

kind of mixed category construction, that shares some of the properties of both verbs and nouns.

1.2 Properties of denominal verbs

A DV can head a clause like any other verb can. West Greenlandic is an ergative language, so a verb can govern an absolutive argument and, if transitive, an ergative argument. A DV also has all the morphological properties of a verb, and can even be nominalized and re-denominalized:

- (2) Apequtissa-qar-to-qar-poq
 question-have-NOM-have-3SG.INDIC
 ‘There is someone with a question.’ (Sadock 1991, 85)

Unlike a verb, though, a DV can also occur with dependents that are characteristic of nouns. For example, nouns can take a possessor in the ergative case:

- (3) a. Kaalip illua
 Karl-ERG house-ABS.3SG
 ‘Karl’s house’ (Sadock 1985, 394)
 b. piniartup qajaa
 hunter-ERG kayak-ABS.3SG
 ‘the hunter’s kayak’ (Fortescue 1984, 216)

As we see in (4), DVs can, like nouns, also take an ergative possessor.

- (4) kunngi-p panip-passua-qar-poq
 king-ERG daughter-many-have-3SG.INDIC
 ‘There are many king’s daughters (i.e., princesses).’
 (Sadock 1991, 96)

Note that intransitive verbs cannot normally occur with an ergative argument.¹

Even more strikingly, in some cases when the DV is itself transitive it can occur with two ergative NPs, the subject of the verb and the possessor of the incorporated nominal:

- (5) Hansi-p qimmi-p ame-qar-tip-paa
 Hans-ERG dog-ERG skin-have-CAUS-3SG.INDIC
 ‘Hans let him have (i.e., gave him) a dog’s skin.’
 (Sadock 1991, 97)

¹Van Geenhoven (1997) discusses a type of NI in West Greenlandic in which the possessor of the incorporated nominal appears in the absolutive or instrumental case. This construction could be derived under the present approach via a lexical rule which combines the *argument structures* of the noun stem and the verbal base rather than their *valences*. However, a complete discussion is beyond the scope of this paper.

1

West Greenlandic noun incorporation in a monohierarchical theory of grammar

ROBERT MALOUF

1.1 Introduction

West Greenlandic noun incorporation (NI) is a highly productive category changing morphological operation that converts a noun into a verb by the addition of one of a set of bound verbalizing suffixes:

- (1) a. Kami-lisaar-puq
 kamik-have.on-3SG.INDIC
 ‘He has kamiks on.’ (Fortescue 1984, 322)
 b. Hansi ino-ror-poq
 Hans(ABS) man-develop.into-3SG.INDIC
 ‘Hans grew up.’ (Sadock 1985, 402)

The resulting denominal verb (DV) has the full syntactic and morphological distribution of any verb in West Greenlandic. It also retains some of the properties of the incorporated nominal, which has led some researchers to analyze this construction as a kind of NI. However, as Sapir (1911), Mithun (1986) and others have argued, it has little in common with NI constructions in languages like Mohawk or Southern Tiwa. In this paper, I will explore an alternative HPSG analysis of these DVs as a

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Verbs in West Greenlandic do not otherwise take two ergative arguments, and examples like (5) are, as Sadock (1991, 97) points out, “not even grossly like anything that occurs independently of noun incorporation”. If the possessor is actually associated with the incorporated noun root, though, then (5) is syntactically no different from any other clause with a transitive verb and a possessed noun.

In addition to taking an ergative possessor, nouns can occur with nominal modifiers, which must agree with the head noun in case and number:

- (6) a. Kaalip illuanut
Karl-ERG house-ALL.3SG
‘to Karl’s house’ (Sadock 1985, 394)
- b. Kaalip illuanut mikisumut
Karl-ERG house-ALL.3SG small-ALL.SG
‘to Karl’s small house’ (Sadock 1985, 394)

And, as with possessors, modifiers can occur with DVs:

- (7) a. kissartu-mik kavvi-sur-put
hot-INST coffee-drink-3PL.INDIC
‘They drank hot coffee.’ (Fortescue 1984, 83)
- b. nutaa-mik piili-siur-punga
new-INST car-look.for-1SG.INDIC
‘I am looking for a new car.’ (Fortescue 1984, 83)

1.3 A problem

A possible source of confusion here is that the examples in (7) look superficially like the ‘half-transitive’ or ‘antipassive’ case-marking pattern, shown in (8b), that is available for many semantically transitive verb roots.

