Verb sequencing constraints in Ga: Serial verb constructions and the extended verb complex

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Abstract

The paper examines two verb sequencing constructions in Ga: the Serial Verb Construction (SVC) and the Extended Verb Complex (EVC). The former is an instance of a commonly recognized construction, the latter is typically found in the Volta Basin area of West Africa. EVCs are sequences of verbs functioning as single verb units relative to the syntax, but with an internal structure much like syntactic complementation. Both constructions show agreement of aspect and mode marking throughout the sequence, but with differences in exponence: in an SVC all Vs expose such marking, in an EVC only a limited (down to one) number of verbs, depending on the inflectional category. The paper presents the basic facts, based on work by Dakubu (2002, 2004, to appear), and gives an HPSG account of their morphology, syntax and semantics. The analysis is sustained by a grammar of the phenomena implemented with the 'Linguistic Knowledge Builder' (LKB), an engineering platform for natural language processing.

1   Introduction

This paper gives a theoretical examination of verb sequencing constraints in Ga (a language spoken in the Accra area of Ghana), as instantiated in Serial Verb Constructions (SVCs) and Extended Verb Complexes (EVCs), based on the comprehensive description of Dakubu (Dakubu, 2002, 2004a, 2004b, to appear), and using Head-driven Phrase Structure Grammar (HPSG) as framework of analysis.

SVCs in Ga largely resemble constructions classified under this category world-wide: as generally conceived, an SVC is a sequence of verbs or VPs without intervening co- or subordinating particles, and without any subordination or argument-of relation obtaining between the adjacent verbs. A non-initial VP takes as its subject argument a participant which is also an argument of the preceding VP, typically its subject. In some languages, including Ga, the non-initial VP in such a sequence occurs sometimes with, sometimes without a subject agreement marker (pronoun prefix). Cross linguistically, SVCs divide into at least two major types, one where the consecutive VPs denote temporally distinct events (often referred to as 'clause chaining'), and one where the VPs express interleaving aspects of one and the same event, often in a collocational fashion (referred to as 'integrated SVCs'). SVCs consistently display patterns of agreement of tense, mode and aspect between the VPs, either implicit or explicit, and independently of the number of

VPs in the sequence (which is in principle unbounded, although largely restricted to two in the cases of interleaving VPs). [1]

Moreover, in Ga, verb sequencing also obtains *word internally*, in that an item which plays the role of *one verb* relative to the syntactic setting, may be internally composed of many verbs: one *main verb*, and one or more *preverbs*. Such sequences we call *Extended Verb Complexes* (*EVC*s) ("SVC" is a widely used term and concept, but the term "EVC" is original to us.) In the following example, the verb expression is one orthographic word, and can, more essentially, be defined as one word on phonological grounds (see Dakubu (to appear)):[23]

(1) a. **Tɛte yana.**

tɛte	yà	nà
Tettey	AOR.EGR	AOR.*see*
PN	V	

`Tettey went and saw (it).'

b. **Kofi kɛba.**

kofi	kɛ́	bà
Kofi	MOVE.PERF	*come*
PN	V	

`Kofi has brought (it).'

c. **Tɛte akasele yɛ biɛ.**

tɛte	á	ká	sèle	yɛ	biɛ
Tettey	SBJV	PROHIB.SBJV	*swim*	*at*	*here*
PN	V			P	ADV

`Tettey is not to swim here'

<div align="right">Generated in TypeCraft.</div>

Ya in (1a), *kɛ* in (1b) and *ka* in (1c) are what are here called preverbs, and are part of a phonological domain also including respectively -*na*, -*ba* or -*sele*, the whole complex functioning as one verb word. In contrast, in an SVC, each verb is phonologically a complete domain—none of the consecutive verbs is part of the same phonological domain as the verb that precedes it or follows it. One

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[1] Many scholars including at least one of the present authors would reserve the term SVC to constructions in which the Subject is shared. If it is not, the relations between the VPs are obviously quite different and should be accounted for as different constructions. The same applies to the various phenomena grouped under "clause chaining".
[2] In this paper only the tones of verbs and their affixes are indicated, in the gloss line (the orthography does not mark tones). Tones of other categories are not relevant to the discussion.
[3] A sequence of any or all of these items, together with a subject pronoun prefix if present, is written as a single word in the established orthography (cf. Bureau of Ghana Languages, 1995, and M.E. Kropp Dakubu, 2000), as reflected in the top line of the example. Notice that in the Parts of Speech line of the glossing (exported from and using the standards of TypeCraft (typecraft.org), the whole EVC is designated as one V, aligned with the initial point of the EVC.

assumed contrast between an EVC and an SVC is thus that the former has the status of a word-level complex, while the latter is a phrasal complex.

Yà in (1a) is a possible verb word by itself, but that is not true for *ká* (1c) or *kɛ́* (1b). In each case, omission of the preverb would still give a well-formed expression. What motivates ascribing them verbal status is mainly their capability of taking inflections characteristic of verbs. As will be shown, both EVCs and SVCs display comparable patterns of aspect, mode and polarity agreement, although they manifest them differently. Corroborating the word status of an EVC as a whole, however, are (i) patterns of agreement between the verbs not parallelled by the patterns in an SVC, (ii) a strict fixedness of position of the preverbs relative to each other, which also does not have a parallel in an SVC. In Ga, thus, an SVC may be a sequence of EVCs, since any V head of a VP is potentially expandable to an EVC.

The EVC construction is apparently quite wide-spread in the languages in the Volta Basin area, and its instantiation in Ga is representative of the phenomenon, although by no means the most complex version, nor the simplest.[4] Based on a comprehensive overview of the Ga verb system (Dakubu to appear), the present paper makes an attempt to construe some of the facts involving Ga EVCs and their relationship to SVCs in a formal grammatical setting. The framework employed is Head-driven Phrase Structure Grammar (HPSG), cf. Pollard and Sag (1994), and Sag, Wasow, Bender (2003).[5]

2   Overview of the Data Situation

The *Preverbs* in Ga are the following:

(2)   ***kɛ***   'move'   (a transitive verb, must be followed by a V)
                    Gloss: **MOVE**
         ka   'not'/'neg'   (must be followed by a V)
                    Gloss: **PROHIB**
         ba   'come'   (must be followed by a V, but is also
                    homophonous with a V$_{main}$ of similar meaning)
                    Gloss: **INGR**
         ya   'go'   (as for ***ba***)
                    Gloss: **EGR**

The latter two will be referred to as *deictic preverbs*, where the notion 'deictic' involves specification of the event as taking place towards (*ba*) or away from (*ya*) the deictic centre, normally the speaker, The prohibitive preverb is used only for expressing modal negation, see Dakubu (to appear) for an overview. The gloss given for *kɛ* is here highly approximate. In an initial / stand-alone VP

