The encoding of adjectives

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1. Introduction

In this paper, we will give a unified account of the cross-linguistic variation in the encoding of adjectives in predicative and in attributive constructions. Languages may differ in the encoding strategy of adjectives in the predicative domain (Stassen 1997), and sometimes change this strategy in the attributive domain (Verkerk 2007). We will show that the interaction of two principles, that of faithfulness to the semantic class of a lexical root and that of faithfulness to discourse functions, can account for all attested variation in the encoding of adjectives.

2. Adjectives in predicative constructions

Stassen (1997) gives a report of a large-scale cross-linguistic study of intransitive predicates. One of his main findings is that although there are four major parts of speech that can be placed in a predicative construction, namely nouns, verbs, adjectives and adverbials, there are only three major strategies in predicative encoding. Adjectives do not have a predicative encoding strategy of their own. In the majority of languages, adjectives are either verbally or nominally encoded. Abstracting away from the marginally attested option to pick a locational strategy, five different options for the predicative encoding of adjectives are discerned, as illustrated in Table 1. In the first and last (marginal but attested) options, all parts

Table 1. Possible encoding options of predicates

	V		Adj		N
1	[v		v		v]
2	[v		v	][	n]
3	[v		v][n		n]
4	[v	][	n		n]
5	[n		n		n]

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of speech get a verbal or nominal encoding respectively. In the second and fourth options, all adjectives are encoded as either verbs or nouns. In the third option, adjectives can receive either encoding depending on the type of predication (stage vs. individual level) of the property described, as we will explain below.

Stassen (1997) introduces the terms "verby" and "nouny" encoding, indicating the choice of adjectives to conform either to the verbal or to the nominal strategy. In example (1) and (2) both strategies are illustrated:

Verby: Tigak (Wetzer 1996)

(1) a. *Tang iai ga lavu*
the tree 3SG.PAST big
'The tree was big'

b. *Na Gamsa ga ima*
the G. 3SG.PAST come
'Gamsa came'

Nouny: Dutch

(2) a. *De man was mooi*
the man was beautiful
'The man was beautiful'

b. *De man was leraar*
the man was teacher
'The man was a teacher'

In the verby example (1) we see that the same morpheme *ga* is used in the predicative constructions with a verb and an adjective; in the nouny example (2) we see that the copula is used both in a predicate construction with an adjective and with a noun.[1] For languages that apply one predicative strategy for all adjectives, Stassen claims that the Tensedness parameter is decisive. Languages that mark tense on their verbs morphologically have a nouny strategy for their adjectives; languages that do not mark tense on their verbs morphologically have a verby strategy. Also, Stassen proposes that "time stability" plays a role in predicative encoding. He argues that the less time stable a predicate is, the greater the chance that it is encoded by the verbal strategy. Stassen observes that if a language uses a verbal strategy for nouns — generally denoting time stable entities — it must also use the verbal strategy for adjectives; and if a language uses a nominal strategy for verbs — generally denoting time instable events — it must also use this strategy for adjectives.

We think the distinction between time stable nouns and time instable verbs is too coarse-grained, since nouns can denote events like *lightning* and short-lived things like *seconds*, while verbs can denote more time stable notions like *to live*. Rather, we would like to think about this distinction in terms of the presence of a Davidsonian event argument. Prototypical nouns like *man* or *tree* do not have a Davidsonian (event) argument, since they refer to entities. Prototypical verbs like *work* or *hit* do have such an argument.[2] Kratzer (1995) argues that the difference between stage-level properties like *sitting on a chair* and individual-level ones like *being blond* involves the presence vs. the absence of a Davidsonian argument.

Stage-level properties, having a Davidsonian argument *e*, can be modified by spatial and temporal expressions; individual-level properties, lacking such an argument, cannot.[3] In (3) this is illustrated:

(3) a. Mary was sitting in a chair at the office for an hour
b. Sitting-in-a-chair(e,Mary) & at-the-office(e) & for-an-hour(e)
c. # Mary was blond at the office for an hour
d. Blond(Mary)[& at-the-office(??) & for-an-hour(??)]

We would like to think of this distinction as being gradient rather than categorical. Although a property is always interpreted as either stage or individual level in a sentence, the property itself can often be used under both readings (cf. *Mary was blond for an hour but then her wig fell off*).

In his typological study, Stassen (1997) shows that the more stage level (or in Stassen's terms, the less time stable) a property is, the more likely it is to be encoded by the verbal strategy (e.g. properties indicating human propensities or physical characteristics). Similarly, the more individual level a property is, the more likely it is to be encoded by the nominal strategy (e.g. properties indicating material or gender characteristics). The stage versus individual levelness of properties is illustrated in Table 2.

