Nouns as Adjectives and Adjectives as Nouns

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Abstract

Many languages have morphological devices to turn a noun into an adjective. Often this morphology is genuinely derivational in that it adds a semantic predicate such as ‘having-N’ (proprietive), ‘lacking-N’ (caritive’), ‘similar-to-N’ (similitudinal) and so on. In other cases the denominal adjective expresses some vaguely defined notion of possession as in Russian Ivan-ovo (detstvo) ‘Ivan’s (childhood)’, or is purely relational as in prepositional phrase (cf. the synonymous preposition phrase). In some languages and in some constructions the resulting adjective retains some of the noun-related properties of its base. For example, the base can be modified by an attribute as though it were still a syntactically represented noun (as in the English proprietive [short sleev]ed shirt), giving rise to what we call ‘syntagmatic category mixing’.

We contrast classes of syntactic and lexical approaches to such constructions. On syntactic approaches the derivational affix takes scope over a syntactic phrase because the affix itself is introduced in the syntax. We argue that there are cases which cannot be handled in this manner, because the affix lacks crucial syntactic properties we would otherwise expect, such as taking wide scope over coordinated hosts, and because the syntactic approach cannot account for some of the syntactic properties of the derived modifier. For these cases we argue for a lexical approach based on the idea that the morphological, syntactic and semantic dimensions of a lexical representation are in principle independent and can be fractionated. We then define lexical type hierarchies on the basis of these fractionated lexical entries. This permits us to express the idea that a denominal adjective can have the external syntax of an adjective, for instance, agreeing with its head noun, while retaining the internal syntax of a noun, for instance, by still taking attributive modifiers of its own. We identify six principal types of denominal modifiers defined in terms of whether they exhibit category mixing and if so what kind. These are canonical derivation, canonical transposition (change of morphosyntactic category but no additional semantic content – relational adjectives in Russian and many other languages), mixed derivation (with syntagmatic mixing – proprietive adjectives in Tungusic), mixed transposition (transposition with syntagmatic mixing – possessive adjectives in Upper Sorbian, Chukchi possessive and relational adjectives), mixed inherent inflection (semantically contentful inflection with syntagmatic mixing – Selkup similitudinal forms), and mixed contextual inflection (Suffixaufnahme based on genitive case forms – Daghestanian/Cushitic). We show how each type represents a different fractionation of the lexical entry of the derived modifier.
1. Introduction

It is tempting to think that in an ideal morphosyntactic world there would be nouns, verbs and adjectives and each class would be clearly delineated from the other in terms of morphology, syntax (for instance, distribution) and morphosyntax (for instance, agreement properties). However, such an ideal world is not our world. In practice it is notoriously difficult to differentiate word classes, either in a particular language, or universally. In this paper we ask very general questions about the nature of word classes on the basis of an examination of seldom discussed types of categorial mismatch, in which denominal adjectives retain certain morphosyntactic and semantic properties of the base noun.

When we compare nouns and adjectives, even in languages which have well established examples of these categories, we can see that there is a regular need to modify the denotation of a noun by means of a word that is itself a noun. English, for instance, has four different ways of doing this. The most direct encoding strategy is noun-noun (NN) compounding: wood polish, cat food, water level. Another strategy is to use a postnominal prepositional phrase (polish for wood, food for cats) or the N of-N constructions where of-N has a purely attributive, modificational function (level of water), cf. Koptjevskaja-Tamm (2003a). In other cases, we are allowed to use the ‘Saxon genitive’ form of the modifying noun: cats’ whiskers, children’s story, men’s room. Finally, we can (sometimes) derive a so-called relational adjective from an inanimate noun or a possessive adjective from an animate/human noun: wooden floor (cf. floor of wood), prepositional phrase (cf. the poetics of Aristotle), feline haemoglobin (cf. the haemoglobin of cats).

The occurrence of relational adjectives in English is somewhat restricted, partly because the standard way of modifying a noun by a noun is by compounding. In other languages, however, especially those lacking the compounding strategy, essentially all nouns productively form a relational adjective. For us their interest lies in the fact that they give rise to a set of situations in which the basic semantics/function of the noun category is at variance with its expected syntactic/distributional property. The derived adjectival form has exactly the same range of denotations as the original noun. For instance, the expression adjectival form used in the previous sentence just means ‘the form of an adjective’ (we could have written adjective form). The noun here serves not as an argument, the function of canonical nouns, but as an attribute, the canonical function of an adjective. Relational adjective formation is thus a way of bringing a noun into line with the grammar of the language so that it can serve as a syntactic modifier.

It is not uncommon to find that relational adjectives, and indeed some other types of denominal adjective, retain aspects of the morphosyntax of the nouns on which they are based. The base noun may itself be modified by a syntactic attributive modifier. For simplicity, and in an attempt to preserve descriptive neutrality, we will refer to the morphological operations which give rise to such adjectives as ‘wide scope affixation’. English examples include adjectives formed by suffixing -ed to a modified noun: [five-pointed] (star) or [short-sleeved] (shirt). Such denominal adjectives seem to belong to

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1Acknowledgements

2The principles governing the use and the subtleties of meaning of the various English constructions are complex and elusive, and it is not our aim to throw any light on these types; we present these examples simply to illustrate the general problem.
an intermediate lexical class: on the one hand, they function as syntactic modifiers, like other adjectives; and on the other hand, they head their own NPs, like nouns. This gives rise to a particular type of the so-called ‘mixed categories’ (the term of Lefebvre and Muysken 1988), what we can call ‘syntagmatic category mixing’. It is especially evident in languages in which adjectives agree with nouns: an adjective such as short would take the same agreement as it would take if it were modifying the noun sleeve, even though that noun does not appear as such as a syntactic terminal (see the Upper Sorbian examples in Section 2 below).

Mixed categories pose certain problems for the approach to word classes which relies on discrete lexical categories defined by binary features because the identification of word classes gives conflicting results within one and the same language. Our first goal in this paper is to suggest an alternative approach that does not depend on a single definitional criterion for a given class. In keeping with the typological observations of Croft (1991, 2001), <author> argues that a word’s category must be fractionated into semantic, syntactic (distributional and selectional) and morphological information. It is this intuition that we will make use of in this paper. We propose that the lexical entry of a lexeme generally has to record a variety of different types of information within the three broad categories of morphological form, syntactic distribution and semantic representation. In the case of standard lexical categories these properties match: for instance, a syntactic noun inflects like a noun and denotes a ‘thing’. An obvious way to encode this fact is to use the language of default inheritance: the syntax inherits noun-oriented properties from the semantic representation by default, and the morphology inherits noun-oriented properties from the syntactic representation by default. However, there is ample scope for mismatches to occur. We can have a mixture of properties, for example, when a syntactic noun inherits adjectival inflection. These mismatches can be represented in the inheritance hierarchy, but the inheritance links will be more complicated.

It is important to emphasize that our aim in this paper is not to argue for any particular model of syntax which could account for mixed categories, but rather to provide an adequate characterization of their lexical representations. Our proposal is not formulated within a specific syntactic framework and should in principle be compatible with various lexicalist (and perhaps some non-lexicalist) theories. The central point we wish to make is that an approach which is adequate to capture the full richness of lexical representations must provide sufficient information to enable a syntactic model to account for distributional mixing of categories. Discussions of lexical representations tend to assume that there is some way of drawing an inflection-derivation distinction and this will often have an impact on the way that lexical representations are presented. However, as will become clear from our (considerably simplified!) typology of lexical relatedness based on denominal adjectives, no such coherent distinction can be drawn. An enriched model of lexical representation is therefore required (cf. <author ref>).

Our second goal is to bring together cross-linguistic evidence for categorial mixing in the noun phrase. We will show that our approach to lexical representations predicts that various kinds of mismatch can occur and will present a typology of adjective-noun mismatch. This will allow us to include seemingly unrelated phenomena within a single space of possibilities. For instance, we will argue that the phenomenon of Suffixaufnahme (see Plank 1995b for an introduction to this notion) is, in fact, an instance of categorial mixing. The prototypical example of Suffixaufnahme is when a dependent noun inflected for, say, genitive case acquires the case marking of its head, yielding structures of the form
father-GEN-INSTR spear-INSTR ‘with father’s spear’. In such structures genitive case marked nouns agree with the head in case. As case marked elements such words are nouns, but as agreeing modifiers they are adjectives. However, nominal and adjec­tival properties are distributed differently from instances of wide scope affixation.

The paper is structured as follows. In Section 2 we summarize two conceptually distinct ways of tackling these issues, the ‘syntactic’ class of approaches and the ‘lexical’ class of approaches. Section 3 outlines various problematical phenomena for the syntactic approach. Section 4 introduces different types of categorial mixture in the noun phrase, related to syntax, semantics and morphology. Section 5 presents our lexicalist assumptions. A central feature of the analysis is the idea of a lexical type hierarchy that allows a class of words to inherit some of its properties from nouns and other properties from adjectives. This idea is common to a number of frameworks (e.g. Malouf’s (2000a,b) treatment of English gerunds within HPSG), but we enrich this style of analysis with explicit reference to details of lexical structure and argue for a factorization of lexical categories, appealing to Corbett’s (2007) notion of canonical properties. Section 6 presents a six-way typology of the kinds of denominal adjectives described in the literature. Section 7 concludes the paper.

2. Two approaches

In all analyses of mixed categories it is agreed that they share properties between two categories both of which can be heads. The head properties are either viewed as inherent properties of the lexemes themselves, or arise from functional heads which always accompany the lexical heads and provide their categorial features.3 There are essentially two types of approach to the problems induced by wide scope affixation of the kind mentioned in the previous section.

2.1. Dual projection approach

What Bresnan and Mugane (2006) call the ‘dual projection’ analysis is based on the idea of syntactic affixation or ‘morphological derivation in the syntax’ (Bresnan 1997). The intuition behind the dual projection analysis is that the word belonging to the mixed category, the lexical terminal (leaf), is dominated in phrase structure by two distinct syntactic nodes, each associated with its own set of categorial features. For the class of phenomena we are discussing this means that the process of adjectivization applies after the noun combines with its dependents, so the wide-scope adjectival morpheme is syntactically external to (‘commands’) the whole phrase. This means we must disregard the (perhaps apparent) word structure and treat the adjectival affix on the noun as an independent syntactic element which just happens to surface as an affix on the head noun. To illustrate this, we reproduce Corbett’s celebrated examples of possessive adjectives from Upper Sorbian (Slavic) (Corbett 1987: 300, 1995: 275):

3In all these cases we see what can intuitively be described as a kind of ‘head sharing’ (Bresnan, 1997: 6). We will avoid this term, however (and its near synonym ‘node sharing’) because of potential ambiguities over the interpretation of ‘share’: do two sets of categorial properties share a single syntactic node or do two syntactic nodes share a single lexical terminal?
Such examples clearly demonstrate the mixed nature of possessive adjectives. On the one hand, they have all the external syntax (see Haspelmath 1996: 52 for this term) and agreement patterns of a regular adjective. It is difficult to see the result as being a noun form, as strengthened by the fact that in Slavic they may also have a declension pattern which is closer to the standard adjectival pattern than the noun declension. On the other hand, they are still based on nouns, whose properties are in part ‘visible’ to the syntax (that is, they retain some of the internal syntax associated with the noun).

The syntactic affixation analysis is represented schematically in (2) for the first example.

(2) [mojeho bratr]=owe dźěći
    my.M.GEN.SG brother(M)-POSS.A-NOM.PL child.NOM.PL
    ‘my brother’s children’

Independently of how else the structure is represented in the syntax, the representation sketched in (2) analyses the possessive affix as a syntactically active object taking a phrase as its complement. This mode of analysis is comparable with a popular analysis of the English possessive phrasal affix (clitic) ‘s: [my brother]=’s children.

The representation in (2) has the advantage that it immediately accounts for the scope properties of the construction, by deploying well-known principles of constituent structure. The disadvantage is that, for some cases and some languages at least, it brings with it unwelcome assumptions about morphology: in Upper Sorbian bratrow(e) is a single morphophonological word, and -ow(e) does not behave in any other respects like a phrasal affix (much less an independent syntactic terminal). For some syntactic models, of course, this is irrelevant because even the common-or-garden inflection that induces no kind of morphosyntactic mismatch is treated as a kind of syntactic affixation, in which each inflection is an autonomous syntactic head and inflected words are constructed in the syntax by head movement.

Depending on the precise model of syntax (and morphology) this syntactic affixation approach can be instantiated in a variety of ways. The incorporation-based analysis of morphologically complex words was pioneered by the work of Baker (1988a) and has become the head-raising approach to morphology, in which syntactic principles account for dependencies such as predicate-argument structure, some aspects of element order and so on. For instance, in the case of a deverbal nominalization a verb will raise to a c-commanding (functional) nominal head. A summary of recent approaches to action nominals and subject nominalizations (of the type truck driver ~ a driver of trucks) can be found in Alexiadou, Haegeman, and Stavrou (2007), while the more morphological aspects

4Baker (1985) proposes an analysis of English gerunds in which the -ing morpheme is treated as a nominal head which lowers into the VP. Such lowering is not generally considered admissible in current models of Principles and Parameters syntax, however.
are handled by the principles of Distributed Morphology (Halle and Marantz 1993). See also Baker (1988b) for explicit discussion of where morphology might fit in to the original incorporation model.

As far as we can tell, very little attention has been devoted in the Principles and Parameters framework to the specific class of attributive modification phenomena that we are investigating here. The detailed survey of the Principles and Parameters literature on ‘DP-internal’ adjectives provided in Alexiadou et al. (2007: 283-394) contains only a few paragraphs of general discussion. Perhaps the most relevant recent work is the discussion of noun-headed compounds, especially English synthetic compounds, presented within the Distributed Morphology framework by Harley (2009), itself almost a unique essay on compounding in that framework. Given the lack of relevant literature we will not attempt to speculate on how our data might be interpreted in the Distributed Morphology/head-movement approach, but see <author ref> for a number of problems with Harley’s proposals.

An interesting attempt to combine the benefits of both syntactic and morphological approaches is given by Sadock (1991: 159f) in his Autolexical Syntax framework. In (3) we reproduce Sadock’s diagram for the phrase *stareje žonina drasta* ‘the old woman’s dress’, which is exactly parallel with our example *mojeho bratrowe dźeći*.