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[4] An example of a more complex system is that found in Dangme, a close relative of Ga (Dakubu 1987). A comparable system of deictic preverbs also exists in Akan (Christaller 1875 [1964]; Dolphyne 1996).
[5] Works on related phenomena in HPSG include Muansuwan 2002, Sahoo 2001.

kɛ always has an object. This object may be overt, so that more than one word is involved, but in this paper we mainly use examples where where it is not overt.[6]

A form displaying a maximal sequence of these items is given in (3):

(3)   **Ekɛɛ akɛ okɛkabaha.**

e	kɛɛ	akɛ	ò	ké	ká	bà	hɛ̃́
3SG	*AOR.say*	*that*	2SG	MOVE.SBJV	PROHIB.SBJV	INGR	*give*
V		COMP	V				

`*He said that you should not come give (it)'*

Generated in TypeCraft.

The only word-internal item capable of preceding the verb cluster in an EVC is the pronominal agreement morpheme, exemplified above by the prefixal 2nd person pronoun **ò-** in (3), which precedes *ké* inside the complex verb word. The sequencing here exemplified is strict:

Pron-prefix $V_{kɛ}$ V_{neg} V_{deict} V_{main}

This whole domain of pre-root verb-internal items obeys principles of a phonological nature, which are as follows (cf. Dakubu 2002):

Ga is a tone language, with two tones. Every syllable of a lexical stem has a specified tone, as do all grammatical affixes. However the four pre-verbs and the subject prefix pronouns do not – they get their tone from what follows. If an Aspect-Mode-Polarity prefix to the main verb or another dependent verb follows a dependent verb, the segmental features of that prefix disappear, ie. it has no segmental realization, and its tone is expressed on the dependent verb or the subject pronoun immediately to the left. This kind of contraction / incorporation occurs nowhere else in the language. In particular it does not happen in a sequence of two "normal" verbs where nothing intervenes between them. This is demonstrated in (4), where the independent lexical verb *ya* 'go' with the progressive prefix *mii-* is followed by another verb *na* 'see', which is preceded by *ya*, this time in the capacity of a deictic dependent verb. Deictic *ya* and independent *na* are each preceded by the subjunctive prefix *á-*. The prefix before *na* is manifested by the high tone on deictic *ya*. The prefix to the deictic *ya* however appears in its full form.[7]

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[6] In Ga as in most Volta Basin languages, a third person pronoun object with non-human reference is phonetically null, except in certain special cases (see Stewart (1966) and Dakubu (to appear)).

[7] Note that (4) is NOT an example of an SVC; it is indeed a sequence of two EVCs, but the second is in a complement (purpose) relation to the first.

(4)   **Kofi miiya ya na lɛ.**

kofi mìi   yà á   yá   na   lɛ
Kofi PROG *go* SBJV EGR.SBJV *see*   3SG
PN   V   V   PRON
`*Kofi is going to see him*'

Among the items in (2), only V_{neg} and V_{deict} inflect for tense/aspect; in addition, any full verb stem (V_{main}) undergoes inflection. Inflectional categories can be realized either by *segments* (which may or may not have assigned tone) or by *floating tones*. A segment can occur either as a prefix or as a suffix, and in principle a floating tone can "dock" either to the left or to the right, although in Ga they invariably dock to the left. By a morpheme having a *single marking*, we mean that it is realized by a single affix/tone, and by it having a *double marking* we mean that it is realized by two affixes (or tone plus affix) at the same time. Segmental exponents representing the aspect inflectional types are *perfect* { é̀- }, *progressive* { mìi- }, *habitual* { -ɔ̀ /-à }. A prefixed floating low tone characterizes both *habitual* and *aorist* and is expressed by downstep, so that habitual thus has double marking. In addition to these aspectual forms, Ga also has a system of modal inflections, which are *future* { àá- }, *subjunctive* { á- }, and *imperative*, which in turn has several phonologically unrelated forms: { -à } for all plural imperatives and, for singular imperatives in the absence of any pre-verb, depending on the phonological type of the main verb: { -mɔ́ }, vowel copy with low-high tone pattern, or the bare root. Singular imperatives with pre-verbs are distinguished from subjunctives only by the absence of a subject pronoun. Plural imperative has double marking, with both the subjunctive prefix and the plural imperative suffix.

Constraints work from left to right. When a main verb item is preceded by a preverb, the preverb and the main verb share the inflectional category; however, the possible choices of inflectional category are then only a subset of those that obtain when a main verb occurs in isolation, and different for each preverb. In essence, the choice of inflectional morpheme category in an EVC is dictated by the category of its leftmost daughter. If V_{main} is alone, then the full array of categories is available, whereas when a deictic preverb is leftmost, the category *Progressive* is not available. When the prohibitive verb is initial, in turn, far fewer categories can be used (mainly, only subjunctive). *kɛ* initial imposes no constraints, and the second verb then decides the array.

A further factor concerns exponency in an EVC. If the chosen inflection is *aspectual*, then only one verb in the EVC may expose it. In a sequence V_{deict} - V_{main}, if the category is *perfect*, then its exponent occurs on V_{deict}, and if the category is *future* (here treated as an aspect) or *habitual*, its exponent occurs on V_{main}. If the chosen inflection is *modal*, and there are at least two verbs present in the EVC, mode is marked twice, on the two leftmost verbs other than *kɛ*. That is, no matter which of the modal morphemes (subjunctive, sing-imperative, or

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plur-imperative) is selected for the leftmost verb other than $k\varepsilon$, the second always carries the subjunctive marker.[8]

The following table is a tentative binary schema of choices (where the rightmost V is the main verb). 'EXP' means 'exposed'. Options rendered in boldface are available when the leftmost licensing V is a deictic verb, those in italics when the leftmost licensing verb is the prohibitive verb:

```
                    V
                   / \
                  /   \
                 /     \
        V deict/prohib    V
```

	V deict/prohib	V
Perfect	**EXP**	
Aorist		**EXP**
Habitual		**EXP**
Future		**EXP**
Sg-imperative	*EXP*	*EXP*[9]
Subjunctive	*EXP*	*EXP*
Plur-imperative	*EXP*	*EXP*

Table 1

Turning now to SVCs, we define an integrated Serial Verb Construction in the Ga language as a structure of multiple finite verbs (internally possibly structured as EVCs) that nevertheless constitutes a single clause, in having just one Subject and a potential array of Objects not greater than that possible for a clause with just one verb/EVC. It also has just one interpretation in terms of aspect and mode. A "clause-chaining SVC" more freely allows long sequences of verbs, in some types at least allowing some of these verbs to introduce Objects beyond the limits of a single clause, and having an interpretation of temporally consecutive events, which however tend to be aspectually and modally uniform. In this paper we concentrate on the integrated type. Two sets of examples follow:

(5)a.