- (8) a. tuttu taku-aa
caribou(ABS) see-3SG.3SG.INDIC
‘He saw the caribou.’ (Fortescue 1984, 86)
- b. tuttu-mik taku-vuq
caribou-INST see-3SG.INDIC
‘He saw a caribou.’ (Fortescue 1984, 86)

The agent (if expressed) appears in the absolutive case and the patient appears in the instrumental case. Since nominal modifiers are formally nouns, one might be tempted to explain the examples in (7) as antipassives and not as stranding. This is the essence of Rosen’s (1989) lexicalist analysis of NI in languages like Mohawk. She argues that apparently

‘stranded’ modifiers are actually headless arguments, and that the incorporated noun root’s function is to semantically restrict the reference of the verb’s direct object. However, Sadock provides several convincing pieces of evidence that such an analysis cannot be maintained for West Greenlandic DVs.

First, nominal modifiers differ from head nouns in that they cannot be marked for possession, as demonstrated in (9).

- (9) a. qatannguti-n-nik
sibling-1SG-INST
‘my sibling (INST)’ (Sadock 1991, 91)
- b. qatanngutinnik arna-mik
sibling-1SG-INST female-INST
‘my sister (INST)’ (Sadock 1991, 91)
- c. *qatanngutinnik arna-n-nik
sibling-1SG-INST female-1SG-INST
‘my sister (INST)’ (Sadock 1991, 91)

In this respect, modifiers occurring with DVs behave as if they were modifiers of the incorporated nominal and not as head nouns:

- (10) a. arna-mik qatanngu-seri-voq
female-INST sibling-be.occupied.with-3SG.INDIC
‘He is occupied with (someone’s) sister.’ (Sadock 1991, 91)
- b. *arna-n-nik qatanngu-seri-voq
female-1SG-INST sibling-be.occupied.with-3SG.INDIC
‘He is occupied with my sister.’ (Sadock 1991, 91)

A second piece of evidence comes from agreement. A handful of nouns in West Greenlandic are semantically singular but formally plural. For example, the noun *qamutit* ‘sled’ is historically related to a root meaning ‘sled runner’ and is syntactically plural, though it denotes a single sled. Since nominal modifiers must agree with the noun they modify in number, *qamutit* triggers plural agreement on its modifiers. This is true even when it is incorporated into a DV:

- (11) a. Hansi ataatsi-nik qamute-qar-poq
Hans(ABS) one-INST.PL sled-have-3SG.INDIC
‘Hans has one sled.’ (Sadock 1985, 402)
- b. *Ataatsi-mik qamute-qar-poq
one-INST.SG sled(PL)-have-3SG.INDIC
‘He has one sled.’ (Sadock 1991, 92)

While verbs in West Greenlandic can select for semantically plural NPs, they do not otherwise place purely formal agreement constraints on their arguments. So, the facts in (11) can be most simply explained if the nominal modifier is actually modifying the incorporated noun root.

Finally, Sadock observes that DVs with stranded non-intersective modifiers have the interpretation that would be expected if the modifiers are associated directly with the incorporated noun.

- (12) peqquuserluuti-nik aningaas-ior-toq
 false-INST.PL money(PL)-make-NOM
 ‘one who makes false money, a counterfeiter’
 (Sadock 1991, 95)

It is difficult to see how the incorporated noun root *anigaasaq* ‘money’ in (12) could be restricting the reference of the object: ‘false money’ is not stuff that is false and money. In fact, it is not money at all. The meaning of (12) follows, however, if the modifier takes scope over the noun root directly.

1.4 A solution: Autolexical Grammar

These facts create a problem: incorporated nominals in West Greenlandic seem to select specifiers and modifiers as if they were independent heads of full NPs, yet they are clearly not independent words in the morphology. To resolve this paradox, Sadock (1985, 1991) has proposed a theory of grammatical information (Autolexical Grammar) that takes syntax and morphology as two independent levels of linguistic structure. ‘Lexical’ morphemes have associated representations in both projections, while inflectional morphemes only appear in the morphological structure and correspond to morphosyntactic features in the syntactic projection. If syntax and morphology are allowed to diverge, then West Greenlandic NI does not create a paradox; it simply is an example of a mismatch between the two levels of representation.

