# (DE)SELECTING ARGUMENTS FOR TRANSITIVE AND PREDICATED NOMINALS

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**Abstract**

Transitive nominals, that is nouns or adjectives that syntactically govern object arguments, are a problematic phenomenon under many influential categorizations of word classes. I show that in some languages, syntactic context can restrict the transitivity of transitive nominal categories; specifically, there is a clear association between predication and nominal transitivity, such that nominals can only be transitive when predicated. I develop a formal model of this restriction, based on the assumption that it should be specified syntactically, rather than lexically; I also consider the selectional properties of copular clauses more generally.

# 1 Transitive Nominals

Transitive nominals, by which I mean nouns or adjectives that subcategorize for object arguments, are a problematic concept for several influential categorizations of word classes (as noted, in relation to adjectives, by Vincent and Börjars 2010: 459). For example, Bresnan and Kanerva (1989: 25), defining the feature [+objective], explicitly deny that objects appear with nouns or adjectives. Similarly, for Bresnan and Moshi (1990: 166–167) this is part of the very definition of an object: "objects are hypothesized to have the primitive property of complementing transitive predicators such as verbs and adpositions, and not complementing intransitive predicators such as basic nouns and adjectives." Bresnan (2001: 100, 120) assumes the following feature distinctions for the major lexical categories (cf. also Bresnan 1976: 19):

(1)

|  | +predicative | −predicative |
|---|---|---|
| +transitive | V | P |
| −transitive | A | N |

In this model, +transitive categories "may take an object or direct complement function." Adjectives and nouns, then, are denied the ability to take objects. These features are essentially the same as those of Chomsky (1970); the categorization of Jackendoff (1977: 31–33) likewise defines adjectives and nouns as inherently non-transitive (having the feature [−OBJ]).

Despite the seemingly widespread formal definition of adjectives and nouns as inherently non-transitive, transitive adjectives have been recognized to exist in some languages. Platzack (1982a) noted and formalized the existence of transitive adjectives in Mordern Swedish. Other works that discuss the possibility of transitive nominals, but that seem uneasy with the idea, include Maling (1983: English),

van Riemsdijk (1983: German), and van Kemenade (1987: Old English). Vincent and Börjars (2010) find evidence for transitive adjectives in Swedish, Danish, Norwegian and Dutch, but treat them as marked relics in Modern Germanic, rather than a synchronically systematic phenomenon. Beside this relatively widespread evidence for transitive adjectives, transitive *nouns* appear to be cross-linguistically considerably rarer. Some do exist, however, and will be discussed below.

Note that we are not here considering non-finite verb forms like participles and infinitives that may be morphologically nominal and yet transitive. The transitivity of such categories is fundamentally dependent on their verbal status, and is in no way typologically remarkable. From an LFG perspective non-finite verb forms can be treated as inflectional forms of verbs, sharing the same PRED value and subcategorization frame as finite verbal forms inflected to the same stem, in contrast to verbally derived nominals, whose PRED values are not paradigmatically identified with a verbal PRED (Lowe 2012).

Note also that we are not here considering derived event nominals that display nominal phrasal syntax but that are often analysed in LFG as selecting for subject and object arguments at f-structure, although these appear in c-structure as possessive or prepositional modifier phrases (e.g. Laczkó 2000). The assumption that derived event nominals like *destruction*, *observation* etc. select for syntactic subject and object arguments involves a conflation of semantic and syntactic argumenthood. The fact that in the noun phrase *Napoleon's invasion of Russia*, *Napoleon* is the semantic agent of the invasion and *Russia* is the semantic patient does not mean that at f-structure *Napoleon* need necessarily be a SUBJ and *Russia* an OBJ. In a parallel architecture, no such direct isomorphism between syntax and semantics is required. Rather, it is simpler to assume that at f-structure *'s* possessives are consistently POSSs, and optional postmodificatory PPs are consistently ADJs, but in some contexts mapped to semantic arguments rather than semantic adjuncts.[1]

For the purposes of this paper, I restrict the notion of nominal transitivity to refer only to syntactic subcategorization for an object (OBJ) argument. Subcategorization for other grammatical functions by nouns and adjectives is typologically less rare and will not be treated in detail here, but the formalism advanced is capable of accounting for nominals that subcategorize for any combination of non-subject arguments.[2]

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[1]As discussed by Asudeh (2005) there may be distinct differences between syntactic and semantic argument structures, e.g. arguments may be present in the semantics that are entirely absent from the syntax.

[2]Despite the apparent rarity and problematic status of transitive nominals as discussed in this section, there is of course no formal problem in licensing subcategorization frames, including subcategorization for objects, for nouns and adjectives in LFG; cf. e.g. Butt et al. (1999: 105). Recent works discussing adjectives that select for non-subject arguments include e.g. Mittendorf and Sadler (2008), Al Sharifi and Sadler (2009) and Raza and Ahmed (2011). It is the syntactic alternation discussed in the following section, and not nominal "transitivity" per se, that I seek to account for in this paper.

## 2 Data

I focus here primarily on data from Old Avestan (OAv.), which is discussed in detail in Lowe (2014), but also briefly discuss phenomena in other languages which demonstrate that the OAv. data is typologically well paralleled. OAv. is the oldest attested Iranian language, surviving in a relatively small body of literature consisting of religious poems attributed to Zarathustra, the founder of Zoroastrianism, and a liturgical prose text of roughly contemporary date.[3] In many respects the texts are obscure and linguistically difficult, but I show in Lowe (2014) that clear patterns emerge in the distribution and syntax of transitive nominals that are not only remarkably unambiguous in OAv. terms, but that are also supported by typological parallels in other languages.

