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The categorial anatomy of adjectives

Abstract: This paper examines how roots are adjectivised within a featural system comprising only two categories. It argues that adjectivisers, a heads, do not exist, leaving the repertory of categorisers with two members only: verbalisers, v heads, and nominalisers, n heads. We proceed to argue that the adjective category is possibly universal insofar as it involves *prima facie* dual categorisation: adjectives obtain when a root combines with a complex categorial structure involving both a verbaliser and nominaliser. This proposal is supported by grammar-internal evidence (viz. their external modification by adverbs and the nominal character of their internal structure) and by broader typological facts (the distribution of which, categorially, follows from our analysis). Several consequences and predictions are beneficially derived.

Communicated by: ...

1 Introduction: ontology, categories, and the primitives of grammar

This piece of research is framed within an understanding that lexical categories are to be analysed as being about interpretation, and not as shallow taxonomic categories: Déchaine (1993), Baker (2003). This would go some way toward explaining their prominence corss-linguistically and their purported universality (Baker, 2003), which would be a most curious fact if, for instance, the verb-noun contrast were a morphological reflex of T features, as in Pesetsky and Torrego (2004). We also subscribe to the view that categorisation is a necessary process (Embick and Marantz, 2008, 6) because it renders roots readable at the interface with Conceptual-Intentional systems (Panagiotidis 2011), or because it enables visibility and the onset of a derivational procedure (Mitrović and Panagiotidis 2017; harking back to Chomsky 2013), or maybe both.

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We take the view that the existence of verbal and nominal categories is universal (Baker 2003; see also Panagiotidis 2015, chap. 2) for granted. Panagiotidis (2011, 2015) argues that categorial features encode "fundamental interpretive perspectives". In the vein of Baker (2003), he posits two categorial features:

(1) a. An [N] feature, encoding a sortal interpretive perspective on the concept, hence nouns are kinds – alternatively, they lack temporal parts (Acquaviva, 2014).

b. A [V] feature encoding an extending-into-time interpretive perspective, hence verbs are sub-events – alternatively it encodes abstract causation (Ilkhanipour 2013; cf. Darteni 2007, chap. 7)

In general, we find it necessary to distinguish between *denotation* from *interpretive perspective*, along the methodological and conceptual lines of Acquaviva (2014). For instance, *hour* denotes a temporal interval but its interpretive perspective as a noun is sortal, hence *hour* is treated as a kind and—ultimately—as an object of sorts.

[N] and [V] are understood to be features on the categorizing heads n and v respectively (Marantz, 1997, 2000, 2006). This leaves adjectives out of the picture. Is there an [A] feature on an adjectiviser a? If such categorial features exists, what interpretive perspective would it encode? Marantz (1997, 2000, 2006, 2012) argues exactly for this, claiming that a introduces "properties". Intuitively, and rather informally, this is problematic: just as nouns like *misery* or *hue* seem to denote properties, so do (some) verbs, like *exist*.

The wide-spread take on the semantic notion of adjectivity is, therefore, too weak and intractable with respect to the other two lexical categories. Semantic characterisations of adjectives as denoting *properties*. (Marantz, 1997, 2000, 2006, 2012) While it seems necessarily true that '[p]roperties are the semantic counterparts of natural language predicative expressions" (Chierchia and Turner, 1988, 261), predicativity alone is an insufficient semantic characterisation of adjectival meanings (i.e., those properties of meaning associated with the adjectival category alone) since both verbs and nouns can associate with predicative expressions.

As properties have to be conceived as unary predicates (Chierchia and Turner 1988, cf. Feferman 2015), their extensions are sets. Type-theoretically, therefore, nouns, verbs, and adjectives are all, in a general set-theoretic sense, equivalent, which leads to a weak semantic characterisation of categorial meaning. Along the denotational dimension, therefore, adjectives are non-distinct from the nouns or verbs in their extensions.[1] Independently from the denotational dimension,

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[1] We concede there is no appropriate property theory that is amenable to our categorial analysis. Mitrović (2017) proposes a new type- and sort-theoretic system for categorisers,
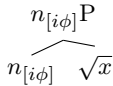
the interpretative dimension [...] these facts, there is no unitary characterisation of adjectives in terms of an interpretive perspective: no such perspective seems possible for adjectives. We are therefore led to conclude: that we cannot motivate the existence of [A] as a lexical-categorial primitive. Therefore, if the interpretative motivation cannot obtain, there is hardly any reason, apart from the notational and methodological convenience, to posit the existence of the adjectival category (in narrow syntax, or beyond).
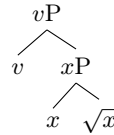
2 Toward a biverse for adjectives