(3) 

\[ \text{NP[Nom]} \]

\[ \text{AP} \]

\[ \text{NP[GEN]} \]

\[ \text{A} \]

\[ \text{NP[N,F,SG]} \]

\[ \text{N[F,SG]} \]

\[ \text{star} \]

\[ \text{žon} \]

\[ \text{in} \]

\[ \text{drast} \]

\[ \text{star} \]

\[ \text{eje} \]

\[ \text{žon} \]

\[ \text{in} \]

\[ \text{a} \]

\[ \text{drast} \]

\[ \text{a} \]

\[ \text{A[-1]} \]

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‘inflectional affix’. Inflected words are assumed to have a constituent structure, with the inflectional stem being a zero-level category (lacking bar level features in these representations) and the inflected word being of bar level [-1]. In the syntactic representation inflection is indicated if at all by features on syntactic nodes. The morphological inflections themselves have no syntactic representation. In this respect Sadock’s model differs from a number of models of syntax, but not in ways that are relevant to the possessive adjective structure. The crucial point to note is that the possessive adjective suffix -in is represented both in the syntax and the morphology. In the morphological representation it is the morphological ‘head’ which creates the adjective from the noun. In the syntactic representation it is a zero-bar level head of the AP which includes the NP consisting of the concatenation of the adjective star- ‘old’ and the noun žon- ‘woman’.

Another class of instances in which a modifier appears to modify a noun within a more complex word occurs with noun incorporation and kindred constructions. A well-known example is that of West Greenlandic, in which a noun serving as a direct object can be ‘incorporated’ into one of about four hundred verbal affixes, creating a complex verb form. Sadock (1980, 1991) discusses cases such as (4), where the verbal affix means ‘have’.

(4) Hansi atatsi-nik qamute-qar-poq
    Hans.ABS one-INSTR.PL sled-HAVE-3SG.INDIC
‘Hans has one sled’

Example (4) is telling because the noun qamutit ‘sled’ is a plurale tantum noun when not incorporated, and the numeral ‘one’ agrees with it not only in the case it would assume if it were overtly realized in the syntax (the instrumental), but also for its lexically stipulated plural number. Sadock argues that such cases show that even though it is part of a word, the noun is syntactically realized, along with the inflectional features it would bear if it were an autonomous syntactic terminal. The modifier, so to speak, can ‘see into’ the complex verb form and gain access to the noun base. In Sadock’s model this can be represented by allowing the modification relation to take place over syntactic representations in which the noun is not incorporated into a verbal head.

The Upper Sorbian and West Greenlandic examples illustrate a clear mismatch between morphological form and the syntactic structure expected from such form. Sadock (1991: 60f) argues that the nature of such mismatches is restricted. He proposes two constraints which govern the way morphology and syntax match up. The Linearity Constraint requires elements to have the same linear order in both representations, while the Constructional Integrity Constraint requires constituent structure to be the same in both representations. Noun incorporation is a paradigm example of a violation of the Linearity Constraint which still respects Constructional Integrity (the incorporated noun combines in the morphology with the morphological exponent of the verb head that the noun is in syntactic construction with). English auxiliary clitics are paradigm examples of violation of Constructional Integrity without violation of Linearity: the auxiliary clitic forms a morphological unit with the previous phrase (usually the subject NP) even though it is part of the verbal complex, possibly even the head of the VP. What is not possible, it is claimed, is to have full-blown violations of both constraints by the same pair of representations (Sadock 1991: 163f).
In point of fact it is rather unclear how the Upper Sorbian construction fits into Sadock’s typology of mismatches. The representation in (3) respects the strongest version of the Linearity Constraint because the order of syntactic and morphological elements is identical. At the same time the representation respects the strongest form of Constructional Integrity because the adjectivizing suffix -in combines in the morphology with a noun stem corresponding to the head of the NP with which the syntactic correspondent of -in combines. Thus, there appears to be no mismatch at all. But in fact, the mismatch arises precisely because the suffixes -in/-ow create forms which have all the hallmarks of traditional words and yet, as seen from (3), the suffix seems to attach to an entire phrase. In effect, such mismatches are too subtle to be detected under Sadock’s typology.

It remains possible that some variant of the syntactic affixation approach would be appropriate for this language, though we very much doubt this (for criticism of syntactic approaches generally and a defense of a lexical, or ‘derivational’, approach to Upper Sorbian see Corbett 1987, 1995). However, we will show in the Section 3 that there exist cases of adjectival wide scope affixation to which a syntactic approach cannot easily apply.

2.2. Single projection approach

The ‘single projection’ (Bresnan and Mugane 2006) or ‘projection switching’ (Bresnan 1997) approach is based on lexical affixation. On such an account, the Upper Sorbian possessive adjectives with wide scope affixes such as bratrow are treated as single words in the syntax, projecting a standard constituent structure, as in (5):

(5) [mojeho [bratrowe]] dzęći
    my.M.GEN.SG brother(M).POSS.A.NOM.PL child.NOM.PL
    ‘my brother’s children’

Lexical affixation commits us to no undesirable assumptions about word structure, but the structure in (5) raises the fundamental question of how we can obtain the syntagmatic category mixing effects.

There are essentially two variants of answer. In the first case the mixed category is left underspecified, so that an action nominal, say, is neither noun nor verb but is non-distinct from either category. Category-neutralizing analyses along these lines can be found in Chomsky (1981), Aoun (1981), van Riemsdijk (1983) and Grimshaw (1991). In the second case it is dually specified, so that a single syntactic node is provided with categorial features of both categories. For instance, an action nominal is both a noun and a verb simultaneously and is dominated by a node with a label such as ‘N/V’, as in Lapointe’s (1993) dual head account. Lefebvre and Muysken (1988) present a similar analysis for Quechua nominalizations. Since Quechua, arguably, has no adjective category, these authors propose to label nominalizations as [+N, +V], a combination otherwise reserved for adjectives.

Malouf (2000a, b) treats the English gerunds (that is, a family of constructions headed by the -ing form of a verb) as mixed categories which inherit properties from two other categories. ‘Poss-ing’ gerunds as in His persuading Dick to finish on time would surprise us all present a classic instance of syntagmatic category mixing. The word form persuading is clearly a form of the verb persuade, taking a direct object and an infinitival clausal complement. But it also has a ‘genitive’ subject argument, as though it were a
noun. A genuine noun derived from persuade, namely, persuasion, cannot be used in this kind of construction because it lacks the argument structure properties of the verb: *His persuasion (of) Dick to finish on time. The word form persuading is therefore a noun for elements to its left and a verb for elements to its right. Malouf (2000a: 65) proposes the type hierarchy in (6) for English gerunds (where ‘p-noun/c-noun’ means ‘proper noun/common noun’):

(6) Type hierarchy for English deverbal mixed categories

Gerunds will have the syntactic distribution of nouns because they are a subtype of noun, but they will only inherit selectional properties of verbs, because they are not subtypes of verb. Instead, they are a subtype of the supertype relational, which includes verbs, adjectives and gerunds. In some ways this represents a prototypical instance of a ‘single projection’ analysis, in the sense that the word which shows the category mixing effects is effectively given two labels, one for each of the categories ‘noun’ and ‘relational’.

While this hierarchy seems to capture the intermediate status of gerunds adequately, it is not entirely clear how it can be re-formulated in such a way as to accommodate other types of transposition (the term of Beard 1995). As is explained in some detail in <author refs>, any major category can be transposed into any other major category. Verbs can be transposed into action nominals and participles (V ⇒ N, A respectively), nouns can be transposed into relational adjectives and predicative nouns, i.e. nouns functioning as the predicate of a finite clause (N ⇒ A, V respectively) and adjectives can be transposed into property nominalizations and predicate adjectives (A ⇒ N, V respectively). Action nominals (gerunds) do not have a privileged status with respect to the relation of transposition, yet Malouf’s hierarchy will make that mixed category unique. This has undesirable consequences when we consider the broader picture of transpositions. Given the hierarchy in (6) it is difficult to see how a deverbal participle will be represented except as a joint subtype of verb and adjective. But by Malouf’s interpretation of the hierarchy this should mean that participles universally have the syntactic distribution of both verbs and adjectives. This is because the types ‘adjective’, ‘verb’ etc. are essentially defined by distributional properties. And yet participles pattern just like action nominals in this regard: they have the external distribution of an adjective and the selectional properties of a verb. Worse, such a solution would fail to capture an asymmetry implicit in the notion of transposition, because there would be no representational way of distinguishing a V ⇒ A transposition (participle) from an A ⇒ V transposition (predicate adjective). Both types are found, for instance, in Chukchi: an adjective used attributively will agree at most in number and occasionally case with its head noun, while a predicate adjective agrees in number/person with the subject, just as an intransitive verb does, and is an instance of an A ⇒ V transposition.
From the perspective of our study, Malouf’s hierarchy would force us to posit a schema such as (6’), which would not distinguish property nominalizations from relational adjectives and which would falsely imply that relational adjectives typically have the same syntactic distribution as nouns.

(6’) Type hierarchy for relational adjectives (and deadjectival property nominalizations)

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  head
    /\    /
   /  \  /  \n noun /   \ relation
    /     /
   /     /
p-noun c-noun adjective verb

relation
property nominalization
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It is equally unclear how the hierarchy can account for different types of A/N hybrids within the same language. For instance, we will show later in the paper that Selkup has denominal adjectives and what we refer to as ‘adjectival representations of nouns’. Both types have the external distribution of an adjective and inherit certain properties of nouns, but they differ in terms of co-occurrence with possessors. One can of course account for this difference in syntax. For example, Malouf handles the differences between the Poss-Acc and the Poss-ing gerunds (Brown painting his daughter and Brown’s painting his daughter respectively) by additional lexical rules specifying the way in which the gerund combines with its subject. But the point is that this information cannot be expressed in the type hierarchy.

Bresnan (1997) and Bresnan and Mugane (2006) argue for a third type of approach in terms of the LFG notion of ‘extended head’. To understand this approach it is necessary to consider certain crucial aspects of LFG architecture. The most important of these is the partitioning of the syntactic representation of a phrase into its c-structure (constituent/phrase structure) and its f-structure (functional structure, in the sense of grammatical functions). Lexical specification on syntactic terminals and annotations on phrase structure rules provide instructions on how to construct f-structures for phrases. This means that information about the grammatical function structure of a phrase or clause can come from several places in the c-structure tree. In general, c-structures are built out of standard, X-bar theoretic, endocentric phrases. However, there are occasions when it is appropriate to posit heads which are not in the expected structural relation to their projections.

In simple terms the extended head is “the closest element higher up in the tree that functions like the f-structure head of Y” (Bresnan 2001: 132). The parade example is Kroeger’s (1993) analysis of Welsh ‘verb fronting’, as described by Bresnan (2001: 126f). In (7), Siôn saw the dragon, we see that the VP lacks a V head. However, all the crucial properties of that head, including its lexical meaning, are associated with the element in the position of the ‘I’ head, gwelodd. Those properties provide the verbal meaning (and its inflections) to the f-structure of the sentence as a whole, because the ‘I’ element is the head of that sentence. The VP node is required in the LFG analysis of (7) because it is required elsewhere in the grammar of the
language, and because the c-structure would wrongly project ‘dragon’ as a predicate nominal if the VP node were not there.

(7)  

The simplified f-structure for (7) is (8):

(8)  

The crucial point to observe about the diagram in (7) is that there is no V node as such, and therefore there is no sense in which two syntactic nodes are linked to a single terminal element. As Dalrymple (2001: 79) points out this corresponds to the situation of apparent ‘head movement’ in models which permit such transformations, but because of the way that c-structures/lexical structures are mapped to f-structure the required analysis falls out automatically (granted X-bar theoretic assumptions about c-structure).

Following Mugane (1997), Bresnan (1997) and Bresnan and Mugane (2006) analyse a particular sort of mixed category in the Bantu language Gĩkũyũ using the notion of extended head. Gĩkũyũ permits agentive nominals to be formed from verbs. In some cases these behave much like -er nominals in English and take complements in the manner of nouns so as to express the complement grammatical functions of the base verb (i.e. constructions akin to this bad slaughterer of goats). However, it is also possible to express verb complements and adjuncts as though they were part of the verb phrase to obtain construction types which are not possible in English:

(9) ŭũū mũ-thĩĩnj-i mbũri ŭũru  

Bresnan and Mugane analyse the agentive nominalization construction by positing a special type of argument structure operation as part of the derivation of the nominal. Normally, when a derivational process applies to a lexeme, say, deriving a noun from a verb, the verbal
argument structure properties are either inaccessible or are only indirectly accessible, as complements to the noun (having been ‘inherited’ by that noun; see Booij, 1988, for detailed discussion). However, in order to account for phrases such as (9) Bresnan and Mugane argue that the ‘verbal’ quality of the underlying base lexeme is retained. They represent this by means of a diacritic ‘v’ attached to the argument structure representation of the derived nominal:

(10) muthĩĩni: ‘agent-of<x, slaughter<x,y>,n’

The subscripts then trigger a special inverse function from f-structure representations to c-structures. Such inverse functions can be used to put constraints on the kinds of c-structures that can correspond to a given piece of f-structure. The ‘n’ subscript requires that the f-structure corresponding to the word be associated with a c-structure node labelled ‘NP’, in other words it states the default situation under which a noun in the c-structure corresponds to a nominal f-structure representation. The ‘v’ subscript requires that the f-structure corresponding to the word be associated with a c-structure node labelled ‘VP’. This means that the c-structure will exhibit category mixing, in that two differently labelled nodes will be constrained to map to the f-structure corresponding to the agentive nominal. The kind of tree envisaged is seen in (11):5

(11) NP
    /   
   N   VP
      /   
     agentive nominalization

The question now arises as to what kind of an analysis Bresnan and Mugane (2006) have proposed, a syntactic affixation analysis (that is ‘dual projection’ in their terms) or a lexical affixation analysis (‘single projection’). The answer appears to be ‘both and neither’. The analysis is a dual projection analysis in so far as the diacritic marking of argument structure representations licenses a VP node which can house verb-oriented complements and adjuncts. The analysis is a single projection analysis in the sense that the mixed lexical category itself is dominated by a single head in c-structure. The category mixing arises entirely by virtue of the optional diacritic mark on the a-structure representation. It is the presence of the ‘v/n’ diacritics in argument structure that distinguishes Gĩkũyũ, which permits structures of the form ‘a slaughterer goats badly’, from English, which does not.

5Rather puzzlingly, earlier in their presentation Bresnan and Mugane (p. 215) provide a version of this tree where the VP is headed by a V which, together with the N head, dominates the agentive nominal. This is reminiscent of a ‘lexical sharing’ analysis proposed for such phenomena as portmanteau prepositions in Romance languages in Wescoat (2002), but it is emphatically not what Bresnan and Mugane intend. The agentive nominal does not have two lexical heads, it has one extended noun head which maps to an f-structure that is also associated with a VP node, in much the same way that the f-structure correspondent of gwelodd in (7) maps to an f-structure which corresponds to a VP node. The difference is that the VP node in Welsh is required by general principles of Welsh syntax, whereas the VP node in (11) is required by virtue of the special diacritic ‘v’ marking in the derived argument structure of the agentive nominal.
The status of the diacritics is not entirely clear (see <author ref.> for a re-interpretation of them in broadly the terms sketched at the end of Bresnan’s (1997) article, and an extension to the problem of denominal adjectives). But for us the crucial point is that it is the enriched lexical representation (with the diacritics) which plays the central role in accounting for the category mixing effects.