Mikuu misɛɛ mibaa dɔŋŋ.

mí	!kũ̋	ũ̋	mi	sɛɛ	mì	bá	á	dɔŋŋ
1SG	*turn*	NEG.IMPERF	1SG.POSS	back	1SG	*come*	NEG.IMPERF	*ever*
V		N		V				ADV

`*I am not coming back again'*

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b.
Kofi miiwie eetsɔɔ Ama.

kofi	mìi	wìé	è	è	tsɔ́ɔ́	ama
Kofi	PROG	*speak*	3SG	PROG	*teach*	*Ama*
PN	V		V			PN

`*Kofi is advising Ama'*

c.
Tɛte baanyɛ eba wɔ.

tɛte	bàá	nyɛ́	é	bà	wɔ
Tettey	INGR.FUT	*can*	3SG.SBJV	*come*	*tomorrow*
PN	V		V		ADV

`*Tettey will be able to come tomorrow'*

(6)a
Kofi wɔɔ kɛmɔɔ shwane fɛɛ.

kofi	wɔ̀	ɔ̀	kɛ̀	mɔ́	ɔ̀	shwane	fɛɛ
Kofi	*sleep*	HAB	*MOVE*	*hold*	HAB	*afternoon*	*all*
PN	V		V			N	Quant

`*Kofi sleeps all afternoon'*

b.
Hoomɔ nii aha wɔ

hòó	mɔ̃́	nii	á	hɛ̃́	wɔ
cook	IMP	*thing*.PL	SBJV	*give*	*us*
V		N	V		PRON

`*Cook for us'*

c.
Akɛfutu nu wo kpulu mli.

à	kɛ̀	fútù	nu	wò	kpulu	mli
IMPERS	AOR.MOVE	*mix*	*water*	AOR.*put*	*cup*	*inside*
V		N	V	N	N	

`*They were mixed with water and put in a cup'*

<div align="right">Generated in TypeCraft.</div>

The three examples in (5) are of the type called "resumptive" SVCs; a pronominal subject agreement element precedes the second verb. No such element appears in the sentences of (6), although semantically the subject is equally shared. The first verb of (5c) and (6c) and the second in (6a) are EVCs and include one preverb each. Aspect, Mode and Polarity marking is identical in both verbs of the SVCs, except in (5c) where the first verb is future and in (6b) where the first verb is singular imperative. In both cases, the second verb

is marked subjunctive. In (6c), there is an understood 3. person plural object of 'mix', understood also as object of 'put'.[10]

As these examples indicate, much of what is said above about EVCs is true of integrated Serial Verb Constructions as well: an SVC is interpreted as manifesting a single aspectual-modal verb feature, and rules for the distribution of feature marking work from left to right. However the feature marking obeys slightly different rules:

Within an EVC (as already said), only modal inflection is morphologically marked more than once, namely on the two left-most pre-verbs excluding *kɛ*. In an SVC on the other hand, all participating Vs must be marked, be it as aorist, perfect, habitual, or progressive, or subjunctive or plur-imperative. One constraint still applies, as noted: only V1 in an SVC can be marked future positive or sing-imperative (see Table 1). V2 in such cases is marked subjunctive. This sequencing however reflects exactly what happens in an EVC, where, e.g., the sing-imperative suffix on the prohibitive verb *ka* is followed by the subjunctive prefix to the next verb. From this, two questions arise: how do we account for this parallelism between the two construction types; and how do we account for the distinctness in verb sequencing for exactly the inflectional categories mentioned?

3 Analytic assumptions and challenges

3.1 Syntactic structure

We assume that in an SVC, each verb phrase is *adjoined* to the preceding sequence of VPs headed by Vs/EVCs (which constitutes a constituent already). This is motivated by the circumstance that when a VP*b* follows VP*a* in the pattern of an SVC, the head verb of VP*a* does *not* take VP*b* as a complement; on the contrary, VP*a* is always fully saturated, and capable of occurring by itself. In an EVC, in contrast, the circumstance that the leftmost V generally

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[10] Note that sometimes otherwise identical sentences exist both with and without the resumptive subject marker on the second verb. A resumptive marker never occurs internally in an EVC. Thus both (i) and (ii) are possible, but not (iii) or (iv).

(i)   ò₁-fɔ́   tsɛnsi lɛ   ò₁-kɛ̀- ŋmɛ̀ shi
            2S-throw pan   DEF 2S-move-put down
            You threw down the pan

(ii)   o-fɔ́   tsɛnsi lɛ   kɛ̀-ŋmɛ̀ shi
            2S-throw pan   DEF kɛɛ-put down
            You threw down the pan.

(iii)   *o-fɔ́   tsɛnsi lɛ   ò-kɛ̀-ò-ŋmɛ̀ shi
            2S-throw pan   DEF 2S-kɛ-2S-put   down

(iv)   *o-fɔ́   tsɛnsi lɛ   kɛ̀-ò-ŋmɛ̀ shi
            2S-throw pan   DEF kɛ-2S-put down

The ungrammaticality of (iii) and (iv) constitutes a further reason to distinguish EVCs from SVCs, since the pronominal prefix can occur on any verb in an SVC.

decides the array of possible inflectional categories can be captured by analyzing the leftmost V as the *head* of the EVC, so that in complex EVC structures, there will be a right-branching complement-taking pattern as in (7) (reflecting (3)):[11]

(7)

```
                        V
              ┌─────────┴─────────┐
            V_kɛ                   V
             │          ┌──────────┴──────────┐
             │        V_neg                    V
             │          │          ┌───────────┴───────────┐
             │          │        V_deict                 V_main
             │          │          │                       │
            ké-        ká-        bà-                      hɛ́
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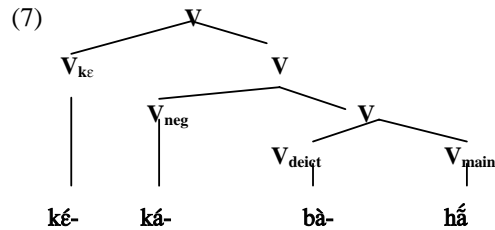
(8) now displays the combination of a simple SVC structure and a simple EVC structure, the latter constituting the head V of the first VP of an SVC:

(8) a **Akwele baahoo nii aha wɔ.**

akwele	bàá	!hóo	nii	á	hɛ́	wɔ
Akwele	INGR.FUT	*cook*	*thing*.PL	SBJV	*give*	1PL
PN	V		N	V		Pron

`Akwele will cook for us'

<div align="right">Generated in TypeCraft.</div>

b.

