can cumulate either with a nominal category acquired (e.g., with class markers as in Fula), or with a verbal category retained (e.g., with TAM categories on participles in Altaic languages).
14. With action nominalizations this pattern is not found at all, as they do not pluralize for semantic reasons (Grimshaw 1990) unlike some other nominalization types (e.g., result nominals). This point can be illustrated by the participial nominalization in Even as in (13) which can be used both as an action nominalization and as a result nominalization (cf. *ičukad-di-va-n* in (13) 'that/what he is showing'). Notably, in the former use, it does not pluralize, while in the latter use it can take plural markers (*ič-uka-d-di-l-bu-n*

'what he is showing (pl)'). Since in both uses it combines with adverbs rather than adjectives, the result nominals of this type can be argued to represent the [+NB/\*CL] pattern.

15. Thus, Koptjevskaja-Tamm (2003: 747) refers to the fact that nominalizations (action nominal constructions, ANC) are usually modeled on either finite clauses or non-derived NPs as the "ANC-parasite universal".
16. One exception to this generalization is found in cases when one of the categories is expressed cumulatively with a nominalizer (e.g., participial forms which express TAM categories cumulatively with a nominalizer).
17. And the other way around, affixes that are better morphologically integrated by other criteria (for example, are in the domain of stress assignment, and are susceptible to morphological alternations) normally occur closer to the root (Haspelmath 2002: 199–203).
18. Other cases of structural dependencies between categories related to paradigmaticity and polyfunctionality are discussed in Malchukov (2004).
19. Cf. (Comrie and Thompson 1985: 360): "We are not, of course, here interested primarily in the phonetic shape of morphological categories, but rather in whether or not those categories can be expressed as categories in the action nominal". Similarly, Koptjevskaja-Tamm (1993) qualifies participial nominalizations as cases of retention of tense/aspect categories (see, e.g., Table 6.1, 124–125).
20. In her recent crosslinguistic study of subordination, Cristofaro (2003), who distinguishes between the retention of TAM in a finite and a modified form, finds that there are more cases of loss of finite TAM markers prior to AGR, which would be more in line with Croft's (1991) position. However, as is clear from Table 10.3. in Cristofaro (2003: 291) the balance is reversed once one takes into account cases of TAM retention in a modified form. Note also that Cristofaro's statistics does not distinguish the cases of subject and object AGR retention, and treats subjunctives that lack tense distinctions as cases of (partial) TAM loss under retention of finite AGR. I do not consider absence of tense distinctions on subjunctives (and infinitives) as problematic for hierarchy constraints, since it can be attributed to economy constraints (see Section 10 below). Otherwise the findings of Cristofaro (2003) are compatible with the model proposed (as long as they address the same range of categories); in particular, Cristofaro also finds that tense is lost prior to aspect and also explains it in reliance to Bybee's Relevance Principle.
21. The fact that nominalizations are sometimes difficult to distinguish from infinitives (see Koptjevskaja-Tamm 1993: 33–42 for discussion of problematic cases), of course does not obviate the need for such a distinction, and there are sufficiently many clear cases of nominalizations distinct from infinitives (cf. Koptjevskaja-Tamm (2003: 755)). Indeed, the two categories differ both functionally (nominalizations are used in an NP function, infinitives are usually used as parts of complex predicates), morphologically (nominalizations reveal some nominal features, infinitives do not, at least synchronically), as well as syntactically (infinitives unlike nominalizations cannot form a constituent with its notional subject); I refer to Noonan (1985: 56–62) and Koptjevskaja-Tamm (1993: 24–26, 40–42) for further discussion.

## References

- Abney, Stephen P. (1987). The English noun phrase in its sentential aspect. Unpublished doctoral dissertation, Massachusetts Institute of Technology.

