Studies in the Languages of the Volta Basin 6
Part 3

IDENTIFYING VERB CONSTRUCTIONS CROSS-LINGUISTICALLY

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I

INTRODUCTION: A GENERAL OVERVIEW OF THE SYSTEM

We present here a system for identifying, specifying and sorting argument structures. Put another way, we introduce a system of labelling syntactic structures, in particular structures that have a verb as their head. The system classifies them according to the syntactic and semantic features associated with the verb. It has been developed by the authors in association with several others[1] within the typology component of the just-ended Legon-Trondheim Linguistics Project, building on earlier work especially by Hellan (on Norwegian) and Dakubu (on Ga). Earlier and partial versions of it have been presented in various fora from time to time during its development (eg. Dakubu 2008; Hellan 2008, 2009). The system is intended to be universally applicable, but in this paper we focus specifically on how the system displays features that are particularly relevant to languages spoken in West Africa, although we also refer to constructions in English and especially Norwegian.

The system is aimed in the first place at facilitating very precise comparative, typological research. To this end there has been every effort to make it notationally simple, to allow string-based search. (At its simplest, this could include using the Search function in a word processor.) For the same reason it is largely neutral as far as theoretical framework is concerned, and should be usable by linguists of all persuasions, including those not particularly interested in formalisms. The system provides a method for devising descriptive labels that include both syntactic and semantic information. Thus the system can help the typologist in elucidating how languages, whether they are related or not, express similar ideas syntactically, and in determining whether apparently similar syntactic constructions are used for the same expressive purposes. The notion 'construction' is used in a theory neutral way, and refers to both the form and the content of an expression.

The system presented here is by no means complete or final, and further development is ongoing. It is expected that a much fuller version, improved, refined and expanded to account for more languages, will be published at a later date. What follows in this section is a brief general overview. Subsequent sections enumerate and explain the labels in more detail.

I.a The notation

Technically, construction types are represented by strings of letters and hyphens called **templates**, composed by **labels**. Although some templates that involve relatively complex labels may seem daunting at first glance, the underlying principles are not complicated. We approach the construction from the 'top', first noting its properties as a whole, and then properties of its main constituents, first their syntactic properties, then their semantic properties. This sequence is reflected in a notation from left to right. Each template thereby consists of several parts, referred to as **slots**.

A slot is filled by one or more labels expressing a clearly defined feature of the construction. Slot 1 consists of a label for *Part of Speech* of the *head* of the entire construction, (in the system as developed so far, a verb, so that in the examples that follow it invariably consists of V). It may include, if considered relevant to the construction type, the category of possible *formatives* marked on the head.

[1] The project began with a list of construction types developed by Lars Hellan for Norwegian. Development of the system with attention to the requirements of African languages by the present authors began in earnest in 2007, in association with Felix Ameka of the University of Leiden. The present authors wish to particularly acknowledge his input, which will be more fully apparent in an extended version of this work to appear. Others who contributed data and discussion to its development include Paul Agbedor, Yvonne Agbetsoamedo, Nana Ama Agyeman, Nana Aba Amfo, George Akanlig-Pare, Evershed Amuzu, Clement Appah, Maxwell Lamptey, Apenteng Sackey, James Saanchi, Elias Williams, Eric Ziem, Akua Agyei-Owusu, all of the University of Ghana.

For example, `vPrf` would indicate that the construction is headed by a verb in perfect aspect. (The formatives may be realized as affixes, tones, stem formation (as in Semitic languages), vowel change, reduplication, and more – the realization mode as such is not displayed, only the category expressed.)

Slot 2 consists of a label for *valency specification*, like `intr` (intransitive), `tr` (transitive), `ditr` (ditransitive), and varieties thereof. This slot gives an over-all view of what kinds of arguments are expressed in the construction.

Slot 3 consists of one or more labels for specification of *syntactic constituents*: subject, object etc.

Slot 4 consists of one or more labels for specification of *participant roles*: agent, theme, instrument etc.

Slot 5 consists of a label for *aspect and Aktionsart*, written in CAPS.

Slot 6 consists of a label for the *situation type* or general semantics of the construction, also written in CAPS.

Slot 7 provides a linking between the slot 6 situation type and the specifications in slots 2-4. This is of relevance especially for contents whose expression varies crosslinguistically (cf. (5)-(6) below), and for "idiomatic" or "metaphorical" constructions. However we do not discuss this slot here, since it is still in a very early stage of development.

Of these, slots 1, 2 and 3 represent well understood areas of specification, and can build on much consensus across frameworks. Slots 4 and 5 are less robust, but have a core of consensus to build on. Slot 6 is still at a highly preliminary state of development, as is Slot 7. Slots 1 and 2 are obligatorily filled, the others not. A slot not filled is not displayed: the labels defined for the various slots are distinct and quite unlike those for any other slot, hence no specification can be misread with regard to which slot it concerns. Likewise, no labels are distinguished in terms of CAP vs. not.

For the build-up of a template, the following conventions apply:

- Slots are interconnected by '-' (hyphen).
- Distinct items inside a slot are interconnected by '_' (underline).
- A label containing neither '-' nor '_' is an uninterrupted string of letters.
- If the content of a label is complex, the internal composition is indicated by alternation between small and capital letters (however, no labels are distinguished solely in terms of CAP vs. not).

Some templates are given below as examples. Constructions subsumed by the specification given in (1) are of types one may expect to find in a very broad range of languages:

(1) `v-tr-suAg_obAffincrem-COMPLETED_MONODEVMNT`

(Ex.: English **the boy ate the cake**)

The template reads from left to right as follows:
Slot 1: the head is verb;
Slot 2: the syntactic frame is *transitive*;
Slot 3 is not filled;
Slot 4: the thematic roles expressed are *agent* `(ag)`, by Subject `(su)`, and *incrementally affected* `(affincrem)`, by Object `(ob)`;
Slot 5: a major aspectual feature inherent in the situation is characterized as *completed monotonic development*.
Slot 6 is not filled. If desired it could be filled by something like `CONSUMPTION.`

(2) and (3), exemplified from two languages spoken in Ghana, are also straightforward and widely attested, although the construction type in (3) is perhaps more localized:

(2) `v-intr-suAgmover-MOTION`

(Ex.: Ga **Tɛte ba** 'Tettey came)

Slot 1 indicates that, like (1), the expression is headed by a verb, but Slot 2 indicates that unlike (1), the frame is intransitive. Slot 3 is again absent, but Slot 4 indicates that the role expressed by the Subject is an *agent mover* – a subtype of *agent*. Slot 5 is not present, but Slot 6 indicates that the situation type is characterized as MOTION.

(3) `v-tr-suAg_obThAbst-PROPTYDYN`

(Ex.: Ewe **É-wɔ akúvíá**

3SG-do laziness 'He was lazy')

Reading the template from left to right, we find that in most respects the construction is identical to that of (1): Slot 1 indicates that the head is a verb; Slot 2 that the frame is transitive, Slot 4 that the subject expresses the role *agent*, and that the object expresses the role *abstract theme* – a different role from that of the object of (1). Unlike (1), however, in this template Slot 6 is filled with the situation type '`PROPTYDYN`', meaning that the whole expresses a property of the Subject, but that this property is temporally manifested (dynamic) and not inherent in the Subject. Slot 5 is not filled.

To give an example of how the system can handle features not found in European or Ghanaian languages, we give an example with a construction type from Bantu languages illustrating *verbal extensions*; (4) is from Citumbuka (spoken in Northern Malawi and Zambia (courtesy of Jean Chavula)). It indicates the possibility of specifying the derivational morphology of the verb and its relations to the arguments, something that has not so far been found relevant for Ghanaian languages (italics indicate items related in object agreement).

(4) `v-ditrOblApCs-oblCsu_obAobl-suCsr`

Tumbikani wa-ka-*mu*-phik-isk-ir-a *Temwa* nchunga kwa Mary

Tumbikani 1SM-pst-*1OM*-cook-Caus-Appl-fV *Temwa* beans 'to' Mary

'Tumbikani made Mary cook beans for Temwa'

The construction presents a person-causer and a three-participant caused event, with the Agent of the caused event (the 'Causee') expressed as Oblique, and an oblique participant of the caused event having been promoted as an Applicative, taking the position of First Object. The component labels read as follows:

Valence slot (slot 2):

`ditrOblApCs`: double object plus oblique, built up—through 'backtracking' the operations—by 'Applicative Formation' and 'Causative Formation'.

Syntactic constituents slot (slot 3):

`oblCsu`: the Oblique represents the 'causee', i.e., the subject relative to a 'base' structure composed by the same verb, promoted by Causative Formation.

`obAobl`: the First Object represents an oblique relative to a 'base' structure composed by the same verb, promoted by Applicative Formation ('`A`' for 'Applicative');

Semantic participants slot (slot 4):

`suCsr`: the Subject expresses a Causer

As is apparent from these examples, when comments are made about *constituents* of the construction, they are identified by the traditional *grammatical function* (GF) categories 'Subject', 'Object', 'Oblique', and the like – this applies whether the specifications are syntactic or semantic. In general there is only one of each GF per sentence. In cases where one speaks of a First Object and a Second Object, as in (4), these are counted as distinct GFs, and when a sentence has more than one Oblique, these will be distinguished as Obl1, Obl2, etc. according to the order in which they occur. Apart from

this reflection of linear order, the specification of constituents in a template says nothing about linear ordering, although in practice it is usually convenient to follow the attested order.

The next example is again taken from Ga, illustrating a prevalent strategy in West African languages in which complex NPs and (di)transitivity are used for contents where e.g. English would use prepositions (example from Dakubu 2008):

(5) `v-ditr-obPostp-suAg_obEndpt_ob2Th-PLACEMENT`

Amɛ-wo	**tsɔne**	**lɛ**	**mli**	**yɛlɛ**
3P.AOR-put	vehicle	DEF	inside	yam

'They put [vehicle's inside] [yam]' = 'They put yams in the lorry.'

Here the two objects represent a Mover (the yam) as Second Object and its Endpoint, where it finally lands (the lorry's inside) as First Object. This Endpoint is characterized as the inside of something, but there is no preposition and this Object is headed by a postposition, structurally like a possessive NP construction – in Ga in fact the postposition construction is morphologically identical with the possessive construction. Thus, the labels read:

Valence slot:
`ditr`: double object (ditransitive) construction;

Syntactic constituents slot:
`obPostp`: the First Object is a 'postpositional phrase', i.e., an NP with a head expressing a spatial domain relative to the item expressed in the Specifier of the NP;

Semantic participants slot:
`obEndpt`: the First Object represents the Endpoint of a movement;
`ob2Th`: the Second Object represents the Mover (Theme) of a movement;

Situation type slot:
`PLACEMENT`: The situation type is one of *placement* (putting something somewhere).

Another example from Ga (Dakubu op.cit.) exposes an *identity* (ID) and a *body-part* (BP) pattern. In Ghanaian languages body part words are very frequently associated with particular templates, having particular relevance to slots 6 and 7 (situation type and semantic interpretation):

(6) `v-tr-suPossp_obIDsuSpec_suBPsuSpec-suLocus_obExp-EXPER`

Mí-hiɛ	**di**	**mi**
$1S_1$.POSS-face	black	$1S_1$

"My face blackens me" = 'I am dizzy.'

Syntactic constituents slot:
`suPossp`: the Subject is a possessive phrase (NP with an NP, in this case possessive pronoun) specifier)
`obIDsuSpec`: the Object is (referentially) **ID**entical to Specifier of the Subject (that is, **mi** of the Object refers to the same person as **mí** that specifies or "possesses" the Subject).
`suBPsuSpec`: the Subject is (referentially) a **B**ody**P**art of the Specifier of the Subject

Semantic participants slot:
`suLocus`: the Subject expresses the 'locus' of the situation.
`obExp`: the Object expresses an Experiencer.

Situation type slot:
`EXPER`: The situation type is one of *experiencing* (someone having an experience).

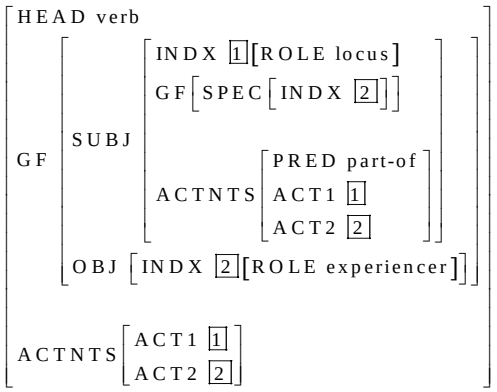
Below in section II we present a comprehensive list of labels for slots 1, 2 and 3; in section III we present rather tentative labels for slots 4, 5 and 6, and section IV presents template structures for various types of multi-verb constructions. A wiki page is currently available at www.typecraft.org, where constructions and annotated example sentences can be viewed and discussed. Thus, an inventory of Norwegian types is located at this site under www.typecraft.org/research/projects/Verbconstructions/, and likewise one for Ga types.

Before displaying the labels, we show how the labels for various slots and indeed the templates as wholes are linked to a formalism used in some formal linguistic frameworks.

I.b Linkage to AVM format

For those interested in linguistic formalisms, the template is constructed in such a way as to be linkable to attribute-value-displays, as used for instance in HPSG and LFG. For instance, the information encoded in the template (6) above can be exposed in AVM (Attribute Value Matrix) notation as shown in (7), with `GF` standing for 'grammatical functions', `ACTNTS` for 'actants' (= 'participants'), and `ACTn` used according to the convention that given the situation type expressed by the verb, a participant with the role carried by `ACTn+1` could not be expressed unless the role carried by `ACTn` is expressed. These labels are a blend from many frameworks, such as GF-notions from LFG, semantic notions from Melchuk, and an integrated syntactic-semantic description partly in the spirit of HPSG.

(7)



An AVM corresponding to the specification of (4) above, repeated, will be as in (8), using the same design as in (7) (left out in (8) is an exposition of possible intermediate steps of the *derivational* processes 'Applicative' and 'Causative' – the `ACTNTS` structure here mirrors a possible 'base' configuration, and `GF` exposes the resulting syntactic functional structure):

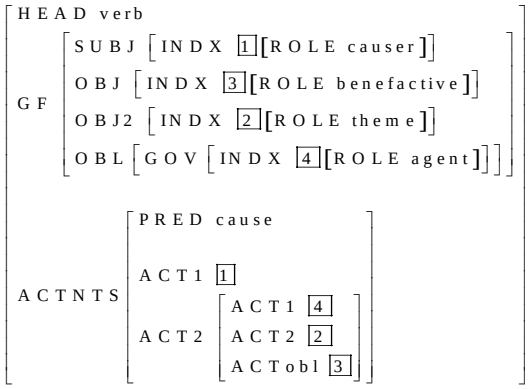
(4) `v-ditrOblApCs-oblCsu_obAobl-suCsr`

Tumbikani wa-ka-*mu*-phik-isk-ir-a *Temwa* nchunga kwa Mary

Tumbikani 1SM-pst-*1OM*-cook-Caus-Appl-fV *Temwa* beans 'to' Mary

'Tumbikani made Mary cook beans for Temwa'

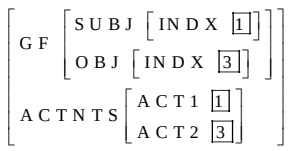
(8)



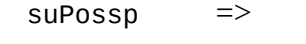
From a technical point of view, it is possible to model each separate label as a partial AVM, so that, with '-' and '_' in the templates interpreted as *unification* operators, the AVMs of labels constituting a template can be merged together to an AVM of the entire template. With the template in (6) and the AVM in (8) as an example, the constituent labels of (6) can be defined as the AVMs listed in (9); merging them yields (8):

(9)

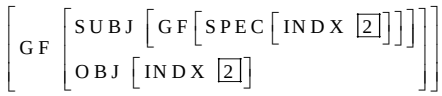
`tr` =>



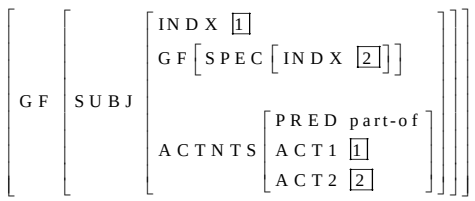
`suPossp` =>



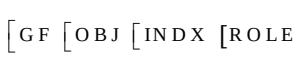
`obIDsuSpec` =>



`suBPsuSpec` =>



`suLocus` =>



`obExp` =>

In the definitions in section II below, all labels are associated with such AVMs, along with definitions in words spelling out the intended content. For any combination of labels constituting a template, such a merged AVM can be constructed.

To indicate the space of specifications considered, Table 1 gives a list of attributes serving inside of the AVMs. In this list, features in boldface are 'outermost' in a sign path, and features in italics are next in the path. In addition to explaining the contents of the AVMs, this list also summarizes most of the factors of verb constructions that the system currently addresses.

Table 1
Attributes and Values Employed

HEAD part of speech and other properties associated with the head of a construction
- *FORMATIVES* list of affixes, tones, stem formation (as in Semitic), reduplication, and other formatives marked on the head constituent
- *CASE* case (mainly for nouns, pronouns and determiners)
- *DEF* definiteness (mainly for nouns, pronouns and determiners)
- *REAL* realization status: dropped, cliticized, normal (mainly for pronouns)
- *AGR-TARGET* the constituent is targeted by agreement marking on the head of the construction (mainly for nominals)
- *TAM* Tense/aspect/mood (mainly for verbs)

GF grammatical function
- *SUBJ* subject sign
- *OBJ* object sign; used together with IOBJ, OBJ is 'direct object', and together with OBJ2, 'first object'
- *IOBJ* indirect object, to be used in combination with OBJ
- *OBJ2* second object, to be used in combination with OBJ
- *COMP* sentential complement (not being classified as object)
- *OBL* oblique, i.e., a PP where the governed NP has a role defined relative to the head, and it is thus the semantics of that NP, and not the semantics of the PP as a whole, which is of interest
- *PRESENTED* 'presented' NP in a presentational construction
- *SECPRD* secondary predicate
- *IDNT* complement of an identifying predicate
- *ADVBL* 'adverbial complement', i.e., a PP, Adv or AdvP serving as complement, where – in contrast to OBL - it is the semantics of the whole constituent which is of interest
- *PRTCL* 'particle', with aspectual or less tangible impact

GOV governee, used in connection with a preposition for its inherent GF (roughly, an abbr. for 'GF | OBJ')

INDX referential index
- *ROLE* participant role ('theta-role')
- *CLASS* class, i.e., inherent properties

XACT 'exposed actant': in 'raising' and 'equi' constructions, XACT coincides with the subject of the infinitive, and in non-verbal secondary predicates it coincides with the ACT1 of the predicate.