The theoretical status quo concerning the inventory of presumably universal categorisers is a categorial "triverse", which we notate as $\mathcal{C}_3$, i.e. the assumption of a tripleton set of lexical primitives (Marantz 1997, 2000, 2001, 2012, *int. al.*). xxx

We depart from this general view by assuming a categorial "biverse", notated $\mathcal{C}_2$, i.e. a universal doubleton inventory of categorisers, containing verbalisers (v) and nominalisers (n) alone. Consequently, we contend that the adjective category derives as categorial composite, as suggested in (4b), as opposed to a triversal structure for a minimal adjective (4a)
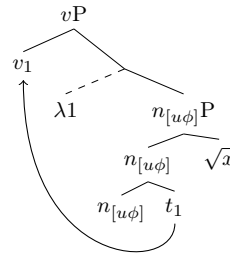
(2)   Nouns:

$$n_{[i\phi]}\text{P}$$
$$n_{[i\phi]} \quad \sqrt{x}$$

(3)   Verbs:

$$v\text{P}$$
$$v \quad x\text{P}$$
$$x \quad \sqrt{x}$$

(4)   Adjectives:

a. $\mathcal{C}_3$

$$a\text{P}$$
$$a \quad \sqrt{x}$$

b. $\mathcal{C}_2$

$$v\text{P}$$
$$v_1$$
$$\lambda 1 \qquad n_{[u\phi]}\text{P}$$
$$n_{[u\phi]} \quad \sqrt{x}$$
$$n_{[u\phi]} \quad t_1$$

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which rests on Chierchia and Turner's (1988) system. We do not explore the such semantics here further.

(4b) appears *prima facie* to represent an instance of denominal verbs. However, However, this is not the case for at least three reasons: (*i*) denominal verbs involve a more complex, and therefore different, structure (Alexiadou, 2001; Alexiadou and Schäfer, 2010; Alexiadou et al., 2011), (*ii*) the categorisers involved are qualitatively different in that they are defective (as we buttress below), and (*iii*) verbal derivations require at least one intepolating element (x) along with its extended (subcategorial) structure Levin (1993), (Levin and Hovav, 2005; Harley, 2005; Pylkkänen, 2008).

We show that a projectionally non-extended set of n and v derives the adjectival 'category', amply motivated on both empirical and theoretical grounds. We motivate excorporation of the minimal verbal category—viz. chain $\langle v_1, t_1 \rangle$ in (4b)—with two arguments: (*i*) morphosyntactically, the [N] and [V] categorial features clash and contradict each other (Baker, 2003); (*ii*) the head complex of n and v leads to type mismatch. Both reasons sufficiently motivate excorporation of one of the minimal categories: we take v to undergo such movement. It is a matter of conceptual necessity, given the existence of λ-driven covert movement, that a λ-'slot' be present in syntax (given the No Tampering and the Extension Conditions). Shimada (2007), whom we follow in the general programmatic thrust, supplies a detailed motivation for the λ-presence in narrow (morpho-)syntax.

2.1 Why there are no adjectivisers

There are two approaches to the status of adjectives as the "third category", i.e. of the category that breaks the symmetry between nouns and verbs.

The first one is Baker's (2003) , who argues that adjectives are the 'elsewhere' member of the triplet, the unmarked lexical category, lacking any categorial features: "a kind of default category, a category with no positive defining essence" (Baker 2003, 270). This however runs against typological evidence, to begin with: Dixon's (2004, 9–12) points out that adjectives are typologically the marked lexical category as they typically comprise fewer members than both noun and verb classes and as "a higher proportion of adjectives than of nouns and verbs will be derived forms". Having said that, even the existence of derived adjectives, e.g. denominal and deverbal adjectives, immediately invalidates the option of the adjective category resulting from the absence of categorial features: if adjectives are categorially unmarked, what kind of features would adjectivising affixes bear?

The received scenario on the categorial identity of adjectives is that they are not the "elsewhere" member of the categorial triplet, but the marked one. Adjectives are understood to be a $[+\text{V}, +\text{N}]$ lexical category, one in which both nominal

and verbal properties are combined as a result of them bearing both categorial features (Chomsky, 1970; Jackendoff, 1977; Stowell, 1981). Of course the $[+v, +n]$ scenario presents a different kind of difficulty: what kind of interpretation at the Conceptual-Intentional interface would a $[+v, +n]$ feature specification encode?