Table 2. Stage versus individual levelness of properties

Stage level				**Individual level**
human propensity	>> physical	>> dimension, color	>> form, age, value	>> gender, material
hungry	>> *	>> *big, black*	>> *round, old, good*	>> *male, golden*

So-called "split" languages make a categorical distinction within the class of adjectives, forming two groups of adjectives (one using verby encoding, the other nouny encoding). An example of a split language is Samoan. In this language, we see that stage-level adjectives, such as *ill*, conform to the verby strategy, which is characterized by the tense-aspect markers in front of the predicate, as can be observed in (4b). Individual-level adjectives like *golden*, on the other hand, conform to the nouny strategy, which is characterized by the absolutive marker *'o* and the article *le* in front of the predicate, as illustrated in (4d).

Samoan [Austronesian, Polynesian] (Stassen 1997)

(4) a. *Ua alu Ioane*
PERF go Ioane
'Ioane has gone'
b. *Sa ma'i le teine*
PAST ill ART girl
'The girl was ill'

c. *ʾO le fafine la pua'a lea*
ABS ART woman ART pig DEM
'This pig is female (a sow)'
d. *ʾO ona fulufulu ʾo le matū auro mamā lava*
ABS its feather ABS ART EMPH gold pure EMPH
'Its feathers are (made of) pure gold'

"Switching" languages make a fluid distinction in the encoding of adjectives, for example by putting focus on the property's origin or not. For switching languages too, the distinction between stage and individual level predication can be used to explain the encoding pattern. The more individual level a property is perceived, the more likely it is encoded as a noun. An example of a switching language is Luo:

Luo (Stassen 1997)

(5) a. *D'uf-an*
come-3PL.PAST
'They came'
b. *Inníi xeesúmmaa*
3SG.MASC.NOM guest
'He is a guest'
c. *Ní guddat-an*
3PL.NOM big-3PL.PAST
'They have grown up'
d. *Inníi gúddaa*
3SG.MASC.NOM old
'He is old'

In (5), we see that both the verb and the adjective can be inflected with the same markers for tense and person. The meaning of (5c) is not simply 'they are big', since the notion of becoming is added to the meaning of the property. In (5d) we see an adjective with nouny encoding. Here the dynamic meaning is absent, and 'old' is associated with a more inherent, fixed meaning, that is, it is a more individual level property. When speakers of a switching language want to express that someone has acquired a certain property, they will use verby encoding; if they want to express that someone has a property, without relating the temporal development of that property, they will use nouny encoding.

In conclusion, cross-linguistically, languages do not have a specialized predicative construction for adjectives. Depending on the extent to which a property is (perceived) as being stage or individual level, an adjective gets encoded either as a noun or a verb. In the next section, we will give an Optimality Theoretic (OT) analysis of this finding.

3. An OT analysis

For our OT analysis, we will make use of the OT procedure harmonic alignment. Aissen (2003) uses harmonic alignment to account for differential case-marking. In

this operation, two hierarchies, one of which is binary, are combined, as illustrated in the following examples:

(6) a. D1: X >> Y
b. D2: a >> b >> … >> z

(7) a. H1: X/a >> X/b >> … >> X/z
b. H2: Y/z >> … >> Y/b >> Y/a

The highest ranked member of the first hierarchy combines with the members of the second hierarchy, starting with the highest ranked one and proceeding downwards. The lowest ranked member of the first hierarchy combines with the members of the second hierarchy, starting with the lowest ranked one and proceeding upwards. In OT, such hierarchies are formulated in terms of constraints that militate against less harmonic combinations:

(8) a. C1: *X/z >> … >> *X/b >> *X/a
b. C2: *Y/a >> *Y/b >> … >> *Y/z

The first hierarchy states that the combination of X and z should be avoided the most, and the combination of X and a the least; the second hierarchy states that the combination of Y and a should be avoided the most, and the combination of Y and z the least.

Importantly, these constraint hierarchies are universal and not subject to cross-linguistic variation. Languages can differ in the way other constraints break up this hierarchy, overruling (some of) the members of the hierarchy.

As we saw above, nouns typically denote entities and are individual-level predications, while verbs typically denote events and are stage-level predications. This can be captured by a harmonic alignment operation. First, we can rank verbs and nouns on a hierarchy of "temporal modifiability": crosslinguistically, verbs are often inflected for tense, but nouns only rarely so (Sadler & Nordlinger 2000). Also, as Malchukov (2006) argues, tense is the first category a newly derived verb acquires, and the first category a nominalised verb will lose. (Note that this is also consistent with the Stassen's (1997) Tensedness parameter.) Thus, we get the binary hierarchy in (9).