The construction in (9) respects ‘phrasal coherence’: “all and only the post-head immediate constituents of VPs are possible post-head constituents of the mixed agentive nominalization phrase, and all and only the possible orderings of these VP constituents are possible orderings of the same constituents in the mixed agentive phrase” (Bresnan and Mugane 2006: 211).

Intuitively speaking, what this means is that the construction can remain verbal up to a certain point, and then can switch to being nominal, but it cannot then switch back again to being verbal once it has been transposed into a noun. In the analysis of Bresnan (1997), Bresnan and Mugane (2006), phrasal coherence results from two things: first, the nominalization reflects category mixing in that it includes reference to verbal as well as to nominal properties; second, the framework permits different properties of the lexical representation to map to different syntactic nodes in c-structure. They argue that phrasal coherence poses problems for a single projection approach, although it is a recurrent cross-linguistic feature of mixed categories of this sort, as is amply demonstrated, for instance, in the cross-linguistic survey of action nominalizations in Koptjevskaja-Tamm (1993) (see also Malouf, (2000a: 96ff.)). However, Malouf (2000a, Chapter 3) is a detailed defense of a different generalization, the Lexical Coherence Hypothesis, under which the phrasal coherence effects are the results of lexical rules which specify the default relations that subtend between, say, a verb and an action nominal. Malouf presents empirical arguments in favour of his approach based on generalizations over lexical representations and speaking against the Bresnan/Mugane approach in terms of constituent structure syntax.

In sum, the literature that addresses categorial mixing generally assumes that the mixing occurs either ‘in the syntax’, where two syntactic nodes correspond to one lexical item, or ‘in the lexicon/morphology’, where a single syntactic node has properties corresponding to both types of category. We will ultimately adopt the second type of solution but will argue for a far more elaborated model of lexical representation than that proposed by Bresnan and Mugane or by Malouf. Such elaborated lexical representations can readily be deployed in a framework such as LFG or any equivalent framework to account for the ‘phrasal coherence’ property of a given mixed category construction.

To begin with we will outline a number of reasons why the first type of solution, what we have called the ‘syntactic affixation’ class of analyses, will not always work.

3. Reasons for rejecting syntactic affixation (for some languages)

In some languages there may well be reasons for treating an adjective formative as a syntactically represented object taking syntactic scope over a nominal phrase. Arguably, the Hindi-Urdu ‘genitive’ postposition discussed below is just such an instance. However, not all cases can be handled in this fashion. In this section we show that syntactic affixation frameworks are insufficient to capture the full empirical richness of the adjective-noun relationship. We outline several reasons why we cannot assume that an adjective head scopes syntactically over the inner NP and identify several types of

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6The term is originally due to Malouf (2000a: 97).
construction that pose problems for (obvious interpretations of) a syntactic affixation analysis of wide scope affixes. However, it is important to emphasize that we are not arguing that our data disconfirm any syntactic approaches whatever to these phenomena. Rather, we are advancing a somewhat weaker, but true, claim, in denying that those data provide adequate prima facie evidence in favour of a syntactic affixation analysis over their lexicalist rivals.

3.1 Coordination

If a possessive element is introduced in the syntax with wide scope then we expect it to take scope over coordinated nouns and NPs. This is borne out by the Hindi-Urdu postpositions, for instance. Hindi (Urdu is essentially identical in relevant respects) has a possessive (‘genitive’) postposition *kaar* which cliticizes to the right edge of a NP to establish that phrase as the possessor. This postposition inflects exactly like an adjective, agreeing in number, gender and case (direct, oblique, and vocative) with the possessed noun head (Payne 1995: 286):

(12) [Raam aur Raanii] k-e bhaaiyõ
    Ram and Rani POSS-OBL.PL brother.OBL.PL
    ‘Ram and Rani’s brothers’

This can be compared to a popular representation of the English translation of (12), shown in (13):

(13) [Ram and Rani]’s brothers

As demonstrated in detail by Payne (1995), the Hindi *kaar* formative is not a derivational affix which creates an adjectival lexeme from a noun.

In general, genuinely adjectival affixes do not scope over coordinate structures. The Russian comitative construction provides an interesting apparent exception which proves this rule. Proper names, kin terms and some other animate nouns in Russian have the adjectival possessive forms:

(14) a. Ivan-ov-o detstvo
    Ivan-POSS.A-NEUT.NOM childhood(NEUT)
    ‘Ivan’s childhood’

b. mam-in-a kniga
    Mummy-POSS.A-F.NOM book(F)
    ‘Mummy’s book’

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7 The clitic postpositions of Hindi-Urdu and a number of other Indo-Aryan languages such as Punjabi represent a further strategy for turning a noun phrase into an attributive modifier with the same morphosyntax (here, agreement) as an adjective. Albanian and Rumanian have a similar device, but in the form of a cliticized preposition. In these languages the clitic adposition is often mislabelled as a kind of ‘genitive case’. In that connection it is worth noting that the constructions as a whole are homologous to the ‘a-of association’ construction in Bantu languages, which lack a case system altogether. See Koptjevskaja-Tamm (2003b: 660-665) for details.
The meaning of the Russian possessive adjective is much closer to the genitive case form of a noun than it is to a novel lexical item with enriched semantics. Indeed, examples in (14) are more or less synonymous with the construction in which Ivan and mama ‘Mummy’ appear as (generally postnominal) genitive case dependents: detstvo Ivan-a ‘childhood Ivan-GEN’ and kniga mam-y ‘book Mummy-GEN’, i.e. ‘Ivan’s childhood’ and ‘Mummy’s book’, respectively.

Turning now to coordination, the Russian examples in (15) are cited from Koptjevskaja-Tamm and Šmelëv (1994):


b. *Aljoša i Maš-in-y deti Alyosha and Masha-POSS.A-PL children

i.e. *[Aljoša i Maša]-in-y deti ‘Alyosha and Masha’s (joint) children’

c. Aljoša s Maš-ej Alyosha with Masha-INSTR ‘Alyosha and Masha’

d. Aljoš-in-y s Maš-ej deti Alyosha-POSS.A-PL with Masha-INSTR children ‘Alyosha and Masha’s (joint) children’

In (15a) we see the straightforward coordination of two denominal possessive adjectives by means of the coordinating conjunction i ‘and’. As seen from (15b) the possessive suffix -in- is unable to scope over the coordinated phrase. In (15c) we see the comitative coordination construction found with human referents, characteristic of Russian. The coordinated phrase is headed by the first noun which takes a ‘with’ phrase as a dependent (the complement of the preposition s ‘with’ is in the instrumental case). This comitative construction serves as the basis for (15d), but it is only the head noun of the comitative phrase that can take the possessive adjective suffix. Although examples such as (15d) illustrate an interesting problem for the relationship between syntactic structure and semantic structure they do not represent instances of phrasal affixation proper, because it would be impossible for the possessive suffix to take as its input a case-inflected noun form. But (15b) crucially shows that the Russian structure differs from phrasal affixation as represented in Hindi-Urdu and English.

Similarly, when we consider Upper Sorbian in which the possessive adjective suffix seems to take wide scope we find that it does not permit scoping over coordinate constructions. Thus, we could not construct phrases such as *[Hilža i Jan]-owe dźěći ‘Hilža and Jan’s children’ or (using nouns which would take the same adjectival suffix) *[Hilža i Mar]-in bratr ‘Hilža and Maria’s brother’ parallel to the Hindi-Urdu example in (12). Other languages we will discuss in Section 6 do not allow coordination of base nouns either.

The failure of adjectival morphology to scope over coordinate structures is extremely puzzling on any syntactically based account of syntagmatic category mixing, including the hybrid model of Sadock. If there is an adjective head, A, in the syntax and this head takes a
full NP as its complement, why can it not take a coordinated NP? So although Sadock’s analysis may well be appropriate for the Hindi-Urdu examples shown above, it is seriously compromised by the examples we have been discussing, including his own Upper Sorbian example.

3.2 Morpheme order

The next argument is similar to the one made by Malouf (2000a: 99f.) for deverbal nominalizations. In some cases we find that the relative surface linear ordering between the wide scope adjective affix and its ‘host’ NP does not necessarily mirror syntactic order and hence is not what would be predicted on syntactic grounds. In these constructions we obtain the semantic scope effects but they cannot be sensibly modelled in terms of syntactic constituency.

Georgian and Svan, two closely related Kartvelian languages, have proprietive adjectives with the surface morphosyntax of adjectives; for example, they show case agreement. Their meaning is roughly ‘with N, having N’. In Georgian the adjectivizing element is a suffix -ian. The noun base of the ian-suffixed adjectives can be modified as though the adjective were still a noun, giving rise to syntagmatic category mixing. The data are from Boeder (2005: 44-45), and Boeder and Schroeder (2000: 183):

(16) a. or ucnob-ian-i gant’oleba
   two unknown-PROP.A-NOM equation(NOM)
   ‘an equation with two unknowns’

b. tormeţ abaz-ian-ma cxvar-ma
twelve abazi-PROP.A-ERG sheep-ERG
   ‘a sheep worth twelve abazi [coins]’

c. tetr tm-ian-i ƙac-i
   white hair-PROP.A-NOM man-NOM
   ‘white-haired man’

In Svan a similar construction exists, except that the adjectivizing morpheme is a prefix, yet the modifiers of the denominal adjective still appear to its left:

(17) a. tvetne lu-patv mare
   white PROP.A-hair(NOM) man(NOM)
   ‘white-haired man’

b. püri ü(v)i la-ṭar gāc
cow GEN horn GEN PROP.A-handle(NOM) knife(NOM)
   ‘a knife with a handle made of a cow’s horn’

Georgian examples do not present apparent difficulty for syntactic affixation. A possible syntactic affixation analysis of Georgian proprietives can be represented as follows for (16c): [tetr tm]-ian-i ƙac-i. However, it is impossible to provide such bracketing for (17) to

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8Here ‘N’ stands for the semantic representation of the base noun. The proprietive is a fairly common category cross linguistically (it is especially well represented in Australia, for instance).
illustrate how the \textit{la-} prefix scopes over the whole phrase \textit{püri ü(v)i ţar} and \textit{tvetne patv}. These examples could, of course, be derived from an underlying structure in which the affix was placed externally to the whole phrase and was then moved by some syntactic or morphological process into the right place, but this would remove all motivation for the syntactic analysis in the first place.

We can sketch the kind of analysis for Svan we might expect on Sadock’s hybrid model. The structure is just like the Upper Sorbian case except that we do not have the troubling fact of an adjective agreeing with a possessor-marked noun as though it were in the genitive case. The crossing lines in (18) illustrate a violation of the Linearity Constraint. However, this is still comparatively minor in that the structure still respects the Constructional Integrity Constraint: the adjective suffix is associated with the head of the phrase to which it attaches in the syntax.

Although Sadock does not present any examples of precisely this structure, his model contains sufficient apparatus to handle them.

But another morpheme order effect related to the linearization of adjectival morphemes is seen in Tungusic languages. The proprietive adjectives in Evenki are productively derived from nouns with the suffix \textit{-či-}, for example \textit{saŋari-či} ‘with a hole’. However, the adjectival suffix is not always even the most peripheral element in the word form, leave alone the phrase, because it may be followed by diminutive and augmentative affixes that semantically modify the base noun (\textless\text{author_ref}\textgreater). This is shown in example (19).

(19) a. \textit{saŋari-či-ka:r}
\textit{hole-PROP.A-DIM}
‘with little holes’
b. xegdi dere-či-ke:ku:n
   big face-PROP.A-AUG
   ‘with a big face’

These constructions violate both relevant constraints in Sadock’s model and will be very
difficult to account for them in other syntactic affixation approaches, in that it is very hard
to see how they could be derived syntactically without appeal to a totally arbitrary series of
otherwise unmotivated reordering transformations.

3.3 The form of the dependent

The next argument is based on cases when there is no non-vacuous way in which the
adjectival affix can be thought of as syntactic, because the denominal adjective shows
category mixing even within its own phrase. The modifier it takes does not behave like a
regular modifier of a noun.

In another Tungusic language, Udihe, we find syntagmatic category mixing when a
proprietary adjective derived from a noun with the suffix -xi is modified by an adjective
which bears a semantic relationship to its base noun (<author_ref>). As seen in (20), this is
similar to regular modification.

(20) a. ic’a sita
    small  child
    ‘a small child’

b. ic’a sita-xi
    small  child-PROP.A
    ‘with a small child, having a small child’

The problem is illustrated in (21). Here, the affix -xi is suffixed to the noun igi ‘tail’ to
produce a proprietary adjective meaning ‘having a tail’. The base noun can be modified,
for instance, by the numeral ila ‘three’. As we might now expect, the affix -xi has semantic
scope over the whole phrase ila igi ‘three tails’, but in such a construction the numeral ila
can optionally appear in the instrumental case.

(21) ila / ila-zi                    igi-xi
    three / three-INSTR          tail-PROP.A
    ‘with three tails’

Now, this instrumental case form of the numeral is used exclusively to modify adjectival
words. It is rather as though English allowed structures such as *thrice-headed (dog) or
*quintuply-pointed (star) for three-headed, five-pointed. However, the instrumental case
form of the numeral cannot be used to modify an unaffixed (non-adjectival) noun:

(22) ila / *ila-zi                   igi
    three /three-INSTR              tail
    ‘three tails’
This means that we cannot assume that example (21) derives from some underlying structure of the form [i]la igr]xi, in which the -xi suffix takes syntactic scope over the numeral as well as the noun, because then there would be no well-formed source for the instrumental case marked alternative.9

The second problem is this. Adjectives in Udihe can be modified by adverbs of various kinds. This is seen in (23a), in which the adverb piam ‘through’ modifies a proprietive adjective siei ‘having a wound, wounded’. However, it is absolutely impossible for an adverb to modify a regular noun (23b). A relative clause of some kind would be needed to render the meaning in (23b).