I define nominal transitivity in OAv. as government by a noun or adjective of an accusative case dependent that does not show the semantics (expression of goal/extent) expected of an accusative adjunct in the language.[4] Only certain morphological categories of nominal can display transitivity in this sense. Most, but not all, of these show marginally verbal morphological features. These features are not sufficient to justify analysing the forms involved as part of the non-finite verb system, i.e. they cannot be categorized as participles vel sim.; rather, their morphology suggests a derivational relationship with the verbal system: they are lexical nouns and adjectives, but derived from (or at least from stems related to) verbal stems.

The ability of these forms to govern object arguments clearly derives from their morphological relationship with verbal stems, but this ability is in certain respects distinct from the seemingly parallel transitivity of non-finite verbal forms built to the same stems. Non-finite verb forms proper can be transitive in whatever syntactic context they appear, as long as the verbal stem to which they are formed is itself transitive. But the transitive nominal categories under discussion show a clear distribution of transitive vs. non-transitive uses: only when functioning as the main predicate in a nominal or copular clause do these 'potentially transitive' categories appear with objects; when not so predicated such nominals are intransitive. The two categories differ in other ways too: participles in OAv., for example, are rare as the main predicate in a nominal or copular clause, while this is common with all the transitive adjective categories. In this paper, I use the term "predicated" to refer to nouns or adjectives that function as the main predicate in a nominal or copular clause, as the superlatives in exx. (2) and (3) respectively.

The distribution of transitive vs. non-transitive uses of certain nominal categories is most clear with the 'verbal' subclass of superlative adjectives (Tucker 2009).[5] For example the superlative *mairišta-*, related to the verbal root $\sqrt{mar}$

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[3]Estimates of its date range from about 1500 to 700 B.C.

[4]Due to the problematic nature of the language as it is attested, there are unfortunately no unambiguous syntactic tests that can be used alongside this criterion.

[5]These are superlative adjectives built to roots that also form primary finite verbal systems, in contrast to another set of superlative adjectives, formed in precisely the same way but to adjectival

'remember', clearly governs an accusative, and is also predicated (2). Similarly *vaēdišta-*, derived from the verb √*vid* 'know' (3); in this clause there is an explicit copula.[6]

(2)  mazdå      sax^vārə̄     *mairištō*
     Mazda.N.SG  outrage.A.SG  best_recalling.N.SG
     'Mazda *best remembers* outrage.' (Y. 29.4a)

(3)  yaēš̨ąm      tū        ahurā    irixtəm     mazdā
     which.G.PL  you.N.SG  Lord.V   assets.A.SG  Wise.V
     *vaēdištō*             ahī
     best_knowing.N.SG     be.2SG
     'for which (crimes) you, Wise Lord, *know best* the net assets.' (Y. 32.7)

All the predicated 'verbal'-type superlatives in OAv. that are derived from transitive roots are unambiguously transitive. However, the one example of a 'verbal'-type superlative formed to a transitive root that is not predicated is also, crucially, not transitive. The form *zrazdišta-* is unambiguously a 'verbal'-type superlative, and given the meaning of the root the form would otherwise be expected to be transitive (4). In fact the morphologically and functionally equivalent *zrazdātəma-*, attested in a later (Younger Avestan) text, is transitive and, notably, predicated (5).

(4)  yauuaṯ      āžūš       *zrazdištō*           būnōi     haxtii̊å
     yoke.FUT   penis.A    most_faithful_to.N   base.L.SG  thigh.G.SG
     '*The most faithful one* will yoke (his) penis at the bottom of the (female) thighs.' (Y. 53.7b)

(5)  yaθra  narō. . .   aṣ̌əm     *zrazdātəma*
     where  man.N.PL    truth.A   most_faithful_to.N.PL
     '. . . where the men are *most faithful to* truth.' (Yt. 13.25)

'Verbal'-type superlatives therefore display transitivity under two conditions: firstly, derivation from a transitive verbal root, and secondly predication in a nominal or copular clause (exx. 2, 3, 5 vs. 4). This pattern of transitive predicated vs. intransitive non-predicated appears clearly also with root nouns in -*mi*-. The noun *dąmi-* 'creator' is transitive twice, and in both passages is clearly predicated (6); none of the four non-predicated instances are transitive, any dependent appearing in the expected objective genitive (7).

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roots (like *vah-* 'good'); these latter never display transitivity. There are no transitive comparative adjectives in OAv., but this is likely an accidental gap in the data, as such forms are found in the later Younger Avestan language.

[6]Translations of OAv. passages are largely taken from Humbach (1991). Non-self-evident abbreviations used in the glosses: A accusative, G genitive, I instrumental, L locative, N nominative, V vocative.

(6)    huuō       xraθβā       *dąmiš*       ašəm
        that.N.SG  intellect.I.SG  creator.N.SG  truth.A.SG
        'That one is *the creator* (of) truth through his intellect.' (Y. 31.7b)

(7)    huuō       *dāmōiš*     drūjō    hunuš
        that.N.SG  creator.G.SG  lie.G.SG  son.N.SG
        'That one is a son *of the creator* of the lie.' (Y. 51.10)

The reduplicated *i*-stem noun *caxri*- 'maker' governs a double accusative in the sense 'make X (into) Y'; again the form is predicated (8). The only other example of this morphological category in OAv., *manarōiš*, genitive of an original *\*mamri*-, is not predicated, and not transitive (9); the form is morphologically problematic, but at the very least does not contradict the observed pattern.