Sadock takes the behavior West Greenlandic NI to be evidence that morphology and syntax are in principle independent. Typically, though, the morphological structure matches the syntactic structure very closely. And, there seem to be strict limits on how much the two levels can diverge: it would be surprising indeed to find a language in which, say, the morphological structure was always the mirror image of the syntactic structure. So, Sadock (1991) proposes a set of universal **homomorphism constraints** on the association between syntactic and morphological representations that restrict the kinds of possible mismatches. Two of these constraints are given in (13).

- (13) a. LINEARITY CONSTRAINT (LC)
 The associated elements of the morphological and syntactic representations must occur in the same order. (Sadock 1991, 103)
 b. CONSTRUCTIONAL INTEGRITY CONSTRAINT (CIC)
 If a lexeme combines with a phrase P in the syntax and with a host in the morphology, then the morphological host must be associated with the head of the syntactic phrase P. (Sadock 1991, 103)

The purpose of the LC is pretty straightforward, but the CIC is perhaps a little more opaque. In (11a) the verbalizing suffix *qar* ‘have’ combines in the syntax with its direct object, the entire NP *ataatsinik gamut* ‘one sled’. In principle, this suffix should be able to combine morphologically with either lexical word in the NP. In this kind of DV construction, though, the verbal morpheme always combines with the head noun, stranding modifiers, and not with a modifier, stranding the head noun.² This is what the CIC ensures.

Not all constructions will satisfy both of these constraints. The balance between these two constraints limits the range of possible mismatches: a structure can only violate one constraint to the extent that it satisfies the other. In particular, NI produces structures that violate the LC but satisfy the CIC. This is expressed in the construction-specific constraint in (14).

- (14) INCORPORATION PRINCIPLE
 If a lexeme combines with a stem in the morphology and with a phrase in the syntax, its morphosyntactic association will conform to the CIC. (Sadock 1991, 105)

Since the CIC and the LC are complementary, a corollary of (14) is that NI is not subject to the LC.

1.5 A better solution: mixed categories

Sadock’s arguments for a polyhierarchical analysis rest on the assumption that if a word has some of the properties of more than one syntactic category then it must at some level be represented as more than one word. Also, in defense of a lexical view of NI, Mithun (1986) has pointed out that NI in West Greenlandic has little in common with incorporation processes in other languages. In particular, true NI involves the morphological combination of a noun and a verb. West Greenlandic

²The exceptions to this generalization involve incorporation of a fully inflected word rather than a stem, and are probably better analyzed as the combination of an entire phrase with a verbalizing clitic (Manning 1996, 121).

DVs however are formed by the additional of a verbalizing suffix to a noun. These verbalizing suffixes are morphologically unrelated to the free form of the verb:

- (15) a. Marlun-nik ammassat-tor-punga
two-INST.PL sardine-eat-1SG.INDIC
'I ate two sardines.' (Sadock 1991, 94)
- b. Ammassan-nik marlun-nik neri-vunga
sardine-INST.PL two-INST.PL eat-1SG.INDIC
'I ate two sardines.' (Sadock 1991, 94)

West Greenlandic verbalizing suffixes are bound forms which by themselves have none of the morphosyntactic properties of true verbs.

In the remainder of this paper, I will show how the West Greenlandic DV can be seen as a kind of mixed category construction, parallel to the English verbal gerund. Under this view, the possessor and modifiers that occur with a DVs are not stranded by incorporation, nor do they bear a relation to the incorporated nominal directly. Instead, the DV inherits its subcategorization requirements from both the verbalizing suffix and the incorporated nominal. This is exactly parallel to mixed category constructions in other languages. For example, the English verbal gerund, like *devouring* in *Pat's devouring the pancakes*, occurs with both a genitive specifier, like nouns do, and an accusative direct object, like verbs do (Malouf 1996).

For concreteness, I will assume that all verbal elements in West Greenlandic (including verbal bases) are subtypes of one or more of the valence patterns in (16).