(23) a. piam sie-xi
    through wound-PROP.A
    ‘with an exit wound’

    b. *piam sie
    through wound
    ‘exit wound’

Here, then, there is another mismatch between syntactic form and semantic scope which goes against the assumption that the proprietive marker is a phrasal suffix. In the Autolexical Syntax model, which is specifically designed to deal with morphosyntactic mismatches, a morphologically complex word generally has a morphological structure which maps to a syntactic terminal. For the cases of syntactic affixation we exceptionally permit a part of a word to project a syntactic head of its own, which can then take syntactic (and hence semantic) scope over a NP. Although this provides a convenient way of describing the wide scope effects, and although it has the additional benefit that it permits us to state simultaneously that the possessive adjective is itself a word and not a (genuine) phrase, it brings with it the assumption that in the syntax the affix will show all the properties of a regular syntactic head. But this will lead to difficulties with the constructions and example types discussed in this section. The main problem is that it is only in very selective respects that the morphologically complex word behaves as though it were also syntactically complex.

In sum, we have seen then that a number of instances of syntagmatic category mixing do not lend themselves to the syntactic affixation type of approach. First, syntactic affixation is unable to account for the failure of the relevant affixes to scope over coordinate structures. Second, the syntactic affixation account fails with cases in which the adjectival affixes are internal to other affixes, because the morphological structure does not mirror the putative syntactic structure. Third, there are languages in which we have modification of the base noun of a denominal adjective but the construction shows properties that are not found with ordinary modification of that noun. The approaches we have broadly labelled as ‘lexical affixation’ do not fall foul of the problems outlined in this section.

9In effect, this is the mirror image of the problem presented by West Greenlandic ‘modifier stranding’ cases such as (4) discussed above.
4. Categorial mixture in the noun phrase

Speaking very generally, mixed categories are lexical types that have some properties of the morphology, syntax or semantics of one category but other properties of the morphology, syntax or semantics of the other category. Precisely which properties they have and how they are realized are language-specific or even item-specific facts. In this section we present three parameters of variation in adjective-noun hybrids.

4.1. Semantics

The sense of our semantic parameter is that in some cases the morphology deriving adjectives from nouns adds content. For instance, the proprieative adjectives like the ones found in Kartvelian and Tungusic (see Section 3) add the semantic predicate HAVING(N). The added content is in part nominal, since it contains a noun denotation (N), and in part adjectival, since it includes a property-like predicate (‘having’). The latter involves, crucially, the relation ‘have’ and we have worded it as a participle so as to give it the flavour of a modifier.

We can see these two semantic aspects clearly in those languages where they are actually encoded by different morphemes. In such instances attributivization applies to well-formed case forms which serve as regular clause-level elements when they are not attributivized. In (24) we see the Turkish locative case marked noun sokak-ta ‘on the street’ (street-LOC), which has been turned into an attribute by means of the attributivizer -ki:

(24) sokak-ta-ki araba
    street-LOC-ATTR car
    ‘the car on the street’

In this instance the locative specifies the exact type of the semantic relation between the head and dependent noun, while -ki is ‘semantically empty’ in the sense that it only adds a modificational meaning. Similarly, a number of Daghestanian languages have special attributivizers compatible with most case forms of nouns. The resulting forms function as modifiers, but their exact meaning largely depends on the respective case. Below we present examples from Akhvakh cited here from Boguslavskaja (1989).

(25) a. žijali-La-še įeni
cow.PL-DAT-ATTR water
‘water for cows’

b. wacˉo-k’ena-še waša
brother-COM-ATTR boy
‘the boy with the brother’

c. qeda-Li-še qot’o
wall-LOC-ATTR plate
‘the plate on the wall’

In these examples derivation adds a clearly identifiable semantic predicate, e.g. ‘meant for N’ in (25a), ‘having N, with N’ in (25b), ‘located on N’ in (25c), and so on. The nature of this predicate is indicated by a case marker preceding the attributivizing morpheme.
Typically, where a language permits such attributive formation it is not restricted to case marked nouns. The Turkish -ki suffix attaches to some postpositional phrases and temporal and locative adverbs, and is even able to turn whole clauses into attributive modifiers (Schroeder 2000; Göksel and Kerslake 2005: 71-72). Another example is the Hungarian való analyzed as a morpheme attributivizing PPs by Laczkó (1995). It is simply a category-changing device, while the nature of the semantic relation between the denotation of head noun and the denotation of the object of postposition is indicated by the postposition itself.

On the other hand, some morphology appears not to change the conceptual content of the lexeme at all. This is the essence of transpositions: the process alters the morphosyntax (and arguably, categoriality) of the word but does not introduce any additional semantic predicate. With respect to adjective-noun hybrids, we will distinguish two semantic subtypes of transposition: possessive adjectives and relational adjectives. In contrast to, say, proprietary adjectives, it is not possible to discern any additional conceptual content in them.

We mentioned in Section 1 that English relational adjectives are roughly synonymous with NN compounds. As is well-known, the semantics of NN compounding is essentially empty: the meaning relation between the head noun $N_2$ and its modifier $N_1$ is such that ‘$N_2$ … bears some pragmatically defined relation to $N_1$,’ (Downing 1977). English NN compounds tend to acquire fixed uses, especially if they have a high textual frequency, giving rise to the impression that the construction itself expresses some kind of determinate meaning over and above the meaning of its parts (see Levi 1978 for a misguided attempt to establish a set of fixed meanings). However, this impression is misleading. Compounding is entirely productive in English and the meaning of new coinages can only be determined pragmatically. If a person uses a particular pen for signing cheques then they might call it their chequebook pen. If they own a pen which came as a free gift when they opened a new bank account then they might also call it their chequebook pen. There is nothing in the semantics of the compounding construction that can explain this. Even highly lexicalized compounds demonstrate that it is futile to look for a small fixed set of meanings which exhaust the semantics of the compounding construction. There is no way that we can derive the special meaning of elephant gun from elephant and gun. Likewise, in British English and its derivatives there is an expression speed camera denoting ‘roadside camera whose function is to take photos of vehicles which exceed the speed limit’. Only knowledge of the world (specifically of traffic regulations) will allow a speaker to derive this meaning, whether as an on-line nonce creation or as a conventionalized expression.

English relational adjectives seldom have a purely relational semantics, but often acquire additional nuances of meaning, or restrictions on meaning. For instance, when it refers literally to ‘wood’ (and is not used, for instance, in a metaphorical sense, as in wooden acting), the adjective wooden almost always means ‘made out of wood’. This restriction is lacking in NN compounds with wood as first member. A rare example of a pure ‘relational’ usage for an adjective in English is found in the expression prepositional phrase. The word prepositional here is effectively no more than the adjectival form of the noun preposition.

10 More recently, the term has begun to be superseded on roadside signs by a longer variant, which cannot be easily read if travelling at speed: police enforcement camera. This, if anything, is even more opaque than speed camera.
serving, therefore, as an attributive modifier (and hence no different in meaning from the noun itself, as we can see from the fully synonymous compound preposition phrase). However, we will see in Section 6 that in other languages relational adjectives are entirely productive and do not differ in meaning from English compounds.

The possessive adjective is subtly different from the relational adjective, in that the derivational process gives rise to an adjective which realizes essentially the same kinds of semantic functions as a genitive noun. English has possessive adjectives, as in Galilean revolution (revolution instigated by Galileo) or Jovian moon (moon of Jupiter), but such constructions are difficult to illustrate unambiguously because they are all but impossible to distinguish from relational adjectives. In other languages there are special attributive forms of nouns to indicate canonical possessive relations. We already introduced Russian and Upper Sorbian possessive adjectives and will provide more examples later (see Koptjevskaja-Tamm, 2002, 2003b, 2004, for a detailed survey).

The point is that possessive adjectives express the same kind of semantically indeterminate relation between two noun-like entities as the regular possessive construction. We assume here, following Barker (1995) and others, that the possessor and possessed are co-arguments in a two-place relationship. In inalienable possession the nature of this relation is unique and determined by the meaning of the head noun: John’s hand can only have one interpretation. In alienable possession the relationship between the possessor and the possessed is semantically unspecified and can be designated simply as ‘ℜ’ (cf. Kathol, 2002). For example, the rough (i.e. extensional) semantic representation for John’s book would be something like \( \exists x \exists y[[John(x) & book(y) \& ℜ(x,y)]] \), or perhaps, to reflect the fact that book is the syntactic and semantic head, \( \exists y.book(y) \& [((\exists x.John(x)) \rightarrow ℜ(x,y)] \). In the default case ℜ is interpreted as (legal) ownership, but many languages allow non-ownership readings based on a contextually established association between two entities.

The same is observed in possessive adjectives. For instance, the Russian example (14b) above has many interpretations and can mean ‘the book Mummy owns, wrote, is talking about, is doing the illustrations for, is writing a review of …’, etc. The point is that, unlike proprietive adjectives (and some other types), possessive and relational adjectives do not require the addition of a semantically non-empty predicate. Their denotation does not differ from the denotation of the base noun from which they are derived. From this point of view their semantics is purely nominal.

4.2. Syntax

The syntactic parameter has been already introduced. It refers to syntagmatic category mixing, i.e. the ability of the derived form to inherit distributional and selectional properties from two sources, as in the case of English gerunds or deverbal participles familiar from many European languages, which retain the argument structure of verbs but show the agreement morphosyntax and linear ordering of adjectives.

In principle, syntagmatic category mixing is independent of morphology (see also Bresnan and Mugane 2006: 221). For instance, we could imagine a language with no verbal inflectional morphology but in which arguments of nouns were marked by one preposition and arguments of verbs where marked by a different set of prepositions, and where, in addition, nouns took a special determiner. A language such as this could still display syntagmatic category mixing if, say, it had a non-finite construction headed by a nominal
determiner in which the subject argument were marked as though it were the argument of a noun while the object argument were marked as though it were the argument of the original verb. Schematically, from The girl write the letter we might get The write the letter of the girl. In practice, of course, most of the categorial mixing we observe is linked to morphology, as discussed in the next subsection.

Turning to denominal adjectives, some of them do not retain any nominal properties in terms of their syntax. For instance, we can find little syntactic evidence of nounhood in French relational adjectives or in the Russian possessive adjectives introduced in Section 3.1. In other languages denominal adjectives illustrate the phenomenon of syntagmatic category mixing by heading their own NP. At the same time, they behave like canonical adjectives. For instance, they have the typical word order privileges of adjectives, they agree with the head noun in the appropriate fashion and so on. We have seen Upper Sorbian possessive adjectives in Section 2.1. Another example is Tundra Nenets (Uralic, Samoyed) similitudinal adjectives in -rəxa/-r°xa with the meaning ‘similar to N’.

(26) par’id’en’a-q sarm’ik⁰-rəxa-x⁰h wen’ako-x⁰h
    black-PL wolf-SIM.A-DU dog-DU

‘(two) dogs (looking) like black wolves’

The similitudinal form exemplified in (26) cannot be analyzed as an oblique case because oblique nouns never function as prenominal modifiers in Tundra Nenets and because it has other distributional properties of an adjective. Adjectives in Nenets form a well-defined class with distinct syntactic and morphological behaviours (see Nikolaeva 2003) and agree with the noun head for number (and optionally for case). This agreement shows that the constructions have the expected external syntax of an adjective. However, the similitudinal adjective retains (some of) the properties of a base noun: the base noun from which the adjective is derived can serve as the head for genitives or attributive modifiers (adjectives) of its own and controls agreement on the latter. Moreover, it retains its potential to be a discourse referent. This is apparent from Upper Sorbian examples (1) above, where ‘brother’ and ‘teacher’ are clearly referential, but it can be shown to be true for Nenets, too. Similitudinal adjectives are compatible with the genitive possessor:

(27) numki⁰-q tu-r°xa
    star.GEN-PL fire-SIM.A

‘like the light of the stars’

If possessors (specifiers of NP/DP) encode referentiality, as is commonly assumed, the possessed noun tu ‘fire’ in (27) must be referential.

To account for syntagmatic category mixing, Malouf (1999) presents an alternative to Sadock’s analysis of noun incorporation in West Greenlandic, in which the denominal verb like the one exemplified in (4) above is effectively treated as a kind of mixed category. The mixing takes place at the level of argument structure in HPSG representations of the denominal verb. Malouf analyzes the external modification of incorporated nouns as the

11For instance, unlike oblique forms of nouns, it can function as a final predicate without a copula verb. Note, too, that the similitudinal suffix is attached to the noun root, not an inflected form. All these facts demonstrate that we are not dealing with a case of Suffixaufnahme here: the derived word is categorially an adjective, not a noun. In this respect Nenets differs crucially from Selkup, (Section 6e) or the more standard cases of Suffixaufnahme discussed in Section 6f.
result of inheritance by a verb of the ARG-ST attributes of both the verbal affix and the incorporated noun. Nominal modification is taken to be an ARG-ST operation: the modifier is a non-thematic oblique complement whose lexical representation is added to the (presumably unbounded) list of modifiers included in the COMPS list of the noun. At the same time, the semantic content of that modifier takes the semantic representation of the head noun as its value (Malouf 1999:57, Fig. 2). Thus, an ordinary noun phrase with an adjectival modifier such as small house will have a semantic representation along the lines of (28a). This will unify to give (28b), a representation of ‘small house’:

(28) a. 
\[
\begin{align*}
&\text{\textit{house}} \\
&\text{COMPS} \quad #2 \\
&\text{CONTENT} \quad #1 [\text{ARG} \text{\textit{house}\_rel}] \\
&\end{align*}
\]

\[
\begin{align*}
&\quad #2 \\
&\quad \text{\textit{small}} \\
&\quad \text{CONTENT} \quad #1 \text{\textit{small\_rel}} \\
&\end{align*}
\]

b. 
\[
\begin{align*}
&\text{\textit{small\_rel}} \\
&\text{\textit{ARG} \text{\textit{house}\_rel}} \\
&\end{align*}
\]

The noun in West Greenlandic takes an optional ergative case marked specifier (denoting a possessor) and that property, too, is inherited by the verb base (the verb affix has a VALENCE|SPR attribute which is normally empty but which can unify with the noun’s optional value VALENCE|SPR<NP[erg]>). By treating modification as a kind of argument structure operation and by permitting inheritance of argument structure (and specifiers) Malouf is able to place all the relevant information, including case and number properties, in the representation of the denominal verb form. He argues that such an account is superior in various respects to the Autolexical Syntax account offered by Sadock.