(9) N >> V

Semantically, we could say (at least for the purposes of this paper) that the world consists of entities, properties, and events (cf. Croft 1991). By definition, an entity is more individual level than an event, properties being an intermediate category, as illustrated in (10).

(10) entity >> property >> event

Following (7), we can combine the two hierarchies by harmonic alignment:

(11) a. Nouns: N/ENTITY >> N/PROPERTY >> N/EVENT
b. Verbs: V/EVENT >> V/PROPERTY >> V/ENTITY

These hierarchies can be translated into constraint hierarchies:

(12) a. Noun hierarchy: *N/EVENT >> *N/PROPERTY >> *N/ENTITY
b. Verb hierarchy: *V/ENTITY >> *V/PROPERTY >> *V/EVENT

The two constraint hierarchies interact, causing a verby or nouny strategy for the adjectives depending on their mutual ranking. The different rankings in (13) can account for all cross-linguistic variation in the encoding strategies that Stassen (1997) observed in predicative constructions. ([VH] is short for Verb hierarchy.)

(13) a. *N/EVENT >> *N/PROPERTY >> *N/ENTITY >> [VH]
b. *N/EVENT >> *N/PROPERTY >> [VH] >> *N/ENTITY
c. *N/EVENT >> [VH] >> *N/PROPERTY >> *N/ENTITTY
d. [VH] >> *N/EVENT >> *N/PROPERTY >> *N/ENTITY

Consider for example the ranking in (13b). Read from left to right, the constraints penalize a nouny encoding of events, a nouny encoding of properties, a verby encoding of entities, properties and events, and finally, a nouny encoding of entities. Since it is more important to be faithful to high ranked constraints, a language with this ranking will avoid nouny encoding of events and properties, choosing a verby strategy instead. This does entail a violation of some constraints in [VH], but these are lower ranked in the constraint hierarchy. The verb hierarchy as a whole is more important than the constraint that militates against the nouny encoding of entities. Thus, we get a verby language: entities are encoded as nouns; events and properties as verbs.

In Tableau 1, the optimization process just described is represented for entities, properties, and verbs. In the top row, the constraints are ranked according to their strength from left to right. The first column contains the input to the optimization process, the second column contains the output candidates. The asterisks indicate a constraint violation. Whenever this violation is fatal (because another candidate does not violate a higher constraint), this is marked by an exclamation mark. The optimal candidate (the candidate that best satisfies the constraints and becomes the actual output for a given input) is marked by the pointing finger. (As the reader may verify, the rankings (13a–d) pair-up with strategies 1, 2, 4, and 5 of Table 1, of which the second strategy is illustrated here.)

Tableau 1. Verby languages

Input	Candidates	*N/EV	*N/PR	[VH]	*N/EN
entity	☞ Nouny				*
	Verby			*!	
property	Nouny		*!		
	☞ Verby			*	
event	Nouny	*!			
	☞ Verby			*	

The constraint hierarchies can be very easily elaborated with the stage-individual level distinction within adjectives, in which case they also account for the third strategy (that of the split and switching languages) in Table 1. As we saw above, some adjectives are more time stable than others. In most languages that make a distinction between verby and nouny encoding for their adjectives, only two groups are distinguished: a stage-level group, consisting at least of adjectives like *hungry* and *ill*, and a individual-level group, consisting at least of adjectives like *golden*, *American* and *female*. Refining our hierarchies with this distinction, we get the following:

(14) a. *N/EVENT >> *N/STAGE PROP >> *N/IND. PROP. >> *N/ENTITY
b. *V/ENTITY >> *V/IND. PROP >> *V/STAGE PROP. >> *V/EVENT

An illustration of the encoding of predicates in a split or switching language (with the ranking *N/EVENT >> *N/STAGE PROP >> [VH] >> *N/IND PROP >> *N/ENTITY) is given in Tableau 2. As we already know from Section 2, and is made explicit in this tableau, in such a language, events and stage-level properties are encoded with a verbal predicate; entities and individual-level properties are encoded with a nominal strategy.

Tableau 2. Split or switching languages

Input	Candidates	*N/EV	*N/STAGE	[VH]	*N/IND	*N/EN
Entity	☞ Nouny					*
	Verby			*!		
Individual level property	☞ Nouny				*	
	Verby			*!		
Stage level property	Nouny		*!			
	☞ Verby			*		
event	Nouny	*!				
	☞ Verby			*		

4. Attributive encoding of adjectives

Verkerk (2007) examines whether adjectives that have a verby encoding in a predicative structure keep their verby encoding in an attributive environment. By comparing relative clauses and attributive adjectives, she finds that out of her sample of fifteen predicatively verby languages, four languages (Tukang Besi, Maori, Turkana and Sanuma) become attributively nouny.