ACTNTS 'actants', i.e., participants of the situation type expressed by the head of the construction
- *ACT0* index of the situation type expressed by the construction
- *ACT1* actant 1
- *ACT2* actant 2
- *ACT3* actant 3
- *ACTobl* actant expressed by the NP complement of an oblique
- *LOC* locative argument
- *DIR* directional argument
- *PRED* predicate (used only with grammatically expressed meanings)

ASPECT aspect

AKTART Aktionsart

Values	
+/-	
copula	value of HEAD: a subtype of *verb*
drop	value of HEAD | REAL: dropped, in the sense 'pro-drop'
clit	value of HEAD | REAL: cliticized
nomin, acc, erg, ...	value of HEAD | CASE
decl-compl, yes-no-compl, wh-compl,	
infin-compl	value of HEAD
gerund	value of HEAD | TAM
infinitive	value of HEAD | TAM
irrealis	value of HEAD | TAM
cause	value of ACTNTS| PRED
increm-cause	value of ACTNTS| PRED (causation happening incrementally)
binary-rel	value of ACTNTS| PRED
part-of	value of ACTNTS| PRED
spatial-coord-of	value of ACTNTS| PRED
concur	value of ACTNTS| PRED
explet	value of INDX: expletive, i.e., referentially void
spatial	value of INDX | CLASS
bodypart	value of INDX | CLASS
sign	value of any GF|SUBJ, GF|OBJ, GF|IOBJ, etc.: sign
oriented-obj	value of ACT1 and ACT2: oriented object, a super-type of paths, direction indicators and locomotors (movers)

Of the attributes in Table 1, the GF attributes correspond to the initial part of any Slot 3 or Slot 4 label, abbreviated as follows:

(10)

SUBJ	su
OBJ	ob
IOBJ	iob
OBJ2	ob2
COMP	comp
OBL	obl
PRESENTED	pres
SECPRD	sc
IDNT	idnt
ADVBL	adv
PRTCL	prtcl

A ***direct syntactic argument*** of a verb is any nominal constituent syntactically directly related to the verb (as subject-of, direct object-of, or indirect object-of), and any clausal constituent with either of these functions. This *in*cludes expletive subjects and objects, and *ex*cludes clausal constituents in extraposed position; it also excludes any NP or clause governed by a preposition (thus, any `obl`). It also excludes NPs carrying locative case as in Finno-Ugric or Caucasian languages – these count as obliques, see below.

With this notion of 'direct syntactic argument', we define the three basic valency notions:

`intr` = **intransitive,** i.e., with only SUBJECT as direct syntactic argument.

`tr` = **transitive,** i.e., with SUBJECT and one OBJECT as direct syntactic arguments.

`ditr` = **ditransitive**, i.e., with SUBJECT and two OBJECTs as direct syntactic arguments. (Also: '`dbob`' = 'double object' is used with this definition.)

A direct syntactic argument is ***standardly linked*** when it has referential content and serves a semantic argument function relative to the verb. (This *ex*cludes expletive subjects and expletive objects, and 'raised' full NPs.) Linking is reflected in the AVM in the identities between specifications under GF and under ACTNTS.

Any standard introduction to feature structure notation, or to LFG or HPSG, gives an introduction to AVM notation. For the particular feature geometry used here, an introduction is given in Hellan 2009. For a toolkit for building elementary grammar fragments using this AVM notation, see Hellan 2008b.

II

LABELS FOR SLOTS 1, 2 AND 3 IN SINGLE-VERB CONSTRUCTIONS

In this section we list the labels so far devised and employed in the first three slots of a template. As indicated above, the first two slots must contain a label to have a template at all, but slot 3 is only filled when an item accounted for in slot 4 is syntactically complex in a way considered relevant to the argument structure of the head – for example, if the subject or object necessarily includes an adposition.

II.a SLOT 1 Head specification

There are many possible combinations of head + formatives. Only a few are entered here in Table 2. Not all are applicable to West African languages, particularly those indicating derivational extensions.

Table 2
Sample Labels for Slot 1

v = construction is headed by Verb.
$[\text{HEAD verb}]$

vPas = construction is headed by Verb and the verb has a Passive formative
$[\text{HEAD verb}[\text{FORMATIVES } \langle \text{passive} \rangle]]$

vPrf = construction is headed by Verb and the verb has a Perfect formative
vAor = construction is headed by Verb and the verb has an Aorist formative
vProg = construction is headed by Verb and the verb has a Progressive formative
vHab = construction is headed by Verb and the verb has a Habitual formative
vSm = construction is headed by Verb and the verb has a Subject Marker formative. This and several following are used for languages where arguments must be marked on the verb according to syntactic function.
vOm = construction is headed by Verb and the verb has an Object Marker formative
vAgr = construction is headed by Verb and the verb has an Agreement formative (used only for languages/constructions where there is no contrast between Subject Marker and Object Marker)
$[\text{HEAD verb}[\text{FORMATIVES } \langle \text{AGR} \rangle]]$

vSmOm = construction is headed by Verb and the verb has a Subject Marker and an Object Marker formative
$[\text{HEAD verb}[\text{FORMATIVES } \langle \text{SM, OM} \rangle]]$

vAppl = construction is headed by Verb and the verb has an Applicative formative
vApplPas = construction is headed by Verb and the verb has an Applicative and a Passive formative
vCaus = construction is headed by Verb and the verb has a Causative formative
vCausPas = construction is headed by Verb and the verb has a Causative and a Passive formative
vCausAppl = construction is headed by Verb and the verb has a Causative and an Applicative formative
vCausApplPas = construction is headed by Verb and the verb has a Causative, an Applicative and a Passive formative
vCausSmOm = construction is headed by Verb and the verb has a Causative formative, a Subject Marker and an Object Marker
$[\text{HEAD verb}[\text{FORMATIVES } \langle \text{causative, SM, OM} \rangle]]$

II.b SLOT 2 Valency

The following general definitions are essential to Slot 2 definitions (restating from the end of I.b):

A ***direct syntactic argument*** of a verb is any nominal constituent syntactically directly related to the verb (as subject-of, direct object-of, or indirect object-of), and any clausal constituent with either of these functions. This *in*cludes expletive subjects and objects, and *ex*cludes clausal constituents in extraposed position; it also excludes any NP or clause governed by a preposition. It also excludes NPs carrying locative case as in Finno-Ugric or Caucasian languages – these count as obliques – see below. A direct syntactic argument is ***standardly linked*** when it has referential content and serves a semantic argument function relative to the verb. (This *ex*cludes expletive subjects and expletive objects, and 'raised' full NPs.)

With this notion of 'direct syntactic argument', we define three basic valency notions:

intr = intransitive, i.e., with only SUBJECT as direct syntactic argument.
tr = transitive, i.e., with SUBJECT and one OBJECT as direct syntactic arguments.
ditr = ditransitive, i.e., with SUBJECT and two OBJECTs as direct syntactic arguments. (Also: 'dbob' = 'double object' (same definition).)

When these labels occur without suffixes, the grammatical functions involved are standardly linked. Among possible suffixes, the following may be particularly noted (with *val* for *intr*, *tr* or *ditr*) – whether linking is standard or not is then indicated elsewhere in the template:

*val***Obl** = *val* followed by a PP whose NP has a thematic role relative to the head

*val***Path**= *val* followed by a Path-expression (typically an adverb or a PP, whose NP does not have a thematic role relative to the head)

*val***Loc** = *val* followed by a Location expression (typically an adverb or a PP, whose NP does not have a thematic role relative to the head)

*val***Comp**= *val* followed by a sentential complement which does not act as an object

*val***Scpr**= *val* followed by a Secondary Predicate (or 'small clause' predicate)

*val***Expn**= *val* followed by an 'extraposed' clause

*val***Prtcl**= *val* followed by a 'particle' (often an aspectual)

*val***Adv** = *val* followed by an adverb or adverbial

The following list contains all defined Slot 2 labels.

intr = intransitive, i.e., with only SUBJECT as direct syntactic argument, standardly linked.

$$\begin{bmatrix} \text{GF} \left[\text{SUBJ} \left[\text{INDX } \boxed{1}\right]\right] \\ \text{ACTNTS} \left[\text{ACT1 } \boxed{1}\right] \end{bmatrix}$$

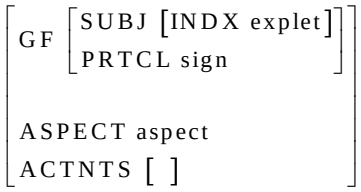
(Ex.: Eng. **he sleeps**)

intrImpers = impersonal intransitive, i.e., SUBJECT is an expletive not linked to any other item in the clause.

$$\begin{bmatrix} \text{GF} \left[\text{SUBJ} \left[\text{INDX expl\!et}\right]\right] \\ \text{ACTNTS} \left[\ \right] \end{bmatrix}$$

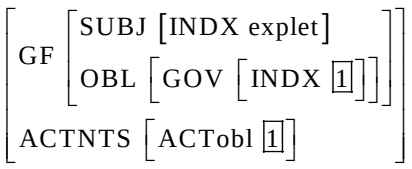
(Ex.: Eng. **it snows**)

intrImpersPrtcl = impersonal intransitive with an aspectual particle.



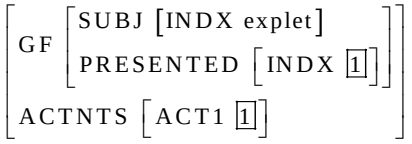
(Ex.: Norw. **det klarner opp** 'it clears up')

intrImpersObl = impersonal intransitive with an Oblique argument.



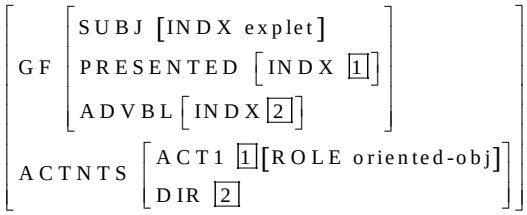
(Ex.:Norw. **det synger i fjellene** 'it sings in the mountains'
= 'one can hear singing from inside the mountains')

intrPresnt = intransitive presentational, i.e., an expletive subject and an indefinite NP (the 'presented' NP) occupying the post-verbal position.



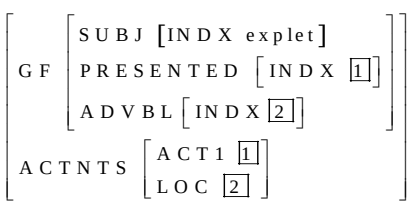
(Ex.: Eng. **there lives a man**)

intrPresntPath = intransitive presentational with a Path adverbial**.**



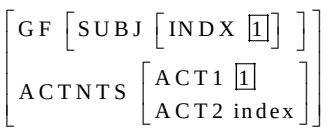
(Ex.: Norw. **det springer en mann nedover bakken**
'there runs a man down the hillside')

intrPresntLoc = intransitive presentational with a Locative adverbial.



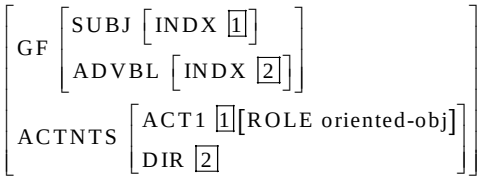
(Ex.: Norw. **det sitter en mann i stolen**
'there sits a man in the chair')

intrImplobj = intransitive with an implicit object.



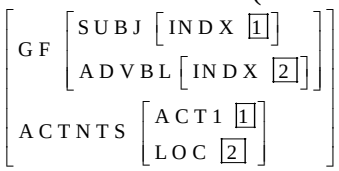
(Ex.: Eng. **he ate**)

intrPath = intransitive with a Path adverbial.



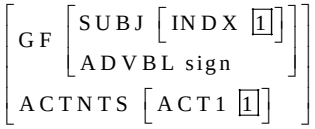
(Ex.: Eng. **he drove to Finnmark**)

intrLoc = intransitive with a ('bound') locative adverbial.



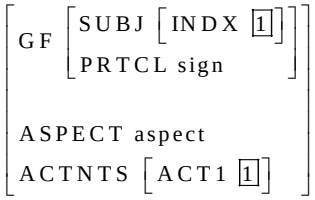
(Ex.: Eng. **he lives in Finnmark**)

intrAdv = intransitive with a ('bound') Manner adverbial.



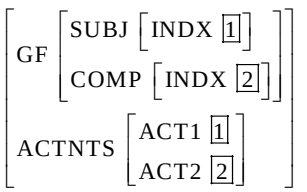
(Ex.: Eng. **he functions well**)

intrPrtcl = intransitive with an aspectual particle.



(Ex.: Norw. **regnet varer ved** 'the rain lasts')

intrComp = intransitive with a sentential complement (not classifiable as object).

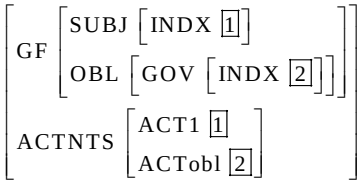


(Ex.: Ga **Yoo lɛ e-tee ní e-ya-he wolo lɛ**

woman$_1$ DEF PERF-go COMP 3S$_1$-EGR-buy book DEF

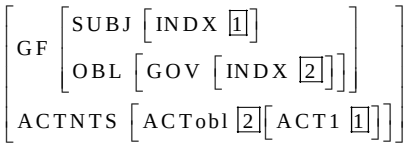
'The woman has gone to buy a book')

intrObl = intransitive with an Oblique (PP) argument.



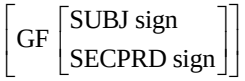
(Ex.: Engl. **he talks about John**)

intrOblRais = intransitive with an oblique argument from which an NP has been 'raised'.



(Ex.: Norw. **han later til å komme** 'he appears [to] to come')

intrScpr = intransitive with a secondary predicate ('Small Clause' predicate).



(Ex.: Eng. **he seems sick**)

(For further classification, see Slot 3, labels starting with **sc**..)

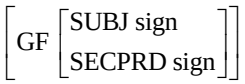
intrScprPrtcl = intransitive with a secondary predicate and a particle

(Ex.: Norw. **gutten høres syk ut** 'boy-DEF sound-PRES sick out')

intrPrtclScpr = intransitive with a particle and a secondary predicate

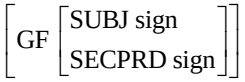
(Ex.: Norw. **gutten høres ut som en papegøye** 'boy-DEF sound-PRES out like a parrot')

intrLghtScpr = intransitive light verb with a secondary predicate (see near-equivalents **lghtAdj/ lghtAdv/ lghtN** below).



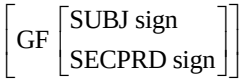
(Ex.: Eng. **the house stands empty**)

intrAuxperfScpr = intransitive perfect auxiliary verb with a secondary predicate. (This presupposes a 'raising analysis of auxiliaries. See 'axv' in the Multiverb section.)



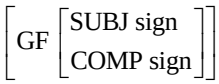
(Ex.: Eng. **he has arrived**)

intrAuxmodScpr = intransitive modal auxiliary verb with a secondary predicate ('epistemic modal'). [This presupposes a 'raising' analysis of auxiliaries. See 'axv' in the Multiverb section.]



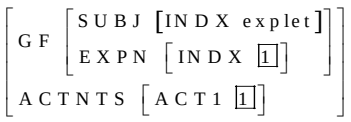
(Ex.: Eng. **he will arrive**)

intrAuxmodComp = intransitive modal auxiliary verb with a complement. ('root modal') (This presupposes an 'equi' analysis of auxiliaries. See 'axv' in the Multiverb section.)



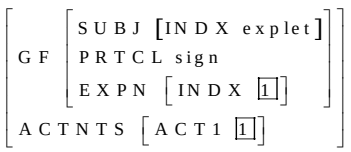
(Ex.: Eng. **he can sing**)

intrExpn = intransitive with an 'extraposed' clause.



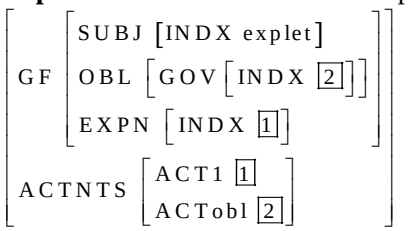
(Ex.: Eng. **it seems that he is sick**)

intrPrtclExpn = intransitive with an 'extraposed' clause and adverbial particle.



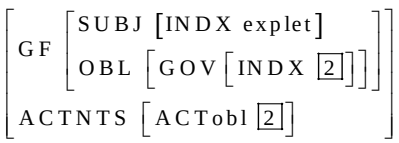
(Ex.: Eng. **it came out that he was sick**)

intrOblExpn = intransitive with an 'extraposed' clause and an oblique argument.



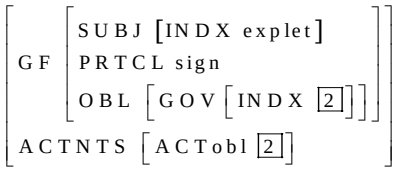
(Ex. Eng. **It depends on you whether he will win**)

intrOblExlnk = intransitive with an 'extralinked' clause and an oblique argument. (An *extralinked* clause is like an *extraposed* clause except that substituting it for the expletive does not yield a grammatical construction.)



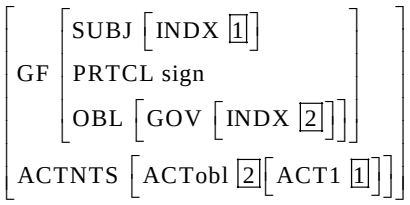
(Ex.:Norw. **det haster med å rydde**
'it hastes with to tidy' = "it is urgent that it gets tidied up")

intrPrtclOblExlnk = intransitive with an 'extralinked' clause, an oblique argument, and an advparticle. (An *extralinked* clause is like an *extraposed* clause except that substituting it for the expletive does not yield a grammatical construction.)