```
                            S
              ┌─────────────┴─────────────┐
              N                           VP
              │              ┌────────────┴────────────┐
              │              VP                         VP
           Akwele      ┌─────┴─────┐              ┌─────┴─────┐
                       V           N              V_main      N
                 ┌─────┴─────┐     │              │           │
               V_deict    V_main   │              │           │
                 │           │     │              │           │
                bà      (a)á-!hóo  nii           á-hɛ́        wɔ
                INGR     FUT-cook  things        SBJV-give    1PL
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' Akwele will cook for us'

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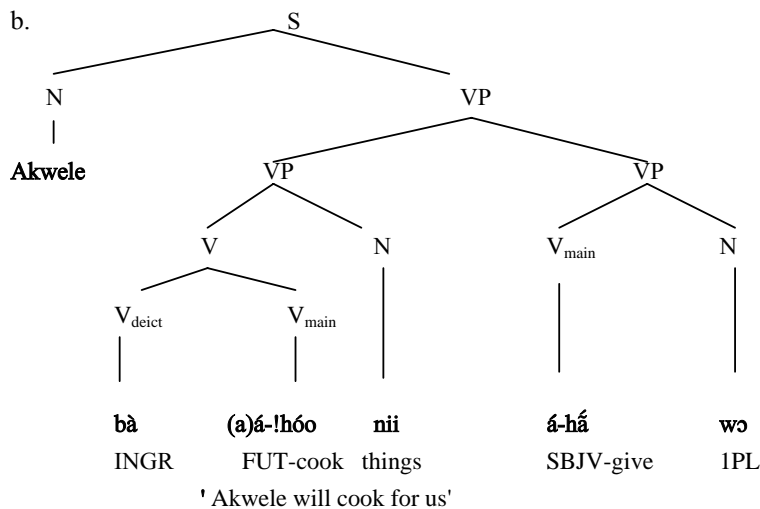
[11] An alternative that could be explored is to treat the preverb as a *specifier* of its sister   V projection. Examples of an adjunction analysis of SVCs can be found also in Bodomo 1997 and Sahoo 2002 (the latter for rather different phenomena, though).

bàá!hóô is an EVC, with the transitive verb *hòô* 'cook' as main verb; since the verbs are sequenced together as a word unit, the object of *hoo* appears structurally outside the EVC, and thus not in a direct complement position relative to the verb.

3.2   Argument sharing

Technically in (8b), the valency of *hoo* has to be transmitted up to the dominating V, formally along lines well explored e.g., in the analysis of German complex verbs (cf. Müller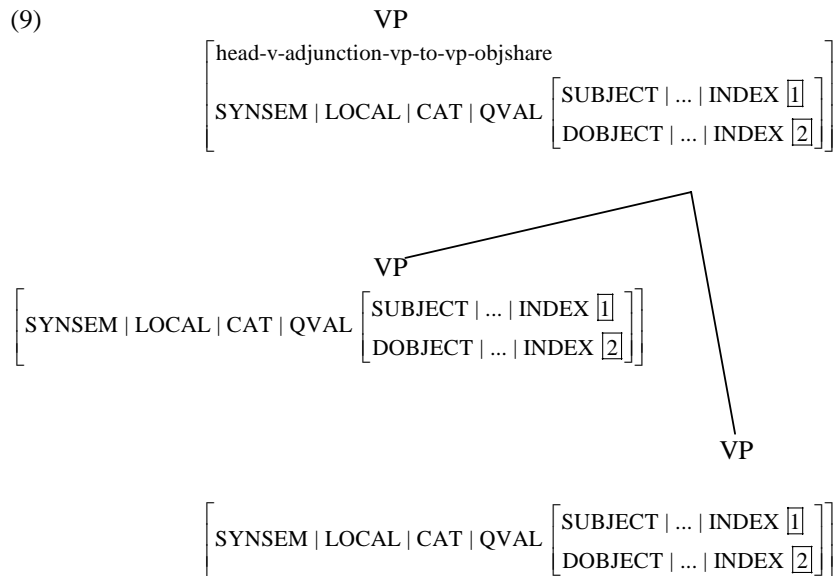 2002 for a summary of the literature). The second main verb *ha* 'give' is ditransitive, but in this construction followed only by a single object, the indirect object *wɔ*, instantiating the well known constellation of 'object-sharing' of SVCs: what semantically fills the role of the received of *ha* is *nii*, the object of the first EVC.

At the point where the two verb projections meet in the structure, the COMPS lists of both verbs are saturated. To propagate the information that the theme argument of *ha* 'give' is identical to the direct object of *hoo* 'cook', we need a feature which 'survives' cancellation. In the current setting, we use a feature DOBJECT, exploited in the rule adjoining a serial VP to the preceding VP as follows in (9), in the code of an HPSG Grammar-matrix based LKB grammar (cf. Copestake 2002, Copestake et al. 2005) sustaining the current analysis:

(9)   VP

$$\begin{bmatrix} \text{head-v-adjunction-vp-to-vp-objshare} \\ \text{SYNSEM | LOCAL | CAT | QVAL} \begin{bmatrix} \text{SUBJECT | ... | INDEX } \boxed{1} \\ \text{DOBJECT | ... | INDEX } \boxed{2} \end{bmatrix} \end{bmatrix}$$

VP

$$\begin{bmatrix} \text{SYNSEM | LOCAL | CAT | QVAL} \begin{bmatrix} \text{SUBJECT | ... | INDEX } \boxed{1} \\ \text{DOBJECT | ... | INDEX } \boxed{2} \end{bmatrix} \end{bmatrix}$$

VP

$$\begin{bmatrix} \text{SYNSEM | LOCAL | CAT | QVAL} \begin{bmatrix} \text{SUBJECT | ... | INDEX } \boxed{1} \\ \text{DOBJECT | ... | INDEX } \boxed{2} \end{bmatrix} \end{bmatrix}$$
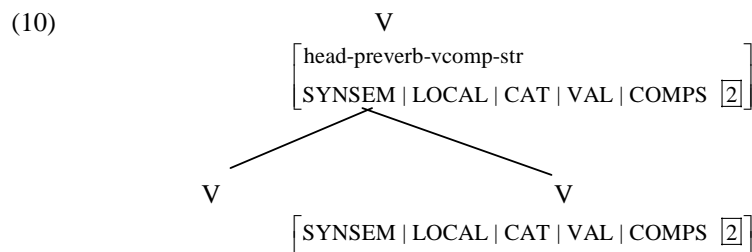
Notice that since the VPs may in principle be saturated also for subject (due to the prefixed pronoun admissible on a 'resumptive' V2), the QVAL identity

requirement also comprises SUBJECT.[12] (In a language not allowing for such 'resumptive' SVCs, on the other hand, ensuring shared subject can be done using VAL list information.) [13]

Arguably, object sharing is not necessarily a property of SVCs with transitive verbs, and thus the grammar must contain a counterpart to (9) which does not impose DOBJECT identity (but necessarily SUBJECT identity[14]), to be referred to as *head-v-adjunction-vp-to-vp-nonobjshare*. How to ensure selection of the correct option for each relevant case (when ambiguity does not obtain), is a topic that limitations of space prevent us from going into here.