"Verby verbies" (VVs) are languages that keep their verbal strategy for adjectives in an attributive environment. An example of such a language is Yukaghir. The same allomorph (*-ce/-d'e*) that is used in the relative clause in (15a) is used on the attributive adjective in (15b). This language keeps its verby encoding of adjectives in the attributive environment.

Yukaghir (Maslova 2003)

(15) a. *tat aj qon-de-ge cuge-ge irk-in [qodo-d'e šaqale*
CA CP go-3SG-DS way-LOC one-ATTR lie-ATTR fox
-k] juø-l'el-mele
-PRED see-INFR-OF:3SG
'When he was still going, he saw a fox lying on the way'

b. *Met-in [er-ce n'er-ek] kej-?ile*
I-DAT bad-ATTR clothes-PRED give-3PL:OF
'They gave me bad clothes'

"Nouny verbies" (NVs) are languages that switch from a verbal to a nominal strategy in an attributive environment. An example is Tukang Besi:

Tukang Besi (Donohue 1999)

(16) a. *ku-hoto [wunua to'oge]*
1SG-have house big
'I have a big house'

b. *no-he-doo na [ana t-um-inti] measo'e*
3R-DO-cry NOM child run.SI over.there
'That running child is crying'

In Tukang Besi, the strategy for adjectives and verbs is the same in predicative contexts, but different in attributive contexts. The obligatory subject infix *-um-* that is used on verbs in attributive contexts, is not used with adjectives. Apparently, it is possible for languages to use the same strategy for both adjectives and verbs in predicative contexts, but to make a distinction between them in attributive contexts.

In the previous section we saw that in split and switching languages, more individual-level properties are encoded as nouns while more stage-level properties

are encoded as verbs. The Tukang Besi data show that (categorical) verby languages can become nouny in attributive contexts. What is the difference between attributive and predicative constructions that causes some languages to switch their strategy?

5. Why some verby languages become nouny in an attributive context

Since it is possible for languages to opt for different strategies for adjectives and verbs in attributive contexts, even though both use the same strategy in predicative contexts, the attributive construction must have certain characteristics that can make adjectives choose a non-verbal strategy. We propose that this characteristic has to do with the difference in function of attributive and predicative constructions, as proposed by Croft (1991). Croft makes a distinction between two main motivations for parts of speech differentiation: the semantic class of a lexical root and the pragmatic function of a lexical item. Stassen's (1997) analysis and our OT formalization in Section 3 are concerned with the semantic class: verbs typically denote events, nouns typically denote entities. In addition to this dimension, however, there is that of pragmatic function: nouns are typically used to refer to discourse participants, verbs are typically used for predication. The two dimensions often go hand in hand, entities being good discourse referents and events being good predicates. But the two dimensions sometimes work in opposite directions. In these cases, as we will show, we get precisely the variation described in the sections above.

In OT terms, we can capture the function principle in a constraint FuncFaith that states that nouns are preferably referential and therefore occur in NPs, and that verbs are preferably predicative and therefore occur in VPs (cf. Malchukov 2006).

(17) FuncFaith: Nouny elements (Ns) sit in nominal projections; verby elements (Vs) sit in verbal projections.

An adjective in an attributive construction is in a nominal projection; an adjective in a predicative environment is in a verbal projection. Now, a verby adjective violates this constraint in an attributive construction, but satisfies it in a predicative environment, while a nouny adjective violates this constraint in a predicative construction, but satisfies it in an attributive environment.

Depending on the ranking of this constraint with respect to the two hierarchies discussed in Section 3, we can account for the fact that, sometimes, adjectives used attributively can no longer get a verby encoding in the NV languages described in Verkerk (2007). This is illustrated in Tableau 3. For ease of exposition, we collapse the semantic class hierarchy into the constraint $\text{SemRoot}_{\text{N/V}}$. Thus, for verby

languages, the constraint SemRoot$_V$ represents the ranking *N/event >> *N/property >> [VH] >> *N/entity; for nouny languages, the constraint SemRoot$_N$ represents the ranking *N/event >> [VH] >> *N/property >> *N/entity.