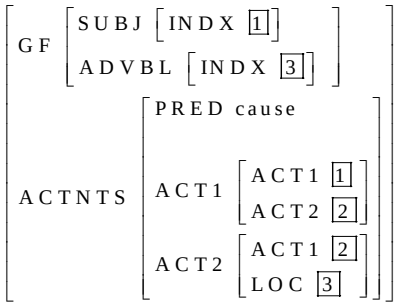
(Ex.: Norw. **det ser ut til at han kommer**
'it looks out to that he comes' = "it seems that he comes")

intrPrtclOblRais = intransitive with an oblique argument from which an NP has been 'raised', and an adverbial particle.



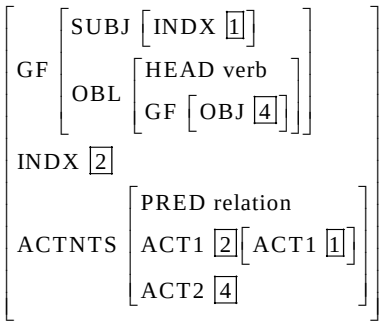
(Ex.:Norw. **han ser ut til å komme**
'he looks out to to come' = "he seems to come")

intrImpltransfAdv = intransitive with adverbial, however with implicit reference to an item which is transferred, and which could have been expressed as object of the verb in question..



(Ex.: Eng. **he vomited on himself**)

intrVid = intransitive together with a verbid phrase acting as oblique[2]



(Ex. Ga: **E-da fe mi**
'3S-grow surpass 1S' = "He is bigger than me.")

intrVidScpr = intransitive with a secondary predicate and a verbid phrase

intrSubcoord = intransitive with a subcoordination

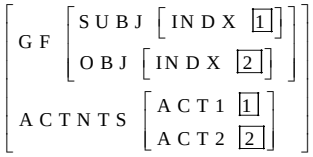
(Ex. Norw.: **Ola driver og plystrer**
'Ola keeps and whistles' = "Ola keeps whistling."

intrPrtclSubcoord = intransitive with a particle and a subcoordination

(Ex. Norw.: **Ola driver på og plystrer**
'Ola keeps on and whistles' = "Ola keeps on whistling"

[2] For a discussion of verbid expressions as they appear in Ga see Dakubu 2004b

tr = transitive, i.e., with SUBJECT and one OBJECT, standardly linked.



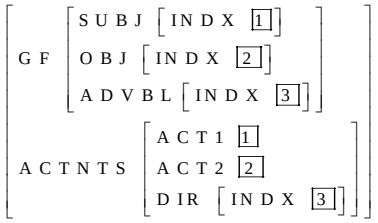
(Ex.: Eng. **he kicked the ball**)

trAtc = transitive with an attributive clause, that is, a clause that modifies its own subject, which is has identical reference to the object of the main verb and must be manifested by a pronoun.

(Ex.: Ga. **Mina lɛ ní enyiɛ**

I saw him that he walked = I saw him walking)

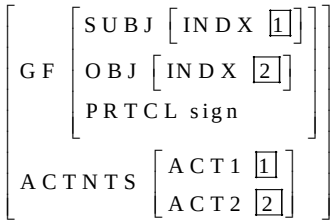
trPath = transitive, where the subject or object is understood in a directional capacity, and a path specification.



(Ex.: Eng. Directional Subj: **he passed a church along the road**

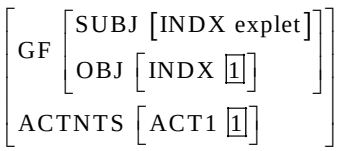
Directional Obj: **he threw the ball through the window)**

trPrtcl = transitive with an adverbial particle.



(Ex.: Norw. **Kari fant ut svaret** 'Kari found out the answer')

trImpers = impersonal transitive, where SUBJECT is an expletive not linked to any other item in the clause.

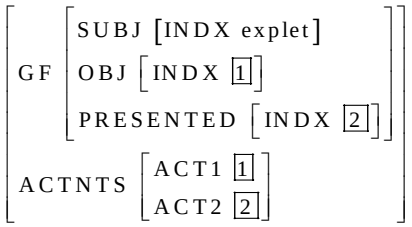


(Ex.: Ga **e-fe-ɔ mi akɛ amɛ́-hi-ii**

3S-make-HAB 1S COMP 3P-be.good-NEG.IMPERF

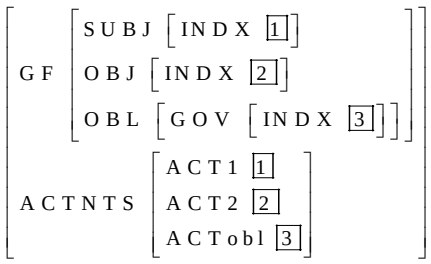
= 'It seems to me that they are not good.')

trPresnt = presentational with an NP (object) preceding the 'presented' NP.



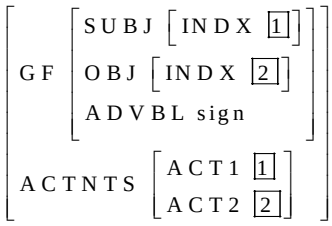
(Ex.: Norw. **det venter ham en ulykke**
'there awaits him an accident' = “an accident awaits him”.)

trObl = transitive with an oblique.



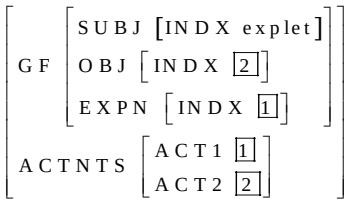
(Ex.: Eng. **he told Peter about the window**)

trAdv = transitive with an obligatory adverbial.



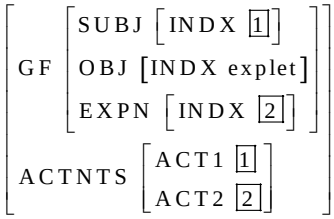
(Ex.: Eng. **They treated him well**)

trExpnSu = transitive with an extraposed clause correlated with the subject, and an argument object.



(Ex.: Eng. **it impresses me that he can sing**)

trExpnOb = transitive with an extraposed clause correlated with the object, and an argument subject..



(Ex.: Norw. **vi muliggjorde det at han fikk innreisetillatelse**
'we possible-made it that he got entrance visa'
= “we made it possible for him to get an entrance visa.”)

trScpr = transitive with a secondary predicate (‘Small Clause’ predicate).

$$\begin{bmatrix} \text{GF} & \begin{bmatrix} \text{SUBJ sign} \\ \text{OBJ sign} \\ \text{SECPRD sign} \end{bmatrix} \end{bmatrix}$$

(Ex.: Eng. **he made me sick**)

(For further classification, see slot 3, with **sc**...)

trScprShft = transitive with a secondary predicate, where the object and the predicate have switched relative to their standard order

(Ex.: Norw. **han sparket i stykker ballen**

'he kicked to pieces the ball' = “he kicked the ball to pieces”)

trNrf = transitive whose object is non-referential.

$$\begin{bmatrix} \text{GF} & \begin{bmatrix} \text{SUBJ} & \begin{bmatrix} \text{INDX} & \boxed{1} \end{bmatrix} \\ \text{OBJ} & \begin{bmatrix} \text{INDX} & \text{explet} \end{bmatrix} \end{bmatrix} \\ \text{ACTNTS} & \begin{bmatrix} \text{ACT1} & \boxed{1} \end{bmatrix} \end{bmatrix}$$

(Ex.: Norw. **Kari skammer seg**

’Kari shames herself’ = ”Kari is ashamed”)

trNrfAdv = transitive whose object is non-referential, and with an adverbial item

(Ex.: Norw. **han oppfører seg pent**

'he behaves REFL well' = “he behaves well”)

trNrfComp = transitive whose object is non-referential, and with a complement clause

(Ex.: Norw. **han undrer seg hvorvidt du kommer**

'he wonders REFL whether you come' = “he wonders whether you will come”)

trNrfObl = transitive whose object is non-referential, and with an oblique item

(Ex.: Norw. **han finner seg i å vente**

'he finds REFL in INF wait' = “he accepts having to wait”)

trNrfPath = transitive whose object is non-referential, and with a path item

(Ex.: Norw. **han lister seg ut**

'he tiptoes REFL out' = “he tiptoes out”)

trNrfPresnt = transitive presentational with a non-referential object, and a locative

(Ex.: Norw. **det oppholder seg en muldvarp i haven**

'there stays REFL a mole in the garden' = “there is a mole in the garden ”)

trNrfPresntPath = transitive presentational with a non-referential object, and a path expression

(Ex.: Norw. **det smyger seg en mann ut**

'there tiptoes REFL a man out' = “there is a man tiptoeing out”)

trNrfPrtcl = transitive whose object is non-referential, and with a particle

(Ex.: Norw. **han dummet seg ut**

'he fooled REFL out' = “he made a fool of himself”)

trNrfScpr = transitive whose object is non-referential, and with a secondary predicate

(Ex.: Norw. **han viser seg å komme**

'he shows REFL to come' = “he turns out to come”)

trNrfExpnSu = transitive whose object is non-referential, and with an ‘extraposed’ clause linked to subject.

(Ex. Norw: **det viser seg at han kommer**

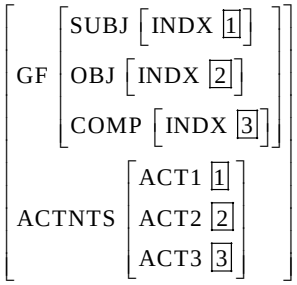
'it shows itself that he comes' = “it turns out that he comes”)

trNrfPresntLoc = transitive presentational with a non-referential object, and with a locative

(Ex. Norw.: **det oppholder seg en gutt i hagen**

'there stays REFL a boy in the garden' = “there is a boy staying in the garden”)

trComp = transitive with a sentential complement (apart from the object).

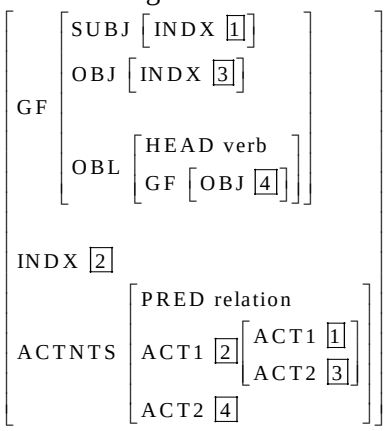


(Ex.: Ga: **Ò-bàá-nyɛ́ éné ó-lá?**

2S-INGR.FUT-able this 2S.SBJV-sing

‘are you capable of this that you could sing it?’ = “Can you sing this?”)

trVid = transitive together with a verbid phrase

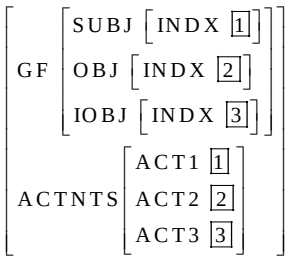


(Ex.: Ga: **E-ye loo fe mi**

3S-eat meat surpass 1S = ‘She ate more meat than me.’)

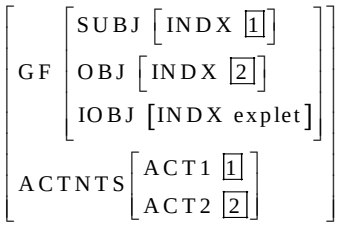
trLghtVid = transitive light verb with a verbid

ditr = ditransitive, i.e., with SUBJECT and two OBJECTs (here referred to by the traditional terms 'indirect' ('iob') and 'direct' object), standardly linked.



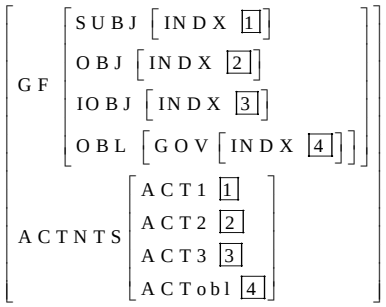
(Ex.: Eng. **he gave me the book**)

ditrNrf = ditransitive whose indirect object is non-referential.



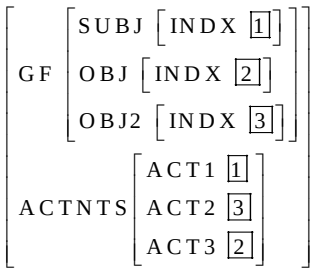
(Ex.: Norw. **han foresetter seg å komme**
he [foresetter] himself to come' = "he plans on coming")

ditrObl = ditransitive with oblique.



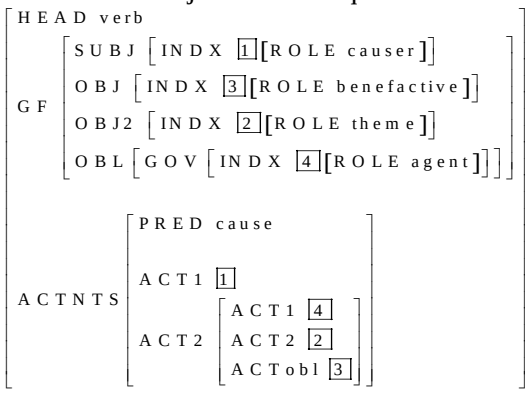
(Ex.: Norw, **jeg kaster Ola kakestykker i ansiktet**
'I throw Ola cakes in the face' = "I throw cakes in the face of Ola")

dbob = double object, i.e., with SUBJECT and two OBJECTs referred to by the terms '(first) object' and 'second object'), standardly linked.



(Ex. Citumbuka:
Tumbikani wa-ka-*mu*-pa *Mary* ndalama
Tumbikani 1SM-pst-1OM-give Mary money = "Tumbikani gave Mary money.")

dbobObl... = double object with oblique.

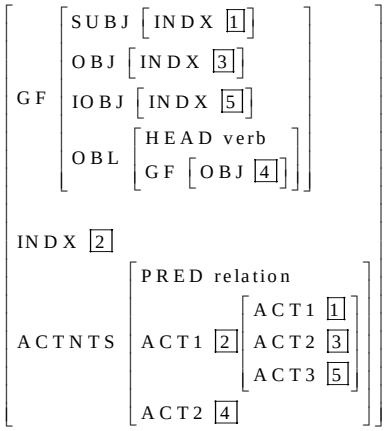


(Ex. Citumbuka (alternatively `ditrOblApCs` – see Introduction, (4)):

Tumbikani wa-ka-*mu*-phik-isk-ir-a *Temwa* nchunga kwa Mary

Tumbikani 1SM-pst-1OM-cook-Caus-Appl-fV Temwa beans 'to' Mary =
"Tumbikani made Mary cook beans for Temwa")

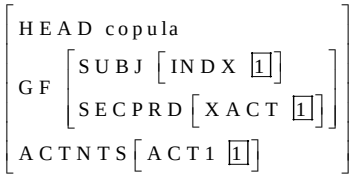
ditrVid = ditransitive together with a verbid



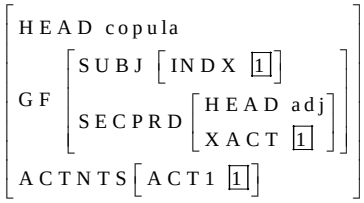
(Ex. Ga: **A-du lɛ kakla yɛ e-sɛɛ**

3-pierce 3S knife be.at 3S.POSS-back =
'He was stabbed in the back.')

predicative copular construction = construction where the verb ties an NP and a predicate together so as to make the NP the logical subject (XACT) of the predicate



copAdj = *predicative copular construction* with adjectival predicative.



(Ex.: Eng. **the book is black**)

copN = *predicative copular construction* with nominal predicative.

(Ex.: Eng. **the man is a fool**)

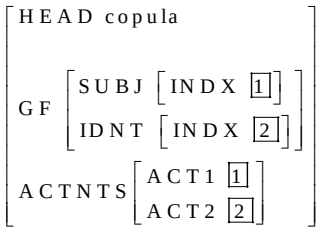
copPP = *predicative copular construction* with prepositional predicative.

copPredprtcl = *predicative copular construction* with predicative headed by a predicative particle.

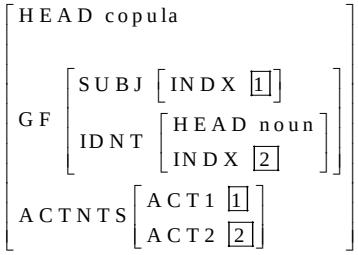
coplocAdj = *predicative copular construction* with adjectival predicative and where the verb (like **yɛ** 'be.at' in Ga) suggests the predicate as somehow a location.

coplocAdv = *predicative copular construction* with adverbial predicative and where the verb (like *yɛ* 'be.at' in Ga) suggests the predicate as somehow a location.

identity copular construction = construction where the verb ties two referring expressions together expressing identity between their referents



copIdN = *identity copular construction* with nominal identifier.



(Ex.: Norw. **dette er mannen**
'this is the man'.)

copIdAbsinf = *identity copular construction* with infinitival identifier.

(Ex.: Norw. **oppgaven er å spise silden**
'the task is to eat the herring'.)

copIdDECL = *identity copular construction* with a declarative clause as identifier.

(Ex.: Norw. **problemet er at han spiser silden**
'the problem is that he eats the herring'.)

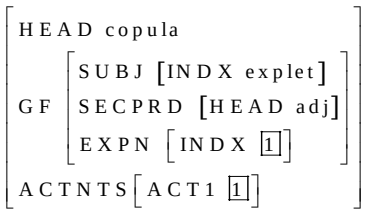
copIdYN = *identity copular construction* with a yes-no-interrogative clause as identifier.

(Ex.: Norw. **problemet er om han spiser silden**
'the problem is whether he eats the herring'.)

copIdWH = *identity copular construction* with a wh-interrogative clause as identifier.

(Ex.: Norw. **spørsmålet er hvem som spiser silden**
'the question is who eats the herring'.)

copExpnAdj = *predicative copular construction* with adjectival predicative and the 'logical subject' extraposed.



(Ex.: Norw. **det er trist at han kommer**
'it is sad that he comes';
det er uvisst hvem som kommer
'it is uncertain who comes'.)

copExpnN = *predicative copular construction* with nominal predicative and the 'logical subject' extraposed.

