

Serial Verb Constructions and the Syntax-Prosody Interface*

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Abstract. Rolle (2019) identifies an apparent morpho-phonological conspiracy in serial verb construction (SVCs) in Degema (Niger-Congo, Nigeria). He argues that it constitutes evidence for a unified postsyntactic module, in which morphology and prosody are built in parallel (by ‘Optimality-Theoretic Distributed Morphology’). We argue that the pattern Rolle identifies in Degema SVCs instead results from the simultaneous interaction of two independently-attested syntax-prosody phenomena: (1) the pressure for adjacent verbs in an SVC to form a single prosodic unit, and (2) the suppression of redundant agreement within a single prosodic word (a.k.a. ‘Kinyalolo’s Generalization’). Thus the Degema SVC conspiracy can be localized to the syntax-prosody interface, and there is no need to adopt a unified parallel-computing postsyntactic module. We also offer some further critiques of Rolle’s model.

Keywords: clitics, syntax-prosody, Degema, serial verb constructions

1 Introduction

Rolle (2019) describes an interaction between morphology and prosody in serial verb constructions (SVCs) in Degema (Nigeria). He argues that this interaction can only be captured under an ‘OT-DM’ model (Optimality Theory – Distributed Morphology) which abandons traditional serial morphological derivations, and holds that syntactic structures are morphologized and prosodified in parallel, within a unified postsyntactic module. We propose an alternative analysis, which deconstructs the Degema pattern into two components which are both attested independently in various languages. Because the components of the pattern are found independently, they each require independent explanations that do not make reference to each other.

The first component relates to the prosodic profile of SVCs cross-linguistically: adjacent verbs in an SVC (forming a *contiguous* SVC) will form a single prosodic unit, while non-adjacent verbs (a *non-contiguous* SVC) will not. The second component to our analysis relates to a dispreference for word-internal repetition of functional morphology: following work by Kinyalolo (1992), Carstens (2003, 2005) and others, we refer to this phenomenon as *Kinyalolo’s Constraint*. We contend that both of these patterns are strictly observed in Degema, and the interaction identified by Rolle is simply both patterns surfacing simultaneously.

We thus show that the Degema pattern can be captured with a serial morphological module feeding a parallel (OT-based) syntax-prosody mapping module, and does *not* merit a radical change to this kind of theory. In addition, we show how SVCs require a unique treatment at the syntax-prosody interface, which has thus far gone unrecognized, and has remained accordingly undertheorized.

We present the Degema generalizations in Section 2, followed by the syntactic assumptions made by OT-DM and by us (Section 3). Section 4 introduces our analysis of the facts, which is to be contrasted with the OT-DM analysis in Section 5. Section 6 concludes.

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2 The Degema pattern

2.1 Proclitics and enclitics

In Degema, verbs can be bookended by both proclitics and enclitics. Proclitics are obligatory and agree with the subject in person, number and +/-human features. They come in two sets, with the choice between the sets determined by the tense and polarity of the clause. Enclitics are used to mark perfect and factative aspect. Example (1) shows a verb with both a proclitic and an enclitic. Degema being an SVO language, the object DP follows the verb complex. Our description relies primarily on Rolle (2019), whose original example numbers are cited.

- (1) Ohoso [o- sá -n] ẹ́nám
Ohoso 3SG.SET2-shoot-FAC animal
‘Ohoso shot an animal.’ (4b)

Heavy (disyllabic) object pronouns behave like full object DPs, in that they also appear after the verbal complex, shown in (2).

- (2) Osoabo [o- kótú-n] ọ̀yí
Osoabo 3SG.SET2-call -FAC him/her
‘Osoabo called him/her.’ (5a)

Light (monosyllabic) object pronouns, in contrast, intervene between the lexical verb and the enclitic, as in (3).

- (3) [o- kótú wọ́ -ōn]
 3SG.SET2-call you-FAC
‘He/she called you.’ (5b)

2.2 Serial verb constructions

Degema has serial verb constructions (SVCs), which show an interesting interaction with the cliticization pattern just outlined. When the verbs in an SVC are *not* interrupted by a full object DP, as in (4), the proclitic attaches to the front of the entire SVC, and the enclitic to the end of it. Note how the light pronoun in (4c) “incorporates” into the SVC.

- (4) a. Ohoso [o- tá ẹ́ -n] isen
Ohoso 3SG.SET2-go buy-FAC fish
‘Ohoso went and bought fish.’ (10a)

- b. ovó_i nù [mí- dúw t_i tá -an]?
who that 1SG.SET2-follow go-FAC
‘Who did I go with?’ (12b)

- c. Breno [o- dúw mé tá -ān]
Breno 3SG.SET2-follow me go-FAC
‘Breno went with me.’ (7b)/(10b)

When SVCs show this pattern, which Rolle (2019) calls the *single-marking* pattern, they also display a notable phonological property: the entire SVC (excluding the proclitics and enclitics) forms a single domain for tone spreading (Rolle 2019:§4.4).

In contrast to the single-marking pattern, when the verbs in an SVCs are interrupted by a full DP object or a heavy object pronoun (cf. (2)), each verb is bookended by its own proclitic and enclitic, as in (5). Rolle (2019) refers to this as the *double-marking* pattern.

- (5) a. [mi- dúw -n] **óyi** [mì- tá -ān]
 1SG.SET1-follow-FAC her/him 1SG.SET1-go-FAC
 ‘I went with him/her.’ (7a)

- b. Tatane [ɔ- sá -n] **ēnám** [o- gbíyé-ēn]
 Tatane 3SG.SET2-shoot-FAC animal 3SG.SET2-kill -FAC
 ‘Tatane shot and killed an animal.’ (8b)

In double-marking SVCs, the intervening object is *not* part of the domain of tone spreading.