Understandably, Baker (2003, 165–169) explicitly bars this option via his Reference-Predication Constraint, which amounts to banning a syntactic node from bearing both an [N] and a [V] feature. Panagiotidis (2015, 119) simply stipulates that "lexical heads bear interpretable categorial features, *either* [N] *or* [V] (emphasis ours)"; still, given his system of interpretable categorial features, it is hard to see how both [N] and [V] could co-exist on a single lexical head, a categoriser. To be more explicit, this coexistence of [N] and [V] on a single head, say an adjectiviser a, would be problematic on three counts:

(5)   i. The sortal perspective of [N] and that of extending-into-time of [V] would probably contradict each other;

      ii. The $[+n, +v]$ coexistence in all probability cannot yield a single categorial label;

      iii. The $[+n, +v]$ coexistence would also create a type/sort-theoretic clash (Mitrović, 2017).

The above lead us to a paradox: adjectivisers cannot exist but adjectives certainly do. An [A] feature on the adjectiviser a would encode an elusive and perhaps inexistent interpretive perspective. At the same time a featureless a would be impossible—something that Baker (2003, chap. 4) makes all too clear. At the same time, a could not be the host of both [N] and [V]. Hence adjectivisers, the purported a heads, do not exist and there is no other categorising (i.e. lexical, cf. Panagiotidis 2011) head besides n and v.

2.2 Adjectives as categorial composites

We are now ready to spell out the analysis according to which the adjectival category arises without an adjectiviser and as a derivational consequence of the nominal-verbal complex, bearing both [N] and [V] features. Our analysis overcomes the technical and conceptual shortcomings of Chomsky (1970) and avoids the consequences of any version of Baker's (2003, 165–169) Reference–Predication Constraint. Thus, an adjective is derivationally "born" in the following way, as demonstrated in (6): The root ($\sqrt{x}$) and the composite head comprising n,v categorisers, qua bearers of the [N] and [V] features, enter the derivation. The composite head and $\sqrt{x}$ merge to form a syntactic object (SO). The SO contains a

clash and is unlabellable (cf. Chomsky 2013), halting the derivation. The composite head also suffers type mismatch.[2]

(6)
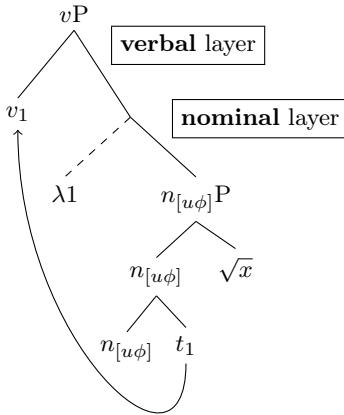
Labelling is resolved via excorporation of v (as signalled by lambda operator, λ, which we represent in narrow syntax). The resulting SO is type-compatible and labellable, as desired. This composite adjective analysis makes adjectives look like verbs on the outside and nouns on the inside. We now proceed to laying out the evidence for this prediction.

2.2.1 Nominal interior

From 'below', adjectives behave like nominals in that they show ϕ-agreement, such as concord, where typologically applicable. A structure of an adjectivally modified noun phrase is given in (8), where we exclude λ-terms for simplicity of exposition.[3] Prior to excorporation of v^a, the n^a_ϕ is in c-commanding and Agreeable relation with n so as to allow ϕ-feature checking, *qua* nominal ϕ-concord.

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2 While Predicate Modification (PM) would rescue type-mismatch, we assume, in line with Mitrović (2017), a non-identical type of v and n, which would prevent PM from applying. The details fall outside the scope of this paper and our motivation does not rest on the type-mismatch argument alone.

3 In fact, assuming that covert displacement cannot be compositionally accounted for, the λ-terms are necessary for any narrow-syntactic movement operation, although this is not represented in the derivation. Given the no-tampering condition, we take this to be an implicit default of syntactic-semantic structures.

In this vein, we derive the noun-adjective concord, assuming that the nominal component in the adjectival head-complex , i.e. n^a, is defective insofar as it lacks an interpretable ϕ-features, present on independent n heads that feature in nominalisation structures.