(Ex.: Norw. **det er en skuffelse at han kommer**
'it is a disappointment that he comes';
det er et spørsmål hvem som kommer
'it is a question who [that] comes'.)

copExpnPP = *predicative copular construction* with prepositional predicative and the 'logical subject' extraposed.

(Ex.: Norw. **det er hinsides diskusjon at han kommer**
'it is beyond discussion that he comes'.) ("hinsides diskusjon" is a PP)

copExpnPredprtcl = *predicative copular construction* with predicative headed by a pred-particle and the 'logical subject' extraposed.

(Ex.: Norw. **det var som bestilt at han tapte igjen**
'it was like preordained that he lost again' = "it was as one would have wished that he lost again") (The predparticle is "som".)

copImpersAdjLoc = copula with expletive subject, adjectival predicate and a locative 'logical subject'

(Ex.: Norw. **det er fint i Finnmark** 'it is fine in Finnmark'.)

lghtAdj = intransitive light verb whose complement is headed by Adj functioning as a secondary predicate (= **intrLghtScpr-scAdj** – see above).

lghtAdv = intransitive light verb whose complement is headed by Adv functioning as a secondary predicate (= **intrLghtScpr-scAdv** – see above).

lghtN = intransitive light verb whose complement is N functioning as a secondary predicate (= **intrLghtScpr-scN** – see above)
(in contrast to **trLght** – see below).

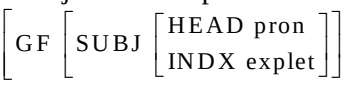
lghtAdjVid = intransitive light verb whose complement is headed by Adj functioning as a secondary predicate, and with a Verbid phrase

trLght = transitive light verb whose complement is an NP expressing an event-type performed (or in other ways operated on) by the subject.

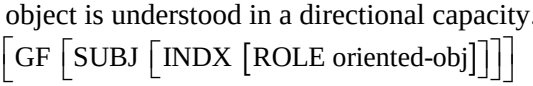
(Ex. Eng.: **he makes progress**.)

II.c SLOT 3 Constituents, syntactic properties

suExpl = subject is an expletive.



suDir = object is understood in a directional capacity.



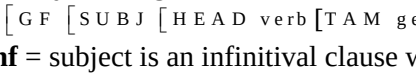
suDECL = subject is a declarative clause.

suYN = subject is a yes-no-interrogative clause.

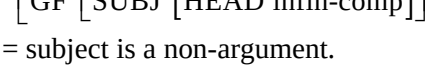
suWH = subject is a wh-interrogative clause.

suInf = subject is an infinitival clause.

suGer = subject is a gerundive clause.



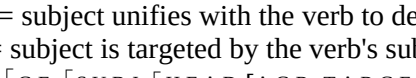
suAbsinf = subject is an infinitival clause with non-controlled interpretation.



suNrg = subject is a non-argument.

suUnif = subject unifies with the verb to determine the verbal meaning

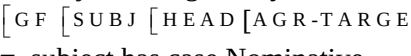
suSM = subject is targeted by the verb's subject marking



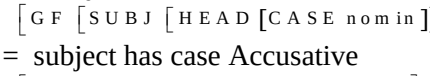
suAgr = subject is targeted by the main verb's agreement marking

suAgraux = subject is targeted by the auxiliary verb's agreement marking

suAgrsc = subject is targeted by the secondary predicate's agreement marking

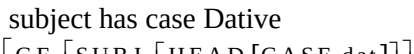


suNom = subject has case Nominative

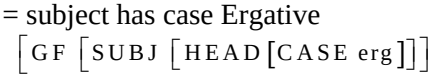


suAcc = subject has case Accusative

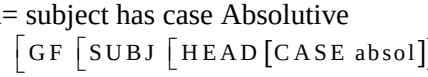
suGen = subject has case Genitive



suDat = subject has case Dative

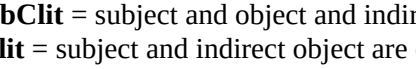


suErg = subject has case Ergative



suAbsl= subject has case Absolutive

suClit = subject is cliticized (cliticization site not specified)



suObClit = subject and object are cliticized (cliticization site not specified)

suObIobClit = subject and object and indirect object are cliticized (cliticization sites not specified)

suIobClit = subject and indirect object are cliticized (cliticization sites not specified)

suObOb2Clit = subject and object and object2 are cliticized (cliticization sites not specified)

suOb2Clit = subject and object2 are cliticized (cliticization sites not specified)

suDrop = subject is dropped

$$\left[\text{GF}\left[\text{SUBJ}\left[\text{HEAD pron}\left[\text{REAL drop}\right]\right]\right]\right]$$

suObDrop = subject and object are dropped

$$\left[\text{GF}\begin{bmatrix}\text{SUBJ}\left[\text{HEAD pron}\left[\text{REAL drop}\right]\right]\\ \text{OBJ}\left[\text{HEAD pron}\left[\text{REAL drop}\right]\right]\end{bmatrix}\right]$$

suObIobDrop = subject and object and indirect object are dropped **suObOb2Drop** = subject and object and object2 are dropped

suIobDrop = subject and indirect object are dropped

suOb2Drop = subject and object2 are dropped

suBPsuSpec = (the referent of) the subject is a bodypart of (the referent of) the subject's specifier (literal ex: "his heart", "his head").

$$\left[\text{GF}\left[\text{SUBJ}\begin{bmatrix}\text{INDX}\,\boxed{1}\left[\text{CLASS bodypart}\right]\\ \text{GF}\left[\text{SPEC}\left[\text{INDX}\,\boxed{2}\right]\right]\\ \text{ACTNTS}\begin{bmatrix}\text{PRED part-of}\\ \text{ACT1}\,\boxed{1}\\ \text{ACT2}\,\boxed{2}\end{bmatrix}\end{bmatrix}\right]\right]$$

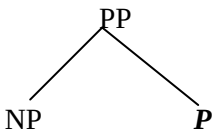
suPossp = the subject has a possessor (NP) phrase as specifier.

$$\left[\text{GF}\left[\text{SUBJ}\begin{bmatrix}\text{INDX}\,\boxed{1}\\ \text{GF}\left[\text{SPEC}\left[\text{INDX}\,\boxed{2}\right]\right]\\ \text{ACTNTS}\begin{bmatrix}\text{PRED binary-rel}\\ \text{ACT1}\,\boxed{1}\\ \text{ACT2}\,\boxed{2}\end{bmatrix}\end{bmatrix}\right]\right]$$

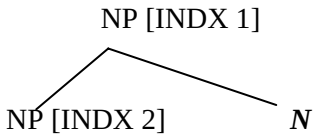
suSpecBPsuSpecSpec = the subject's specifier is a body part of the specifier's specifier. This is a further specification of the structure exemplified above, that is, 'heart', which heads the specifier of the postposition that heads the Noun Phrase, is a body part of its own specifier, 'his' (or 'her').

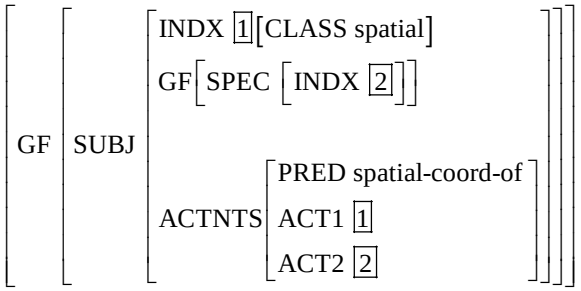
suPostp = the subject is a 'postpositional phrase'; that is to say, depending on the language, the subject is to be analyzed either (a) as a PP with preposition last (giving the name of the label), or (b) as reflected in the feature structure below, as an NP with a relational noun as head and an NP specifier (literal ex: "his inside, inside him").

a.

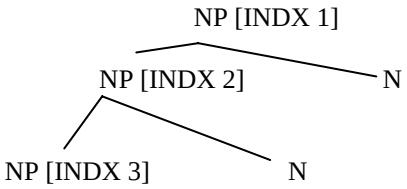


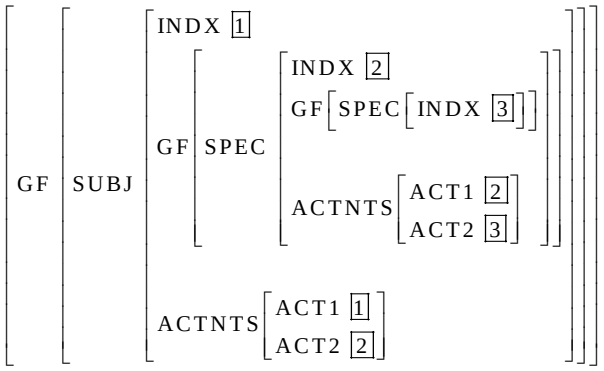
b.





suSpecPossp = the subject's specifier has a possessor NP as specifier
(eg. in Ga: **e-tsui naa wa** "he is brave", literally 'his heart's edge is hard.')

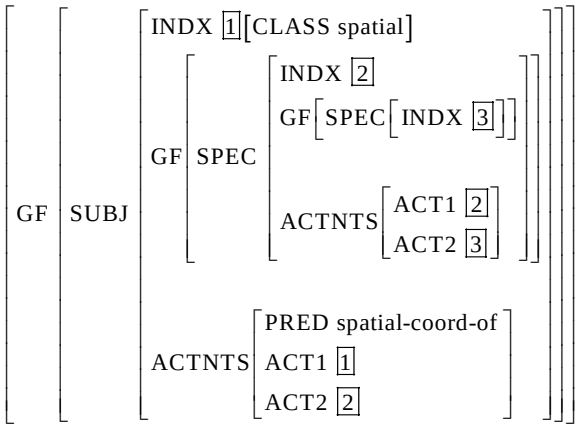




suSpecBPsuSpecSpec = the subject's specifier is a body part of the specifier's specifier. This is a further specification of the structure exemplified above, that is, 'heart', which heads the specifier of the postposition that heads the Noun Phrase, is a body part of its own specifier, 'his' (or 'her').

suSpecPostp = the subject's specifier is a postpositional phrase (same tree structure as above)

suPostpSpecPossp (a specialization of **suSpecPossp**) = the subject is a postpositional phrase and has a possessor NP as specifier of its specifier (literal ex: "his head's edge")



suSpecBPsuSpecSpec = the subject's specifier is a bodypart of the subject's specifier's specifier ("his head's edge")

suIDobSpec = the subject is identical to the specifier of the object

$$\begin{bmatrix} \text{GF} & \begin{bmatrix} \text{SUBJ} & [\text{INDX } \boxed{1}] \\ \text{OBJ} & [\text{GF}[\text{SPEC } [\text{INDX } \boxed{1}]]] \end{bmatrix} \end{bmatrix}$$

suSpecIDobSpec = the specifier of the subject is identical to the specifier of the object

$$\begin{bmatrix} \text{GF} & \begin{bmatrix} \text{SUBJ} & [\text{GF}[\text{SPEC}[\text{INDX } \boxed{1}]]] \\ \text{OBJ} & [\text{GF}[\text{SPEC } [\text{INDX } \boxed{1}]]] \end{bmatrix} \end{bmatrix}$$

suIDobSu = the subject is identical to the subject of the object (the object being a clause)

$$\begin{bmatrix} \text{GF} & \begin{bmatrix} \text{SUBJ} & [\text{INDX } \boxed{1}] \\ \text{OBJ} & [\text{GF}[\text{SUBJ } [\text{INDX } \boxed{1}]]] \end{bmatrix} \end{bmatrix}$$

suIDiobSpec = the subject is identical to the specifier of the indirect object

$$\begin{bmatrix} \text{GF} & \begin{bmatrix} \text{SUBJ} & [\text{INDX } \boxed{1}] \\ \text{IOBJ} & [\text{GF}[\text{SPEC } [\text{INDX } \boxed{1}]]] \end{bmatrix} \end{bmatrix}$$

suIDobSpecSpec = the subject is identical to the specifier of the specifier of the object

suIDcompSu = the subject is identical to the complement's subject

For the feature structure of many of the **ob**... labels, see corresponding labels starting with **su.**..

obDir = object is understood in a directional capacity.

$$[\text{GF } [\text{OBJ } [\text{INDX } [\text{ROLE oriented-obj}]]]]$$

obArg = object functions as argument relative to the matrix verb.

$$\begin{bmatrix} \text{GF} & [\text{OBJ } [\text{INDX } \boxed{1}]] \\ \text{ACTNTS} & [\text{ACT2 } \boxed{1}] \end{bmatrix}$$

obPro = object is a pronoun.

$$[\text{GF } [\text{OBJ } [\text{HEAD pron}]]]$$

obRefl = object is a reflexive pronoun.

$$[\text{GF } [\text{OBJ } [\text{HEAD refl}]]]$$

obReflExpl = object is an expletive reflexive pronoun.

$$\begin{bmatrix} \text{GF} & [\text{OBJ } \begin{bmatrix} \text{HEAD refl} \\ \text{INDX explet} \end{bmatrix}] \end{bmatrix}$$

obDECL = object is a declarative clause

obDECLcmp = object is a declarative clause with a complementizer

obDECLbare = object is a declarative clause without a complementizer

obIRR = object is an irrealis clause

obIRRcmp = object is an irrealis clause with a complementizer

obIRRbare = object is an irrealis clause without a complementizer

obYN = object is a yes-no-interrogative clause.

obWH = object is a wh-interrogative clause.

obOM = object is targeted by the verb's object marking

$$\left[\text{GF}\ \left[\text{OBJ}\ \left[\text{HEAD}\left[\text{AGR-TARGET}\ +\right]\right]\right]\right]$$

obAgrsc = object is targeted by the secondary predicate's agreement marking

$$\left[\text{GF}\ \left[\text{OBJ}\ \left[\text{HEAD}\left[\text{AGR-TARGET}\ +\right]\right]\right]\right]$$

obAcc = object is marked Accusative

$$\left[\text{GF}\ \left[\text{OBJ}\ \left[\text{HEAD}\left[\text{CASE acc}\right]\right]\right]\right]$$

obGen = object is marked Genitive

obDat = object is marked Dative

obNom = object is marked Nominative

obAbsl = object has case Absolutive

$$\left[\text{GF}\ \left[\text{OBJ}\ \left[\text{HEAD}\left[\text{CASE absol}\right]\right]\right]\right]$$

obDef = object is definite

$$\left[\text{GF}\ \left[\text{OBJ}\ \left[\text{HEAD}\left[\text{DEF}\ +\right]\right]\right]\right]$$

obIndef = object is indefinite

$$\left[\text{GF}\ \left[\text{OBJ}\ \left[\text{HEAD}\left[\text{DEF}\ -\right]\right]\right]\right]$$

obAccDef = object is marked Accusative and is definite

$$\left[\text{GF}\ \left[\text{OBJ}\ \left[\text{HEAD}\begin{bmatrix}\text{CASE acc}\\ \text{DEF}\ +\end{bmatrix}\right]\right]\right]$$

obAccIndef = object is marked Accusative and is indefinite

obAccDefOM = object is marked Accusative, is definite, and is targeted by the verb's object marking

$$\left[\text{GF}\ \left[\text{OBJ}\ \left[\text{HEAD}\begin{bmatrix}\text{CASE acc}\\ \text{DEF}\ +\\ \text{AGR-TARGET}\ +\end{bmatrix}\right]\right]\right]$$

obClit = object is cliticized (cliticization site not specified)

$$\left[\text{GF}\ \left[\text{OBJ}\ \left[\text{HEAD pron}\left[\text{REAL clit}\right]\right]\right]\right]$$

obIobClit = object and indirect object are cliticized (cliticization sites not specified)

obOb2Clit = object and object2 are cliticized (cliticization sites not specified)

obDrop = object is dropped

$$\left[\text{GF}\ \left[\text{OBJ}\ \left[\text{HEAD pron}\left[\text{REAL drop}\right]\right]\right]\right]$$

obIobDrop = object and indirect object are dropped

obOb2Drop = object and object2 are dropped

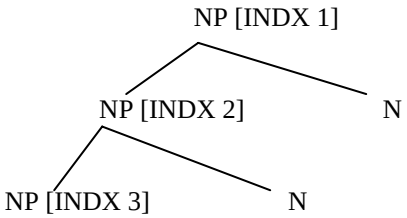
obPossp = the object has a possessor (NP) phrase as specifier. (See definition of **suPossp**.)

obPostp = the object is a 'postpositional phrase'; that is to say, the object could be analyzed either as (a) a PP with preposition last (giving the name of the label), or, (b) as an NP with a relational noun as head and an NP specifier (literal ex: "his inside"). (See definition of **suPostp**.)

obBPobSpec = (the referent of) the object is a bodypart of (the referent of) the specifier of the object (literal ex: "his heart", "his head"). (See definition of **suBPspec**.)

obSpecBPobSpecSpec = the object's specifier is a body part of the object's specifier's specifier (for example, in **amɛ-toi nɔ** the head of the object, **nɔ**, which is a postposition, has has specifier **toi** 'ear', which in turn has a specifier **e** 'his', and 'ear' is a body part of 'his'.

obSpecPossp = the object's specifier has a possessor NP phrase as specifier (literal ex: "his head's edge")



obSpecPostp = the object's specifier is a postpositional phrase (same tree structure as above)

obPostpSpecPossp (a specialization of **obSpecPossp**) = the object is a postpositional phrase and has a possessor NP as specifier of its specifier (literal ex: "his head's edge")

obPro = object is a pronoun. Used if for some reason pronominalization is considered integral to the construction. It is also used to indicate that the verb is transitive, even in instances where the nature of the system of third person pronouns means that the object has no phonetic exponence.