- (16) a. *verbal-valence* → *transitive* ∨ *intransitive* ∨ *half-transitive*
b. *transitive* →

$$\left[\begin{array}{l} \text{SUBJ} \quad \langle \mathbf{1} \rangle \\ \text{COMPS} \quad \langle \mathbf{2} \oplus \mathbf{3} \rangle - \text{list}(\text{noncanon}) \\ \text{ARG-ST} \quad \langle \mathbf{2} \text{NP}[\text{erg}], \mathbf{1} \text{NP}[\text{abs}] \rangle \oplus \mathbf{3} \text{list}(\text{oblique}) \end{array} \right]$$

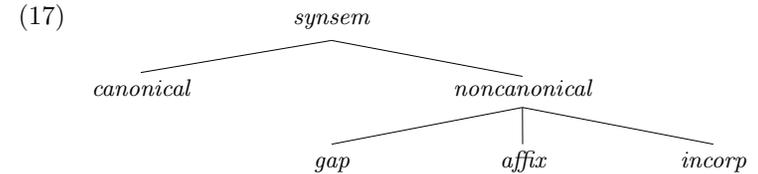
- c. *intransitive* →

$$\left[\begin{array}{l} \text{SUBJ} \quad \langle \mathbf{1} \rangle \\ \text{COMPS} \quad \langle \mathbf{3} \rangle - \text{list}(\text{noncanon}) \\ \text{ARG-ST} \quad \langle \mathbf{1} \text{NP}[\text{abs}] \rangle \oplus \mathbf{3} \text{list}(\text{oblique}) \end{array} \right]$$

- d. *half-transitive* →

$$\left[\begin{array}{l} \text{SUBJ} \quad \langle \mathbf{1} \rangle \\ \text{COMPS} \quad \langle \mathbf{2} \oplus \mathbf{3} \rangle - \text{list}(\text{noncanon}) \\ \text{ARG-ST} \quad \langle \mathbf{1} \text{NP}[\text{abs}], \mathbf{2} \text{NP}[\text{inst}] \rangle \oplus \mathbf{3} \text{list}(\text{oblique}) \end{array} \right]$$

The three types in (16) correspond to the transitive, intransitive, and half-transitive valence patterns. Some verbs may occur in any of these valence patterns, while other verbs are lexically specified as occurring in only one. Following Manning (1996), in each case the absolutive argument is identified as the subject, even when it is not the initial element on the ARG-ST list. The COMPS list consists of all non-absolutive canonical arguments. Any arguments that are not realized directly as dependents of the verb are **non-canonical** and so are not included in the verb's valence features. Types of non-canonical arguments proposed in the literature include the gaps associated with fillers in unbounded dependency constructions (Sag 1997, Bouma et al. 1998) and pronominal affixes (Miller and Sag 1997). Incorporated noun stems also must be included as a type of non-canonical argument:



One thing to note is that none of the constraints in (16) is specific to DVs. These types reflect general constraints on case assignment and on the linking of argument positions to grammatical relations in West Greenlandic.

Given this theoretical background, intransitive verbalizing suffixes in West Greenlandic can be accounted for by the lexical rule in Figure 1.³ This is a binary lexical rule that combines a verbal base with a nominal stem to form a DV. The resulting DV will combine with an absolutive subject, by virtue of its being a verb, and it will project a phrase that is like any other verbal projection following general principles of argument saturation. But, the derived verb also inherits the incorporated nominal's selection for an optional ergative possessor and complements, so any constraints which the noun stem places on its specifier and complements will be inherited by the DV. This accounts for the fact that the external specifier has the properties it would have had if it had appeared with the incorporated nominal alone.

To see how this analysis works, it will be helpful to go through an example in detail. First, consider the lexical entry for a noun root:

³This formulation of Figure 1 as a binary lexical rule is due to a suggestion by Carl Pollard.