We may ask whether such a manoeuvre would in general suffice to analyse all the syntagmatically mixed denominal adjectives we have described, given that the most salient difference between the West Greenlandic case and our cases is simply that in our cases the resulting denominal word is an adjective, not a verb. For instance, we could say that the lexical representation for the adjective affix in a language such as Nenets or Upper Sorbian would have to be permitted to inherit the same array of COMP and SPR values from the noun as the West Greenlandic verb affixes. It is certainly possible that an approach along these lines might work, though we would need to be clear that the analysis was able to account for adjective-specific phrasal syntax in all those languages that demonstrate it. A single projection model of the denominal adjective will have to propose lexical rules which ensure an adequate description of the syntax of transpositions, though arguably this would be essentially an implementational issue.\(^{12}\)

\(^{12}\)Nick Evans has raised with us the interesting question of whether the mixed category constructions we discuss in this paper provide evidence that traditional X-bar theoretic assumptions about endocentric phrases are incorrect or oversimplified. In a way, that is the
4.3. Morphology

The third parameter of variation concerns morphology. The words responsible for the category mixing often have some of the morphological properties of one category and some of the morphological properties of the other category. For instance, a deverbal participle may inherit the tense or aspect morphology of the verb while also inflecting like an adjective, and in many languages a gerund is formed by taking a non-finite verb form and adding noun case suffixes to it. We can refer to this purely morphological type of mixing as ‘paradigmatic category mixing’. In some cases of paradigmatic category mixing there is little or no effect on the syntactic behaviour of the morphologically mixed word type. For instance, in Russian there is a morphological difference in the inflection of nouns and adjectives, but some nouns, such as nasekomoe ‘insect’ belong to the adjectival inflectional class. Nonetheless, such nouns remain nouns in (almost) all their syntactic properties.\(^\text{13}\) However, purely paradigmatic mixing without syntagmatic consequences is somewhat rare.

We will be considering one important aspect of paradigmatic category mixing here: is the derived category an inflected form of the base category or is it an instance of a new lexeme, and hence derivational? In terms of standard assumptions about morphology and its interfaces, this parameter of variation would not be independent of the other two parameters discussed in this section. If word formation is to be genuinely derivational then it should always create a new lexeme (a new self-standing entry in the dictionary) and that entails the addition of a new semantic predicate to the semantic representation of the base lexeme. The base lexeme from which a new lexeme is derived should be invisible to syntactic processes such as attributive modification (derivational morphology should give rise to syntactic ‘islands’, in other words).

Haspelmath’s (1996) early and important discussion of category mixing provided a rule-of-thumb characterization of the inflection/derivation divide. He points out that inflection is typically associated with exhaustively paradigmatic organization and productivity, while derivation is typically “irregular, defective and unproductive” (p. 47). However, these are not hard-and-fast properties so that the inflection/derivation distinction must allow for “gradience” and “fuzzy boundaries” and is represented as a “continuum”.\(^\text{14}\) Haspelmath then argues that regular and productive asemantic transpositions, such as the German active participle, constitute instances of category-changing inflection. Such a transposition is an inflected word form whose external syntax is different from that of the rest of the lexeme’s forms because the form’s class is different. On the other hand, the lexeme’s word class remains the same and this governs the internal syntax, which remains that of the original verb. He then proposes a statistical universal (p. 58) (what Bresnan and Mugane, 2006, call ‘Haspelmath’s Generalization’):

question that always motivated the extended head proposals of LFG. A proper answer to that question would require a separate study.

\(^\text{13}\)The one exception is when the noun is quantified by a paucal numeral, two, three, or four, when it appears in the genitive plural, like an adjective, rather than in the genitive singular like a noun would.

\(^\text{14}\) Taken literally this should imply some metric mapped onto a continuous space defined over the real numbers, but we find it difficult to see what exactly this might mean.
In words derived by *inflectional* word-class-changing morphology, the internal syntax of the base tends to be preserved.

In words derived by *derivational* word-class-changing morphology, the internal syntax of the base tends to be altered and assimilated to the internal syntax of primitive members of the derived word-class.

We agree with the basic thrust of these proposals, especially where we have regular and productive morphology, in the sense that it is necessary to separate out properties such as category-changing from other properties that might be associated with inflection. However, the inflection-derivation distinction is notoriously difficult to draw and the mixed categories we are discussing here represent one of the problems associated with that distinction. There are far too many patterns of lexical relatedness between canonical inflection and canonical derivation for us to analyse transpositions as just some kind of deviant variant of one or the other.

One problem with Haspelmath’s proposal is that there are good examples of very regular transpositions which acquire all the inflectional and/or syntactic properties of the derived category and thus fail to show any category mixing. Indeed, English nominalizations of the Poss-**ing** type show exactly this. On its event, action nominal reading, the phrase *the painting of Aristotle by Rembrandt* has the same internal syntax as *the portrait of Aristotle by Rembrandt*, and the same is true of nominalizations in -*nie/-ni/-ne* in Slavic languages, and it is even true of one set of uses of the *substantivierter Infinitiv* (nominalized infinitive) in German. On the other hand, some arguably derivational forms permit syntagmatic mixing, which effectively means that the internal syntax of the base lexeme has been preserved. As we show in Section 6, in many cases the process of adjectivization is derivational in the sense that it creates something like a new lexical entry, for instance, a word belonging to a different inflectional class from the base lexeme. The Upper Sorbian possessive adjectives in –**ow/-in** illustrate exactly this type. ‘Haspelmath’s Generalization’ therefore fails in both directions, except as a very general tendency.

In other cases the process might be inflectional in the sense that the morphology of the output patterns with the rest of the inflection for that base lexeme. For example, we will see in Section 6.5 that Selkup relational adjectives are actually part of the inflectional system of the language. Normally a process which creates an adjectival form of a noun without addition of a semantic predicate is what we would call a transposition. But in Selkup the relational adjectivizing suffix is in a paradigmatic relation to the case suffix series and hence is best regarded as inflection.

It can be argued that there are two types of inflection (Booij 1996). ‘Inherent inflection’ refers to inflection which specifies some grammatical property associated specifically with a given word class, such as number for nouns or tense for verbs. As such, inherent inflection is associated with the addition of a more-or-less well defined semantic component. It is to be contrasted with ‘contextual inflection’, a type of inflection which adds no such semantic content and is conditioned entirely by the grammatical context, for instance, accusative case marking on direct objects or adjectival agreement morphology. A straightforward example of inherent inflection is locative case morphology such as that found, for example, in many Uralic languages. Locative case adds meanings such as ‘in’ or
‘on the surface of’ or the like, which correspond to those of spatial adpositions in other languages. On the other hand, genitive case is an asemantic inflectional element in that it adds no discernible content to the semantic representation of a noun (not even the predicate ‘possessor’), in much the same way that the English preposition *of* has no conceptual meaning. Since the adjectivizing process in Selkup fails to add a semantic predicate and serves solely to represent the grammatical relation of attributive modification, it would fall under Booij’s definition of contextual inflection, a somewhat counterintuitive result, because we are not dealing here with some sort of agreement or government dependency.

The moral of this story is that descriptive categories such as ‘inflection/derivation’ are wholly inadequate to define the kinds of lexical relatedness that we are discussing here. Even the more nuanced categories such as ‘inherent/contextual inflection’ or ‘transposition’ are difficult to apply in some cases. Inflection can appear to have semantic effects so even if a process adds to the semantic representation we cannot guarantee that it will be derivational. Similarly, transpositions are processes which change word category (and are hence traditionally taken to be derivational) but which fail to add a semantic predicate and thus fail to create a new lexeme in this sense. Hence, there is no non-circular way of determining when asemantic category-changing morphosyntax is inflectional or derivational. Inflection and derivation are terms of convenience applied to a particular assemblage of commonly co-occurring properties, but there is no reason to force all types of lexical relatedness into one or the other category.

We believe that what is required in order to understand the types of construction we will examine is not a set of more-or-less traditional categories into which we have to shoehorn recalcitrant phenomena, but rather a clear statement of exactly what the construction involves. The fact that those component properties cut across traditional categories of description means either that those categories represent a misanalysis or that it is a mistake to treat those descriptive categories as non-intersecting.

5. Mixed categories and lexical representations

There are two main features of our proposal. First, the general approach we will adopt to analyze the internal structure of lexemes will appeal to the notion of inheritance hierarchies, following much work in the framework of HPSG. However, we will ground the hierarchies we propose by appeal to the notion of ‘canonical properties’ argued for by Corbett (2006, 2007) (on canonical properties of adjectives and nouns specifically, see <author refs>). We will start this section by discussing the basic ideas of the ‘canonical’ approach to the description of word classes.

Second, we propose a model of lexical representation which is somewhat more elaborated than that found in most accounts. The types of category mixing we will outline show that the enriched information is sometimes accessible to other words which the mixed category is in construction with.

5.1. Canonical word classes

In a number of theoretical approaches to word classes (which means most other current theoretical approaches) cross-categorial generalizations are captured by fractionating classes into features such as [±N, ±V] (as in Government-Binding theory, see Chomsky
1981) or [±Predicative, ±Transitive] (as in LFG, see Bresnan 2001). Baker (2003) has argued that the categories of noun and verb are universal. He applies traditional binary features [+/-N] and [+/-V] but invests them with some content: nouns bear a referential index understood as the syntactic representation of the 'criteria of identity', while verbs require a specifier (generally equated with a subject NP). The class of adjectives is also universal. Adjectives are defined by the negative specification of categorial features: they are [-N] and [-V] because they have no referential index, unlike nouns, and take no specifiers, unlike verbs. In this sense they are a default category and normally appear in syntactic environments where neither nouns nor verbs are likely to appear. Baker provides a variety of interesting arguments to support this categorization.

Under such analyses lexical classes are essentially defined by distribution, in keeping with the syntactic presupposition underlying them. In other words, when we ask whether a given word is a noun or an adjective we are asking whether it combines to form phrases in the manner of a noun or an adjective. However, in mixed category cases we cannot take for granted that we know 'the' class of a word. A mixed category then has an unexpected feature content. We saw that in a number of analyses such a mixed category arises by uniting two regular syntactic heads in a single morphological word. Combining two independent syntactic heads in this way can, in principle, be used to create mixed categories even when the categories themselves are defined by unary features, i.e. by simple labels ‘N’, ‘A’ and so on. This view is compatible with the dual projection approach discussed above and motivates it to a certain extent. It is also typical of most single projection analyses.

In contrast, we adopt the position that a word’s category must be fractionated into semantic, syntactic (distributional and selectional) and morphological information (<author refs>). This picture is similar to that proposed by a number of typologists, especially the kind espoused by Croft (1991, 2001). Croft argues that traditional syntactic categories are prototypical pairings of semantic types and propositional act functions. Semantic types are defined by several notional parameters and include objects, properties, and actions. Propositional act functions correspond roughly to constructions and include predication, reference, and modification. A prototype category is typologically unmarked with respect to the relevant construction. Object words prototypically serve for reference, property words prototypically serve for modification, and action words prototypically serve for predication. Across languages these associations are grammaticalized as unmarked nouns, unmarked adjectives and unmarked verbs, respectively. Non-prototypical associations of semantic types and propositional act functions also exist, but are structurally and behaviourally marked.

Malouf (2000a: 124ff.) provides an HPSG formalization of Croft’s proposal that lexical categories can be viewed in terms of greater or lesser prototypicality. He represents prototypical categories as default constraints on types. These constraints can be overridden by individual constraints on more specific types. For example, the default constraints on nouns look as follows (Malouf 2000a: 125):

\[\text{15 Dixon (2004) has also recently argued that all languages actually have a surface category of adjective (and, we must presume, all languages have a categorial distinction between nouns and verbs). But Dixon’s claim for adjective as a universal category has been questioned (see, for instance, Enfield 2004 and Spencer 2008) and it is probably fair to say that his (and Baker’s) is the minority view.}\]
The HEAD value indicates constructions in which the word can occur (the external distribution of the word), whereas the CONT(ent) attribute denotes the semantic type. According to (29), the lexical entry for a noun involves a pairing of the HEAD value *noun* and the content type object (*nom-obj*). The sign ‘/’ indicates that the constraint is violable, which ensures that some members of the class have more prototypical properties than others.

Unlike Croft and Malouf, we find little to recommend the notion of ‘prototype’ in this context. We have based our analysis on the concept of canonical categories in the sense of Corbett (2006, 2007), rather than following the customary line of speaking in terms of prototypes. One difference between a canonical property and a prototype is that a prototype has to exist. For instance, if we wish to claim that humans categorize the animal kingdom by appeal to notions such as ‘prototypical bird’ then some bird species (robin? sparrow? eagle?) has to be the prototype from which all other species deviate. Canonical objects, on the other hand, are not necessarily frequent and in fact there is no guarantee that anything like such a category does exist. It seems to us that talking of canonical properties is more appropriate for lexical classes because we do not want to commit ourselves to the existence of, say, some prototypical adjective in a language. Another difference is that prototypes may be ‘linguist-specific’, while canons are, at least in principle, indisputable and therefore easily compatible with various theoretical frameworks.

The usual characterizations of the canonical semantics of syntactic categories is that a canonical noun denotes a physical object, a canonical verb denotes a (transitive) event and a canonical adjective denotes a (gradable) property. In syntax a canonical noun is the head of a phrase denoting the argument of a predicate, a canonical verb is the head of a phrase used as a predicate and a canonical adjective is the head of an attributive modifier phrase. Morphological properties of nouns, verbs and adjectives are defined on a language-particular basis, of course. We can then re-configure Croft’s characterization in the following simplified terms making appeal to canonical properties:

**Semantics/function:**
- Canonical Nouns denote (countable physical) objects
- Canonical Adjectives denote (physical, directly perceptible) properties
- Canonical Verbs denote actions and situations

**Syntax/distribution:**
- Canonical Nouns head phrases denoting arguments of predicates.
- Canonical Adjectives head phrases used as attributive modifiers
- Canonical Verbs head phrases used as predicates.

In the canonical cases all the properties converge on a single category. When they line up, we have what <author> refers to as a Morpholexically Coherent Lexical Entry. The more canonical properties a word exhibits the more likely we are to achieve a consensus in labeling it.
However, a word can deviate from canonicity. Our approach easily allows for non-canonical cases which result in categorial mismatches and give rise to mixed lexical entries/classes. This fact is not surprising given that categoriality is defined by a cluster of parameters. Normally we tend to find the greatest variation in the expression of semantics: there are innumerable exceptions to the canonical semantics-to-structure mappings. Nouns can denote events, verbs can denote stative properties, adjectives can denote people, and so on. For instance, *party* is a noun denoting an event and *suffice* is a verb denoting a gradable property. Other languages have even greater variety of semantico-syntactic mismatch. This does not invalidate the semantic (sometimes called ‘notional’) basis of word categorization; it just means that there are plenty of deviations between semantics and syntax. However, it is abundantly clear that we frequently find mismatches between morphological and syntactic representations, too (<author refs>).

Mismatches can be represented by cross-classifying lexical categories in the form of an inheritance hierarchy, similar to that suggested by Malouf (2000a,b) for English gerunds (see also the analysis proposed by <author_ref> for Tungusic adjectives and nouns). But in order to account for various instances of categorial mixture, we have to make our inheritance hierarchy more sophisticated by being more explicit about lexical representations. This is discussed in the next subsection.