- Alexiadou, Artemis and Wilder, Chris (1998). *Possessors, Predicates and Movement in the Determiner Phrase*. Amsterdam: John Benjamins.
- Arnott, David W. (1970). *The Nominal and Verbal Systems of Fula*. Oxford: Clarendon Press.
- Auwers, Johan van der and Plungian, Vladimir (1998). Modality's semantic map. *Linguistic Typology* 2, 79–124.
- Bhat, D. N. Shankara (1994). *The Adjectival Category*. Amsterdam: John Benjamins.
- Bybee, Joan (1985). *Morphology: A Study of the Relation between Meaning and Form*. Amsterdam: John Benjamins.
- Bruce, Les (1984). *The Alambalak Language of Papua New Guinea (East Sepik)*. Pacific Linguistics, Series C, No. 81. Canberra: Australian National University.
- Cheremisina, Maja I. (ed.) (1986). *Strukturnye tipy sinteticheskix polipredikativnyx konstrukcij v jazyxax raznyx system*. Novosibirsk: Nauka.
- Chomsky, Noam (1995). *The Minimalist Program*. Cambridge: MIT Press.
- Cinque, Guglielmo (1999). *Adverbs and Functional Heads: A Cross-Linguistic Perspective*. Oxford and New York: Oxford University Press.
- Cole, Peter (1982). *Imbabura Quechua*. *Lingua Descriptive Studies* 5. Amsterdam: North Holland.
- Comrie, Bernard (1976). The syntax of action nominals: a cross-linguistic study. *Lingua* 40, 177–201.
- (1989). *Language Universals and Linguistic Typology*. Chicago: University of Chicago Press.
- and Thompson, Sandra (1985). Lexical nominalizations. In *Language Typology and Syntactic Description*, vol. 3, Timothy Shopen (ed.), 349–398. Cambridge: Cambridge University Press.
- Croft, William (1991). *Syntactic Categories and Grammatical Relations: The Cognitive Organization of Information*. Chicago: University of Chicago Press.
- Cristofaro, Sonia (2003). *Subordination*. Oxford and New York: Oxford University Press.
- Dik, Simon C. (1989). *The Theory of Functional Grammar*. Vol. 1: *The Structure of the Clause*. Dordrecht: Foris.
- (1997). *The Theory of Functional Grammar*, vol. 2: *Complex and Derived Constructions*. Berlin: Mouton de Gruyter.
- Dixon, Robert Malcolm Ward (1988). *A Grammar of Boumaa Fijian*. Chicago: University of Chicago Press.
- and Aikhenvald, Alexandra Y. (2000). Introduction. In *Changing Valency: Case Studies in Transitivity*, R. M. W. Dixon and A. Y. Aikhenvald (eds.), 1–29. Cambridge: Cambridge University Press.
- Donaldson, Tamsin (1980). *Ngiyambaa, the Language of the Wangaaybuwan*. Cambridge: Cambridge University Press.
- Driem, George van (1987). *Grammar of Limbu*. Berlin: Mouton de Gruyter.
- Foley, William A. and Van Valin, Robert D. (1984). *Functional Syntax and Universal Grammar*. Cambridge: Cambridge University Press.
- Fortescue, Michael (1984). *West Greenlandic*. London: Croom Helm.
- Givón, Talmy (1980). The binding hierarchy and the typology of complements. *Studies in Language* 4 (3), 333–377.
- (1990). *Syntax: A Functional-Typological Introduction*, vol. 2. Amsterdam: John Benjamins.
- Gordon, Lynn (1986). *Maricopa Morphology and Syntax*. Berkeley, CA: University of California Press.
- Grimshaw, Jane (1990). *Argument Structure*. Cambridge, MA: MIT Press.