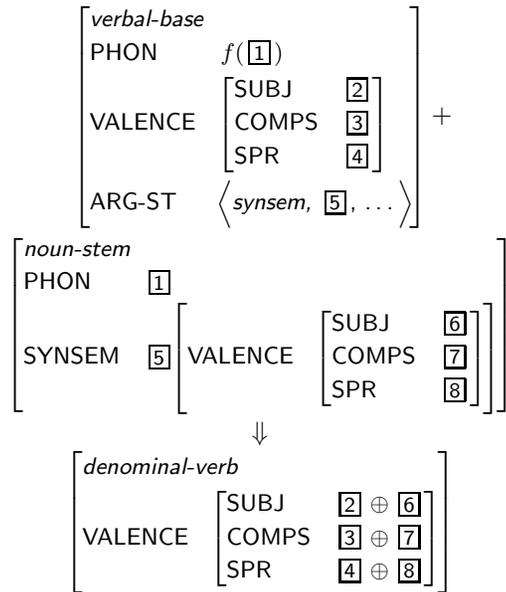
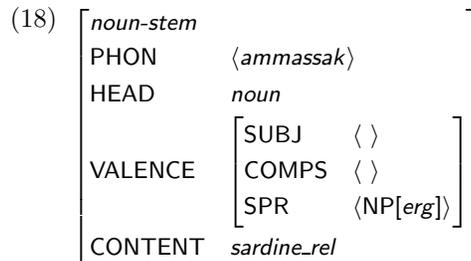
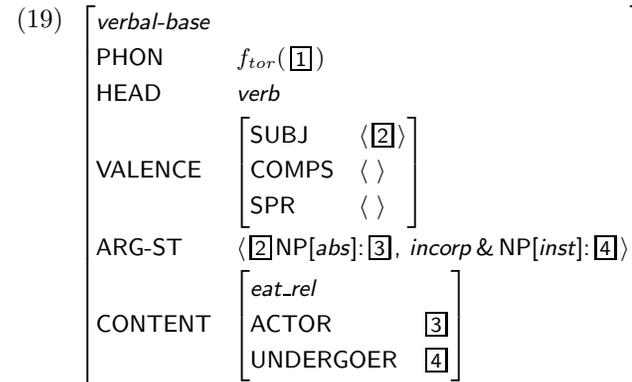


FIGURE 1 Noun incorporation lexical rule

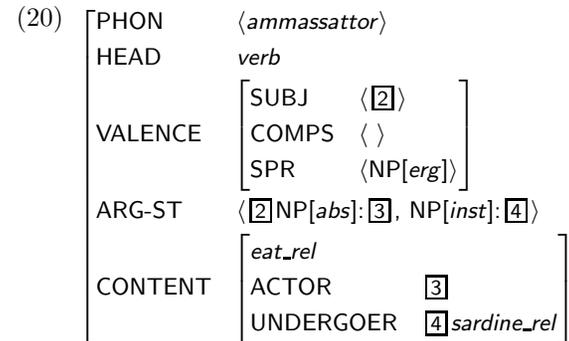


Of course, some of the information in (18), such as the selection for an optional ergative specifier, will be inherited from a more general type. Similarly, much of the information in the entry for a verbal base in (19) will also be inherited from higher types:



As a verbal base, *-tor* has no status as an independent verb. It carries some verbal features, but by itself a verbal base is simply an affix. A verbal base also obligatorily incorporates its second argument. Thus, the second member of the ARG-ST in (19) is lexically specified as being of type *incorp*.

Given the lexical entries in (18) and (19), the lexical rule in Figure 1 produces the deverbal noun in (20), which selects for and can potentially combine with two dependents: an absolutive subject and an ergative possessor.



The modification facts can also be explained by the Adjunct Lexical Rule in Figure 1. I assume that nominal modifiers are actually non-thematic oblique complements introduced by lexical rule in Figure 2.⁴ This rule adds a nominal modifier to the ARG-ST list of a noun stem.

⁴Here I am drawing on work on Japanese causatives by Manning et al. (to appear). Also, similar type-shifting rules have been proposed for modifiers in French, Dutch, and English. The present analysis is also compatible with alternative formulations of the Adjunct Lexical Rule, such as the constraint based approach proposed by van Noord and Bouma (1994).

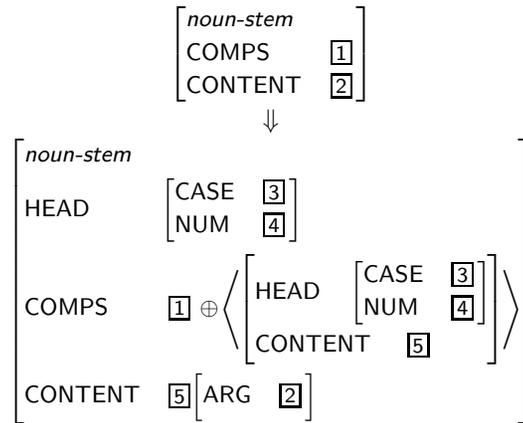


FIGURE 2 Adjunct lexical rule

The modifier must agree in case and number with the head noun. Since the content of the modifier has scope over the content of the head noun, modifiers introduced by Figure 2 behave semantically like adjuncts.