5.2. Lexical representations

Our more refined inheritance hierarchy should be designed to reflect the properties of words and the relations that hold between them. To represent lexical relatedness properly, the hierarchy has to make explicit the relationship between different attributes of a lexical entry. This means that we must fractionate constructions into their crucial components: how the morphology of the construction relates to the rest of the morphological system, what properties the construction appeals to in the syntax, what aspects of other syntactic constructions it inherits, what semantic contribution the construction makes, and so forth. That is precisely what is at issue in the case of the mixed categories. Once we have such a defining checklist of properties not much else needs to be said, since this constitutes the explicit characterization of the construction required of any generative grammatical description. This is one of the reasons for using default inheritance to characterize word categories and for taking lexical representations seriously.

We will assume a lexical entry to be an abstract object in the form (at least) of an ordered triple <FORM, SYN, SEM> (cf. Mel’čuk 1982, 2006). The FORM attribute holds information about the root of the lexeme and any idiosyncratic morphological information, such as inflection class, irregular forms and so on. The SYN(TAX) attribute indicates the argument structure of the word and its syntactic class, i.e. it will contain that information which is neither morphological nor semantic and which contributes to defining the distributional properties of the word. The SEM(ANTICS) attribute we take to be some kind of representation of lexico-conceptual structure along the lines of Jackendoff (1990) and many other references. For our current purposes the precise details of FORM and SEM are not very important.

In (30) we see the type hierarchy for non-verbal heads, i.e. canonical nouns and adjectives.
The core idea reflected in the hierarchy in (30) is as follows. Non-verbal heads can be thought of as objects or properties, based on distributional facts and the canonical semantics associated with the respective distribution. We reflect this by setting up the types \textit{obj\_rel} and \textit{prop\_rel}. The words of the \textit{prop\_rel} class denote properties, as shown in the SEM attribute. As mentioned above, their crucial syntactic characteristic is the ability to serve as attributive modifiers. The words of the \textit{obj\_rel} class denote objects. Their crucial syntactic property is the ability to take a specifier. Here we simply take `specifier` to be, broadly speaking, a syntactic satellite to a head which is not a complement or modifier and which (canonically) serves to fix referential properties. So `specifier` refers to elements such as (non-adjectival) determiners, quantifiers, possessors and the like, rather than adjective specifiers which serve to modify gradable properties in various ways. The intuition we wish to capture here is that canonical nouns have the potential to serve as referential expressions and therefore serve as arguments, while canonical adjectives do not.

So the SYN attribute for nouns has the value Spec[], which is intended to mean `has the potential to take a specifier` (together with any other distributional properties of the canonical noun in a given language). In this sense nouns that cannot take specifiers are not canonical. If a noun functions as a modifier itself, there is no need for it to denote an argument and be referentially anchored by a specifying element. When nouns are turned into adjectives some of them are no longer able to serve as (canonical) referring expressions, although in some cases it is still possible to cross-reference them in discourse. In semantico-syntactic terms this means that they are no longer compatible with specifiers though they may retain certain other nominal properties. For example, in English compounds of the type \textit{used car salesman} the noun \textit{car} has to lack specification, even though it is modified by an adjective \textit{used}.

The SYN attribute for adjectives has the value MOD(N), which is a shorthand for whatever is the appropriate representational device to express the notion of attributive modification of a head noun. A full analysis of this phenomenon would require a more articulated theory of the syntax of adjectives, which, we believe, is lacking. In effect, our MOD(N) feature is a label for such an analysis. But it is crucial that the derived adjectives we have been discussing inherit at least this property from the canonical adjective type.

By `N, A features` of FORM we simply mean the inflectional features common to (canonical) nouns and adjectives in particular languages, such as number, definiteness, case, possession (for nouns), and agreement features for adjectives.
With this picture in mind, in the next section we will present a descriptive taxonomy allowing us to distinguish the behaviour of fully canonical nouns and adjectives from the behaviour of denominal adjectives and adjective-like forms. The latter may show mixed category effects, in which some aspects of the base noun’s lexical representation remain transparent after the formation of the adjective. In some cases they may share properties from the same attribute of each canonical category.

6. **Six illustrative cases**

Given the discussion in the previous two sections, we will divide the adjective-noun hybrids into six groups on the basis of three parameters: (i) whether the formation of a new word adds a semantic predicate or not (see Section 4.1), (ii) whether it involves syntagmatic category mixing (see Section 4.2), and (iii) whether the morphology is essentially derivational or essentially inflectional (see Section 4.3). A simple six-way typology of category changing/mixing in denominal adjectives can be represented with mnemonic labels as in (31).

\[
\begin{align*}
\text{a. canonical derivation:} & \text{ derivation, no syntagmatic mixing, added semantic predicate} \\
\text{b. canonical transposition:} & \text{ derivation, no syntagmatic mixing, no added semantic predicate} \\
\text{c. mixed derivation:} & \text{ derivation, syntagmatic mixing, added semantic predicate} \\
\text{d. mixed transposition:} & \text{ derivation, syntagmatic mixing, no added semantic predicate} \\
\text{e. mixed inherent inflection:} & \text{ inflection, syntagmatic mixing, added semantic predicate} \\
\text{f. mixed contextual inflection:} & \text{ inflection, syntagmatic mixing, no added semantic predicate}
\end{align*}
\]

We will now illustrate this typology and discuss examples of each of these types in turn, paying particular attention to which nominal properties are retained by the attributive forms.

6.1. **Type a: Canonical derivation**

We start with two types of denominal adjective that do no involve any syntagmatic category mixing. In canonical derivation a single morphological process such as affixation gives rise to a derived adjective which is semantically more complex than the base noun. Such denominal adjective formation adds a clearly identifiable semantic predicate. This is the most familiar type of denominal adjetival process, in which derivational morphology creates a new lexeme (lexical entry) with additional semantic content, and the base noun is opaque to the morphosyntax. In (32) we provide a list of some of the more common types denominal adjetival derivational categories with additional semantic content.

\[\text{The two remaining logical possibilities correspond to garden-variety contextual/inherent inflection.}\]
Common derivational categories of denominal adjective

<table>
<thead>
<tr>
<th>Category</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Similitudinal</td>
<td>English <em>god-like</em>, <em>ellips-oid</em>, <em>boy-ish</em></td>
</tr>
<tr>
<td>Proprietary/ornative/comitative</td>
<td>Russian <em>glaz-ast-yj</em> ‘with (big) eyes’ &lt; <em>glaz</em> ‘eye’</td>
</tr>
<tr>
<td>Privative</td>
<td>Hungarian <em>ház-talan</em> ‘homeless’ &lt; <em>ház</em> ‘house, home’</td>
</tr>
<tr>
<td>Locative</td>
<td>Tundra Nenets <em>war°-xi°</em> ‘on the shore’ &lt; <em>war°</em> ‘shore’</td>
</tr>
<tr>
<td>Temporal</td>
<td>Yakut <em>sajïŋ-ŋï</em> ‘(in) summer’ (adjective) &lt; <em>sajïn</em> ‘summer’ (noun)</td>
</tr>
<tr>
<td>Origin</td>
<td>Georgian <em>sopl-ur-</em> ‘from the village’ &lt; <em>sopl</em> ‘village’</td>
</tr>
</tbody>
</table>

Adjectives of this type require definitions such as ‘similar to N (along some dimension)’, ‘having N’, ‘lacking N’, ‘located at N’, ‘occurring at/during N’, and so on. Any approach to lexical semantics will have to account for the fact that such adjectives systematically require a paraphrase which introduces an additional contentful predicate. Each adjective in (32) is derived from a noun by a single affix that indicates both the semantic nature of the added predicate and the change of the distributional class.

In (33) we show the type hierarchy for canonically derived adjectives, using similitudinal adjectives as an example.

Type hierarchy for canonical derivation

```
head

obj_rel

FORM: N features
SYN: Spec[], ...
SEM: [Object…]

prop_rel

FORM: A features
SYN: MOD(N)
SEM: [Property…]

Similitudinal

FORM: ...
SYN: ...
SEM: [Property SIMILAR_TO […]]
```

Adjectives derived by canonical derivation do not inherit any properties from the noun node other than the noun’s meaning (together with the adjectival meaning, as explained in Section 4.1), hence we have shown only one inheritance link from the base noun to the similitudinal adjective in (33).

6.2. Type b: Canonical transposition

The canonical derivational type can be contrasted with what we call ‘canonical noun-to-adjective transpositions’. In these transpositions there is no specific added semantic predicate, rather the meaning of the transposition simply consists in expressing some contextually determined relationship between the denotation of two nouns. There can be more or less any semantic or conceptual relationship between the attribute noun and the head noun. As discussed in Section 4.1, in this respect the constructions are no different
from English NN compounds or NP-of-NP constructions. The derived word simply acquires the morphosyntax of a modifier without changing its meaning as such.

Russian has more relational adjectives than English, although they are not fully productive either. Relational adjectives are normally derived with the suffix -n- and involve a canonical transposition from the noun class to adjective class without any additional semantics. As in English, Russian relational adjectives tend to get fixed functions, making them look like the true derived adjectives illustrated in the previous section. For instance, *sten-n-of stena ‘wall’ does not (usually) mean ‘having a wall, with a wall’ but ‘located on a wall’ (location); *zamoč-n-yj from zamok ‘lock’ means ‘used for a lock’ (function), *moloč-n-yj from moloko ‘milk’ means ‘made of milk’ (material) and so on. However, even with examples such as these we find alternative uses. For instance, moločnyj can occur in the following expressions:

(34) molоčnyj kombinat  ‘milk factory, dairy factory’
moločnyj produkt  ‘dairy produce, milk product’
moločnaja produkciya  ‘milk production’
moločnaja dieta  ‘milk diet (diary foods diet)’
moločnyj brat  ‘brother of one’s wetnurse’

Overall, then, the range of functions and uses of relational adjectives corresponds very closely to the range of functions and uses of modifying nouns in NN compounds (which are effectively absent in Russian). The relational adjective is simply a semantic noun used as an attributive modifier.

However, Russian relational adjectives are purely adjectival in the sense that the base noun does not retain any nominal syntactic properties. The ‘relational adjective + noun’ construction can usually be paraphrased by means of the construction in which the adjective is replaced by the genitive form of the base noun, or by a prepositional phrase headed by that noun. Thus, moloč-n-yj puding  ‘milk pudding’ means essentially puding iz moloka ‘pudding (made) from milk’. The postmodifier constructions have to be used whenever the modifying noun is itself modified. So (35a) can only have the meaning ‘milk pudding which is fresh’, not ‘pudding made from fresh milk’, cf. (35b):

(35) a. svež-ij  molоč-n-yj  puding
    fresh-M.NOM  milk.REL.A-M.NOM  pudding(M).NOM
    ‘fresh milk-pudding’

    svežij [moloč-n-yj puding]
    *[svežij moloč]-n-yj puding

b. puding  iz  svež-ego  molok-a
    pudding  from  fresh-GEN  milk-GEN
    ‘fresh-milk pudding’

In other words, the base noun of relational adjectives is opaque. The derived adjective behaves syntactically in all respects like an adjective.

As we saw in Section 3.1, Russian also has possessive adjectives. Possessive adjectives are generally formed using different sets of affixes from those used to form relational adjectives (-ov- or -in-). Russian does not reliably distinguish a possessor meaning as such,
as we have seen. The meaning of *mamina kniga* ‘Mummy’s book’ is no more restricted to possession sensu stricto (ownership) than is the English translation. The semantic difference between possessive and relational adjectives essentially follows from the meaning of the base noun. In Russian, it is often difficult to draw a clear distinction between possessive and relational adjectives. For instance, in the phrase *medvež'ja lapa* ‘bear’s paw’, we seem to have a possessive adjective derived from *medved* ‘bear’ while in *medvež'ja usluga* ‘a favour which does more harm than good’ we seem to have a relational adjective. However, as mentioned above, possessive adjective morphology in Russian is found principally with proper names and kin terms. Other nouns take different types of relational adjective suffixes. But it is precisely proper names and kin terms that denote entities which prototypically are capable of owning things or which (inalienably) possess body parts and so on. Thus, it seems that the choice of possessive over relational morphology is decided in part by whether or not the referent of the base noun can be thought of as a prototypical or, possibly, canonical possessor. In a sense, then, it is accidental that Russian has distinct morphology for possessive forms as opposed to purely relational adjectives. And in the case of animal names it seems best to think of the ‘possessive’ suffixes as effectively just a variant on the relational adjective suffixes.

Like relational adjectives, possessive adjectives in Russian do not have any syntactic noun properties. The relational/possessive adjective is then a transposition which has the morphosyntax of an adjective but retains the semantics of its base noun. The difference from the previous type is that the semantic attribute of the modifier does not contain an identifiable property-like semantic predicate such as HAVING(N), SIMILAR_TO(N) or the like. Instead it includes the underspecified relation \( R \), so that for a possessor ‘person’ and a possessed noun ‘noun’ we have \( y.noun(y) \& [(\exists x.person(x)) \ R(x,y)] \) (again, simplifying by assuming a purely extensional semantics). Thus, the semantic representation for a possessive adjective from a noun ‘person’ will be something along the lines of \( y.P(y) \& [(\exists x.person(x)) \ R(x,y)] \) (assuming that common nouns have the representation \( \lambda z.noun(z) \) of type P). The type hierarchy for Russian relational/possessive adjectives is shown below.

(36) Type hierarchy for canonical transposition

![Type hierarchy for canonical transposition](image)

17The range of person-denoting nouns which regularly and idiomatically take possessive adjective morphology differs from one Slavic language to another (see Corbett 1987 for a useful survey).
In (36) we can see that the relational/possessive adjective inherits the adjectival agreement features from the canonical property denoting word type. Relational adjectives in Russian are morphologically indistinguishable from ordinary adjectives, but possessive adjectives take somewhat different inflectional endings, so we have included a specification of that idiosyncratic inflectional class for the possessive subtype. The relational/possessive adjective has the canonical syntactic function of the adjectival word type, attributive modifier. However, it inherits its basic semantics from the node which defines the noun word type, while the adjectival (derived) category contributes no information whatever to the semantic representation, in contrast to canonical derivation illustrated in (33).

6.3. Type c: Mixed derivation

Tungusic proprietives represent type (31c) in our typology. Proprietives involve an added semantic predicate HAVING(N) and therefore create a special subtype of adjective related specifically to an individual base noun. As discussed in Section 3, in Udihe and Evenki proprietives are derived from virtually every noun by the suffixes -xi and -či, respectively (37a, b).