A preverb is subcategorized for a verbal complement, which may be a main verb or an EVC in turn. The combinatorial rule follows the pattern of head-complement rules. Whatever is the valence of the main verb is propagated to the higher nodes, by a specification in the preverb combinatorial schema as indicated below:

(10)

$$
\text{V} \quad
\begin{bmatrix}
\text{head-preverb-vcomp-str} \\
\text{SYNSEM | LOCAL | CAT | VAL | COMPS } \boxed{2}
\end{bmatrix}
$$

$$
\text{V} \qquad \text{V} \quad
\begin{bmatrix}
\text{SYNSEM | LOCAL | CAT | VAL | COMPS } \boxed{2}
\end{bmatrix}
$$

As noted, *kɛ* is not an independent verb – it must always be followed by another verb. But it also always has an object, even if this is a phonetically null pronoun, or it is only semantically present as in a VP2 in an SVC; in (11a), however, it is present, and the structure of (11a) is interestingly different from (8b), indicated in (11b):

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[12] QVAL is a counterpart to VAL supporting non-cancellable valence information, and is an attribute also used in the Norwegian LKB grammar *NorSource* (Beermann and Hellan 2004, Hellan and Beermann 2005): the QVAL specification supplements VAL specification, the latter dealing with valence saturation as in standard HPSG, the former with 'non-local' propagation of valence information. It may be noted that in the LKB grammars based on the 'HPSG Grammar Matrix', a special attribute XARG is used for purposes similar to those of the current QVAL features (earlier HPSG literature also has other attributes with similar function; cf. Ackermann et al).

[13] In the structure illustrated, the second VP is headed by a ditransitive verb, whose valence for a direct object is not satisfied by an actually occurring NP. Whichever mechanism is used to suspend the requirement of a direct object (in the grammar framework referred to it is a unary rule), it has to preserve a referential index for this object, to be equated to the index of the actually occurring NP in the preceding VP.

[14] The constellation type often referred to as 'switched sharing', with object of the first V being identical to the subject of the second V, is not to our knowledge attested in Ga.

(11) a.

ekɛ wolo lɛ ha mi.

è	kɛ̀	wolo	lɛ	hã́	mi
3SG	MOVE	*book*	DEF	AOR.*give*	1SG
V		N	DET	V	Pron

`*He gave me the book'*

Generated in TypeCraft.

b.

```
                              VP
                          ╱        ╲
                       V₂            NP
                    ╱      ╲          │
                  V₁       V_main     │
               ╱     ╲       │        │
            V_deict   NP      │        │
              │       │       │        │
            e-kɛ   wolo lɛ   ha       mi
          3S-MOVE  book the  give     1S
                    'he gave me the book'.
```

(12)

$$V$$

$$\begin{bmatrix} \text{head-preverb-vcomp-str} \\ \text{SYNSEM | LOCAL | CAT} \begin{bmatrix} \text{VAL | COMPS} & \boxed{2} \\ \text{QVAL|DOBJECT} & \boxed{3} \end{bmatrix} \end{bmatrix}$$

$$V$$
$$\begin{bmatrix} \text{SYNSEM | LOCAL | CAT | QVAL | DOBJECT} & \boxed{3} \end{bmatrix}$$

$$V$$
$$\begin{bmatrix} \text{SYNSEM | LOCAL | CAT} \begin{bmatrix} \text{VAL | COMPS} & \boxed{2} \\ \text{QVAL|DOBJECT} & \boxed{3} \end{bmatrix} \end{bmatrix}$$
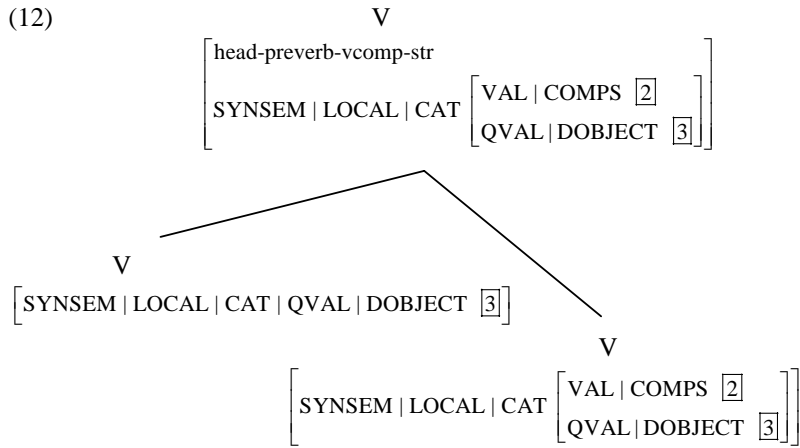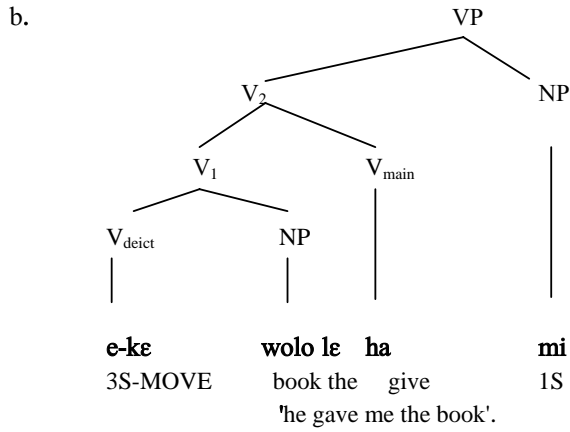
Like in (8), the understood direct object of *ha* has to come from the preceding verbal projection, but this time, that projection, viz. V_1 in the tree, is itself a preverb of the EVC in which *ha* is the main verb. To deal with this structure, one first needs a variant of the head-complement rule for direct objects which is defined at word level, to accommodate V_1. In the combination of V_1 with V_{main}, which is effected by (10), an identity must in turn be imposed between the . . .QVAL|DOBJECT of the head V_1 and the . . .QVAL|DOBJECT of the V_{main},

an identity of the kind otherwise expressed in the SVC combination rule (9). This, technically, requires one subtype of (10) defined for the case where the left daughter V is a transitive construction (the one here in question), and one for where that V is intransitive (as for the prohibitive verb and the deictic verbs); the version relevant for (11b), thus, is (12) (technically a subtype of (10)).