(7) ϕ-concord and nominally defective adjectives (Slovenian):

  a. siv-∅   stol-∅
     grey-SG.M chair-SG.M
     '(a) grey chair'

  b. siv-**a**   stol-**a**
     grey-SG.F table-SG.F
     '(a) grey table'

  c. siv-**o**   pohištv-**o**
     grey-SG.N furniture-SG.N
     'grey furniture'

(8) Adjectival structures and first-order modification: *siva miza* 'grey table'
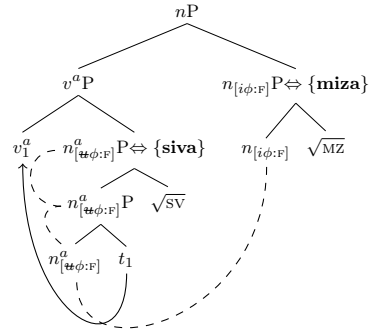
The second argument we submit for the nominality of adjectives is suggested to us by Andrew Nevins (pers. comm.): in English, some categorial affixes are *prima facie* homophonous for both nouns and adjectives. Take the affix ⟨-an⟩, which features both as a nominaliser, as in *librari-an*, or a (seeming) adjectiviser, as in *reptili-an*. In $\mathcal{C}_3$, ⟨-an⟩ is homophonous, while in $\mathcal{C}_2$ it is not: it is a spell of the [N] feature, whether in nominalisation or adjectivisation structures.

(9) ⟨-an⟩ in $\mathcal{C}_3$:
   a. $n \Leftrightarrow ⟨\text{-an}⟩_1$
   b. $a \Leftrightarrow ⟨\text{-an}⟩_2$

(10) ⟨-an⟩ in $\mathcal{C}_2$:

   a. $n \Leftrightarrow ⟨\text{-an}⟩$

2.2.2 Verbal exterior

From above (4b), a modified Adjective has verbal behaviour, since modification of an Adjective requires selection by an adverbial element. A structure of a recursively modified noun phrase (where an adverbially modified adjective modifies the noun in turn) is thus the one in (12). This derives the desideratum of theoretically deriving the fact that adjectives behave both nominally (from 'below') and verbally (from 'above'), which explains the adjectival behaviour of participles. Additionally, this is also compatible with the Corver's (2014) analysis that adverbs are copular in

nature. Corver takes an A(djective)P to move to Spec(Cop(ula)P) which is headed by $[_{\text{Cop}}$ *-ly*$]$ in prenominal adverbial structures. His empirical facts are derivable by virtue of a verbal presence in the proposed adjectival structure (where his Cop is analogous to our v^a).

We consider the same mechanism to be operative cross-linguistically, including Slovenian—consider the following data, following (7).

(11)   PIC-blocked ϕ-concord and verbally non-defective adjectives (Slovenian):

   a. pretežn-**o**/∗-∅   siv-∅   stol-∅
       predominantly.SG.N/M grey-SG.M chair-SG.M
       '(a) grey chair'

   b. pretežn-**o**/∗-**a**   siv-**a**   stol-**a**
       predominantly.SG.N/F grey-SG.F table-SG.F
       '(a) grey table'

   c. pretežn-**o**$_{\phi_i}$/∗-**o**$_{\phi_{ii}}$ siv-**o**$_{\phi_{ii}}$ pohištv-**o**$_{\phi_i}$
       predominantly.SG.N grey-SG.N furniture-SG.N
       'grey furniture'

(12)   Adverbial structures and second-order modification (v^{a^a}): *pretežno siva miza* '(a) predominantly grey table'
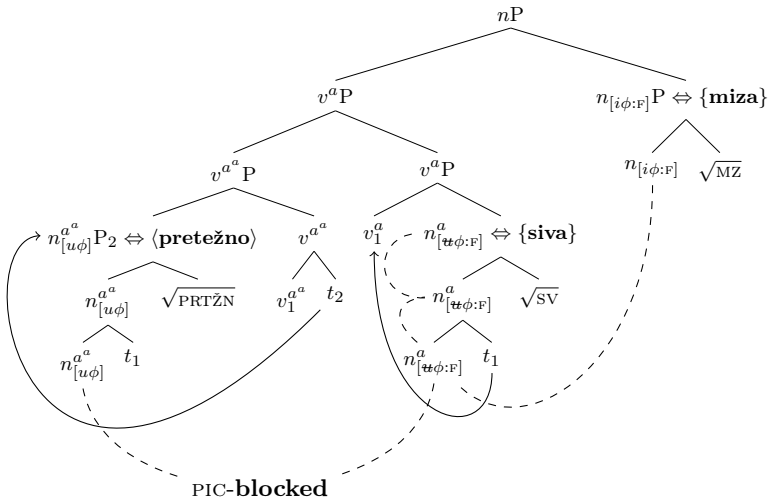
Concord is blocked, in our system (12), by the fact that, *ceteris paribus*, categorisers are Minimal Phases Chomsky (2001); Roberts (2010). As such, the verbal component, v, is not in a configuration that would allow an Agree operation
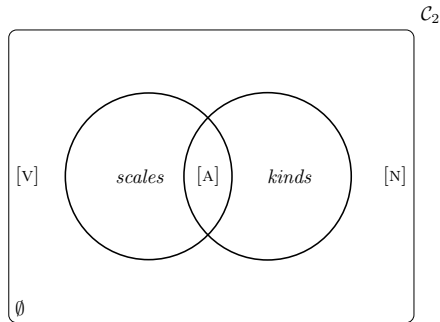
Fig. 1: Adjectives semantically within the categorial biverse.