(37) a. Proprietives in Udihe
   sita ‘child’ sita-xi ‘with a child’
   igi ‘tail’ igi-xi ‘with the tail’
   woptä ‘lid’ woptä-xi ‘with a lid’

b. Proprietives in Evenki
   oro ‘reindeer’ oro-či ‘with a reindeer’
   gerbi ‘name’ gerbi-či ‘with the name, named’
   ŋinaki ‘dog’ ŋinaki-či ‘with a dog’

<author_ref> shows in detail that proprietives behave like regular adjectives as far as their external distribution is concerned. They occur anywhere where other property words (adjectives) occur: they function as attributive modifiers, secondary predicates and sometimes main predicates, but do not occur as independent arguments or adjuncts. Like regular adjectives, proprietives take attributive agreement in case and number in Evenki (though not in Udihe).

However, the base noun inherits some of the syntactic properties associated with modification and quantification from the class of nouns. It can head its own phrase and take a modifier or (38a) or an appositional phrase (38b).

(38) a. ic’a sita-xi a:nta Udihe
   small child-PROP woman
   ‘woman with a small child’

b. Tokko gerbi-či bira Evenki
   Tokko name-PROP river
   ‘the river named Tokko’
In Evenki, which has attributive agreement, the base noun controls optional number agreement on a stranded adjective. In (39) the proprietive agrees in case (the dative) with the noun it modifies, as is typical of other attributive adjectives. The underlying noun is in the plural, as indicated by the plural affix preceding the proprietive morpheme. This noun triggers plural agreement on its adjectival modifier *aja-l*.

(39) \[ \text{aja-l} \quad \text{oro-l-či-du} \quad \text{asi:-du} \]
\[ \text{good-PL} \quad \text{reindeer-PL-PROP.A-DAT} \quad \text{woman-DAT} \]
\[ \text{‘to the woman with good reindeer (PL)’} \]

Obviously, this property of the underlying noun is syntactically relevant, so we can conclude that in spite of being embedded by the proprietive morpheme, it remains active in syntax. Moreover the base noun stays referential, as is confirmed by the fact that it is available for cross-reference by anaphoric elements (see <author_ref>). This distribution of properties is shown below.

(40) Type hierarchy for Tungusic proprietive (‘mixed derivation’)

The hierarchy in (40) demonstrates that in mixed derivation both syntactic and semantic properties are inherited from two sources.

6.4 Type d: Mixed transpositions

Russian is not unique in distinguishing possessive and relational adjectives. Chukchi (Chukotko-Kamchatkan, also called ‘Chukchee’) has distinct morphology for deriving both relational and possessive adjectives and both types of adjective are fully productive (Koptjevskaja-Tamm 1995; Skorik 1961: 225-268 on possessive adjectives, 268-280 on relational adjectives; NB both these sections come in the ‘Nouns’ chapter of Skorik’s grammar). The possessive adjectives are formed with the suffix -(n)in(e)/(n)en(a) (for plural human possessors -rgine/-rgena) as in (41a), while the relational adjectives are formed with -kin(e)/-ken(a), as in (41b).
Possessive and relational adjectives are ‘true’ adjectives in the sense that they show attributive agreement with the head, as shown below.

Chukchi possessive adjectives are the principal way of expressing NP-internal possession in this language. Koptjevskaja-Tamm (1995) argues that the possessive and relational adjectives in Chukchi are actually a type of genitive case, though one which itself takes the morphosyntax of an attributive modifier, i.e. shows Suffixaufnahme. This goes against all current analyses of the Chukchi case system from the earliest descriptions of Bogoraz (1900) to Dunn’s (1999) descriptive grammar. Her arguments in favour of analyzing the adjective forms as genitives are that the morphology is very transparent and regular and that the meaning/function of the denominal adjectives is similar to that of genitives in other languages. But much of the behaviour she describes is what she calls ‘derivational’ (in fact, indicative of a transposition, at least in the case of relational adjectives) and she herself musters a good deal of evidence showing that the adjectival suffixes should not be treated as a kind of genitive case. Interestingly, Dunn (1999: 97f) does argue for a reanalysis of two nominal suffixes as spatial case markers, using the morphological criterion that the marker itself must be in complementary distribution with the core case markers, absolutive and ergative, and the syntactic criterion that the case-marked nominal must be able to function as an independent core argument or adjunct of a predication. The possessive/relational suffixes fail both tests, and Dunn (1999: 149) explicitly contradicts Koptjevskaja-Tamm’s claim that the possessive/relational suffixes are cases.

Important for us is that both possessive and relational adjectives allow their base nouns to be modified. Examples below from Skorik (1961: 394) show that they are compatible with numerals and that the numerals have been incorporated into the head noun they modify.  

---

18This, of course, only strengthens the claim that the affixed noun base retains noun properties, but it also introduces interesting complications which go beyond the scope of our discussion. It would be interesting to find examples from other languages involving modifier/specifier incorporation parallel to these Chukchi examples.
Like possessive adjectives in Russian, possessive adjectives in Chukchi tend to be used for kin relations, part-whole relations, ownership and other relations cross-linguistically described under the rubric of prototypical possession, but unlike Russian possessives, they are regularly found with inanimate nouns, too. The relational adjectives, however, are found only with inanimate nouns and are used for general pragmatically determined relations (but with some overlap with possessive adjectives, e.g. for part-whole relations). Inanimates then can take either the possessive suffix or the relational suffix. Skorik (1961: 268-9) offers the minimal pair reproduced in (44a, b):

(44) a. weem-in pəcʔəcʔən
   river-POSS.A current
   ‘the river(‘s) current’

b. weem-kine-t wəkwə-t
   river-REL.A-PL rock-PL
   ‘the rocks in the river’

Skorik (1961: 249, 268) explicitly states that with inanimates, possessive morphology entails inalienable possession (for us, a kind of canonical possession), while relational morphology entails alienable possession. On the other hand, animates seldom take relational adjective suffixes, even to express alienable possession. For them the possessive forms express both alienable and inalienable possession. Chukchi is then essentially like Russian: it has a possessive suffix for nouns which are prototypically able to own things, but possessive morphology has been co-opted for expressing a prototypically possessive relationship with respect to inanimates, namely, inalienable possession (particularly part-whole). We can therefore provide the general schema for possessive and relational adjectives which does not distinguish the two types, and hence is appropriate for those cases in which it is difficult to draw such a distinction.

In our view, both possessive and relational adjectives ultimately express the modification of a noun denotation by a construction crucially involving another noun. The semantic effect of the modification may be similar to that of a genitive marked dependent (in the case of possessive adjectives) or it may be similar to the pragmatically determined modification found in English NN compounds (in the case of relational adjectives). In this sense, too, Chukchi possessive and relational adjectives are like Russian possessive and relational adjectives. However, in Russian they do not show any syntagmatic category.
mixing, while in Chukchi they do. So Chukchi differs syntactically from Russian and behaves more like Upper Sorbian illustrated in Section 2. On the other hand, the mixed transposition is similar to the mixed derivational adjectives except that it is a transposition. The principal difference between the Tungusic proprietives and the possessive/relational adjectives in Chukchi is semantic: the proprietive construction introduces a HAVING(N) semantic predicate, which the possessive/relational adjectives merely introduce an underspecified semantic relation $\mathcal{R}$ between the head and dependent. This means that while in mixed derivation semantic properties are inherited from both the nominal and the adjectival source, in mixed transpositions the semantics is entirely nominal.

(45) Type hierarchy for Chukchi possessive/relational adjective (‘mixed transposition’)

Both in mixed derivation and mixed transposition the new word cannot readily be treated as an inflected form of the base word. The process is closer to derivation than to inflection. This makes proprietive and possessive/relational adjectives different from more clearly inflectional category mixing discussed in the following two subsections.

6.5. Type e: Mixed inherent inflection

In this subsection we discuss a Samoyedic (Uralic) language, Selkup, based on the data from Kuznecova, Xelimskij and Gruškina (1980 = KXG). Selkup has a great variety of morphological devices for creating transpositions from one lexical category to another, to the extent that Kuznecova et al. explicitly demarcate this aspect of the grammar in their description under the heading of representacija (‘representation’), following Smirnickij (1959). Here we concentrate on some of their examples of ‘adjectival representation of nouns’, that is, denominal forms of various types derived by suffixation. What we will see is that the adjectival representations of nouns, while fulfilling the canonical syntactic function of adjectives, namely, attributive modification, retain significant traces of their nominal past and behave in many respects like inflected forms of nouns.

We begin by describing Selkup nominal inflection. Selkup nouns share the general structure of Uralic nouns in having three suffix position slots, for number, possessor agreement and case. Number/possessor and possessor/case are often cumulated, but this fact will not play any role in our discussion. Selkup has singular, dual and plural number for nouns and for possessor agreement and in addition has distinct collective forms for nouns. It distinguishes the following case forms (the names reflect the canonical uses of
each case, of course): nominative, accusative, genitive, instrumental, caritive, translative, coordinative, dative-allative, illative, locative, elative, prolative, and vocative. The number forms for the unpossessed nominative form of the noun *qok* ‘leader’ are shown in (46) (KXG: 197):

(46) Selkup ‘leader’

<table>
<thead>
<tr>
<th>Case</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>singular</td>
<td><em>qok</em></td>
</tr>
<tr>
<td>dual</td>
<td><em>qoqqi</em></td>
</tr>
<tr>
<td>plural</td>
<td><em>qoːt</em></td>
</tr>
<tr>
<td>collective</td>
<td><em>qoːl’my</em></td>
</tr>
</tbody>
</table>

A typical example of a fully inflected noun is shown in (47) (constructed following KXG: 201):

(47) *qoː-iːnt-yt-kɔːlyk*

leader-PL-2PL.POSS-CARITIVE

‘without your (2+) leaders (2+)’

Adjectives fall into two morphological classes, *l’*-adjectives and non-*l’*-adjectives depending on whether they end in the formative *-l’* or not. Neither type inflects except (marginally) for comparative degree. Some adjectives are derived from nouns by means of various suffixes, usually containing *-l’*.

In addition, there are three synthetic ‘adjectival representations of nouns’, which KXG refer to as ‘relational’ (*otnositel’naja forma*), ‘co-ordinative’ (*koordinativnaja forma*), and locative (*lokativnaja forma*). The relational representation is formed by suffixing *-l’* to the second stem of the noun, while the similitudinal and locative representations are formed by means of a suffix which contains the *-l’* formative as a part (though this cannot easily be separated as a distinct affix). The glosses provided for the relational type make it clear that the semantic relationship between the relational form and the base noun is very general, as in English NN compounding. The gloss for the ‘co-ordinative’ type is (p. 193) “... corresponding to something/someone, identical to something/someone in size or some other property”, for instance, *alako-ššal’* ‘the size of a boat, comparable with a boat in some respect’ derived from *alako* ‘boat’. We take this formation to be a kind of (perhaps semantically restricted) similitudinal form. The locative form is semantically self-explanatory.

(48) Adjectival representations of Selkup nouns

<table>
<thead>
<tr>
<th>Type</th>
<th>Form</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>relational representation</td>
<td><em>kana-l’</em></td>
<td>‘dog’s, related to dogs’</td>
</tr>
<tr>
<td>similitudinal representation</td>
<td><em>alako-ššal’</em></td>
<td>‘similar to a boat’</td>
</tr>
<tr>
<td>locative representation</td>
<td><em>mɔːt-qi’l’</em></td>
<td>‘located in the/a house’</td>
</tr>
</tbody>
</table>

KXG make a clear formal distinction between adjectival representations of nouns and simple denominal adjectives. Both only function as modifiers, but adjectival representations are analyzed as part of the nominal paradigm and KXG explicitly exclude adjectival representations from the class of adjectives proper (p. 265). The crucial difference is that, unlike true adjectives, adjectival representations of nouns take nominal possessive inflections. Thus, in addition to the relational form of the unpossessed noun
*qaqly* ‘sledge’, *qaqlyl’*pertaining to a sledge’, we have forms such as *qaqlynl’*pertaining to our.DU sledge’ and *qaqlyntytyl’*pertaining to their.PL sledge’. Similarly, in addition to the form *qaqlo:qyl’*located in the sledge’ we have *qaqlo:gyntytyl’*located in our.PL sledge’. In (49a) we see the similitudinal suffix attached to a noun which is modified by an adjective, and in (49b) we see it attached to a noun bearing possessor agreement morphology doubled by a genitive pronominial (cf. 50b) (KXG: 193):

(49)  

(a)  

worky alako-ššal’ anty  
large boat-SIM.A canoe  
‘canoe similar to a large boat’

(b)  

mat pra-ny-šal’ qum  
I.GEN size-1SG-SIM.A man  
‘man of my size (lit. man similar to my size)’ (KXG: 194)

A simple denominal adjective is illustrated by the Selkup proprietive construction, formed by suffixing -symyl’ to a noun base. This has essentially the same properties as the Tungusic proprietives already discussed. The proprietive suffix can attach to a noun which is itself modified by an adjective (50a). However, unlike the three adjectival representations it cannot attach to a noun which bears possessor agreement (50b):

(50)  

(a)  

onty mɔ:t-symyl’ qum  
own house-PROP.A man  
‘man with (his) own house’

(b)  

(*)tapyn *mɔ:t-ty-symyl’ qum  
(he.GEN) house-3SG-PROP.A man  
‘man with his (own) house’ (KXG: 191)

Example (50b) is ungrammatical whether or not the possessor agreement is doubled by an overt genitive case pronoun and therefore contrasts with (49b).

A further intriguing observation is that the suffixes of three adjectival representations are incompatible with case markers. Now, in the case of the locative representation, this is not surprising, given the meaning. It is worth observing that the locative adjectival suffix -qul’ is effectively the locative case suffix -qun further suffixed by the adjectival -l’ element. However, it remains puzzling that the relational and similitudinal suffixes should be incompatible with at least the meaningful case markers, given that they combine with possessor inflection. In other words, it is not difficult to conjure up meanings for the relational adjectives which would include cases. For instance, KXG: 191 cite the example *ky:mylyl’ kyr ‘bloody wound’ from kəm/ky:my- ‘blood’. There is no obvious reason why we should not see an example derived from the caritive case (in -kɔ:lyk) of this noun to give something such as *ky:mykɔ:lykyd’ kyr ‘bloodless wound’, but such constructions seem to be unattested. In the same way it is unclear why we cannot have forms translatable as ‘similar to with a knife (instrumental)’ or ‘similar to at the river (locative)’ but they are impossible. In other words, the relational/similitudinal adjective suffix is not only compatible with
inflected (possessive) forms of lexemes, it is also in paradigmatic opposition to case suffixes, occurring in the same slot where a case suffix would be expected.\textsuperscript{20}

Given that the three suffixes of the adjectival representations of nouns are in complementary distribution with the case markers, the most economical way of describing the Selkup nominal system is to say that they are actually in a paradigmatic opposition to those case markers, that is, effectively to define them as a kind of case inflection.\textsuperscript{21} This also follows from the fact that the three types of adjectival representation can apply to nouns inflected for possessor agreement (a form of contextual inflection in Booij’s terms). It is, admittedly, unusual for affixes with such different morphosyntactic functions to be allotted to the same position class slot in nominal inflection, but comparable phenomena are fairly common in verb morphology, where we may find a pronominal agreement marker in a position normally occupied by aspect markers, or a polarity marker in a position normally occupied by subject markers. The point is that such constructions in Selkup behave morphologically as though they were part of the inflectional system and not a kind of derivation such as that exemplified by proprietary adjectives, which create a new lexeme in its own right.