(8)    yōi. . .     aspə̄n̦cīt̯        sādrācīt̯        *caxraiiō*
        who.N.PL  misfortune.A.PL=any  distress.A.PL=any  maker.N.PL
        ušəurū
        pleasure.A.PL
        ' Who. . . *turn* any misfortune and distress *into* pleasure.' (Y. 34.7ab)

(9)    kadā  mazdā  *manarōiš*  narō      vīsən̦tē
        when  Mazda.V  reciter.G.SG  men.N.PL  take_position.3PL
        'When, O Wise One, will (some) honourable persons take up their positions side by side *with the reciter*.' (Y. 48.10a)

Some other nominal categories in OAv. are consistently transitive and predicated, but there are no corresponding non-predicated, non-transitive instances that would prove the vital role of predication in licensing transitivity; nevertheless we can assume that the same pattern may well have extended to all potentially transitive nominals in the language.

A relation between nominal transitivity and predication is found in several other old Indo-European languages. In R̥gvedic Sanskrit, closely related to OAv., the only instances of nominals selecting for infinitival complements (admittedly XCOMPs, not OBJs) all involve those nominals being predicated (Keydana 2013: 310–312).[7] More specifically in relation to object government, the only transitive nominal in Gothic is always predicated; likewise the only transitive nominal in Old High German is transitive only when predicated (10), and intransitive otherwise (11).[8]

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[7]Otherwise, although there appears to be a strong preference in R̥gvedic Sanskrit for potentially 'transitive' nominals to take object arguments only when predicated, there are many couterexamples, in contrast to Avestan, such that the analysis proposed in this paper for Avestan cannot fully carry over into an analysis of nominal transitivity in Sanskrit.

[8]Although synchronically transitive, the diachrony of this construction is more complicated; cf. Lowe (2013). It also differs from the Avestan construction in that an explicit nominative subject is never found; in all other respects it is parallel, however.

(10) tés íst míh *uuúnder*
this.G is me.A wonder.N
Lit. '(There) is wonder (to) me
of this'. (*Boeth.*)

(11) uuir gisahumes *uuuntar* hiutu
we.N see.PF wonders.A today
'We saw wonders today.' (*Tat.*)

A close association between nominal transitivity and predication is found also in Early Latin (mainly in Plautus, c. 254–184 B.C.). In Classical Latin (c. 75 B.C. on), no nominal can take an accusative object, but in the early language a few such forms are found, and again the same pattern seen in OAv. is found here: all of the forms concerned are predicated.[9]

A further instance of predicated, transitive nominals is that of predicated relational nouns in the Central Guerrero dialect of the Uto-Aztecan language Nahuatl, discussed by Amith and Smith-Stark (1994). In Central Guerrero Nahuatl (CGN) *predicate* nouns referring to "culturally recognized interpersonal relationships" (largely kinship terms) can take verbal argument markers, whereby the referent of the noun is marked as an object, and the possessor as subject, but only where the referent/object is $1^{st}$ or $2^{nd}$ person.

(12) *ti-ne:č-na:n*
2sgS-1sgO-mother
'I am your mother.'

(13) *ti-miȼ-iȼkʷin*
1sgS-2SgO-dog
'You are my dog.'

Amith and Smith-Stark (1994) show that these constructions derive from an inherited Uto-Aztecan construction in which the noun was originally inflected and used essentially as a verb (which accounts for the association between transitivity and predication here); the verbal construction survives to an extent in related languages like Huichol, Cora, and Hopi. In CGN, however, all verbal properties have been lost, leaving, as the only vestiges of the verbal origin of the construction, both the transitivity of the nouns concerned and the fact that they must be predicated. This verbal origin is different from the Indo-European forms discussed here, the morphological origins of which were entirely nominal, and any verbal associations of which were entirely secondary. Transitive nominals, then, can result from distinct diachronic developments affecting categorially divergent words.

The languages discussed above attest a direct association between predication and nominal transitivity. It is this phenomenon that I will attempt to account for formally in §4. However, it is also worth noting that in some other languages we find similar but distinct phenomena, which cannot be explained in the same way, but that do at least support the concept of an association between degree of predication and nominal transitivity.[10] In Modern Swedish, several adjectives take

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[9]The forms are listed by Bennett (1914: 252–253). Only one of the nominals attested as predicated and transitive in early Latin is also attested in a non-predicated context in the same period, where it is intransitive (*observatio* 'observation', Plautus *Mil.* 2.6.5).

[10]A similar connection between nominal transitivity and a particular syntactic context, though not specifically predication, is seen e.g. in Japanese, where certain nominals can license arguments only when used in a complex predicate construction with the light verb *suru* (Grimshaw and Mester 1988).

NP object complements: e.g. *hängiven* 'devoted to', *lik* 'like', *tillgiven* 'attached to', *underlägsen* 'inferior to', *värd* 'worthy of'. Platzack (1982b) notes that these adjectives can also be transitive when attributive. Even so, there is still a syntactic difference between predicated and attributive constructions: attributive transitive adjectives must have the object directly preceding the adjective, while the objects of predicated transitive adjectives can either precede or follow. In Modern Swedish too, then, transitivity is more restricted (though not excluded) with non-predicated adjectives.

Again, there is a similar but distinct pattern in the distribution of complements and adjuncts with adjectives in English: they can appear only when the adjective concerned is either predicated or predicative, but not when it is attributive (predicated *he is happy about the result*, predicative *the man, happy about the result, . . .*, but attributive *\*the happy about the result man*). Syntactically, this is an entirely different phenomenon from that discussed above, but descriptively it is nevertheless similar.[11]

In descriptive terms, such patterns are easily comprehensible: predicated nominals (both nouns and adjectives) are in some way more 'verbal' than non-predicated nominals, in that they carry the main predication of the clause, a role prototypically associated with finite verbs. In terms of a cline between verbal and nominal, predicated nominals are somewhat further from purely nominal, and somewhat closer to purely verbal. In a similar vein, Hopper and Thompson (1980: 280ff.) discuss the relation between backgrounding and lower transitivity, which implies a corresponding relation between foregrounding (e.g. predication) and higher transitivity.