to be established with the head noun, bearing the relevant ϕ-feature(s). In Slovenian, as shown in (11), neuter agreement kicks in as a default/unmarked option (see Marušič et al. 2008, *int. al.*) as last resort rescue at Vocabulary Insertion. In very general terms, our analysis accounts for adverbs as adjectives unable to ϕ-agree, as shown in (12), by virtue of the Phase Impenetrability Condition (PIC; Chomsky 2001, which we find as a desirable consequence.

Adjectives are not (necessarily) bimorphemic, as we would expect from [v nP] structures. Finally, no verbal functional superstructure ('Extended Projection') is allowed on top of the purported (adjectivally composing) v^a, not even Voice, although adjectives are understood to be inherently relational (Larson 1999, Larson 2014, ch. 7), possibly as a result of their dual categoriser composition. We argue that the categorial ingredients of adjectives are dual, involving both [v] and [n]. They begin their derivational lives in tandem, as feature- or head-complexes, with a λ-element (à la Shimada 2007) intervening between v and n once (overt) raising of the former is triggered. As a result, adjectives are compositionally derived as creating a 'scalar—*qua* gradable—sort': (*i*) SCALARITY, courtesy of [v] (which provides means for temporality; cf. Panagiotidis 2015, ch. 4), and (*ii*) SORTALITY, courtesy of [N]. In tandem, the two ingredients yield an inherently gradable predicate. That is, an adjective.

Semantically, we predict the adjectives to share, by virtue of its composite morpho-syntax, aspects of meaning with nouns and verbs.

In the remainder of this section, we further buttress the proposed structure by drawing on empirical evidence from wider typology. As we claim, the typological distribution of adjectives, with regard to their categorial encoding, provides independent evidence for the categorially composite view of adjectives.

2.2.3 Beyond English: the wider typology

It's an established typological fact that there exists *a three-way system* of categorial encoding of adjectives across languages(Dixon, 2004; Beck, 1999; Stassen, 2013). In Fig. 2, the *WALS* data by Stassen (2013) are presented ($N = 386$).

(13)   Cross-linguistically, adjectives may "behave" like

      i. **verbs** (39%)

     ii. **nouns** (34%)

   iii. **mixed**, i.e. as either verbs or nouns (27%)

We derive the typological trichotomy by proposing that the relevant parameter pertains to the object of excorporation from within the arguably universal adjectival head-complex. Indo-European-type languages show nominal encoding of adjectives which we analyse by assuming the relevant v^a undergoes excorporation. In Korean, for instance, adjectives are allegedly indistinguishable, in their core distribution, from verbs. We propose to analyse Korean adjectives using an obverse excorporation mechanism: the nominal element n^a undergoes excorporation, leaving the internal layer of the adjective to take on verbal properties. The last typological group, allowing for both verbal and nominal categorial behaviour of adjectives, is best analysed, we believe, by appealing to optionality and underspecification of the parameter that obligates the excorporation of one, and only one, categorial element from within the head-complex. For this last group, where free variation is presumably operative, we also find diachronic patterns which support the view that optionality in terms of adjectival encoding arose, or stabilised, in time. While we do not have the opportunity to explore this dimension further, we investigate the diachronic evidence for free variation of categorial encoding in Dravidian elsewhere.

3 Conclusion & discussion

After reaching the general conclusions, we submit three theoretical and empirical areas for further research in the following subsections.