(Ex. Ga:_ E-na 'He saw it.'

obPRTOFsu = the referent of the object is interpreted as part-of the referent of the subject.

$$\begin{bmatrix} \text{GF} & \begin{bmatrix} \text{SUBJ} & \begin{bmatrix} \text{INDX} & \boxed{1} \end{bmatrix} \\ \text{OBJ} & \begin{bmatrix} \text{INDX} & \boxed{2} \end{bmatrix} \end{bmatrix} \\ \text{ACTNTS} & \begin{bmatrix} \text{PRED} & \text{part-of} \\ \text{ACT1} & \boxed{2} \\ \text{ACT2} & \boxed{1} \end{bmatrix} \end{bmatrix}$$

(Ex. Ga: **E-yɛ tsui**

3S-have heart = "He is patient")

obUnif = object is an 'inherent complement', i.e., unifies with the verb to determine the verbal meaning

obNomvL = object is a nominalization of a verbal expression, in which the verb occurs last ie. following its arguments

obSpecNomvL = object's specifier is a nominalization of a verbal expression, in which the verb occurs last

obIDatcSu = object is identical to subject of attributive clause

obIDexpnSu = object is identical to extraposed clause's subject

obIDsuSpec = object is identical to the specifier of the subject

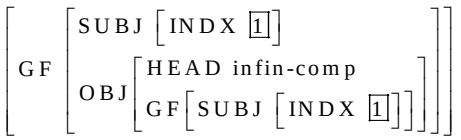
obSpecIDvidObSpec = object's specifier is identical to Verbid's object's specifier

obIDvidObSpec = object is identical to Verbid's object's specifier

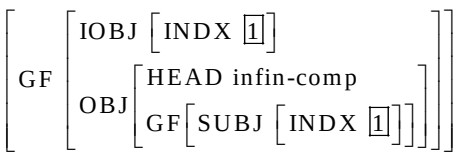
obEqInf = object is an infinitive equi-controlled by the subject (used when there is only one option)

$$\begin{bmatrix} \text{GF} & \begin{bmatrix} \text{SUBJ} & \begin{bmatrix} \text{INDX} & \boxed{1} \end{bmatrix} \\ \text{OBJ} & \begin{bmatrix} \text{HEAD} & \text{infin-comp} \\ \text{GF} & \begin{bmatrix} \text{SUBJ} & \begin{bmatrix} \text{INDX} & \boxed{1} \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

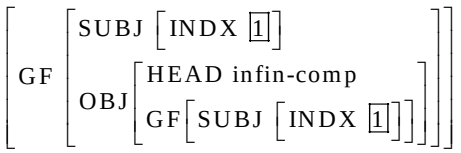
obEqSuInf = object is an infinitive equi-controlled by subject (used when there is more than one option).



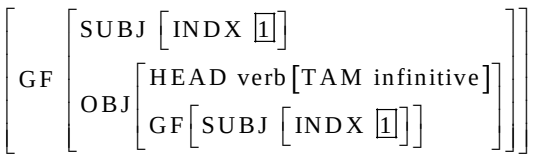
obEqIobInf = object is an infinitive equi-controlled by indirect object (used when there is more than one option).



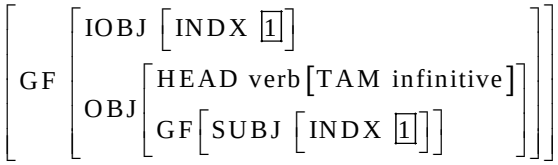
obEqBareinf = object is a bare infinitive equi-controlled by the subject (used when there is only one option)



obEqSuBareinf = object is a bare infinitive equi-controlled by subject (used when there is more than one option).



obEqIobBareinf = object is a bare infinitive equi-controlled by indirect object (used when there is more than one option).



.

obAbsInf = object is a non-controlled (‘absolute’) infinitive.
obAspIDvAsp = (a clausal object:) object’s Aspect is identical to the matrix verb’s aspect.

For the feature structure of many of the **iob**... labels, see corresponding labels starting with **su.**.. or **ob**…

iobReflExpl = indirect object is an expletive reflexive.
iobOM = indirect object is targeted by the verb's object marking
iobAcc = indirect object is marked Accusative
iobGen = indirect object is marked Genitive
iobDat = indirect object is marked Dative
iobPostp = the indirect object is a postpositional phrase (literal ex: "his inside").
iobCl = indirect object is cliticized (cliticization site not specified)
iobDrop = indirect object is dropped

For the feature structure of many of the **ob2**... labels, see corresponding labels starting with **su.**.. or **ob**…

ob2DECLcmp = second object is a declarative clause with complementizer
ob2OM = second object is targeted by the verb's object marking
ob2Acc = second object is marked Accusative
ob2Gen = second object is marked Genitive
ob2Dat = second object is marked Dative
ob2Unif = object2 is an 'inherent complement', i.e., unifies with the verb to determine the verbal meaning
ob2Cl = object2 is cliticized (cliticization site not specified)
ob2Drop = object2 is dropped
ob2AccDef = object2 is marked Accusative and is definite

ob2AccIndef = object2 is marked Accusative and is indefinite
ob2AccDefOM = object2 is marked Accusative, is definite, and is targeted by the verb's object marking
ob2DatDef = object2 is marked Dative and is definite

ob2DatIndef = object2 is marked Dative and is indefinite
ob2DatDefOM = object2 is marked Dative, is definite, and is targeted by the verb's object marking

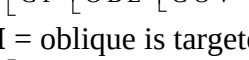
Object3 arises in verb extension constructions, typically in languages having little case, so tentatively only the specifications below are relevant.

ob3OM = object3 is targeted by the verb's object marking
ob3Cl = object3 is cliticized (cliticization site not specified)
ob3Drop = object3 is dropped.

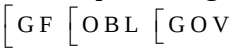
Object4 arises exceptionally in verb extension constructions, typically in languages having little case, so tentatively only the specifications below are relevant.

ob4OM = object4 is targeted by the verb's object marking
ob4Cl = object4 is cliticized (cliticization site not specified)
ob4Drop = object4 is dropped

oblRefl = the governee of the oblique is a reflexive.



oblOM = oblique is targeted by the verb's object marking



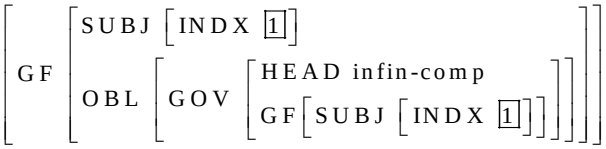
oblDECL = the governee of the oblique is a declarative clause.

oblYN = the governee of the oblique is a yes-no-interrogative clause.

oblWH = the governee of the oblique is a wh-interrogative clause.

oblAbsinf = the governee of the oblique is a non-controlled infinitive.

oblEqSuInf = the governee of the oblique is an infinitive equi-controlled by subject.

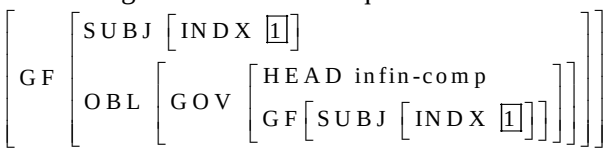


(Ex. Norw: **han håper på å komme** 'he hopes [on] to come')

oblEqObInf = the governee of the oblique is an infinitive equi-controlled by object.

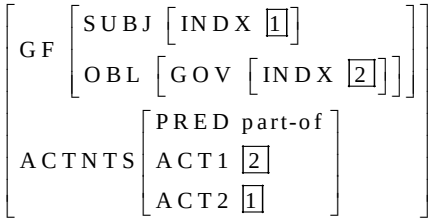
(Ex. Norw: **han bønnfalt meg om å gå**
'he begged me about to go' = "he begged me that I leave")

oblRaisInf = the governee of the oblique is an infinitive which is raising-controlled by the subject.



(Ex. : Norw. **han later til å komme**
'he appears [to] to come')

oblPRTOFsu = the referent of the governee of the oblique is interpreted as part-of the referent of the subject.

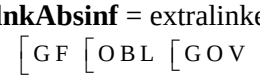


(Ex. : Norw. **han fryser på ryggen**
'he freezes on the back'
= 'his back is cold")

oblPRTOFob = the referent of the governee of the oblique is interpreted as part-of the referent of the object.

oblPRTOFiob = the referent of the governee of the oblique is interpreted as part-of the referent of the indirect object.

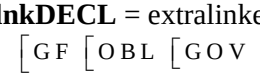
oblExlnkAbsinf = extralinked is a non-controlled infinitive occurring as governee of an oblique.



[An *extralinked* clause is like an *extraposed* clause except that substituting it for the expletive does not yield a grammatical construction.]

(Ex.:Norw. **det haster med å rydde**
'it hastes with to tidy' = "it is urgent that it gets tidied up")

oblExlnkDECL = extralinked is a declarative clause occurring as governee of an oblique.



(Ex.: Norw. **det ser ut til at han kommer**
'it looks out to that he comes' = "it seems that he comes")

advEndpt = the adverbial constituent indicates an Endpoint

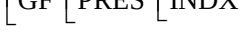
advLoc = the adverbial constituent is a Locative.

advRefl = the adverbial constituent is a PP with a REFL as governee

(Ex.: Norw. **han sølte på seg** 'he spilled on REFL')

advTrgt = the adverbial constituent represents the Target of the event.

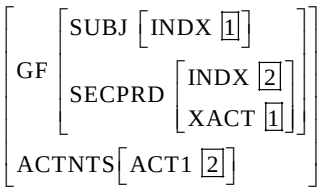
presDir = presented (NP in presentational) is understood in a directional capacity.



(Ex.: Norw. **det løper en mann**

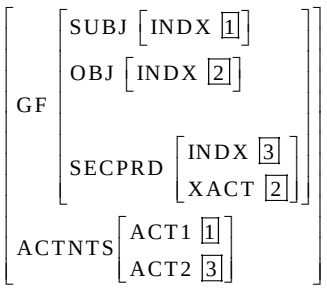
'there runs a man' = "there is a man running")

scSuNrg = the secondary predicate is predicated of a non-argument subject (i.e., a subject not serving as semantic argument of the matrix verb – a construction sometimes referred to as 'raising to subject').



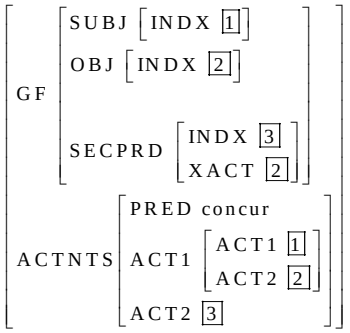
(Ex.: Eng. **he seems sick**)

scObNrg = the secondary predicate is predicated of a non-argument object (i.e., an object not serving as semantic argument of the matrix verb – a construction sometimes referred to as 'raising to object').



(Ex.: Eng. **I saw him sleeping**)

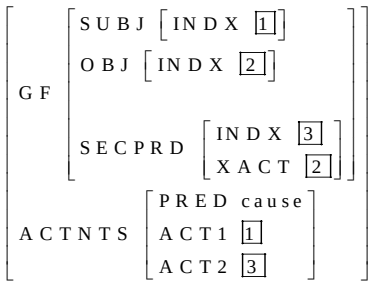
scObArgConcurr = the secondary predicate is predicated of an argument object (i.e., an object serving as semantic argument of the matrix verb), and the matrix verb (together with its subject) is part of the description of an event concurrent with the situation described by the secondary predication.



(Ex.: Eng. **he drank the coffee warm**)

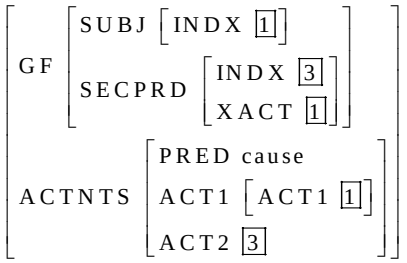
scObNrgRes = with a person-causer, a one-actant caused

(incrementally or not), and the XACT of the predicative expressed as object (the object is not serving as semantic argument of the matrix verb).



(Ex.: Eng. **he made the horse jump**)

scSuArgCsd = the secondary predicate is predicated of an argument subject (i.e., a subject serving as semantic argument of the matrix verb), and the matrix verb (together with its subject) is part of the description of an event causing the situation described by the secondary predication.

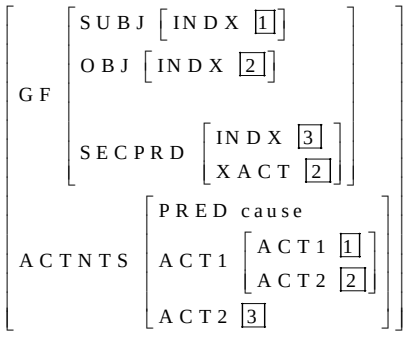


(Ex.: Norw. **kaffen koker bort**
'the coffee boils away')

scResIncrm = **scSuArgCsd** (with causation understood as being incremental)

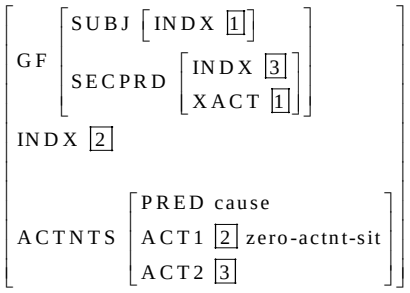
scSuNrgResIncrm = **scSuNrgCsd** (with causation understood as being incremental)

scObArgCsd = the secondary predicate is predicated of an argument object (i.e., an object serving as semantic argument of the matrix verb), and the matrix verb (together with its subject) is part of the description of an event causing (incrementally or in one event) the situation described by the secondary predication.



(Ex.: Eng. **he kicked the ball flat**)

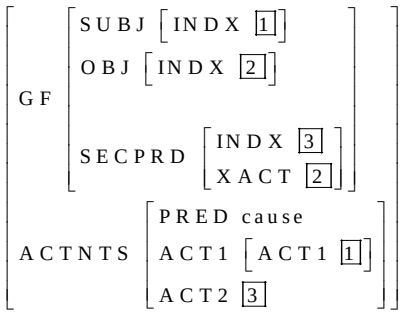
scSuNrgCsd = the secondary predicate is predicated of a non-argument subject (i.e., a subject not serving as semantic argument of the matrix verb – "raising to subject'), and the matrix verb is part of the description of an event causing the situation described by the secondary predication.



(Ex.: Norw. **landsbyen snør ned**

'the village snows down' = “the village gets snowed in”)

scObNrgCsd = the secondary predicate is predicated of a non-argument object (i.e., an object not serving as semantic argument of the matrix verb – "raising to object'), and the matrix verb (together with its subject) is part of the description of an event causing the situation described by the secondary predication.



(Ex.: Norw. **han sang rommet tomt**

'he sang the room empty')

scAdj = the secondary predicate (‘sc’) is headed by an adjective

[GF [SECPRD [HEAD adj]]]

scAdjAgr = the secondary predicate is headed by an adjective which carries an agreement formative

[GF [SECPRD [HEAD adj[FORMATIVES ⟨AGR⟩]]]]

scN = the secondary predicate is headed by a noun
scPP = the secondary predicate is a PP
scPrtcl = the secondary predicate is a particle
scAdv = the secondary predicate is headed by an adverb
scPredprtcl = the secondary predicate is headed by a predparticle
scInf = the secondary predicate is an infinitive clause
scBareinf = the secondary predicate is a bare infinitive clause
scPerf = the secondary predicate is a perfective phrase
scEquat = the secondary predicate is an equative phrase

compDECL = complement is a declarative clause.

[GF [COMP [HEAD decl-comp]]]

compDECLbare = complement is a declarative clause without complementizer
compYN = complement is a yes-no-interrogative clause.
compWH = complement is a wh-interrogative clause.
compIRR = complement is an irrealis clause
compIRRcmp = complement is an irrealis clause with a complementizer

expnDECL = a declarative clause is extraposed.

[GF [EXPN [HEAD decl-comp]]]

expnYN = a yes-no-interrogative clause is extraposed.
expnWH = a wh-interrogative clause is extraposed.
expnCOND = a conditional clause is extraposed.
expnEqInf = an equi-controlled infinitive is extraposed.
expnAbsinf = a non-controlled infinitive is extraposed.
expnInfabs = a non-controlled infinitive is extraposed.
expnHYP = a hypothetical clause is extraposed.
expnEQUAT = an equative clause is extraposed.
exlnkDECL = a declarative clause is extralinked.

[GF [GOV [EXLNK [HEAD decl-comp]]]]

exlnkYN = a yes-no-interrogative clause is extralinked.
exlnkWH = a wh-interrogative clause is extralinked.
exlnkCOND = a conditional clause is extralinked.
exlnkEqInf = an equi-controlled infinitive is extralinked.
exlnkAbsinf = a non-controlled infinitive is extralinked.

III

LABELS FOR SLOTS 4, 5 AND 6 IN SINGLE-VERB CONSTRUCTIONS: ROLE, ASPECT/AKTIONSART, AND SITUATION TYPE

This section lists the labels currently in use for the three slots associated with semantic features. They are less well established than the syntactic labels of the first three slots. Nevertheless there are fairly widespread conventions to build on, particularly for slot 4.