When a noun stem which this rule has applied to occurs as the free-standing head of an NP, the result is a structure like that in Figure 3. If, on the other hand, the noun stem is incorporated into a DV, the result is a structure like that in Figure 4. In Figure 4, the modifier is selected by the DV, and the incorporated nominal has no independent syntactic existence. But, the valence requirement for the modifier (marked $\boxed{2}$) is introduced by Figure 2 on the incorporated nominal and inherited by the DV. So, the modifier is selected in exactly the same way a modifier of an independent head noun would be, so it has all the properties of a regular nominal modifier.

Finally, observe that Sadock's homomorphism constraints follow directly as theorems of a rule like Figure 1. First, since 'stranded' elements are licensed by the valence potential of the DV inherited from the incorporated nominal, incorporation structures must satisfy the CIC. Only the head noun can contribute the valence requirements needed to license stranded possessors or modifiers. If a verbalizing suffix were to combine with something other than the head, the resulting DV would not inherit any valence values that would license a stranded head noun. So, it follows directly from a mixed-category analysis that it must be the head noun that gets incorporated. The CIC need not be stipulated as an additional constraint.

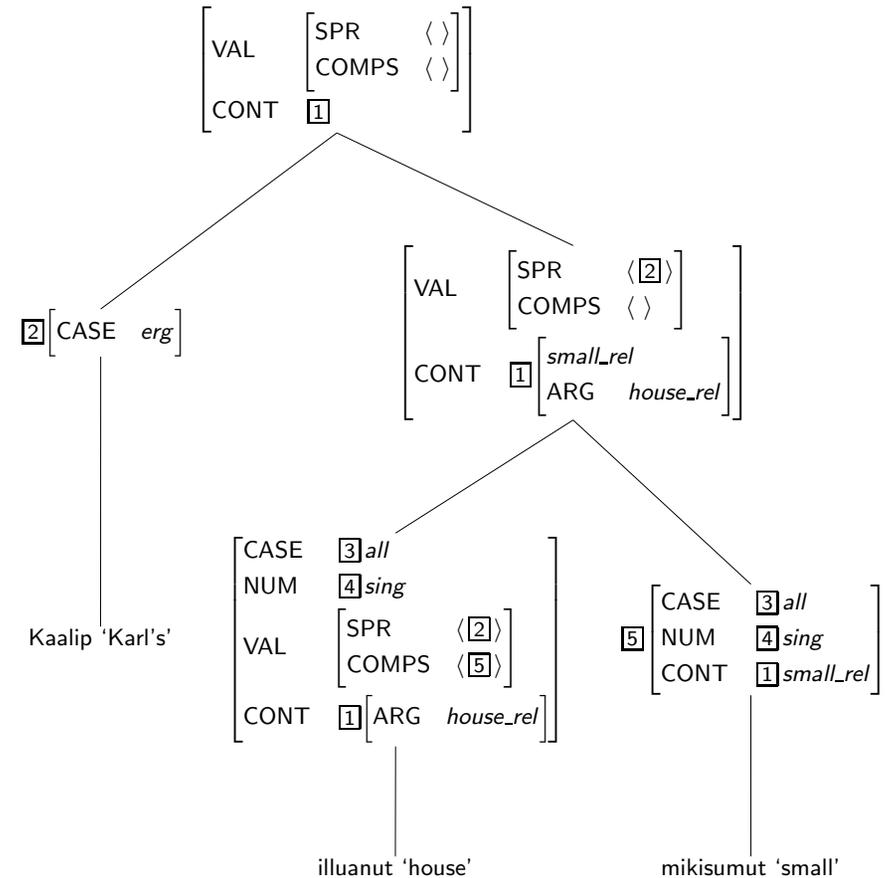


FIGURE 3 Structure of (6b)

The word order properties of NI constructions also follow immediately from the present analysis. In West Greenlandic, constituent order within sentences is fairly free but tends to be Subject – Object – Verb (Fortescue 1984, 93). Within the noun phrase, the possessor must precede the head noun and any modifiers must follow it (Fortescue 1984, 117). Under Sadock’s analysis, examples like (7), where a nominal modifier precedes an incorporated nominal, violate the linear precedence constraints for noun phrases. Under the analysis presented here, on the other hand, the word order seen in (7) is exactly what one would expect. The verb (which happens to be a DV) is preceded by its single complement (which happens to be inherited from an incorporated nominal). Because the incorporated nominal has no independent existence in the syntax, it is naturally exempt from word order constraints. There is no need to relax the LC for NI constructions since they satisfy all word order constraints.