First, let us consider verby languages, the starting point of Verkerk (2007) and the present paper. In a predicative construction, the nouny candidate will always incur a more serious violation of the verby candidate, given the low ranking of the verb hierarchy [VH]. This is represented by the double asterisk for the nouny candidate, and the single asterisk for the verby candidate. As the semantic root of the input is the same in both constructions, the evaluation of the candidates with respect to this constraint is the same in the attributive construction. The evaluation of FuncFaith, however, differs depending on the construction. The nouny candidate violates this constraint in a predicative construction, but satisfies it in the attributive construction; the verby candidate, on the other hand, satisfies this constraint in the predicative construction, but violates it in the attributive construction.

Tableau 3. The encoding of adjectives in VV languages

	Output candidates	SemRoot$_V$	FuncFaith
Predicative construction	☞ Verby	*	
	Nouny	**!	*
Attributive construction	☞ Verby	*	*
	Nouny	**!	

With the ranking SemRoot >> FuncFaith, illustrated in Tableau 3, in both constructions a verby form will be chosen for the adjectives. This ranking represents the eleven languages in Verkerk's (2007) sample that did not change their strategy in the attributive context. The reverse ranking of these two constraints represents another strategy. This is illustrated in Tableau 4. Again, in the predicative construction the verby candidate is optimal. In the attributive construction, however, the verby candidate fatally violates the higher ranked FuncFaith so that the nouny candidate becomes optimal. Thus, we can account for the four languages in the sample that change their encoding strategy depending on the construction.

Tableau 4. The encoding of adjectives in NV languages

	Output candidates	FuncFaith	SemRoot$_V$
Predicative construction	☞ Verby		*
	Nouny	*!	**
Attributive construction	Verby	*!	*
	☞ Nouny		**

Consider next Tableau 5. In Section 3 we argued that in nouny languages the verb hierarchy [VH] was ranked above the constraint *N/property. With this ranking,

verby candidates will always incur a more serious violation of SemRoot$_N$ than nouny candidates, making the latter optimal. However, as Tableau 5 shows, not all languages with this internal ranking of the semantic root constraint are nouny languages. When FuncFaith outranks SemRoot$_N$, the verby strategy is chosen for adjectives in predicative constructions, notwithstanding the internal "nouny" ranking of the latter. (As the reader may verify, ranking SemRoot$_N$ above FuncFaith correctly leads to a nouny strategy in both constructions.)

Tableau 5. An alternative ranking for NV languages

	Output candidates	FuncFaith	SemRoot$_N$
Predicative construction	☞ Verby		**
	Nouny	*!	*
Attributive construction	Verby	*!	**
	☞ Nouny		*

Finally, and importantly, our analysis correctly predicts that if there is a change in the encoding strategy of adjectives between the attributive and the predicative construction, languages with a verby strategy in the predicative construction will always switch to a nouny strategy in the attributive construction, and not vice versa. (For discussion of this prediction, see Baker 2000.) This is illustrated in Table 3.

Table 3. Encoding strategies of properties depending on ranking

Internal ranking of SemRoot	**Ranking of SemRoot and FuncFaith**	**Predicative context**	**Attributive context**
VH >> *N/Property	SemRoot$_N$ >> FuncFaith	Nouny	Nouny
VH >> *N/Property	FuncFaith >> SemRoot$_N$	Verby	Nouny
*N/Property >> VH	SemRoot$_V$ >> FuncFaith	Verby	Verby
*N/Property >> VH	FuncFaith >> SemRoot$_V$	Verby	Nouny

6. Conclusion

In this paper we have given a unified Optimality Theoretic account of the cross-linguistic variation in the encoding of adjectives. Languages have the choice between a verby and nouny encoding in the predicative domain (Stassen 1997), and sometimes diverge from this strategy in attributive contexts (Verkerk 2007). We have accounted for all attested variation in the encoding of adjectives, using the verbal and nominal constraint hierarchy SemRoot$_{V/N}$ (based on the distinction between stage-level and individual-level properties), and the constraint FuncFaith, which states that nominal elements should refer to discourse participants and that verbal

elements should predicate over these discourse participants. Our analysis also correctly predicts that verby languages can become nouny in attributive contexts, but not the other way around.

Notes

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1. An anonymous reviewer notes that in Dutch and English, adjectives in predicative encoding do not behave exactly like nouns or verbs. They must use a copula, like nouns, but they cannot be preceded by an article, like verbs. Unlike both verbs and nouns, however, they do not show agreement with the subject of the sentence. In his classification, Stassen (1997) uses the criterion of having a copula or not. Even though nominal and adjectival predication are not exactly alike in English and Dutch, these languages are classified as nouny on the basis of this criterion.

2. Of course, exceptions exist: Some nouns can be argued to have an event argument, such as a deverbal noun like *destruction*.

3. More tests and arguments have been developed to validate this distinction, but for the purpose of this paper this is sufficient.

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