III.a SLOT 4 Roles

Except for 'Abst' and 'Sit', which mark a specific ontological type, there are no capped parts of role labels. When used, the role label is prefixed by a grammatical function, so that, e.g., 'ag' occurs as 'suAg'. Another example:

vidObEndpt = the role of the object in the Verbid phrase is 'endpoint'

$$\left[\text{GF}\left[\text{OBL}\begin{bmatrix}\text{HEAD verb}\\ \text{GF}\left[\text{OBJ}\left[\text{INDX}\left[\text{ROLE endpoint}\right]\right]\right]\end{bmatrix}\right]\right]$$

The list that follows is not complete, but contains the role labels that have been found useful in the languages examined so far. There is no reason why others should not be added, but it is advisable that a standard is aimed at, at least for within a typological area. It is likely that depending on the language, some can be considered to be sub-types of others, for example, obviously, **ag**ent, **ag**ent**mover** and **ag**ent**sens**or, as well as **th**eme, **th**eme**loc**ative, and **th**eme**mo**ver.

activated = item set into some activity
aff = affected
affincrm = incrementally affected
ag = agent
agintent = agent relative to intended/considered eventuality
agmover = agentive mover
agsens = agentive senser
alongline = line being followed
ass = assessor
ben = beneficiary / benefactive
cog = cognizer
com = comitative
comitmover = comitative mover
content = content of thought/ communication
csd = caused
csee = causee
csr = causer
dir = directional
distunit = distance unit of movement/extension
descd = entity described
ejct = ejected
effector = item effecting
emitter = something from which a substance is emitted
endpt = endpoint of movement/extension
endstate = endstate of development
eventcontent = content of an event, what actually happens
eventcont = event content of activity/ eventuality

exp = experiencer
idfd = item identified in an identity predication
idfng = item providing identification in an identity predication
instr = instrument
instrmover = instrumental mover
instrsit = instrumental situation
interloc = interlocutor
lengthcont = the actual length content of an act or situation involving extent
loc = location
locomoevent = an event or activity involving locomotion (like a guided tour)
locsit = localized situation
locth = locative theme, = thloc
locus = locus of event with respect to a containing item
mal = malefactive
mover = locomotor
orientedline = line being oriented
orientedobj = instance of movement/extension
path = path/trajectory of movement/extension
pathobj = instance of extension (like a road)
prcpt = percept
prcsit = perceived situation
prcvr = perceiver
permissee = one given permission to do something
poss = possessor
possAbst = abstract possessor
possd = possessed
pres = presented
purelyorient = orientation without extension or movement (like a signpost)
quality = ascribed quality
rec = recipient
res = result of activity
sens = senser
startpt = startpoint of movement/extension
time = timepoint or timespan of activity/ eventuality
timecont = time content of activity/ eventuality
th = theme
thAbst = abstract theme
thincrem = theme incrementally involved
thloc = locative theme
thmover = theme mover
thsit = situational theme, thematic situation
thvehcl = vehicle
top = topic
trgt = target of attention
viapt = viapoint of movement/extension
weightcont = content of ascribed weight
xBPy = x is a body part of y (also used in slot 3)
xIDy = x is identical to y (also used in slot 3)

III.b SLOT 5 Aspect/ Aktionsart

The labels indicated here are even more tentative that those for Slot 4. Those given below are simply those that have been used – some are equivalent to others, and others could undoubtedly be added.

ACHVMNT = Achievement
ACT = agentive event
ACTIVATION = activation of an entity
ACTIVITY
CESSATION = stop doing a habitual activity
COMPLETION
DOFREQUENTLY
EVENT
FINISH
GEN = Generic, eg. a generic property
HAB = Habitual
INCH = inchoative, a process or change is initiated
INCREMRESULT = the result of an incremental process.
ITER = iterative
MONODEVMNT = monotonic development
NONCOMPLETED
PHENOMTELIC = telic phenomenon
PROCESS
PROTR = protracted
SEMELFACTIVE
STATIVE
STOPPING = stop doing a non-habitual activity
TELIC

III.c SLOT 6 Situation Type

In the list below, situation types are entered together with role concepts specific to that situation type, largely coinciding with roles used in slot 4. Slot 7 is designed as a slot where, for a given construction type, the connections can be explicitly stated; this, however, is not developed in this presentation.

We do not yet have a clear conception of what in principle differentiates the types in this list from on the one hand aspect and aktionsart, and on the other hand singular lexical concepts.. For these reasons the list is very tentative. Moreover, many of the types have clear aspectual implications, which is one reason why in an actual annotation one rarely uses both slot 5 and slot 6. In a worked out system, the exact entailments in this domain would need to be made explicit, which they are not here.

ABILITY
ABOUTNESS (CONTENT, REFERENCE)
ACCOMPANYING (MOVER, MOVERACCOMPANIED)
ACQUISITION (AGENT, ACQUIRED)
ACTIVATION (ACTIVATED ENTITY)
AFFECT (EFFECTOR, AFFECTED)
EXTENSIONALONGLINE (EXTENDEDOBJ, LINEFOLLOWED)
MOTIONALONGLINE (MOVER, LINEFOLLOWED)
ASKINGABOUT (AGENT, INTERLOCUTOR, QUERYMATTER)
ASSESS (AGENT, ASSESSEDMATTER)
ASSUMELOCATION
AVAILING (AGENT, BENEFICIARY, UNDERGOER)
CARETAKING
CAUSATIONwithCAUSINGENTITY (CAUSER, CAUSED)

CAUSATIONwithCAUSINGEEVENT (CAUSE, CAUSED)
CAUSERESULT (CAUSE, RESULT)
CHANGEofSTATE
CHANGEofSTATUS
COGNITION (COGNIZER, COGNCONTENT)
COLLECT (ACTOR, UNDERGOER, RESULTING_COLLECTION)
COMMITMENT (AGENT, COMMITMATTER)
COMMUNICATION (AGENT, CONTENT, INTERLOCUTOR, REFERENCE)
COMPARISON (AGENT, COMPARANDUM, REFERENCE)
COMPARATIVE (COMPARANDUM, REFERENCE)
EQUATIVE (COMPARANDUM, REFERENCE)
COMPARISON_COMPARATIVE (AGENT, COMPARANDUM, REFERENCE)
COMPARISON_EQUATIVE (AGENT, COMPARANDUM, REFERENCE)
CONCURRSTATE (CONCURRENT STATE, event occurs simultaneously with a state)
CONSUMPTION
CONTACTEJECTION (LAUNCHER, MOVER, TARGET) (Mover keeps contact with Launcher during the whole act, and attains contact with Target at the end of the act)
CONTACTFORCEFUL (ENTITY SUBJECTED TO FORCEFUL CONTACT)
CONTINUATION
CONTROL
COVER (COVER, AREACOVERED)
CROSSINGMOTIONS (MOVER, MOVERCROSSED)
CROSSINGPATHS (EXTENDEDOBJ, LINECROSSED)
CUTTING (ACTOR, INSTRUMENT, AFFECTED, [CONSTRUCTEDENTITY])
DEPEND (DEPENDENT, DEPENDABLE)
DEPARTURE
DETERIORATION
EJECT (EJECTOR, EJECTED)
EJECTION (EJECTOR, EJECTED)
EJECTIONDIRECTED (EJECTOR, EJECTED, ORIENTATION)
EJECTIONTARGETED (EJECTOR, EJECTED, TARGET)
EMISSION (EMITTER, SUBSTANCE EMITTED)
EMOTION (EXPERIENCER, [EXPERIENCED])
EMOTIONCAUSED (CAUSE, EXP)
EMOTIONDIRECTED (EXPERIENCER, [EXPERIENCED], ORIENTATION)
EMOTIONTARGETED (EXPERIENCER, TARGET)
EXPOSE
EXTENDING
EXTENSIONtoENDPT (EXTENDEDOBJ, ENDPOINT)
EXTENSIONviaVIAPT (EXTENDEDOBJ, VIAPOINT)
EXHIBACT
EXHIBOBJ (EXHIBITOR, OBJECT EXHIBITED)
EXHIBPROPTY
EXPER (EXPERIENCER, EXPERIENCED)
EXTENDING
HELP
IMPRECATION
IDENTITY
INTENT
LASTING
LINESITUATING (ACTOR, EXTENDEDOBJ, ORIENTATION)
LOCATION (ITEMLOCATED, LOCATION)
LOCOMOCONDUCTION
LOCOMODEVELOPMENT
LOCUTACT (LOCUTOR, CONTENT, INTERLOCUTOR, REFERENCE)

MAINTAINPOSITION (MAINTAINER, POSITION)
MAINTAINSTATE (MAINTAINER, STATE)
MALEFACTION
MENTION (MENTIONER, MENTIONED)
MOTION (MOVER)
MOTIONALONGLINE
MOTIONCAUSED (CAUSE[R], MOVER)
MOTIONCROSSPATHS
MOTIONPARALLEL (MORE THAN ONE ENTITY, PARALLEL PATHS)
MOTIONTEMPORAL
MOTIONtoENDPT (MOVER, ENDPOINT)
MOTIONviaVIAPT (MOVER, VIAPOINT)
MOTIONfromSTARTPT (MOVER, STARTPOINT)
MOTIONDIRECTED (MOVER, ORIENTATION)
NEED
OPINION
ORIENT (ORIENTED OBJECT)
PARALLELPATHS
PARTWHOLEAFFECTING (EFFECTOR, WHOLE AFFECTED, PART AFFECTED)
PARTWHOLEEXPER (EXPERIENCER, PART EXPERIENCED)
PATHCONSTELLATION
PENDINGSTATE (ASCR)
PENETRATION
PERCPT (PERCEPTION)
PERFORM
PERFORMANCE
PERFORMFUNCTION
PERMISSION
PHENOM (PHENOMENON)
PLACEMENT (EFFECTOR, UNDERGOER, ENDPOSITION)
POSSESS (POSSESSOR, POSSESSED)
POSTURELOC (POSTURED, LOCATION)
PRESENTATION (PRESENTED)
PROPOSITIONALATTITUDE (ASCR)
PROPTY (ASCR) (PROPERTY)
PROPTYASCR (ASCR) (PROPERTY ASCRIBED)
PROPTYDYN (ASCR) (PROPERT)Y DYNAMIC)
PROPTYDYNACQUIRD (ASCR) (ACQUIRED DYNAMIC PROPERTY
PROPTYDYNESTBLSHD (ASCR) (ESTABLISHED DYNAMIC PROPERTY)
PROPTYDYNPROGR (ASCR) (PROGRESSIVE DYNAMIC PROPERTY)
PROPTYESTABD (ASCR) (ESTABLISHED PROPERTY)
PROPTYGEN (ASCR) (GENERIC PROPERTY)
PROPTYPROGR (ASCR) (PROGRESSIVE PROPERTY)
PSYCHSTATE (ASCR) (PSYCHOLOGICAL STATE)
REDUCTION
REMOVAL (EFFECTOR, UNDERGOER, DEPLETEDPOSITION)
RENDERINGinPOSITION (EFFECTOR, UNDERGOER, ENDPOSITION)
REPETITION
REPRESENT (REPRESENTER, REPRESENTED)
SENSATION (SENSER, PERCEIVED)
STATE (ASCR)
STATELOCATION (ASCR)
STRUGGLE
SUCCEEDING
SUSTAINEDACTIVITY (ACTOR)

SUSTAINEDSTATE (ASCR)
SUSTAINEDPHENOM (ASCR)
TRANSFER (INSTIGATOR, UNDERGOER, ENDPOSSESSOR)
TRANSFERPURPOSE (TRANSFER FOR A PURPOSE)
TRANSPORT (CAUSER, MOVER, ENDPOINT OF BOTH MOVER AND CAUSER)
USINGPATH (ACTOR, PATH)
USINGVEHICLE (ACTOR, VEHICLE)
WASHING (ACTOR, UNDERGOER)
WEIGHING ([ACTOR], UNDERGOER, MEASURE)

IV

TEMPLATE ARCHITECTURE FOR MULTI-VERB CONSTRUCTIONS

This section addresses four types of multiverb constructions:

- Serial Verb Constructions (SVC, slot 1 label: `sv`)
- Extended Verb Complexes (EVC, slot 1 label: ev)
- Auxiliary Verb Constructions (AVC, slot 1 label: `axv`)
- Verbids (VID, label: `vid`)

Some of these instantiate phenomena named 'Complex Predicates' in the literature. However the notions only partially intersect: not all Complex Predicates involve multiple verbs, and not all of the four types listed here would fall under the notion 'Complex Predicate'. Auxiliary Verb Constructions and Extended Verb Complexes have much in common and will be treated under the same heading.

IV.a Serial Verb Constructions

These are represented with three major areas: first a 'global' code indicating `sv` status together with the number of verbs in the series, and possible identities holding all across the series; second, information bits about the various verbs' valence and arguments of the verbs; and second, a situation type label covering the whole construction. The first and third specifications are short, whereas the specifications in the second area can constitute a long string. Area 3 is not exemplified here.

AREA 1 Global construction labels

For series of up to four members, the global labels are:

sv = serial verb construction with 2 members

$$\begin{bmatrix} \text{V1} & [\text{HEAD verb}] \\ \text{V2} & [\text{HEAD verb}] \end{bmatrix}$$

sv3 = serial verb construction with 3 members
sv4 = serial verb construction with 4 members
sv_suID = serial verb construction with 2 members and shared reference between the subjects of the verbs

$$\begin{bmatrix} \text{V1} & [\text{GF}[\text{SUBJ}[\text{INDX } \boxed{1}]]] \\ \text{V2} & [\text{GF}[\text{SUBJ}[\text{INDX } \boxed{1}]]] \end{bmatrix}$$

sv3_suID = serial verb construction with 3 members and shared reference (**ID**entity of reference) between the subjects
sv4_suID = serial verb construction with 4 members and shared reference between the subjects
sv_obID = serial verb construction with 2 members and shared reference between the objects

$$\begin{bmatrix} \text{V1} & [\text{GF}[\text{OBJ}[\text{INDX } \boxed{1}]]] \\ \text{V2} & [\text{GF}[\text{OBJ}[\text{INDX } \boxed{1}]]] \end{bmatrix}$$

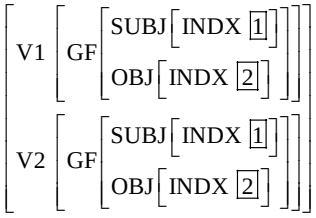
sv3_obID = serial verb construction with 3 members and shared reference between the objects
sv4_obID = serial verb construction with 4 members and shared reference between the objects
sv_aspID = serial verb construction with 2 members and shared aspectual value

$$\begin{bmatrix} \text{V1} & [\text{ASPECT } \boxed{1}] \\ \text{V2} & [\text{ASPECT } \boxed{1}] \end{bmatrix}$$

sv3_aspID = serial verb construction with 3 members and shared aspectual value

sv4_aspID = serial verb construction with 4 members and shared aspectual value

sv_suObID = serial verb construction with 2 members and shared reference between the subjects and objects



sv3_suObID = serial verb construction with 3 members and shared reference between the subjects and objects

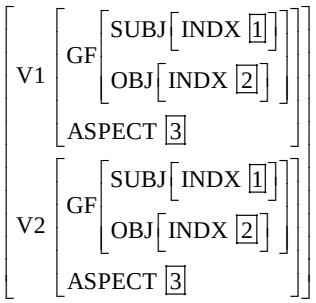
sv4_suObID = serial verb construction with 4 members and shared reference between the subjects and objects

sv_suAspID = serial verb construction with 2 members and shared reference between the subjects and shared aspectual value

sv3_suAspID = serial verb construction with 3 members and shared reference between the subjects and shared aspectual value

sv4_suAspID =. serial verb construction with 4 members and shared reference between the subjects and shared aspectual value

sv_suObAspID = serial verb construction with 2 members and shared reference between the subjects and objects and shared aspectual value



sv3_suObAspID = serial verb construction with 3 members and shared reference between the subjects and objects and shared aspectual value

sv4_suObAspID = serial verb construction with 4 members and shared reference between the subjects and objects and shared aspectual value

Continuing specifications (entailing that su and asp are shared throughout the series):

_suAg = the subjects in whole series are agentive
_aspPerf = aspect throughout the whole series is Perfective
(e.g., **sv3_suObAspID_suAg_obTh_aspPerf**)

AREA 2 Specifications relative to each constituent verb construction

Valence specifications for each verb construction in the series:

v1intr = verb construction 1 is intransitive
[V1 intr]

v2intr = verb construction 2 is intransitive
v3intr = verb construction 3 is intransitive
v4intr = verb construction 4 is intransitive
v1tr = verb construction 1 is transitive
v2tr = verb construction 2 is transitive

v3tr = verb construction 3 is transitive
v4tr = verb construction 4 is transitive
v1ditr = verb construction 1 is ditransitive
v2ditr = verb construction 2 is ditransitive
v3ditr = verb construction 3 is ditransitive
v4ditr = verb construction 4 is ditransitive

Specification relative to arguments inside each verb construction:

The general pattern is using the full range of **Slot 3 & 4** labels prefixed by '**v1**', '**v2**' etc; eg.:
v1suAg = the subject of verb construction 1 (V1) is an Agent

$$\left[\text{V1}\ \left[\text{GF}\left[\text{SUBJ}\left[\text{INDX}\left[\text{ROLE agent}\right]\right]\right]\right]\right]$$

(and likewise for all Vx and all GFs and roles)
v1aspPerf = the aspect of the first verb is Perfective
v1obTh = the object of the first verb is a Theme

Of particular relevance:
v2suSM = the subject of the second verb is targeted by subject agreement on the verb, in languages where subject-verb agreement is required.
v2suClit = the subject of v2 is realized as a cliticized pronoun, for example in languages where subject-verb agreement is not required in single verb expressions but may be required in a serial construction.

$$\left[\text{V1}\ \left[\text{GF}\left[\text{SUBJ}\left[\text{HEAD}\left[\text{REAL clit}\right]\right]\right]\right]\right]$$

(and likewise for v3 and v4:
v3suSM, v3suClit, v4suSM, v4suClit

Identities across specific Vs:

v1suIDv2su = the subject of V1 shares referent with subject of v2

$$\left[\begin{array}{l}\text{V1}\ \left[\text{GF}\left[\text{SUBJ}\left[\text{INDX}\ \boxed{1}\right]\right]\right] \\ \text{V2}\ \left[\text{GF}\left[\text{SUBJ}\left[\text{INDX}\ \boxed{1}\right]\right]\right]\end{array}\right]$$

v1obIDv2su = the object of V1 shares referent with subject of v2 ("switch subject")

$$\left[\begin{array}{l}\text{V1}\ \left[\text{GF}\left[\text{OBJ}\left[\text{INDX}\ \boxed{1}\right]\right]\right] \\ \text{V2}\ \left[\text{GF}\left[\text{SUBJ}\left[\text{INDX}\ \boxed{1}\right]\right]\right]\end{array}\right]$$

v2aspIDv3asp = the aspect of V2 is identical to aspect of V3
v2suIDv3su = the subject of V2 is identical to subject of V3
v3suIDv4su = the subject of V3 is identical to subjpect of V4
v2obIDv3su = the object of V2 is identical to subject of V3
v3obIDv3su = the object of V3 is identical to subject of V4
v1aspIDv2asp = the aspect of V1 is identical to aspect of V2
v3aspIDv4asp = the aspect of V3 is identical to aspect of V4

VI.b Pre-verbal complexes

VI.b.1 Extended Verb Complexes (EVCs; ev)

Extended verb complexes act as single verbs relative to the environment, but consist of a limited number of **preverbs** (**pv**) together with the **main verb**. A simple example is the Ga sentence **Tɛte kɛ-ba biɛ** "Tettey brought it here." The valence of the main verb determines the valence of the whole relative to the containing clause, its subject is necessarily the subject of all the preverbs with the same

role, and its Aspect, Modality and Polarity marking is wholly determined from left to right. Most preverbs are intransitive, but some can be transitive. (For description of this construction in Ga see Dakubu (2008), Dakubu Hellan & Beermann (2007), Dakubu (2004a), and in Dangme, see Dakubu (1987).) Conventions for enumerating the preverbs of an ev can be similar to those for enumerating verbs of an sv, although since the range of combinations in an ev is very limited, a small number of labels covering the totality of combinations is more correct. Thus subject and aspect identities need not be specified. Since these labels will be language dependent, for convenience we here still use the numbered labels, with the proviso that, e.g. in Ga, 'ev2' can only stand for two fixed combinations: **kɛ**+deictic, (for example, **e-kɛ-ba-ha lɛ "**he came and gave it to him**"** and neg+deictic (eg. **e-ka-ba-na lɛ** "he is not to come see him.").