In §4 I develop a formal model of the relation between transitivity of nominals and predication. I begin, however, with a seemingly parallel question concerning nominal predication in LFG.

## 3   Nominal Predication in LFG

Several possibilities exist for the f-structural formalization of copular and verbless clauses in LFG. I follow such authors as Dalrymple et al. (2004), Falk (2004), Nordlinger and Sadler (2007) and Laczkó (2012) in assuming that the different f-structure possibilities may be valid for different languages, and even for different constructions within the same language, depending on the syntactic properties of the construction concerned.[12]

There are three widely used analyses for predicated nominals: one 'single-tier' analysis, in which the predicated nominal itself is the functional head of the clause (15), and two 'double-tier' analyses, in which a (perhaps null) copular verb is the functional head and the predicated nominal an argument of it (16, 17).[13]

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[11]For a syntactic explanation, see Sadler and Arnold (1994).

[12]Contrasting with the uniform PREDLINK approach of Butt et al. (1999), Attia (2008), Sulger (2009), Dione (2012). Cf. also Rosén (1996) on copular clauses.

[13]Laczkó (2012) argues that the XCOMP analysis is not necessary but can be subsumed under the

(14)  Henry is good.

(15)
$$\begin{bmatrix} \text{PRED} & \text{`good}\langle\text{SUBJ}\rangle\text{'} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{`Henry'} \end{bmatrix} \end{bmatrix}$$

(16)
$$\begin{bmatrix} \text{PRED} & \text{`be}\langle\text{XCOMP}\rangle\text{SUBJ'} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{`Henry'} \end{bmatrix} \\ \text{XCOMP} & \begin{bmatrix} \text{PRED} & \text{`good}\langle\text{SUBJ}\rangle\text{'} \\ \text{SUBJ} & [\quad] \end{bmatrix} \end{bmatrix}$$

(17)
$$\begin{bmatrix} \text{PRED} & \text{`be}\langle\text{SUBJ,PREDLINK}\rangle\text{'} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{`Henry'} \end{bmatrix} \\ \text{PREDLINK} & \begin{bmatrix} \text{PRED} & \text{`good'} \end{bmatrix} \end{bmatrix}$$

In terms of analysing the association between predication and nominal transitivity, it does not matter greatly which representation we choose. For simplicity, I assume the single-tier analysis in the following, but the rules presented below could easily be rewritten to apply under either of the double-tier analyses. In this section, however, I address an issue of the single-tier analysis and of the open complement double-tier analysis that appears at least superficially similar to the issue of nominal transitivity.

These analyses of copular clauses assume that predicated nominals (and, indeed, prepositions, etc.) in such constructions select for a subject argument; in non-predicated contexts such selection for arguments is either unnecessary or problematic. Dalrymple et al. (2004) claim that nominals could be open complements in predicative positions but closed in non-predicative contexts; this would be particularly likely for nouns, since it is hard to imagine that all nouns in a language would select for subjects in all contexts (whereas this is not inconceivable for adjectives). The same assumption is made by Falk (2004).

However, neither Dalrymple et al. nor Falk make clear how this alternation would be modelled. Bresnan (2001) assumes lexical rules that effectively create duplicate lexical items, one of which subcategorizes for a subject. This solution is similar to lexicalist treatments of other argument structure alternations, such as the passive, but in this case there is no difference in morphological/phonological form, nor lexical irregularities in the alternation, that might provide any support for treating this as a lexical alternation.[14] Such a solution is certainly possible, since LFG predicts a certain amount of redundancy in the lexicon, but the potential

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single-tier analysis, and also argues for a second type of closed two-tier analysis, involving an OBL. These proposals do not affect the arguments made in this section.

[14]Interestingly, in Zapotec a large class of adjectives show different morphological forms in attributive and predicative uses (Broadwell 2007). This provides clear evidence for lexically distinct forms of the adjective for use in different syntactic contexts in this language, contrasting with the complete absence of evidence for such a lexical distinction in English and the other languages considered here.

duplication of every noun, adjective, preposition etc., in the lexicon would involve massive redundancy, and moreover would not capture the fact that this alternation is determined purely syntactically, and not lexically. The alternative to multiple lexical entries is some sort of function in the *syntax* that licenses argument selection for predicated nominals.

I exemplify my formalization with reference to adjectival predication and (14) above, and begin by dealing with the semantic requirements. I assume that the lexical entry of an adjective contains only the meaning constructor denoting the intrinsic meaning of the adjective, as in (18). As discussed by Dalrymple (2001: 264ff.), two distinct meaning constructors are required to account for adjectival attribution, one denoting the intrinsic meaning of the adjective (as appears in 18), the other determining the semantic combination of a modifier with its noun.[15] Dalrymple implies that the second meaning constructor, given (in adapted form) in (19), may be a part of the lexical entry of an adjective along with that denoting the intrinsic meaning.[16]

(18)

> good: A
> $(\uparrow\text{PRED}) = \text{'good'}$
> $\lambda x.good(x) : (\uparrow_\sigma \text{ V}) \multimap \uparrow_\sigma$

(19)   ATTRIB-ADJ: $\lambda Q.\lambda P.\lambda x.Q(x) \wedge P(x) : ((\downarrow_\sigma \text{ V}) \multimap \downarrow_\sigma) \multimap (((\text{ADJ} \in\downarrow)_\sigma \text{V})$
$\multimap ((\text{ADJ} \in\downarrow)_\sigma \text{R}) \multimap ((\text{ADJ} \in\downarrow)_\sigma \text{V}) \multimap ((\text{ADJ} \in\downarrow)_\sigma \text{R}))$

The meaning constructor in (19) combines with the intrinsic meaning of an adjective to produce an adjectival meaning that can then combine with a noun. However, this meaning constructor is designed to apply only to attributive adjectives, that is to adjectives that function as adjuncts, in f-structure, of the noun that they semantically modify. A predicated adjective in a copular clause requires a different meaning constructor to produce a coherent semantic structure.