We briefly discuss how our model is, or can be, related to other, seemingly independent, properties of adjectival expressions and structures. One such connection that arose in the preliminary investigation is the following implicational universal:

(14)   **Implicational Universal**

    If a language encodes adjectives *nominally*, that language will most likely employ the *morphological* strategy of forming comparatives. (Fig. 3; $p < .0.0001, \chi^2 = 42.6336, df = 1$)
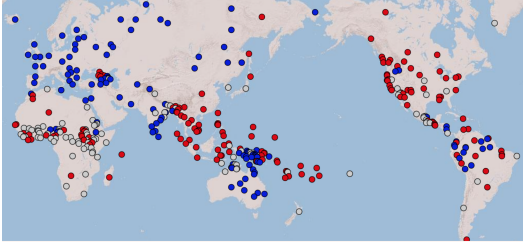
Fig. 2: An areal distribution of the three-way categorial encoding of adjectives, with respect to whether adjectives behave like **verbs** (red), **nouns** (blue), or **both/neither** (grey).
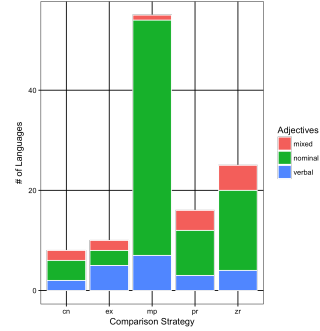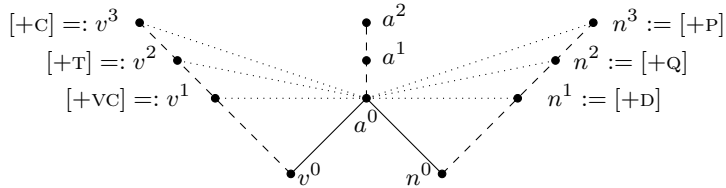

Fig. 3: Categorial encoding of adjectives plotted against various comparison strategies: **cn** conjunctive, **ex** *exceed*-type, **mp** morphological/synthetic, **pr** periphrastic, or **zr** zero strategy.

In Fig. 3, we plot the relation between categorial encoding of adjectives and the comparison strategy. The nature of this universal is left as an important question for future research.

Another question we explore in future work regards the nature of the Extended Projection, if any, for adjectives. Tangentially, and in line with Bobaljik (2012), we take the Extended Projection of adjectival phrases to comprise of a comparative and a superlative structural layer. The functional weights in (15), notated in superscript, are used in the sense of Roberts (2010, 421) and Roberts (2012, 390), where all lexical categories, n, v and a, have a functional weight of 0.

(15)　　A $\mathcal{C}_2$ semi-lattice of lexical (*solid*) and functional (*dashed*) features. *Dotted* lines represent "Cinque lines".[4] The following are shorthands: $a := [+\textsc{v}, +\textsc{n}]$, $n := [-\textsc{v}, +\textsc{n}]$, $v := [+\textsc{v}, -\textsc{n}]$. The *diagonal* chains correspond to nominal and verbal Extended Projections, while the adjectival Extended Projection (*vertical*) a^1 corresponds to the comparative, being the functional layer of weight 1, and a^2 to the superlative projections, being the functional layer of weight 2.

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4 By "Cinque lines" we mean those associations between specific adjective classes and designated positions in the nominal and verbal Extended Projections (*qua* the cartographic enterprise).

$$
\begin{array}{ccc}
[+\textsc{c}] =: v^3 & a^2 & n^3 := [+\textsc{p}] \\
[+\textsc{t}] =: v^2 & a^1 & n^2 := [+\textsc{q}] \\
[+\textsc{vc}] =: v^1 & & n^1 := [+\textsc{d}] \\
 & a^0 & \\
 & v^0 \qquad n^0 &
\end{array}
$$

A feature-microscopic view we advocate is also amenable to semantic considerations that rest on the wider set of assumptions relating narrow-syntactic features and lexical categories to type-theoretic objects.

What remains to be fully and wholly understood is how the signature adjectival property, namely its gradability, can be understood through a semantically-nonvoid categorial features. In concert, as we conjecture and partly motivate, $[+\textsc{v}, +\textsc{n}]$ should yield type-theoretic means for gradability to fall out of the system (as we hope to see it develop).

Empirically, it remains to be determined how the seemingly universal principle of adjectival gradability may be relaxed, explanatorily, in order to account for languages like Warlpiri which lack gradability/comparison expressions (Bowler, 2016). Such variation cannot readily be accounted using morpho-syntactic parameters, such as the excorporational one we submit here, but rather a semantic/ontological parameter. One avenue for future research in this direction is the modification of the lexical feature semi-lattice in (15).

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