So far, this construction type has been found to be specific to Ga and Dangme, although partly similar types exist in other languages of the area, notably Akan (see Saetherø 1997).

AREA 1 Global labels

ev = ev with one preverb and the main verb

$$\begin{bmatrix} \text{HEAD verb} \\ \text{PV1}\left[\text{HEAD verb}\right] \end{bmatrix}$$

ev2 = ev with two preverbs and the main verb

$$\begin{bmatrix} \text{HEAD verb} \\ \text{PV1}\left[\text{HEAD verb}\right] \\ \text{PV2}\left[\text{HEAD verb}\right] \end{bmatrix}$$

ev3 = ev with three preverbs and the main verb

Identities spanning the whole ev are expressed as for svs, e.g.:
ev3 _suAg = ev with three preverbs, where all verbs share subject reference and where the role of the subject relative to all the verbs is Agent.

$$\begin{bmatrix} \text{HEAD verb} \\ \text{GF}\begin{bmatrix} \text{SUBJ } \boxed{1}\left[\text{INDX}\left[\text{ROLE agent}\right]\right] \\ \text{OBJ sign} \end{bmatrix} \\ \text{ASPECT } \boxed{2} \text{ perf} \\ \text{PV1}\begin{bmatrix} \text{HEAD verb} \\ \text{GF}\left[\text{SUBJ } \boxed{1}\right] \\ \text{ASPECT } \boxed{2} \end{bmatrix} \\ \text{PV2}\begin{bmatrix} \text{HEAD verb} \\ \text{GF}\left[\text{SUBJ } \boxed{1}\right] \\ \text{ASPECT } \boxed{2} \end{bmatrix} \\ \text{PV3}\begin{bmatrix} \text{HEAD verb} \\ \text{GF}\left[\text{SUBJ } \boxed{1}\right] \\ \text{ASPECT } \boxed{2} \end{bmatrix} \end{bmatrix}$$

AREA 2 Specifications relative to each constituent preverb

Valence specifications for each verb construction in the series:

pv1intr = preverb 1 is intransitive

$$\left[\text{PV1}\left[\text{GF}\left[\text{SUBJ sign}\right]\right]\right]$$

pv2intr = preverb 2 is intransitive
pv3intr = preverb 3 is intransitive

pv1tr = preverb 1 is transitive
pv2tr = preverb 2 is transitive
pv3tr = preverb 2 is transitive
For the **main** verb, specifications are as in **Slot 1** for ordinary constructions

Specification relative to arguments inside each verb construction:

The general pattern is using the full range of **Slot 3** labels prefixed by '**pv1**', '**pv2**' etc; eg.:
pv1suAg = the subject of preverb 1 (PV1) is an Agent

$$\left[\text{PV1}\ \left[\text{GF}\left[\text{SUBJ}\ \left[\text{INDX}\left[\text{ROLE agent}\right]\right]\right]\right]\right]$$

(and likewise for all PVx and all GFs and roles)
pv1aspPerf = the aspect of PV1 is Perfective

Of particular relevance:
pv2suSM = the subject of PV2 is targeted by subject agreement on the verb
pv2suClit = the subject of PV2 is realized as a cliticized pronoun
(and likewise for pv1, and pv3)

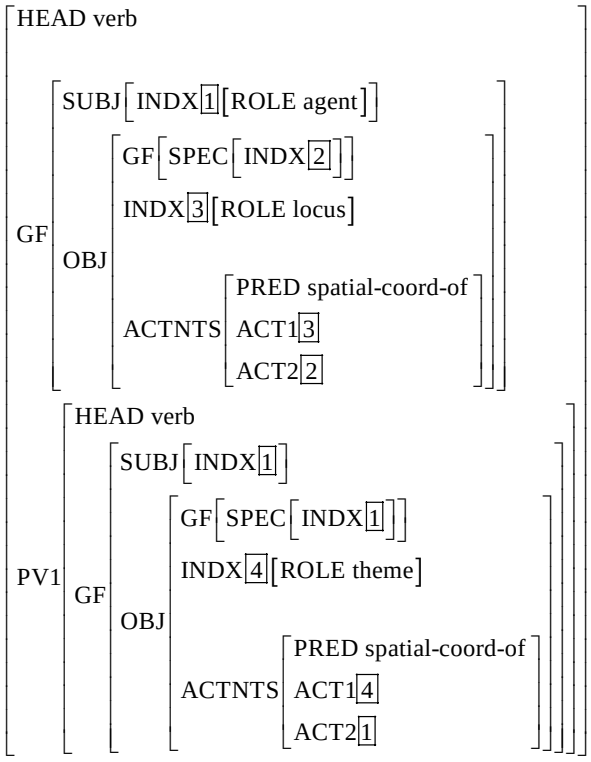
Frequently used specifications for PVs:

pv1obPro = the object of pv1 is pronominalized, which normally means that it has no phonetic expression
pv1obInstr = the object of pv1 has the role 'instrument'
pv1obNomvL = the object of pv1 is a verb-last nominalization (of a verb with its object)
pv1obPossp = the object of pv1 is a possessive NP
pv1suIDpv1obSpec = the subject of pv1 (and therefore of the whole ev) refers to the same entity as the specifier of the object of pv1.
pv1obThsit = the object of pv1 is a thematic situation

Example from Ga:
`ev_suAg-pv1tr-pv1obPossp_pv1suIDpv1obSpec_pv1obBPpv1ObSpec-pv1obTh-vtr-obPostp-obLocus-`

E-kɛ e-hiɛ fɔ-ɔ o-nɔ
$3S_1$-move $3S_1$-face throw-HAB 2S.POSS-surface
'She trusts you.'

Explanation:
Extended verb with one preverb (**kɛ**) and a shared Agent role for subjects of both verbs; PV1 (the only preverb) is transitive and its object is a possessive phrase **e-hiɛ** (see **slot 3**); relative to PV1, its subject is identical to the specifier of the object; the object of PV1 is a Body Part of its specifier ('her face' being part of 'her') and has a Theme role; the main verb is transitive and its object—which is the object of the whole verbal complex, and therefore having no prefix on 'ob'—is a postpositional phrase **o-nɔ**, and semantically in a part-whole relation to its specifier ('your surface' being a part of 'you'); moreover the object has a Locus role relative to the main verb (the implicit item thrown—the face—ending on 'your surface'). Its AVM:



Example from Dangme:
`ev4_suAg-pv1tr-pv1obTh-pv2intr-pv3intr-pv4intr-vtr-obBen-TRANSFER`

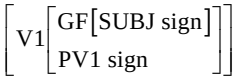
yi ɔ-mɛ kɛ nyu tsá kó bá hã lɛ
women DEF-PL move water INT COUNTRFAC.SBJV INGR.SBJV give 3S
"The women should indeed not bring him water."

EVs in SVs

When an ev occurs as a verbal constituent of an sv, the general pattern of sv specification is followed, but the ev status is marked as follows:
Instead of the specifications at the beginning of AREA2 as seen earlier:

v1intr = verb construction 1 is intransitive
v2intr = verb construction 2 is intransitive
v3intr = verb construction 3 is intransitive ...

one writes:
v1ev = verb construction 1 has a verbal head constituted by an ev with one preverb



v1ev2 = verb construction has a verbal head constituted by an ev with two preverbs
v1ev3 = verb construction 1 has a verbal head constituted by an ev with three preverbs
v2ev = verb construction 2 has a verbal head constituted by an ev ....
v3ev = verb construction 3 has a verbal head is constituted by an ev ....

For specification of each preverb in an sv, one writes
v1pv1intr = V1's PV1 is intransitive

v1pv1tr = V1's PV1 is transitive
v1pv2intr = V1's PV2 is intransitive
v1pv2tr = V1's PV2 is transitive
v1pv3intr = V1's PV3 is intransitive

v1pv3tr = V1's PV3 is transitive

and for specification of arguments relative to each pv, the following holds:
The general pattern is using the full range of **Slot 3** labels prefixed by '**pv1**', '**pv2**' etc, as above, but now with an extra prefix indicating the **Vx** status in the sv; ex.:
v1pv1suAg = in V1, the subject of PV1 is an Agent

$$\left[\text{V1}\left[\text{PV1}\left[\text{GF}\left[\text{SUBJ}\left[\text{INDX}\left[\text{ROLE agent}\right]\right]\right]\right]\right]\right]$$

(and likewise for all Vx, all PVx and all GFs and roles)
v1pv1aspPerf = in V1, the aspect of PV1 is Perfective

Of particular relevance:
v1pv2suClit = in V1, the subject of PV2 is realized as a cliticized pronoun
(and likewise for pv1, and pv3)

Frequently used specifications:

v2ev2_suAspID
v2pv1obTh
v2pv1obThsit
v2pv2intr

An example of an extended verb complex as V2 in a serial verb construction, from Ga:

`sv_suAspID_suAg-v1tr-v1obTh-v2ev2-v2pv1tr-v2pv1obThsit-v2pv2intr-v2tr-v2iobRec-`

E-tao adeka kɛ-ba-ha mi
3S-search box move-INGR-give 1S
'He found a box for me.'

Explanation:
A serial verb construction with two verb constructions, sharing subject and aspect, with both subjects being Agents; V1 is transitive and has a Theme object; V2 is an extended verb with two preverbs; PV1 of V2 is transitive and the object of PV1 is a Situational Theme; PV2 of V2 is intransitive; the main verb is transitive and its object is a Beneficiary. Its AVM:

$$\left[\begin{array}{l}\text{V1}\left[\begin{array}{l}\text{GF}\left[\begin{array}{l}\text{SUBJ}\left[\text{INDX}\boxed{1}\left[\text{ROLE agent}\right]\right]\\ \text{OBJ}\left[\text{INDX}\boxed{2}\left[\text{ROLE theme}\right]\right]\end{array}\right]\\ \text{ASPECT}\boxed{3}\end{array}\right]\\ \text{V2}\left[\begin{array}{l}\text{GF}\left[\begin{array}{l}\text{SUBJ}\left[\text{INDX}\boxed{1}\right]\\ \text{OBJ}\left[\text{INDX}\left[\text{ROLE ben}\right]\right]\end{array}\right]\\ \text{ASPECT}\boxed{3}\\ \text{PV1}\left[\begin{array}{l}\text{GF}\left[\begin{array}{l}\text{SUBJ}\left[\text{INDX}\boxed{1}\right]\\ \text{OBJ}\left[\text{INDX}\boxed{2}\left[\text{ROLE theme-sit}\right]\right]\end{array}\right]\\ \text{ASPECT}\boxed{3}\end{array}\right]\\ \text{PV2}\left[\begin{array}{l}\text{GF}\left[\text{SUBJ}\left[\text{INDX}\boxed{1}\right]\right]\\ \text{ASPECT}\boxed{3}\end{array}\right]\end{array}\right]\end{array}\right]$$

VI.b.2 Auxiliary Verb Constructions (AVCs/ axv)

Under 'auxiliary verb' we subsume the *Modal*, *Perfective* and *Passive* auxiliaries of English, and counterparts of these in other languages. Like the preverbs of the EVCs, they cluster in a fixed order preceding the main verb, and our notation reflects this parallel between EVCs and AVCs. In logical structure, each pre-verb in an EVC typically relates to what follows in the way a V1 relates to V2 in an SVC, whereas in an AVC, the auxiliary is an operator with all the rest of the construction in its scope, thus like a main verb relative to its complement clause. Inflectionally, the TAM pattern inside an EVC is somewhat similar to that inside an SVC, whereas in an AVC, each auxiliary strictly governs the TAM of the verb following (like Modal requiring infinitive, Perfect requiring participle, etc.) The logical difference we assume to be included in the general definition of EVS vs AVC, i.e., in AREA 1 below, whereas the inflectional patterns can be indicated in AREA 2 specifications.

AREA 1 Global labels

axv = axv with one auxiliary verb and the main verb

$$\begin{bmatrix} \text{HEAD verb} \\ \text{AV1}\left[\text{HEAD verb}\right] \end{bmatrix}$$

axv2 = axv with two auxverbs and the main verb

$$\begin{bmatrix} \text{HEAD verb} \\ \text{AV1}\left[\text{HEAD verb}\right] \\ \text{AV2}\left[\text{HEAD verb}\right] \end{bmatrix}$$

axv3 = axv with three auxverbs and the main verb

The following is a definition of the main verb inside an **axv** with regard to what valence it has, and thus the valence of the whole axv:

axv_intr = axv with one auxverb and an intransitive main verb

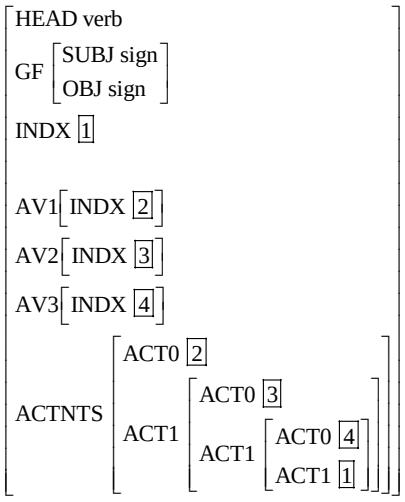
$$\begin{bmatrix} \text{HEAD verb} \\ \text{GF}\left[\text{SUBJ sign}\right] \\ \text{AV1}\left[\text{HEAD verb}\right] \end{bmatrix}$$

axv2_intr = axv with two auxverbs and an intransitive main verb
axv3_intr = axv with three auxverbs and an intransitive main verb
axv_tr = axv with one auxverb and a transitive main verb
axv2_tr = axv with two auxverbs and a transitive main verb

$$\begin{bmatrix} \text{HEAD verb} \\ \text{GF} \begin{bmatrix} \text{SUBJ sign} \\ \text{OBJ sign} \end{bmatrix} \\ \text{AV1}\left[\text{HEAD verb}\right] \\ \text{AV2}\left[\text{HEAD verb}\right] \end{bmatrix}$$

axv3_tr = axv with three auxverbs and a transitive main verb
axv_ditr = axv with one auxverb and a ditransitive main verb
axv2_ditr = axv with two auxverbs and a ditransitive main verb
axv3_ditr = axv with three auxverbs and a ditransitive main verb
axvPerifut_intr/tr/ditr (= v-...trOblRais-suNrg_oblRaisInf-)
= periphrastic future construction with intr/tr/ditr structure
(Ex.: Norw. **han kommer til å sove**
he come-PRES to INF sleep 'he will be sleeping'

AVM displaying both syntax and semantics of **axv3_tr:**



AREA 2. Specifications relative to each constituent auxverb

Head category specification of the auxverb:

av1pass = auxverb 1 is passive (the auxverb of a periphrastic passive, like **be** in **be shot**)

[AV1 [HEAD pass-verb]]

av1perf = auxverb 1 is perfective (the auxverb of a periphrastic perfect, like **have** in **have seen**)

[AV1 [HEAD perf-verb]]

av1mod = auxverb 1 is modal

[AV1 [HEAD modal-verb]]

Inflectional specification of the auxverb:

av1tamPres = auxverb 1's inflection (for TAM) is Present tense

[AV1 [HEAD[FORMATIVES ⟨pres⟩]]]

av1tamPtcpl = auxverb 1's inflection (for TAM) is (Perfect/Passive) Participle

[AV1 [HEAD[FORMATIVES ⟨ptcpl⟩]]]

av1tamInf = auxverb 1's inflection (for TAM) is Infinitive

[AV1 [HEAD[FORMATIVES ⟨inf⟩]]]

Example:

`axv3_intrPs-av1mod-av2perf-av3pass-`

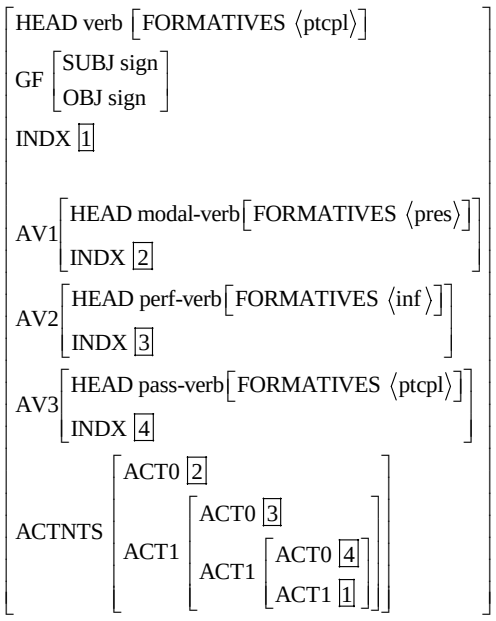
and

`axv3_intrPs-av1mod_av1tamPres-av2perf_av2tamInf-av3pass_av3tamPtcpl-vTamPtcpl-`

both describe the construction of the sentence

he may have been shot

The AVM induced by the longer template is:



IV.c. Verbid phrases

These are here regarded as something close to oblique constituents, but with verbal heads rather than prepositional heads (see Dakubu 2004). See definitions of the Slot 2 labels:

intrVid

intrVidScpr = intransitive with a verbid phrase and a secondary predicate

trVid

trLghtVid

ditrVid

Examples from Ga:

`v-intrVid-suTh_vidObTrgt-COMPARISON`

E-da fe mi

3S-grow surpass 1S "he is bigger than me"

`v-intrVidScpr-scAdv_vidObNomvL-suAg_vidObEventunit-`

É-fee klalo kɛ-ha wuo-yaa

3S.PERF-make ready move-give sea-going "He is ready to go fishing"

`v-trVid-suAg-obTh_vidObTime-`

Kofi e-tsu nii kɛ-ya-shi ŋmɛji ejwɛ

K. PERF-work things move-EGR-arrive.at bells four

"Kofi worked until four o'clock"

`v-trLghtVid-obUnif-suAg_obThAbst_vidObLoc-`

Amɛ-ba-bɔ ade yɛ Ga

3P-INGR-do world be.at Accra "They came to settle permanently in Accra"

`v-ditrVid-suIDob2SpecSpec_obIDvidObSpec_ob2SpecPostp-suAg_obTrgt-ob2Th-vidObLoc-REMOVAL`

E-fo wɔ e-he shika yɛ wɔ-de-ŋ

$3S_1$-AOR.cut $1P_1$ $3S_1$.POSS-self money be.at $1P_1$-hand-LOC

'She collected her money from us.'