The attributive adjective meaning constructor, then, applies only in certain syntactic contexts. Rather than have this meaning constructor appear (even optionally) within the lexical entry of an adjective, we can attach it to the c-structure node under which an attributive adjective will appear.[17] We can assume a PS rule such as (20) for attributive adjectival phrases, in which the template ATTRIB-ADJ calls the meaning constructor in (19). This rule licenses an optional AP adjunct within a noun phrase that functions as an ADJ at f-structure. The meaning constructor introduced by the phrase structure enables the adjective to semantically modify the noun.

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[15]Two meaning constructors are required not only, as argued here, to permit basic adjectival meanings to appear in different contexts, but also, as discussed by Dalrymple (2001), to permit adjectival meanings to be modified by adverbial meanings.

[16]I abbreviate the semantic attributes VAR and RESTR as V and R respectively. I also abstract away from the temporal/aspectual side of the semantics, including the event variable assumed for stage-level adjectives by Haug (2009).

[17]On the attachment of semantic material to phrase structure positions cf. Dalrymple (2001: 240).

(20)

$$\text{N}' \;\rightarrow\; \ldots \begin{pmatrix} \text{AP} \\ \downarrow\in (\uparrow\text{ADJ}) \\ @\textsc{attrib-adj} \end{pmatrix} \ldots$$

The functional and semantic annotations in this rule are relevant only, however, when an adjective is used attributively. In order to obtain a coherent semantic structure for a sentence like (14), we must introduce a meaning constructor that enforces subcategorization for a subject. The meaning constructor required appears in the following PS rule.

(21)

$$\text{V}' \;\rightarrow\; \ldots \begin{pmatrix} \text{AP} \\ \uparrow=\downarrow \\ \lambda P.P : ((\downarrow_\sigma \text{ V}) \multimap \downarrow_\sigma) \multimap ((\uparrow\text{SUBJ})_\sigma \multimap \uparrow_\sigma) \end{pmatrix} \ldots$$

The PS-rule in ex. (21) applies to APs filling the functional head of the clause ($\uparrow=\downarrow$, where $\uparrow$ finds the f-structure associated with the V', and by implication the VP, I' and IP). The meaning constructor introduced on the AP node in the above PS-rule will combine with the meaning constructor specified in the lexical entry for *good*; the semantic proof is given in (22).

(22)

$$\cfrac{\cfrac{\begin{array}{c} \lambda x.good(x) : \\ (g_\sigma \text{ V}) \multimap g_\sigma \end{array} \quad \begin{array}{c} \lambda P.P : \\ ((g_\sigma \text{ V}) \multimap g_\sigma) \multimap \\ ((g \text{ SUBJ})_\sigma \multimap g_\sigma) \end{array}}{\begin{array}{c} \lambda x.good(x) : \\ (g \text{ SUBJ})_\sigma \multimap g_\sigma \end{array}} \qquad Henry : h_\sigma}{good(Henry) : g_\sigma}$$

By the rule in (21), however, this derivation will be associated with the f-structure in (23) which, by traditional assumptions, is incoherent: it violates Completeness and Coherence since a SUBJ appears even though it is not subcategorized for by the PRED.

(23)

$$g : \begin{bmatrix} \textsc{pred} & \text{`good'} \\ \textsc{subj} & h : \begin{bmatrix} \textsc{pred} & \text{`Henry'} \end{bmatrix} \end{bmatrix}$$

There are two possible solutions. Authors such as Kuhn (2001), Andrews (2008) and Asudeh and Giorgolo (2012) have noted that the resource-sensitivity of glue, and the widespread codescriptional approach to semantics in LFG, render the f-structure conditions of Completeness and Coherence superfluous, since they are enforced in s-structure as *semantic* conditions on well-formedness. Asudeh and Giorgolo (2012: 69) propose that f-structure PRED features do not encode subcategorization for semantic arguments, enabling them to encode both transitive and intransitive uses of verbs like English *eat* in a single lexical entry, which is not

possible under traditional assumptions about subcategorization at f-structure. Following this approach, then, the f-structure in (23) would be valid: selection for a SUBJ, and only a SUBJ, is enforced in the semantics and need not also be enforced in f-structure.[18]

The alternative is to utilize analyses for complex predicates and predicate composition in order to effectively 'add' selection for a subject argument to the lexical PRED. Previous work on this topic, e.g. Butt (1995), Alsina (1996), Butt et al. (1997), Arka et al. (2009), assumes that a single f-structure PRED can be composed of information supplied by two distinct lexical items or morphemes. It is relatively trivial to extend this to the construction of PRED values also by information supplied by the c-structure, in precisely the same way that e.g. semantic information can be introduced in the c-structure (cf. 20). We can simply augment the PS-rule proposed above (21) with a rule that adds subcategorization for SUBJ to the PRED introduced by a predicated adjective, using the restriction operator to distinguish the lexical PRED from the composed PRED value (24).[19] The semantic proof will be identical to that in (22), but the associated f-structure will be as in (15) rather than (23), i.e. by traditional assumptions it will be well-formed.