It will be noted that, given an obvious coindexation between the index of DOBJECT and the relevant item on the COMPS list, this scheme will ensure that the DOBJECT feature propagated to the top V in (12), corresponding to V_2 in (11b), will be identical to the object of *kɛ*. This means that in an SVC with transitive main verbs and with a *kɛ*-EVC constituting the V of the first VP, one will expect object sharing. This, however, is not necessarily the case; for instance, in the 'instrumental' SVC (13), where the string *Aku kɛ kakla e-fo brodo* has the same structure as V_2 in (11b),

(13) **Aku kɛ kakla efo brodo kɛbaha amɛ.**

aku	kè	kakla	é	fò	brodo	kɛ́	bà	hɑ̃́	amɛ
Aku	MOVE	*knife*	PERF	*cut*	*bread*	MOVE.PERF	INGR	*give*	3PL
PN	V	N	V		N	V			Pron

`Aku has cut bread for them with a knife'
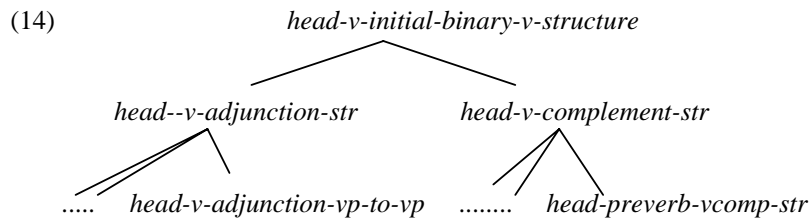
<div align="right">Generated in TypeCraft.</div>

'knife' is relevant only to the the preverb of the first VP; *fo* is not ditransitive, and *kakla* (as an instrument) cannot be its object, so that even within the EVC objects need not be shared. (On the other hand, the object of *fo* "cut", ie. "bread", must be available to VP2 as an Object of *ha* "give".) Thus, alongside (12), there has to be assumed another schema for the transitive preverb where its object is not shared with the object of the main verb – thus, a parallelism of schemata like what we observed in connection with (9) above.[15] Exactly how a traditional SVC category like 'instrumental SVC/EVC' can be technically invoked at the point where the parser can in principle apply either (12) or the non-object sharing variant (and for that matter, (9) or *head-v-adjunction-vp-to-vp-nonobjshare* in an SVC), is a question which involves the notion of 'construction' encoding beyond what normally is encoded in a lexical entry, and is a topic we will not pursue here.

---

[15] It may be noted that when a VP that includes *kɛ* is the V2 in an SVC, its object is not the object of V1 but the entire VP (Dakubu 2004b). An example is given in (i).
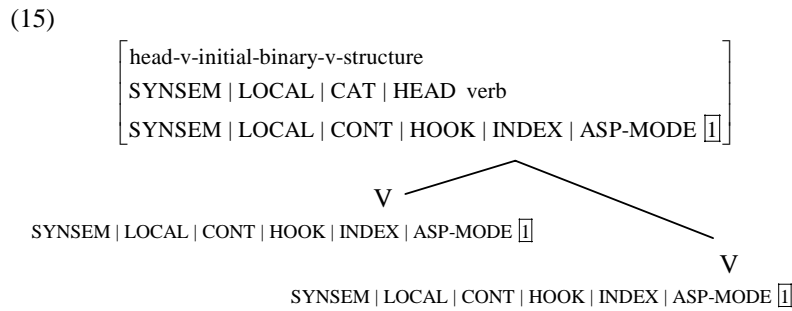
(i)

o-fɔ̃́	tsensi le	kè-ŋmè	shi
2S-throw pan	DEF	MOVE-put	down

'You threw down the pan.'

3.3 Aspect sharing

For both EVCs and SVCs, we have stated that *aspect* and *mode* information is generally shared between the sister V constituents at any combination, and that for both SVC and EVC combination, the inflectional category of the head determines that of the sequence; thus, with the binary breakdown of structure assumed, the inflectional category of the head determines the inflectional category of the head of the right daughter. To generalize this kind of constraint over both right-adjunction and right-complementation structures, we need to define a supertype of these two constellation types, one we may call *head-v-initial-binary-structure*, abstracting away from the mode of combination, and from whether the combination is at a phrasal or word-internal level. Thus, the following partial type hierarchy will be assumed (where the non-specified types under *head-v-complement-str* include phrasal combinations):

(14)   *head-v-initial-binary-v-structure*

        head--v-adjunction-str   *head-v-complement-str*

  .....   *head-v-adjunction-vp-to-vp*   ....   *head-preverb-vcomp-str*

The highest of these types is where the common pattern of aspect-mode agreement should be stated; schematically, what we are aiming for is the following reentrancies, where INDEX has the value *index* declared, when the expression is verbal, for the feature ASP-MODE, with value *asp-mode*, in turn declared for features to be seen shortly:

(15)

$$
\begin{bmatrix}
\text{head-v-initial-binary-v-structure} \\
\text{SYNSEM | LOCAL | CAT | HEAD } verb \\
\text{SYNSEM | LOCAL | CONT | HOOK | INDEX | ASP-MODE } \boxed{1}
\end{bmatrix}
$$

V
SYNSEM | LOCAL | CONT | HOOK | INDEX | ASP-MODE $\boxed{1}$

V
SYNSEM | LOCAL | CONT | HOOK | INDEX | ASP-MODE $\boxed{1}$

but in order to state that whenever the left daughter is *sg-imperative* or (non-negated) *future*, then the right daughter is *subjunctive*, we need two subtypes of this schema, one for when the inflection carries the feature PROSP-, and one for PROSP+, the latter characterizing the cases *imperative* and (non-negated) *future*; PROSP is a feature declared by the type *asp-mode* inside the ASP-MODE feature:

(16)

a.
$$\textit{head-v-initial-binary-v-structure}$$

$$\textit{head-v-nonmode-str} \qquad \textit{head-v-mode-str}$$
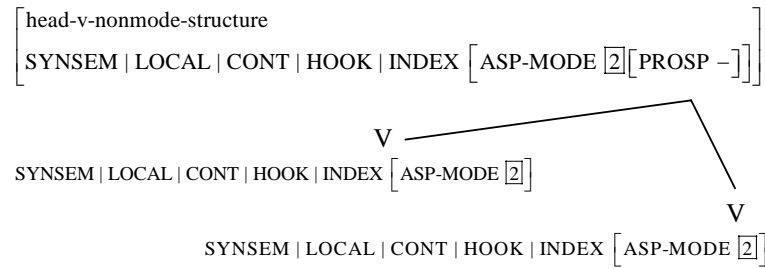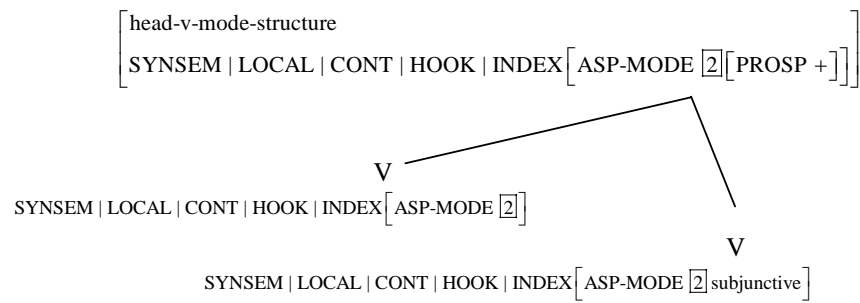
b.
$$\begin{bmatrix} \text{head-v-nonmode-structure} \\ \text{SYNSEM} \mid \text{LOCAL} \mid \text{CONT} \mid \text{HOOK} \mid \text{INDEX} \begin{bmatrix} \text{ASP-MODE } \boxed{2}[\text{PROSP} -] \end{bmatrix} \end{bmatrix}$$

$$V$$
$$\text{SYNSEM} \mid \text{LOCAL} \mid \text{CONT} \mid \text{HOOK} \mid \text{INDEX} \begin{bmatrix} \text{ASP-MODE } \boxed{2} \end{bmatrix}$$

$$V$$
$$\text{SYNSEM} \mid \text{LOCAL} \mid \text{CONT} \mid \text{HOOK} \mid \text{INDEX} \begin{bmatrix} \text{ASP-MODE } \boxed{2} \end{bmatrix}$$

c.
$$\begin{bmatrix} \text{head-v-mode-structure} \\ \text{SYNSEM} \mid \text{LOCAL} \mid \text{CONT} \mid \text{HOOK} \mid \text{INDEX} \begin{bmatrix} \text{ASP-MODE } \boxed{2}[\text{PROSP} +] \end{bmatrix} \end{bmatrix}$$

$$V$$
$$\text{SYNSEM} \mid \text{LOCAL} \mid \text{CONT} \mid \text{HOOK} \mid \text{INDEX} \begin{bmatrix} \text{ASP-MODE } \boxed{2} \end{bmatrix}$$

$$V$$
$$\text{SYNSEM} \mid \text{LOCAL} \mid \text{CONT} \mid \text{HOOK} \mid \text{INDEX} \begin{bmatrix} \text{ASP-MODE } \boxed{2} \text{ subjunctive} \end{bmatrix}$$

The type *subjunctive* we define as follows (introducing INTENT as a further feature declared by *asp-mode*):

(17) $\text{SYNSEM} \mid \text{LOCAL} \mid \text{CONT} \mid \text{HOOK} \mid \text{INDEX} \begin{bmatrix} \text{ASP-MODE} \begin{bmatrix} \text{INTENT bool} \\ \text{PROSP} + \end{bmatrix} \end{bmatrix}$

as opposed to *imperative* as:

(18) $\text{SYNSEM} \mid \text{LOCAL} \mid \text{CONT} \mid \text{HOOK} \mid \text{INDEX} \begin{bmatrix} \text{ASP-MODE} \begin{bmatrix} \text{INTENT} - \\ \text{PROSP} + \end{bmatrix} \end{bmatrix}$

and *future* as:

(19) $\text{SYNSEM} \mid \text{LOCAL} \mid \text{CONT} \mid \text{HOOK} \mid \text{INDEX} \begin{bmatrix} \text{ASP-MODE} \begin{bmatrix} \text{INTENT} + \\ \text{PROSP} + \end{bmatrix} \end{bmatrix}$
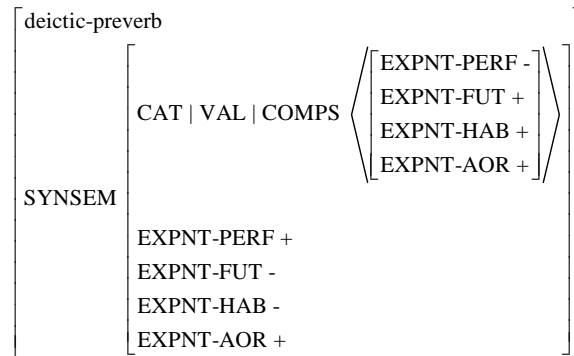
whereby the occurrence of *subjunctive* in SVCs and EVCs is construed as complying with the general uniformity constraint, albeit still constituting a specified option. (As for further features decomposing the type *asp-mode*, see shortly.)

Relative to the schemata indicated in (9) and (10), these are types that will intersect with the subtypes in (16a), thus having subtypes for both the 'mode' and the 'nonmode' version.

3.4 Inflection exponence in EVCs

A further phenomenon requiring specific constraints is the varying options for *exponence* constraints on inflections inside of an EVC, as described above. To state these in a technically viable fashion, a verb form V will have, for each inflectional category C, a binary feature "I can expose C": when positively specified, the inflectional spelling rule for C will induce the morphology associated with C, and when negatively, not. The environment of V decides whether the specification is positive or negative. For instance, a deictic pre-verb will have the following inherent and subcategorization specification (as was said above, if the inflection chosen in an EVC is *aspectual*, then only one verb in the EVC may expose it; in a sequence V_{deict} - V_{main}, if the category is *perfect*, then its exponent occurs on V_{deict}, and if the category is *future* or *habitual*, its exponent occurs on V_{main}). "I can expose *perfect*" is spelled as 'EXPNT-PERF +' which is to say that the item can *in principle* expose a *perfect*, not necessarily that it has that inflection in a given structure:

(20)

$$
\begin{bmatrix}
\text{deictic-preverb} \\
\text{SYNSEM} \begin{bmatrix}
\text{CAT | VAL | COMPS} \left\langle \begin{bmatrix}
\text{EXPNT-PERF -} \\
\text{EXPNT-FUT +} \\
\text{EXPNT-HAB +} \\
\text{EXPNT-AOR +}
\end{bmatrix} \right\rangle \\
\\
\text{EXPNT-PERF +} \\
\text{EXPNT-FUT -} \\
\text{EXPNT-HAB -} \\
\text{EXPNT-AOR +}
\end{bmatrix}
\end{bmatrix}
$$

That is, a deictic preverb by itself can expose perfective, but not future or habitual; and any verb taken as complement of a deictic preverb can expose future, habitual or aorist, but not perfective. A main verb lexeme by itself is underspecified for the EXPNT-features.