- Hagman, Roy Stephen (1973). Nama Hottentot grammar. Unpublished doctoral dissertation, Columbia University.
- Haiman, John (1985). *Natural Syntax. Iconicity and Erosion*. Cambridge: Cambridge University Press.
- Haspelmath, Martin (2002). *Understanding Morphology*. Oxford and New York: Oxford University Press.
- Hengeveld, Kees (1992). *Non-Verbal Predication: Theory, Typology, Diachrony*. Berlin and New York: Mouton de Gruyter.
- Hewitt, Brian George (1979). *Abkhaz*. *Lingua Descriptive Studies* 2. Amsterdam: North-Holland.
- Hopper, Paul and Thompson, Sandra (1984). The discourse basis for lexical categories in universal grammar. *Language* 60, 703–752.
- Iturrioz, Jose Luis (2001). Dimensionen der verbalen Modifikation. In *Language Typology and Language Universals: An International Handbook*, vol. 1, Martin Haspelmath, Ekkehard König, Wulf Oesterreicher, and Wolfgang Raible (eds.), 533–557. Berlin and New York: Walter de Gruyter.
- Kibrik, Alexander E. (1997). Subject-oriented vs. subjectless languages. In *Language Typology and Language Universals: An International Handbook*, vol. 2, Martin Haspelmath, Ekkehard König, Wulf Oesterreicher, and Wolfgang Raible (eds.), 1413–1423. Berlin and New York: Walter de Gruyter.
- Koptjevskaja-Tamm, Maria (1993). *Nominalizations*. London: Routledge.
- (2003). Action nominal constructions in the languages of Europe. In *Noun Phrase Structure in the Languages of Europe*, Frans Plank (ed.), 723–761. Berlin and New York: Mouton de Gruyter.
- Lehmann, Christian (1988). Towards a typology of clause linkage. In *Clause Combining in Grammar and Discourse*, John Haiman and Sandra Thompson (eds.), 181–225. Amsterdam: John Benjamins.
- and Moravcsik, Edith (2000). Noun. In *Morphology: An International Handbook on Inflection and Word-Formation*, G. Booij, C. Lehmann, and J. Mugdan (eds.), vol. 1, 732–757. Berlin: Walter de Gruyter.
- Lyons, Christopher (1986). The syntax of English genitive constructions. *Journal of Linguistics* 22, 123–143.
- Mackenzie, Lachlan (1987). Nominalization and basic constituent ordering. In *Ins and Outs of Predication*, Johan van der Auwera and Louis Goossens (eds.), 93–106. Dordrecht: Foris.
- Malchukov, Andrej L. (2004). *Nominalization/Verbalization: Constraining a Typology of Transcategorial Operations*. Munich: LINCOM.
- Meinunger, André (2000). *Syntactic Aspects of Topic and Comment*. Amsterdam: John Benjamins.
- Merlan, Francesca (1982). *Mangarayi*. *Lingua Descriptive Studies* 4. Amsterdam: North-Holland.
- Miller, Amy (2001). *A Grammar of Jamul Tiipay*. Berlin and New York: Mouton de Gruyter.
- Noonan, Michael (1985). Complementation. In *Language Typology and Syntactic Description*, vol. 2, Timothy Shopen (ed.), 42–141. Cambridge: Cambridge University Press.
- Plank, Frans (1994). Inflection and derivation. In *The Encyclopedia of Language and Linguistics*, vol. 3, R. E. Asher (ed.), 1671–1678. Oxford: Pergamon Press.
- Prince, Alan and Smolensky, Paul (2004). *Optimality Theory: Constraint Interaction in Generative Grammar*. Malden, MA: Blackwell.
- Pullum, Geoffrey (1991). English nominal gerund phrases as noun phrases with verb-phrase heads. *Linguistics* 29, 763–799.

- Reh, Mechthild (1985). *Die Krongo Sprache*. Berlin: Reimer.
- Rice, Keren (2000). *Morpheme Order and Semantic Scope: Word Formation in the Athapaskan Verb*. Cambridge: Cambridge University Press.
- Rijkhoff, Jan (1992). The noun phrase: a typological study of its form and function. Unpublished doctoral dissertation, University of Amsterdam.
- (2002). *The Noun Phrase*. Oxford and New York: Oxford University Press.
- Schaub, Willi. (1985). *Babungo*. London: Croom Helm.
- Sohn, Ho-min (1994). *Korean*. London: Routledge.
- Strom, Clay (1992). *Retuara Syntax*. Dallas: SIL Publications in Linguistics.
- Terrill, Angela (2003). *A Grammar of Lavukaleve, a Papuan Language of the Solomon Islands*. Berlin: Mouton de Gruyter.
- Van Valin, Robert and LaPolla, Randy (1997). *Syntax: Structure, Meaning and Function*. Cambridge: Cambridge University Press.
- Werner, Heinrich (1997). *Die ketische Sprache*. Berlin: Harrassovitz Verlag.
- Zucchi, Alessandro (1993). *The Language of Propositions and Events*. Dordrecht: Kluwer.