(24)

$$ \text{V}' \quad \rightarrow \quad \ldots \quad \begin{pmatrix} \text{AP} \\ \uparrow/\text{PRED}=\downarrow/\text{PRED} \\ (\uparrow\text{PRED}) = \text{`}(\downarrow\text{PRED})\langle\text{SUBJ}\rangle\text{'} \\ \lambda P.P : ((\downarrow_\sigma \text{ V}) \multimap \downarrow_\sigma) \multimap ((\uparrow\text{SUBJ})_\sigma \multimap \uparrow_\sigma) \end{pmatrix} \quad \ldots $$

The analysis presented here can easily be adapted to treat predication of nouns, prepositional phrases, etc. So, the only difference between predicated adjectives and predicated nouns is that the meaning constructor introduced by the PS rule must differ slightly in the latter case, due to the contrasting semantic properties of nouns; i.e. in place of the last line of (24), we would need rather:

(25)  $\lambda P.P : ((\downarrow_\sigma \text{ V}) \multimap (\downarrow_\sigma \text{ R})) \multimap ((\uparrow\text{SUBJ})_\sigma \multimap \uparrow_\sigma)$

Note that by this analysis the subject argument of a predicated noun or adjective has no thematic role. This is appropriate for the subject argument, since (i) it is introduced directly into the f-structure, thereby bypassing argument structure, and (ii) there is no thematic role applicable for the subjects of most predicated nouns and adjectives (thematic roles apply to the arguments of eventualities, not the 'possessors' of attributes). So there is no thematic role associable with the property of being good, or of being a student, etc. This would be problematic if the subject

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[18]There would be no difference here, for our purposes, between a codescriptional approach to semantics and the 'description-by-analysis' approach of Andrews (2007, 2008).

[19]It will make no difference at the semantic level whether a copula is obligatory, as in English, or optional, as in Old Avestan.

of a noun or adjective were selected for in the lexicon just like a verbal argument.[20] Furthermore, this explains why subjects of nominals (and prepositions, etc.) cannot participate in the same argument structure alternations (e.g. voice alternations) as verbal subjects, since they are not present in argument structure.

In this way, then, the alternation between predicated nominals selecting for subjects and non-predicated nominals not selecting for subjects can be easily captured. Such a process is necessary if copular and verbless clauses are to be modelled with one of the open nominal analyses; it would not be required for closed complement analyses. Note that I am not specifically advocating the single-tier or XCOMP analysis here for any particular language, merely showing how the necessary selectional properties can be specified in the syntax.[21]

## 4   Back to Transitive Nominals

We can now return to the phenomenon seen above, that in various languages certain nouns or adjectives can be transitive, but only when predicated. In this case there is more support for treating the alternation as lexical. This may be the simplest solution for the Old Germanic and CGN forms discussed above, which are either isolated or very small closed classes of forms in their respective languages. The alternation is, however, entirely syntactic, just as with the selection for subjects discussed in the previous section; the Old Avestan forms in particular are members of productive morphological classes, such that in principle their number was unrestricted. For this reason, although it would be possible merely to propose two separate lexical entries, one for the non-transitive, one for the transitive variant, it seems preferable if the alternation can be captured in a way that reflects the syntactic context of the alternation.

In the context of nominal transitivity and predication, the 'semantics only' approach to Completeness and Coherence entails a significantly different analysis from the integrated f-structure/s-structure approach. The former approach simplifies the analysis by relaxing the rules of f-structure composition, but thereby

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[20]In this way, subjects in copular clauses are very different from subjects in 'ordinary' verbal clauses, which will always bear a thematic role in relation to the main verbal element. For this reason, the process of subject addition proposed here is entirely different from, and cannot be extended to cover, the proposal found in transformational grammar that subjects are *always* introduced in the syntax (Marantz 1984, Kratzer 1996). Such an extension would in any case be unwarranted in the present framework, since there is no alternation between subject-having and subjectless forms of finite verbs, as there is with nouns, adjectives, etc.

[21]It should be noted that alternative analyses of subject selection may be possible. Homola and Coler (2013) argue against the use of the restriction operator, although it is unclear whether their suggested alternative would be capable of *removing* arguments, as discussed in §4. An alternative would be to permit default PRED values to simply be overwritten where necessary, as suggested by Asudeh et al. (2013). Yet a further possibility might be to take seriously the presence of the s-string between the lexicon and c-structure, and somehow derive f-structure PRED values from s-string F(OR)M features (cf. Mycock and Lowe 2013) rather than specifying them directly in the lexicon, facilitating their manipulation according to syntactic context.

removes the possibility of using f-structure to constrain semantic composition. There are two possibilities for treating nominal transitivity and its connection to predication under a 'semantics only' approach. One would be an optional meaning constructor in the lexical entry introducing, or existentially quantifying, the object argument, parallel to Asudeh and Giorgolo's (2012) treatment of the optional argument of verbs like English *eat*. However, it would be difficult to constrain the application of such a meaning constructor only to contexts in which the nominal was predicated, or the converse, such that we could not directly model the dependence of nominal transitivity on syntactic context.

The second option would be to introduce a meaning constructor in the c-structure, as we saw above, so that it would apply only in the correct syntactic context. But a meaning constructor introduced in the syntax could not be used to add arguments, because different nominals select for different numbers and combinations of non-subject arguments with different thematic roles, such that no generalized addition could be specified. The only alternative would be to existentially quantify lexically selected non-subject arguments in non-predicated contexts. But here too, there is no way to determine in advance precisely what sort of argument is to be suppressed, or indeed how many arguments are to be suppressed. We would therefore have to frame an appropriately vague rule, and permit it to apply as many times as necessary. A meaning constructor like the following might achieve the desired result, but the use of the ! operator is distinctly unsatisfactory in a resource-sensitive semantics (Asudeh and Crouch 2002, Asudeh 2012: 101), and would have to be carefully constrained to prevent overapplication.