1.6 Conclusion

The analysis I have sketched here can account for the behavior of West Greenlandic DVs with no reference to syntactic word formation or multiple hierarchical structures. This analysis does involve a limited kind of mismatch: a DV projects a VP but also has some noun-like valence requirements. However, the unusual properties of DVs are restricted to the lexicon and HPSG’s independently motivated theory of lexical information places strong restrictions on the kinds of mismatches that can be induced. So, there is no need for additional stipulations limiting the degree of mismatch between syntax and morphology.

AG and HPSG have much in common. Both are non-derivational, essentially lexicalist (see Manning 1996, 108ff) theories of grammar that represent linguistic expressions as complex ‘modular’ bundles of syntactic, semantic, and discourse functional information. The most important difference is in how these information modules interact. In HPSG, the interaction is highly constrained. The parts of the sign are built up in parallel through a single recursive operation, and lexical and phrasal constructions impose constraints on all feature values simultaneously. In AG, on the other hand, each dimension of grammatical information is independent, with its own atoms and its own rules for recursive combination. These independent representations are only related to each other by very general interface conditions.

Each approach has its limitations. In AG, it is difficult to account for complex and idiosyncratic transmodular constraints, such as those associated with the kinds of phrasal constructions which have re-

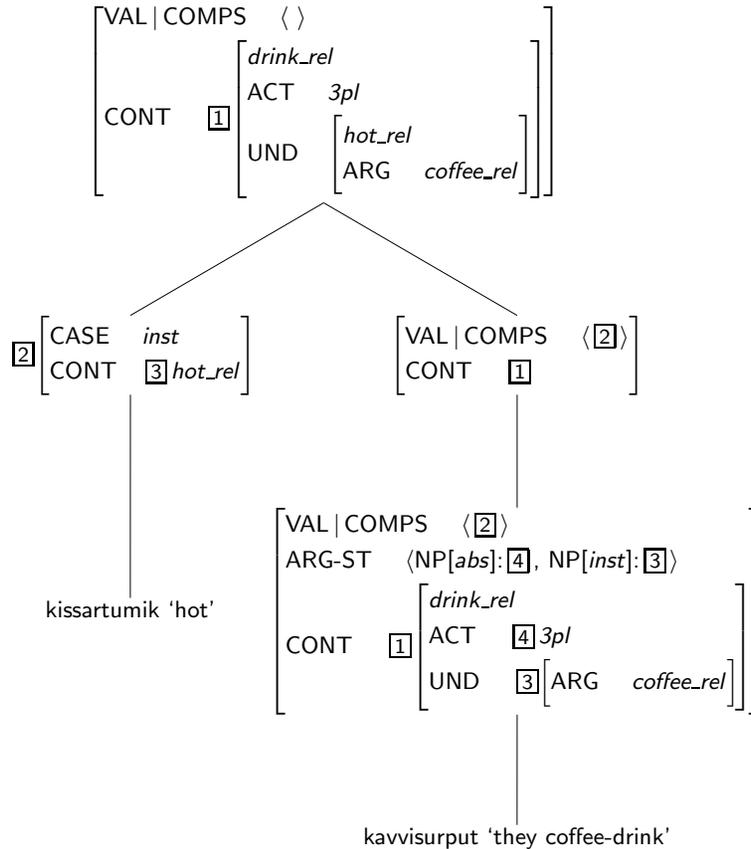


FIGURE 4 Structure of (7a)

ceived so much attention in the Construction Grammar literature (e.g., Fillmore and Kay in press). In HPSG, it has been argued, it is difficult to account for constructions involving radical mismatches between the modules. I have shown here how West Greenlandic NI, one of the most radical of these constructions, can be given a natural account in HPSG.

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