Applying the inheritance hierarchy to Selkup, the similitudinal representation bears the same set of inflection-related properties as a regular noun. Where it differs from a noun is in having a property-related semantic predicate and the argument structure of an attributive modifier.

\begin{equation}
\text{(51) Type hierarchy for Selkup similitudinal adjectives (‘mixed inherent inflection’)}
\end{equation}

\begin{center}
\begin{tikzpicture}
  \node (head) {head};
  \node (noun) [below left of=head] {noun};
  \node (adjective) [below right of=head] {adjective};
  \node (obj_rel) [below of=noun] {obj\_rel};
  \node (prop_rel) [below of=adjective] {prop\_rel};
  \draw (head) -- (noun);
  \draw (head) -- (adjective);
  \draw (noun) -- (obj_rel);
  \draw (adjective) -- (prop_rel);

  \node at (noun) [below] {\textbf{FORM:} (N features)};
  \node at (noun) [below] {\textbf{SYN:} Spec[], …};
  \node at (noun) [below] {\textbf{SEM:} \{Object\_NOUN\}};

  \node at (adjective) [below] {\textbf{FORM:} A features};
  \node at (adjective) [below] {\textbf{SYN:} MOD(N)};
  \node at (adjective) [below] {\textbf{SEM:} \{Property\ldots\}};

  \node at (similitudinal) [below of=head] {Similitudinal};
  \node at (similitudinal) [below] {\textbf{FORM:} [Case:Sim] [Num:undefined]};
  \node at (similitudinal) [below] {\textbf{SYN:} …};
  \node at (similitudinal) [below] {\textbf{SEM:} \{Property \text{SIMILAR\_TO} […]\}};
\end{tikzpicture}
\end{center}

\textsuperscript{20}Curiously, the adjectival representation does not seem to be compatible with number marking, either, even though number and possessor agreement are sometimes fused in the paradigm. We have no explanation for this.

\textsuperscript{21}Interestingly, Kiefer (1987), discussing the complex question of how many case forms there are in Hungarian, adopts the criterion that a suffix is a case suffix if and only if it can attach to an inflected form of the noun, which in Hungarian includes, of course, a noun inflected for possessor agreement.
In (51) we see that Selkup similitudinal adjectives inherit in a more complex fashion than the Tungusic (and Selkup) proprietive adjectives. They inherit morphological features from the base noun, except that the case value is specified, with the result that the similitudinal adjective form is in complementary distribution with other case forms and hence cannot inflect for case. At the same time, such adjectives do not inflect for nominal number. However, they do inflect for possessor agreement and this fact is inherited from the obj_rel FORM node. The syntactic properties of similitudinal adjectives are mixed: from the noun base the adjective inherits the possibility of occurring with specifiers (for instance, possessors). From the adjective node it inherits the attributive modifier grammatical function. Semantically, too, the construction is mixed. By inheritance from the adjective node it has the ontological category of ‘property’, but the construction is so defined that the specific property in question incorporates the semantics of the base noun. Similitudinal adjectivization adds semantic content to the noun representation, creating a representation of the form SIMILAR_TO(N). This semantics means that such a word denotes a property as well as denoting an object. For this reason it will contract a particular set of relations to other property-denoting words (i.e. adjectives) in the Selkup lexicon. Since the similitudinal representation involves the addition of a semantic predicate, it has to be treated as an instance of Booij’s inherent inflection and not contextual inflection.

The relational representation is somewhat different. Here we have an attributive adjective form of the noun with the same kinds of functions as the genitive case. The relational adjective morphology is integrated, in effect, into the case marking morphology. Moreover, to a certain extent we can say that the relational adjective form is even integrated into the inflectionally defined morphosyntax. XXG: 192 note that there are certain verbs which select that form of the noun as their subcategorizing complement, e.g. peːryqo ‘look for’ (qomtä-lʹ peːrusa ‘he was looking for (the) money’) and miršyttqo ‘work (piece of wood) with an axe’ (narapo-lʹ miršyttak ‘I am making a pole’). Finally, the relational adjective formation process has no effect on the semantic interpretation of the noun (and, indeed, in this respect it could be said to contrast sharply with case forms such as the spatial cases or the caritive (‘without/lacking N’), which have clearly defined default interpretations. This type rather represents ‘mixed contextual inflection’, and we will see more examples in the next subsection.

6.6. Type f: Mixed contextual inflection

In Selkup we have treated the similitudinal form as a kind of unexpected case suffix, which, like ‘semantic cases’ generally, is best thought of as inherent inflection, adding a semantic predicate in the manner of a derivational suffix. However, there are languages in which a noun marked by the genitive case can function as an attributive modifier sharing agreement properties with other attributes. Indeed, this phenomenon is rather well-known since it constitutes the core case of Suffixaufnahme (Plank 1995b), in which a case-marked noun assumes a second case marker. As we mentioned in the introduction, the prototypical instances of Suffixaufnahme are found when a dependent noun in the genitive acquires additionally the case marker of its head noun. However, we will argue that it is best to generalize this to situations in which a genitive-marked noun is treated morphosyntactically as an adjectival modifier.

We will consider instances of agreeing genitives reported in Daghestanian languages (Boguslavskaja 1995; Kibrik 1995) and Central Cushitic languages (Hetzron 1995). The
inflecting genitive marks the gender and/or number of the possessum. It is somewhat different from the usual Suffixaufnahme examples because here the genitive-marked noun looks to all intents and purposes like an adjective. A particularly interesting variant on this theme is shown in languages which distinguish normally-used adjectives from so-called ‘restricted’ adjectives, in which some notion of contrast is involved (‘the hot water, not the cold water’). This distinction is shared by genitives in a number of these languages, as illustrated for a Daghestanian language Akhvakh in (49) (Boguslavskaja 1995: 236; subscripted Roman numerals indicate gender/agreement classes):\(^{22}\)

(52) a. dada jači
dad\(_1\).GEN.SG sister\(_2\).NOM.SG

‘father’s sister’

b. haje gude dada-je jači
it is father\(_1\)-RGEN\(_1\).SG sister\(_2\).NOM.SG

‘It is father’s sister (not mother’s)’

c. haje gude dada-we wači
it is father\(_1\)-RGEN\(_1\).SG brother\(_1\).NOM.SG

‘It is father’s brother’

In (52) we can see that the form of the restrictive genitive suffix on ‘father’, -je/-we is conditioned by the gender of the head noun.

Similarly, Hetzron (1995: 326) reports an agreeing genitive construction in Awngi, a Central Cushitic language. Awngi nouns inflect for number and a variety of cases and have masculine or feminine gender (distinguished in the singular only). Attributive adjectives agree in number, gender and case. The genitive inflection exists in masculine, feminine and plural forms, agreeing with the possessum:

(53) a. murí-w aqí
village-GEN(M) man(M)

‘the man of the village’

b. murí-t yuna
village-GEN(F) woman(F)

‘the woman of the village’

c. murí-kʷ aq(ká)/yunayúná
village-GEN(PL) men(PL)/women(PL)

‘the men/women of the village’

This agreeing genitive form then takes on the case endings of a case marked possessum:

(54) wolijí-w-des aqi-w-des Ṯen-des
old-GEN(M)-ABL man-GEN(M)-ABL house(M)-ABL

‘from the old man’s house’

\(^{22}\)Tsakhur exhibits a similar construction, though it is not so clear that we can regard the possessive marker on the possessor noun as a genitive case.
Noticeable in example (54) is the fact that the other case suffixes (which include accusative, dative, ablative, directive ‘towards’, adverbial ‘in the manner of’ and invocative ‘for the sake of’) all follow the genitive suffix. For this reason it might seem that the genitive was really an adjectivizing element rather than a noun suffix. However, Hetzron (1995: 327-329) adduces a variety of properties of the agreeing genitive, showing that the genitive form is essentially a noun, not an adjective. For instance, the construction is recursive and when a genitive modifies a noun which itself is in the genitive, the first noun agrees with the second in case. This is shown somewhat spectacularly in example (55):

(55) gud-a-w-skʷ-da ɣuna-w-skʷ-da
    good-F-GEN(M)-GEN(PL)-LOC woman(F)-GEN(M)-GEN(PL)-LOC
    čənkút-skʷ-da ḡən-škʷ-da
    nice-GEN(PL)-LOC house(M)-GEN(PL)-LOC
    wodel-ká-da əbjél-ká-da
    large-PL-LOC doorway-PL-LOC
' in the large doorways of the nice house of the good woman’

In Figure 1 we reproduce Hetzron’s (1995: 327) illustration of the pattern of agreement dependencies.

/Figure 1 here/

Perhaps most compellingly, the genitive marker triggers the same sort of agreement as on other nouns in number, gender and case, as seen in (55).

In the Akhvakh and Awngi examples we see particularly clear instances in which a genitive-case marked noun is effectively treated morphosyntactically as though it were an adjective. We thus have a meaning-neutral correlate to the Selkup similitudinal adjective and the last of our six types of construction. Again, the fact that the construction is being used essentially to permit a noun to modify another noun attributively means that we have category mixing of the kind seen in the other types of denominal modifier. However, in this case the category mixing is precisely what we would expect, since the agreeing modifiers are themselves nothing but inflected forms of the noun and not in any obvious sense derived adjectives.
Type hierarchy for agreeing genitives (‘mixed contextual inflection with Suffixaufnahme’)

This type hierarchy reflects the fact that agreeing genitives are essentially nouns (object-denoting words) used in a modifying function.

7. Conclusion: Factorizing lexical categories

The central focus of this paper has been attributive adjectives in their relationship to nouns. Many languages have productive morphology turning nouns into adjectives, i.e. words whose grammatical function is to act as an attributive modifier to a nominal head. In some cases the denominal adjective retains a number of nominal properties so that it may even take noun-oriented modifiers and specifiers, whilst still itself serving as an attributive modifier. This gives rise to the appearance of an adjective being formed on a NP, not just a noun. In such cases the adjective affix seems to attach to a whole phrase. It is rather difficult to determine just what the lexical category of such adjectives is, if syntactic distribution is the only diagnostic criterion.

We have identified a series of constructions for allowing a noun to modify another noun by assuming some aspects of the form of an adjective and showed a number of problems with the purely syntactic accounts of denominal mixed categories. First, we noted that in some languages the morphology which derives the adjective is bound to the noun and cannot take wide scope in coordinated constructions. Second, we noted that the order of affixation sometimes fails to match the implied semantico-syntactic ordering. Finally, we pointed to occasional instances of ‘mixed’ denominal adjectives in which the adjective could be modified either as though it were still the base noun, or as a genuine adjective. If a construction shows any of these properties, this indicates that we should regard the derived form as a word exhibiting lexical integrity. These constructions cannot be treated as instances of phrasal affixation and hence cannot be handled efficiently as purely syntactic constructions. Rather, we need to accept that languages permit the formation of lexical
categories which have properties intermediate between those of canonical nouns and canonical adjectives.

To some extent the problem relates to theories of phrase structure. A mixed category may behave as though it were the head of one lexical category to its left (e.g. a NP or DP) and a different lexical category to its right (e.g. a VP). Alternatively, it may behave as though it were c-commanded by functional elements proper to one category (e.g. D elements), while itself c-commanding elements proper to a different category (e.g. complements to a V head). Depending on one’s approach to phrase structure such phenomena may be more or less troublesome.

On the other hand, part of the problem of syntagmatic category mixing has to do with the dependencies between words and phrases rather than their linear or dominance relations. In many cases the answer lies in the nature of lexical representations themselves: what kind of information is provided in a lexical representation and how is that information accessible to other words?\(^{23}\)

We have argued that the appropriate way to code the types of lexical relatedness found in these constructions is to posit a typed hierarchy with default inheritance, much as in Malouf’s (2000a,b) analysis of verbal gerunds in English. Underlying our discussion is the (fairly uncontroversial) presumption that there are three ways of thinking about a word: its meaning (denotation), its syntax (distribution) and its form (morphology). Lexical categories can inherit these properties from different sources and properties inherited in a non-canonical fashion, from the base lexeme rather than from the derived form, will be more or less transparent or opaque to syntactic processes by virtue of language-particular stipulation. Such a representation can be deployed by any syntactic framework which factors out c-structure information from other types of information and which therefore permits ‘mixed’ syntactic structures like those proposed in LFG.

Of course, there remains the onus of showing exactly how an approach based on lexical factorization actually works in an explicit syntactic model. While it may eventually prove straightforward to reach agreement on the basic canonical properties of categories, there is a great deal to do mapping out the different kinds of lexical typing that languages permit, and hence how the ‘mixed categories’ relate to the ‘pure’ categories. One important prerequisite here is a carefully articulated descriptive framework for lexical entries of any kind. As outlined in <author refs> there are a good many complex issues here which tend to be skirted over even in overtly lexicalist approaches. While we do not have a detailed analysis of a sizeable fragment of a particular grammar at this stage, we believe that our framework based on the factorization of lexical categories provides the best tools for tackling such a task in a transparent and principled manner. It defines a clear research program aimed at mapping out the way that languages make choices and what implicational relations there are, if any, between sets of choices.

We may well be tempted to ask in such a situation whether the subtype is ‘really’ a noun or ‘really’ an adjective. But this would be a mistake, since these labels are now conditional on the types of construction in which the words are used and distinct labels may well apply to one and the same item with respect to different aspects of a

\(^{23}\)Of course, in dependency-based models such as the Meaning-Text model of Mel’čuk (1982, 2006) or the Word Grammar model of Hudson (1984) nearly all the interest will lie in the dependency relations.
morphosyntactic construction. For instance, the possessive adjective in Russian does not permit any syntactic access to the noun base, while the ‘same’ word type in Chukchi does permit this (up to a point). In Selkup, within a single language, denominal adjectives with very similar semantics and function differ significantly in the way the resulting word behaves in terms of its internal syntax and morphology. It is part of the grammar of a language to fix these choices. An important consequence of this viewpoint is that, in the final analysis, the question ‘what category does word W belong to?’ may not always be a well-formed question. Instead, we should be asking ‘what categories does word W belong to at which levels of representation?’

Abbreviations


References (omitting author references)


Figures