(26)  $!\exists x : ((\downarrow \text{GF})_\sigma \multimap ((\downarrow_\sigma \text{V}) \multimap \downarrow_\sigma \text{R})) \multimap ((\downarrow_\sigma \text{V}) \multimap \downarrow_\sigma \text{R})$

This semantic problem can be avoided by retaining Completeness and Coherence as f-structure conditions, and manipulating the PRED value in the syntax, as we saw above. As stated, potentially transitive nominals select for non-subject arguments in the lexicon; under a single-tier/XCOMP analysis of predication the subject argument will be introduced when necessary by the syntactic rules discussed above. Ex. (27) shows the lexical entry for OAv. *ḍami-* 'creator', which appeared in (6–7).

(27)

> ḍami-: N
> (↑PRED) = 'creator-⟨OBJ⟩'
> $\lambda x.\lambda e.create(e) \wedge agent(e, x) : (\uparrow_\sigma \text{EV}) \multimap ((\uparrow_\sigma \text{V}) \multimap \uparrow_\sigma \text{R})$
> (@THEME-OBJ)

The noun *ḍami-* selects for an OBJ argument in the lexicon. However, the semantic specification in the lexical entry makes only optional reference to the theme argument associated with that OBJ, by permitting, but not enforcing, calling of the THEME-OBJ template in (28). The non-optional meaning constructor in the lexical entry does not refer to a theme argument; the theme argument may or may

not be introduced into the semantics by calling the template. I assume the PS-rule in (29), where Nom ≡ { N | A }.

(28)    THEME-OBJ:    $\lambda y.\lambda e.\lambda P.P(e) \wedge theme(e,y) : ((\uparrow_\sigma \text{ V}) \multimap \uparrow_\sigma \text{ R}) \multimap$
$((\uparrow \text{ OBJ})_\sigma \multimap ((\uparrow_\sigma \text{ V}) \multimap \uparrow_\sigma \text{ R}))$

(29)

NomP   →   . . .   $\begin{pmatrix} \text{Nom}' \\ \text{GF } (\in) \uparrow \\ \uparrow/\text{PRED} = \downarrow/\text{PRED} \\ (\uparrow\text{PRED}) = \text{'}(\downarrow\text{PRED\_FN})\text{'} \end{pmatrix}$   . . .

By (29), when an NP or AP is used in a context other than predication, a predicate composition rule is introduced, just as with predicated nominals, but here the composition produces a PRED that selects for no arguments, regardless of whether the noun or adjective itself selects for arguments in its lexical entry. This will apply vacuously to the vast majority of nouns and adjectives, which do not select for arguments.

If, then, a 'transitive' nominal such as *dạmi-* is used in a non-predicated context, its argument is effectively removed from the syntax by the above rule. A coherent semantics will then result only by the non-application of the optional meaning constructor in the lexical entry. If, on the other hand, such a nominal is used in a context of predication, the above rule cannot apply and its argument will not be removed. A coherent semantic structure will then result only by the application of the optional meaning constructor, introducing the syntactically selected argument(s) into the semantics. In this way, f-structure formation constrains semantic structure, such that a coherent derivation always results.

Exx. (30) and (31) show the f-structure and semantic proof respectively for (6), ignoring the instrumental adjunct. Exx. (32) and (33) show the f-structure and semantic proof for (7).[22]

(30)       $c : \begin{bmatrix} \text{PRED} & \text{'creator}\langle\text{SUBJ,OBJ}\rangle\text{'} \\ \text{SUBJ} & t : \begin{bmatrix} \text{PRED} & \text{'that one'} \end{bmatrix} \\ \text{OBJ} & r : \begin{bmatrix} \text{PRED} & \text{'truth'} \end{bmatrix} \end{bmatrix}$

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[22]In (31) and (33), as above, I abstract away from the semantics of tense-aspect, hence the unquantified EV argument, but cf. Haug (2008), Bary and Haug (2011), and Lowe (2012) on the semantics of tense-aspect. The first meaning constructor in (33) is an approximation of the meaning of genitive case.

(31)  $\lambda x.\lambda e.create(e)$          $\lambda y.\lambda e.\lambda P.P(e)$
  $\wedge agent(e,x) :$          $\wedge theme(e,y) :$
  $(c_\sigma \text{ EV}) \multimap$          $((c_\sigma \text{ V}) \multimap c_\sigma \text{ R}) \multimap$
  $((c_\sigma \text{ V}) \multimap (c_\sigma \text{ R}))$          $((c \text{ OBJ})_\sigma \multimap$
                      $((c_\sigma \text{ V}) \multimap c_\sigma \text{ R}))$

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  $\lambda x.\lambda y.\lambda e.create(e)$          $\lambda P.P :$
  $\wedge agent(e,x) \wedge theme(e,y) :$          $((c_\sigma \text{ V}) \multimap (c_\sigma \text{ R}))$
  $(c_\sigma \text{ EV}) \multimap ((c \text{ OBJ})_\sigma$          $\multimap (c \text{ SUBJ})_\sigma \multimap c_\sigma$
  $\multimap ((c_\sigma \text{ V}) \multimap c_\sigma \text{ R}))$

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  $truth : r_\sigma$          $\lambda x.\lambda y.\lambda e.create(e)$
                  $\wedge agent(e,x) \wedge theme(e,y) :$
                  $(c_\sigma \text{ EV}) \multimap ((c \text{ OBJ})_\sigma$
                  $\multimap (c \text{ SUBJ})_\sigma \multimap c_\sigma)$

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  $\lambda x.\lambda e.create(e) \wedge$          $that : t_\sigma$
  $agent(e,x) \wedge theme(e,truth) :$
  $(c_\sigma \text{ EV}) \multimap (c \text{ SUBJ})_\sigma \multimap c_\sigma$