With lexical specifications like (20) for preverbs, the combinatorial rules for SVCs and EVCs inheriting from (15) will declare the combining verbs as

having identical aspect, whereby the restrictions on exponence are filtered off from the general identity schema.

3.5   Semantic representation

The semantics of SVC and EVC combination needs to take three circumstances into account:

(A) Items combining in these constructions largely bring with them their lexical meaning, so that as a default, the combinatorial semantics should assemble all lexical predicates (with their arguments) in their expressed relationships.

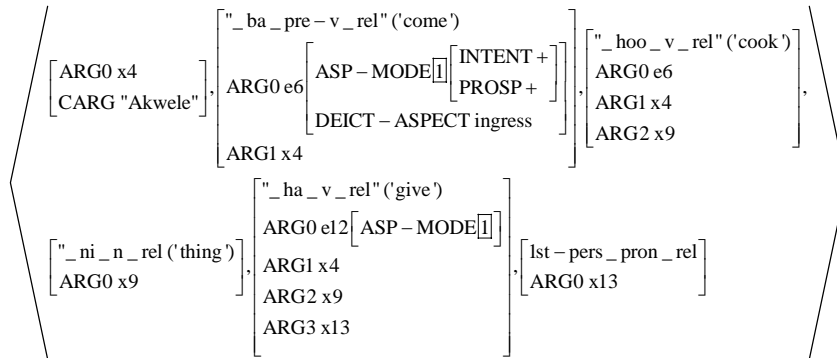(B) Some combinations are collocational, and need to be marked as such.

(C) Some of the preverbs contribute a global aspectual value to the construction, which ought to be exposed representationally at whatever level aspect is otherwise represented.

In the framework in question, the combinatorial semantics of a construction is standardly exposed in *Minimal Recursion Semantics* (cf. Copestake & al. (2005)). As an example, the representation in this notation for the meaning of (8) (with (8a) repeated) is as follows:

Akwele baahoo nii aha wɔ.

akwele	bàá	hóo	nii	á	hɑ̃́	wɔ
Akwele	INGR.FUT	*cook*	*thing*.PL	SBJV	*give*	1PL
PN	V		N	V		Pron

`Akwele will cook for us'

<div align="right">Generated in TypeCraft.</div>

$$
\left\langle
\begin{bmatrix} \text{ARG0 } x4 \\ \text{CARG "Akwele"} \end{bmatrix},
\begin{bmatrix} \text{"\_ba\_pre}-\text{v\_rel" ('come')} \\ \text{ARG0 } e6 \begin{bmatrix} \text{ASP}-\text{MODE}\boxed{1}\begin{bmatrix} \text{INTENT}+ \\ \text{PROSP}+ \end{bmatrix} \\ \text{DEICT}-\text{ASPECT ingress} \end{bmatrix} \\ \text{ARG1 } x4 \end{bmatrix},
\begin{bmatrix} \text{"\_hoo\_v\_rel" ('cook')} \\ \text{ARG0 } e6 \\ \text{ARG1 } x4 \\ \text{ARG2 } x9 \end{bmatrix},
\right.
$$

$$
\left.
\begin{bmatrix} \text{"\_ni\_n\_rel ('thing')} \\ \text{ARG0 } x9 \end{bmatrix},
\begin{bmatrix} \text{"\_ha\_v\_rel" ('give')} \\ \text{ARG0 } e12 \begin{bmatrix} \text{ASP}-\text{MODE}\boxed{1} \end{bmatrix} \\ \text{ARG1 } x4 \\ \text{ARG2 } x9 \\ \text{ARG3 } x13 \end{bmatrix},
\begin{bmatrix} \text{Ist}-\text{pers\_pron\_rel} \\ \text{ARG0 } x13 \end{bmatrix}
\right\rangle
$$

In this notation, essentially every word in the syntactic string is represented with a so-called elementary predication ('EP'), displaying a predicate value for the word and the arguments of that predicate (ARG0 corresponds to a referential index of the word), in a manner partly reflecting the feature structures assigned by the grammatical types and rules. (A) is thereby here observed, in that each lexical item in (8) constitutes an elementary predication (EP) by itself. (C) is reflected in the circumstance that the preverb *ba* induces the value *ingress* for the feature DEICT-ASPECT, in addition to constituting its own EP. The construction is not a collocation, hence there is no collocativity marking. (The fact that the English translation will use "for" rather than the verb "give" is of course no reason to say that *ha* ('give') in this construction has somehow lost its normal meaning.) Notice that, in accordance with the discussion in 3.2 above, the morphological discrepancy between *future* marking in the first VP and *subjunctive* marking in the second VP has no semantic effect, since the *subjunctive* marking is semantically underspecified relative to *future*.

4   Summary

Two types of multiverb constructions in Ga have been considered, the Extended Verb Complex (EVC) and Serial Verb Constructions (SVC). While SVCs are clearly phrasal constructions, EVCs meet on the one hand criteria of being analyzed as single words, but on the other hand they exhibit internal relations of types that are customarily found in phrasal constructions. Thus, the EVCs have been analyzed as recursive head complement structures, constituting a single word, but with dependent word forms as constituents. The boundedness of the preverbs to the EVC construction is analytically expressed through the obligatoriness of their verbal complement. The head-complement rule used for stating the dependence is formally of the same type as is used at phrasal level, and this hybrid nature of phrasal-like syntax and semantics and word-internal morphology and phonology may be seen as capturing the intermediate status of the EVC as a phenomenon situated between syntax and morphology.

As far as SVCs go, particular to Ga compared to other SVC languages is the 'resumptive subject' option. Otherwise sharing of subjects and objects exhibit patterns similar to what is found in other serializing languages. Not unlike the situation in other such langauges, SVCs have been shown to be expose just one asp-mode value, and so do EVCs, although with different patterns of exponence of the asp-mode values.

A challenge to standard 'locality' assumptions within HPSG is constituted by argument sharing relations between the Vs and VPs partaking in an SVC: at the point where two VPs are adjoined, a record of identity of objects seems necessary for object-sharing SVCs across all languages, and in Ga, this mode of specification is needed also for subjects when V2 has a resumptive subject. The type of specification used here (exemplified in (9)), with phrasally propagated

attributes identifying subjects as well as objects, is one way of accommodating the situation.

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