See definitions of the Slot 3 & 4 labels:

vidObLoc

vidObEndpt

Example (Ga):
`v-intrVid-suAg_vidObEndpt-ACTIVITY`

Amɛ-la kɛ-tee Nsawam
3P-sing move-go N. "They sang as far as Nsawam (a town)"

vidObBPvidObSpec
Example (Ga):
`v-trVid-obPostp_vidObBPspec-suAg_obTrgt_vidObLoc-`

E-bi nuu lɛ shi yɛ mi-dɛ-ŋ
3S-ask man DEF down be.at 1S.POSS-hand-LOC "he asked me about the man."

vidObTrgt

V

POSSIBLE APPLICATIONS OF THE SYSTEM, AND DISCUSSION

V.a Ordering of templates in an inventory

An inventory of templates for a language can eventually amount to several hundred, and even if one does not aim at a complete inventory it can become quite large. Keeping track of the templates means they need to be put in a user-friendly order. Our ordering follows a combination of logical-grammatical and alphebetical principles.

Assuming all the templates are headed by **v-**, ordering starts with slot 2 (slot 1 is discussed below.) The following schema applies:

intr
tr
ditr
cop

That is, intransitive templates come first, followed by transitive, followed by ditransitive, and copula verb templates come last.

If the slot 2 label has an extension, as in for example **intrAdv** or **trObl**, the internal order is alphabetical. That is, for 'intr*X*', 'intr*Y*', where X, Y is 'scpr', 'adv', 'comp', etc., the order between 'intrX' and 'intrY' is alphabetical relative to X and Y. Likewise for 'tr', etc:

intr
intrX
intrY
tr
trX
trY
ditr
ditrX
ditrY
cop
copX
copY

For each of the above, templates where *no* item occurs in slot 3 go before templates *with* an item in slot 3. This is because, since slot 3 is specifically to account for syntactic complications, a template without slot 3 can be considered simpler than one that has it.

When there is more than one item in slot 3, the linear precedence inside the slot is:

su > ob > iob > obl > comp > epon > sc > ..ID.. > ..

The rationale behind this is again syntactic simplicity, and also universality, since more constructions have subjects than have objects, and more have objects than have indirect objects, etc. When template ordering is based on items occurring in slot 3, those with initial 'su' take precedence over others (no matter how long the sequence is), next those with initial 'ob' take precedence, etc., following the above precedence scheme. Likewise, when ordering is done according to what occurs in second position in slot 3, the same principles apply, and likewise for any further position.

The above principles form the core ordering. When templates are equal relative to those principles, templates with no labels in slot 4 precede templates *with* labels in slot 4. When there is more than one item in slot 4, the linear precedence inside slot 4 is keyed by the GF-initials, again by the precedence

"su > ob > iob > obl > comp > epon > sc". When two templates are equal up to the slot 4 specification 'su…', then ranking is determined by

suAg > suCog > suSens > suExp

and correspondingly for roles relative to the other GFs.

Next on the priority list is slot 1: here plain 'v' goes before 'v_formative' (**v_pas**, **v_sm** etc.) and in the latter case, templates with fewer formatives go before those with more formatives; precedence is otherwise alphabetical.

Last, as for slot 4, templates with no slot 5 item rank before templates with a slot 5 item. Among templates with a slot 5 item, precedence is alphabetical. Precedence is also alphabetical in slot 6.

In a phase of development when one's main concern is to identify new constructions and templates, strict adherence to these ranking principles is of course not mandatory (and the list in section IV is a case in point), but the sooner one pays attention to them, the better.

V.b Cross-linguistic uses of inventory lists

There are two main scenarios for cross-linguistic use of the lists: one when one establishes a first inventory for a language, and one when comparing established inventories:

For establishing an inventory for a new language, an already constructed list can serve as a **check-list**: In addressing Ewe, for instance, one can take as a point of departure the list for Ga and go systematically down the list, judging for each Ga case whether there is a counterpart in Ewe. The range of full counterparts may give a substantial list already, and then near-counterparts can be characterized and filled into the list which then gradually gets 'customized' for Ewe. Not unlikely, as the Ewe list expands, cases may be found having counterparts in Ga although not yet on the Ga list; and so the lists expand interactively. At this stage of the process, it will matter that one knows precisely where in a given list a certain template would have its place, be this an exact point, or a span ("after this but before that" – it is like searching in a library shelf).

Comparison of established inventories may also have the dynamic effect of enrichments to one or both of the inventories. Whether it does or not, **a strict common ordering facilitates the search for equivalents**, which can then be done simply by running one's eye down the list. Computerized string-search (using for example the Word Find function) is always a fall-back strategy, but takes longer and may not be convenient when one is still building the inventory.

V.c Applying template lists in lexicography

From an inventory of single-verb constructions for a given language, the construction templates can be adapted as **types of lexical entries** for verbs of that language, reflecting the properties encoded as **subcategorization frames**. This is one way of ensuring comprehensive coverage of the situations in which a verb occurs. . For example, in Ga the verb **wò** occurs in the following frames (among others):

INTRANSITIVE
`vPrf-intr-suLoc-`

Paya tso lɛ e-wo
avocado tree DEF PERF-put
'The avocado tree has born fruit.'

TRANSITIVE
a) v-tr-suAg_obTh-

E-wo atade

3S.AOR-put.on garment
'She wears a garment.'

b) v-tr-obPostp-suAg_obLoc-

E-wo o-toi mli

3S.AOR-put 2S.POSS-ear inside
'She whispered in your ear.'

c) v-trComp-compDECLcmp-suAg_obLoc-

E-wo e-yitso-ŋ akɛ e-shwie e-ŋa

3S.AOR-put 3S.POSS-head-LOC COMP 3S.AOR-discard 3S.POSS-wife
'She influenced him to leave his wife.'

DITRANSITIVE
v-ditr-suAg_obBen_ob2ThAbst-

A-baa-wo abifao lɛ gbɛi

3-INGR.FUT-put infant DEF name
'The child will be named.'

These are fundamental frames in the language. Each verb can be checked for whether or not it can occur in each frame.

With a complete inventory of construction types, and a complete inventory of verb lemmas of a language, one can establish which verbs employ a given construction type, and which construction types accommodate a given verb. A **verb class** can then be identified as a set of verbs which are accommodated by the same set of construction types.

This notion of 'verb class' is related to that employed in (Levin 1993), which is based on *alternations* between construction types. An alternation, such as the 'spray-load alternation', can be viewed as a *pair* of construction types in which a number of verbs can participate, typically with rather similar semantics, highlighting – by a 'minimal pair' technique - semantic properties of the constructions chosen. For instance, the verb *load* can be used in sentences such as *He loaded hay onto the wagon* and *He loaded the wagon with hay*. Also *spray* can be used in this pair of construction types, and so *spray* and *load* can be categorized as belonging to the given class called the 'spray-load alternation'.

Joint membership in such a pair of constructions is by itself not a guarantee that the verbs in question have all occurrence frames in common; the latter is what is covered by the notion 'verb class' introduced above. For the situation (which we suspect is the normal one) where verbs have some, but not necessarily all frames in common, we may use the term **partial verb class**. If a verb has some of its occurrence frames in common with a second verb, and some in common with a third which however does not share frames with the second, we may speak of **overlapping verb classes**.

V.d Establishing frequency of construction types

An inventory of construction types manifest in a language does not by itself give a full picture of what construction types are most pervasive in the language (and thus give it its 'character'): to establish this, one also needs to establish the frequency of occurrence of the various types. One way to accomplish this is through annotation of text with templates as here introduced, and then counting relevant occurrences. This does not require the existence of a lexicon attuned to the categories in question.

However, once one has an attuned lexicon, text search can also be made relative to occurrences of verbs, some entries of which correspond to the types in question. This will not require a previously

annotated text, but will require a 'manual' check for each verb occurrence, that it actually occurs in the relevant frame.

V.e The template system and its relation to grammars

A grammar for a language is a set of licensing conditions for constructions of the language, without displaying the licensed constructions themselves. The template system is, roughly speaking, orthogonal in function to that of a grammar; thus, they are supplementary to each other.

If cautiously designed, a template system should be able to communicate with a variety of grammar frameworks and formalisms, by virtue of employing notions recognized across theories and frameworks, and still having a recognizable accommodation within all of them. The labels outlined above are mildly oriented towards generative grammar, and to the extent some of them prove to be too parochial to this tradition, an interesting extension of the system will be the development of alternative labels addressing other traditions, but within definable equivalence or subsumption relations relative to the original labels.

In certain branches of grammar making, especially computational grammars, *test suites* are crucial in recording progress over time for the grammar development. Test suites are normally designed relative to each language (even each grammar), and often consist solely of the sentences themselves. An initiative started in the mid eighties (cf. Lehmann et al. 1996, Flickinger et al. 1987) was to somehow *index* test suites, to make them expose more explicitly what phenomena each sentence represents. The template system may be seen as a contribution to this enterprise, and hopefully so in a way suitable to grammars across frameworks.

The units with which the template system and grammars deal are in principle compatible, partly identical, and so one may explore how intimately the two approaches can be connected, while maintaining their distinct purposes. For instance, consider the correspondences (2) and (3) from above (**the boy ate the cake**), repeated:

(2) `v-tr-suAg_obAffincrem-COMPLETED_MONODEVMNT -`

$$\begin{bmatrix} \text{HEAD verb} \\ \text{GF} \begin{bmatrix} \text{SUBJ} \left[\text{INDX } \boxed{1}[\text{ROLE agent}]\right] \\ \text{OBJ} \left[\text{INDX } \boxed{2}[\text{ROLE aff-increm}]\right] \end{bmatrix} \\ \text{INDX ref-index} \\ \text{ASPECT completed} \\ \text{ACTNTS} \begin{bmatrix} \text{ACT1 } \boxed{1} \\ \text{ACT2 } \boxed{2} \end{bmatrix} \\ \text{SIT-TYPE monotonic\_development} \end{bmatrix}$$

(3)

$$\begin{array}{lll} \text{v} & - & \left[\text{HEAD verb}\right] \\ \text{tr} & - & \begin{bmatrix} \text{GF} \begin{bmatrix} \text{SUBJ} \left[\text{INDX } \boxed{1}\right] \\ \text{OBJ} \left[\text{INDX } \boxed{2}\right] \end{bmatrix} \\ \text{ACTNTS} \begin{bmatrix} \text{ACT1 } \boxed{1} \\ \text{ACT2 } \boxed{2} \end{bmatrix} \end{bmatrix} \\ \text{suAg} & - & \left[\text{GF} \left[\text{SUBJ} \left[\text{INDX } [\text{ROLE agent}]\right]\right]\right] \\ \text{obAffincrem} & - & \left[\text{GF} \left[\text{OBJ} \left[\text{INDX } [\text{ROLE aff-increm}]\right]\right]\right] \\ \text{COMPLETED\_MONODEVMNT} & - & \begin{bmatrix} \text{ASPECT completed} \\ \text{SIT-TYPE monotonic\_development} \end{bmatrix} \end{array}$$

One can well define a scenario where the AVMs to the right are actually produced in a parsing grammar, and where the correspondences to the labels on the left side are also integrated in this grammar. Hellan (2008a) describes an architecture where this is possible, drawing on the correspondence that can be established between construction types and verb subcategorization frames (see V.c above). Assuming that lexical structures are substructures of structures generally provided by the grammar, an AVM like the one in (2) above can be associated with the verb *eat* as its lexical structure (aside from phonological and orthographic information, and more), and the template in (2) can be used as a **lexical type** for *eat*, connected to the AVM as its structural representation (e.g., as an LFG template, or an HPSG type). This lexical type, in turn, can be formally decomposed into its constituent parts with AVM definitions as suggested in (3) – for instance, in an HPSG/LKB setting, the following type definition could be stated composing the complex type `v-tr-suAg_obAffincrem-COMPLETED_MONODEVMNT`, with other type definitions accommodating the constituent labels (using the tdl style definitions used in LKB, cf. Copestake 2002, where ':=' means 'is a subtype of' and '&' expresses unification, thus implementing the 'merger' of the AVMs in (3) into the one AVM in (2)):

```
v-tr-suAg_obAffincrem-COMPLETED_MONODEVMNT :=
      v & tr & suAg & obAffincrem & COMPLETED_MONODEVMNT
```

Such an exercise has been carried out for two HPSG grammars (for Norwegian and Ga) using the LKB system (Hellan 2007 and 2008b). It will seem that a similar conversion of labels could be done into an LFG grammar, and it might be interesting to explore whether it could be done for a GB/Minimalism type of grammar.

While this illustrates the principled possibility of integrating the template formalism and that of a grammar formalism, it by no means follows that for any given usage of the template formalism, there should exist a formal grammar reflecting the labels: on the contrary, this will rather be a rare situation. To restate our main point: the typological purpose of the template notation is to **provide a compact way of representing an array of construction types hosted by a language**, enabling efficient comparison, and still holding fairly detailed information expressed in a not too convoluted manner.

V.f Is the template notation inherently restricted to verbal argument structure?

What is covered by the labeling system as presently given is only a limited, although central, aspect of constructions of a language. Could the system be extended to cover other aspects of verbal constructions, such as modification, wh-movement, and more, and also constructions not headed by verbs? In principle any constructional domain where interesting information can be reached through attributes could be covered by the notational system – many labels in section II, for instance, make use of the attribute SPEC to expose properties of constituents of noun phrases. A general caveat is in order, however: the labeling system is not designed for taking over the role of constituent tree structures – for this, tree structures are far more elegant. Thus, in the context of analytic displays of sentence tokens, it would be wrong to try to encode all kinds of constituent properties into the string format. Likewise, the labeling format is not designed for taking over the role of standard morphological glossing.

Roughly speaking, one may say that for a somewhat complete morpho-syntactic and rudimentary semantic representation of a token sentence, a template representation of argument structure, a tree representation of constituent structure, and a standard morphological glossing, may serve together as a **representational triple** elucidating the different aspects of the sentence. This they may do without competing with possible *complete* representations of all these aspects as they might be devised in a full-fledged LFG or HPSG representation – both approaches are commendable, fullfilling different purposes (and the 'triple' approach may even serve in strategies of 'supertagging' tying the two approaches together – cf. Bangalore and Joshi 1999).

Looking at it from another angle, can the notation be adapted to construction types in which the predicate is not a verb? Many languages have sentence constructions with no verb – in Ga for instance a construction can be headed by a particle, by a noun, or by an adjective. While such locutions do not carry the burden of information that verb-headed constructions do, they are nevertheless core constructions in the language. Most of these construction types are presentationals, deictics or attribute properties. Nevertheless it can be argued that they have an argument structure, even if a rather simple one. Two tentative suggestions from Ga:

(4) `prtcl-intr-suIdfd-IDENTIFICATION`

Nuu lɛ ni

'man DEF prt "It's the man."

The phrase is headed by a particle, which is intransitive. Its subject is an item which is identified, this being an Identification construction.

(5) `adj-intr-suPossp_suBPSpec-suDescd-PROPTY`

È-nànè tábótábó

'3S.POSS-leg flat' "He is flat-footed."

(where **descd** signifies "entity described".

The construction is headed by an adjective, and is intransitive, but has a subject which is a possessive phrase whose head is a body part of its specifier (possessor). This is a property construction, in which the adjective describes its subject.

V.g The template system as a construction ontology

The above-mentioned possibilities notwithstanding, the main role of the template system is that of a repository of free-standing representations of construction types. As such, the templates, as well as their constituent labels, might seem to lend themselves as possible items in an **ontology** of construction types. Since a full template is composed of information from different dimensions, such an ontology would have to be one using **multiple inheritance**. Moreover, since the information is complex, articulating it using **attributes and values** seems recommendable, with the possibility of attribute paths of length exceeding two, yielding AVMs like those exemplified above. A system equipped for an ontology with these properties is LKB (Copestake 2002), and a typed feature structure system which may count as an ontology has been developed using LKB for the labels listed throughout sections II and III, as well as the full templates listed in section IV and the template system for Norwegian referred to in section IV (Hellan 2008c). (This type system is part of the grammar referred to in subsection **V.e** above, enabled by the fact that LKB allows parsing grammars to be constructed within taxonomies of linguistic objects.)

V.h The template system as a *shared methodology*

Once a template system for a language or set of languages has been created, where—concretely—does it reside? With the creators, or in text file copies distributed among interested parties? In such a case, how are updates and improvements, and systems for new languages, integrated with the previously existing versions?

One possibility may be to have generally accessible servers with Version Control systems, which merge existing material with new material and record the development from version to version, and allow people to update their own versions from the Version Control, and check out versions for the first time.

Another possibility will be to have a wiki where people can post their contributions on line, and in addition have a discussion forum. Such a format is provided, e.g., by typecraft.org, which also has an interface for producing the glossing and template parts of the representational triples mentioned in subsection f. above.

Combinations of these may also be possible: what is clear is that the template system is most profitably conducted as a **shared methodology**, of which both approaches mentioned are examples.

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