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          $\lambda e.create(e) \wedge agent(e,that) \wedge$
          $theme(e,truth) : (c_\sigma \text{ EV}) \multimap c_\sigma$

(32)
$$s : \begin{bmatrix} \text{PRED} & \text{'son}\langle\text{SUBJ}\rangle\text{'} \\[4pt] \text{SUBJ} & t : \begin{bmatrix} \text{PRED} & \text{'that one'} \end{bmatrix} \\[10pt] \text{ADJ} & \left\{ c : \begin{bmatrix} \text{PRED} & \text{'creator'} \\ \text{CASE} & \text{genitive} \\[8pt] \text{ADJ} & \left\{ l : \begin{bmatrix} \text{PRED} & \text{'lie'} \\ \text{CASE} & \text{genitive} \end{bmatrix} \right\} \end{bmatrix} \right\} \end{bmatrix}$$

# 5   Conclusion

Despite traditional definitions of adjectives and nouns as inherently intransitive, there is clear evidence for nominals in various languages selecting object arguments. In Old Avestan, Old Germanic and CGN, there is a direct association between nominal predication and nominal transitivity: only predicated nominals can govern object arguments in the syntax. This appears similar to the requirement that nouns and adjectives select for a subject argument when predicated but not otherwise, under the single-tier or XCOMP analyses of copular clauses. It is not only possible, as I hope to have shown, but also desirable to account for the variable argument selection of nouns and adjectives in both these contexts without having to assume lexical duplication, that is, to manipulate the selectional properties of nouns and adjectives in the syntax, appropriately reflecting the fact that this variation is syntactically, not lexically, determined.

(33)  Glue proof for (7):

$\lambda P.\lambda Q.\iota x.\lambda y.P(x) \wedge Q(y) \wedge R_c(x,y) :$          $\lambda x.lie(x) : ((l_\sigma \text{ V}) \multimap (l_\sigma \text{ R}))$
$((l_\sigma \text{ V}) \multimap (l_\sigma \text{ R})) \multimap$
$((((\text{ADJ} \in l)_\sigma \text{V}) \multimap ((\text{ADJ} \in l)_\sigma \text{R})) \multimap$
$(((\text{ADJ} \in l)_\sigma \text{V}) \multimap ((\text{ADJ} \in l)_\sigma \text{R})))$

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$\lambda P.\lambda y.\iota x.lie(x) \wedge P(y) \wedge R_c(x,y) :$          $\lambda x.\lambda e.create(e) \wedge$
$((((\text{ADJ} \in l)_\sigma \text{V}) \multimap ((\text{ADJ} \in l)_\sigma \text{R})) \multimap$          $agent(e,x) : (c_\sigma \text{ EV}) \multimap$
$(((\text{ADJ} \in l)_\sigma \text{V}) \multimap ((\text{ADJ} \in l)_\sigma \text{R})))$          $((c_\sigma \text{ V}) \multimap (c_\sigma \text{ R}))$

$\lambda P.\lambda Q.\iota x.\lambda y.P(x) \wedge Q(y) \wedge R_c(x,y) :$          $\lambda y.\lambda e.\iota x.lie(x) \wedge create(e)$
$((c_\sigma \text{ V}) \multimap (c_\sigma \text{ R})) \multimap$          $\wedge agent(e,y) \wedge R_c(x,e) :$
$((((\text{ADJ} \in c)_\sigma \text{V}) \multimap ((\text{ADJ} \in c)_\sigma \text{R})) \multimap$          $(c_\sigma \text{ EV}) \multimap ((c_\sigma \text{ V}) \multimap (c_\sigma \text{ R}))$
$(((\text{ADJ} \in c)_\sigma \text{V}) \multimap ((\text{ADJ} \in c)_\sigma \text{R})))$

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$\lambda P.\lambda z.\lambda e.\iota x.\iota y.lie(x) \wedge create(e) \wedge$          $\lambda x.son(x) :$
$agent(e,y) \wedge R_c(x,e) \wedge R_c(y,z) :$          $((s_\sigma \text{ V}) \multimap (s_\sigma \text{ R}))$
$(c_\sigma \text{ EV}) \multimap ((((\text{ADJ} \in c)_\sigma \text{V}) \multimap ((\text{ADJ} \in c)_\sigma \text{R}))$
$\multimap (((\text{ADJ} \in c)_\sigma \text{V}) \multimap ((\text{ADJ} \in c)_\sigma \text{R})))$

$\lambda P.P :$          $\lambda z.\lambda e.\iota x.\iota y.lie(x) \wedge create(e) \wedge agent(e,y)$
$((s_\sigma \text{ V}) \multimap (s_\sigma \text{ R})) \multimap (s \text{ SUBJ})_\sigma \multimap s_\sigma$          $\wedge R_c(x,e) \wedge son(z) \wedge R_c(y,z) :$
          $(c_\sigma \text{ EV}) \multimap ((s_\sigma \text{ V}) \multimap (s_\sigma \text{ R}))$

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$\lambda z.\lambda e.\iota x.\iota y.lie(x) \wedge create(e) \wedge agent(e,y)$          $that : t_\sigma$
$\wedge R_c(x,e) \wedge son(z) \wedge R_c(y,z) :$
$(c_\sigma \text{ EV}) \multimap ((s \text{ SUBJ})_\sigma \multimap s_\sigma)$

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$\lambda e.\iota x.\iota y.lie(x) \wedge create(e) \wedge agent(e,y)$
$\wedge R_c(x,e) \wedge son(that) \wedge R_c(y,that) :$
$(c_\sigma \text{ EV}) \multimap s_\sigma$

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