Rolle argues that the single vs. double-marking pattern can only be captured by evaluating morphological outputs in parallel, providing evidence against a serial morphological derivation—see section 5. In the next section we present our own account of the pattern, which retains a classical, serial morphological module. We argue that the ‘conspiratorial’ appearance of the single vs. double-marking pattern emerges not during the morphological computation, but at the interface with prosody, a part of the grammar which has long been analyzed as involving parallel computation.

3 Serial syntax and morphology

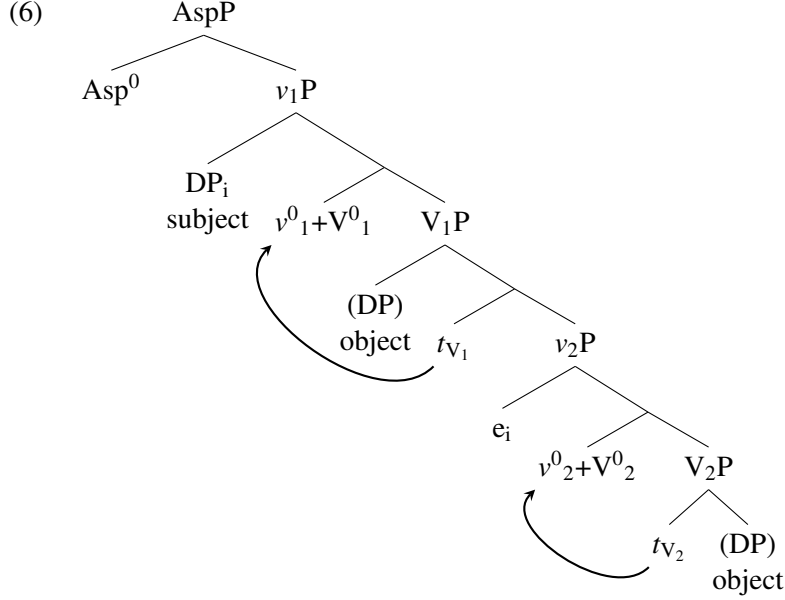
We propose an analysis in which responsibility for the single- vs. doubled-marking pattern in Degema SVCs lies with the mapping from (morpho)-syntax to prosody. The intuition behind our account is that during the morphological derivation, every lexical verb in an SVC is supplied with some morphological nodes which, if expounded, would realize the agreement proclitics and aspect enclitics (in essence, double marking as default). Then, at the prosodification stage, these terminals may go unexpounded, thanks to the influence of two highly ranked syntax-prosody mapping constraints.

Each of the two constraints is empirically motivated by a cross-linguistically well-attested phenomenon, or a well-worn theoretical analysis. One constraint embodies the pressure to create single prosodic words out of unbroken verb chains in SVCs—something familiar from the typological literature on SVCs, albeit undertheorized. The other constraint embodies the pressure against having redundant functional morphemes within a single prosodic word, a phenomenon often described and analyzed under the name *Kinyalolo’s Constraint* or *Kinyalolo’s Generalization*. In some Degema SVCs, these constraints are pitted against each other, and the only way for the grammar to simultaneously satisfy them both is to sacrifice the exponence of SVC-internal clitics.

This section first provides a syntactic analysis (§3.1) and morphological analysis (§3.2) of SVCs in Degema. Here we hew fairly closely to Rolle’s (2019) own analysis. Section 4 then turns to the prosodification of SVCs. This is, we argue, where the single- vs. double-marking alternation arises.

3.1 Syntax

Following Collins (1997, 2002), Rolle (2019) assumes that SVCs consist of nested vP shells, where one lexical verb selects the next vP as its complement, as in (6). We adopt his syntactic structure in its entirety.



Following Rolle, we also assume that lexical verbs undergo head-movement to become a complex head with their associated v , thus deriving the fact that the first verb in an SVC will always precede any object. But that is as far as head-movement goes. Rolle and Kari (2016) and Rolle (2019) argue that in Degema, the second (lower) lexical verb does not undergo head-movement into the first (see also Baker 1989, Aboh 2009), and we follow their analysis. And following Rolle (2019) once again (at least in part), this structure is subsequently manipulated postsyntactically to copy the Asp node onto both verb complexes, and insert Agr nodes onto both verb complexes—discussed next.

3.2 Morphology

We broadly adopt the morphological analysis of Rolle (2019) regarding how aspect enclitics and subject agreement proclitics end up on verbs in an SVC. However, because we do not propose to capture the single- vs. double-marking pattern in the morphological derivation, our morphological analysis is slightly simpler than Rolle's: we claim that by the end of the morphological derivation every verb in an SVC will end up with its own Agr_{SUBJ} node, to be exponed as an agreement proclitic, and (for some aspectual values) its own Agr_{ASP} node, to be exponed as an aspect enclitic. So at the end of the morphological derivation, a two-verb SVC will have the structure in (7).

$$(7) \quad [{}_v \text{ Agr}_{\text{SUBJ}}^0 + v + V + \text{Agr}_{\text{ASP}}^0] (\text{object}) [{}_v \text{ Agr}_{\text{SUBJ}}^0 + v + V + \text{Agr}_{\text{ASP}}^0] (\text{object})$$

We make use of a serial DM model in which the order of operations is as in (8) (Embick and Noyer 2001).

$$(8) \quad \text{Dissociated Node Insertion (DNI)} > \text{Vocabulary Insertion (VI)} > \text{Local Dislocation (LD)}$$

Following Rolle, we assume that each verb complex (a complex head consisting of v + lexical V) receives an Agr_{SUBJ} node and an Agr_{ASP} node by DNI.¹ Note that because the Agr_{SUBJ} and Agr_{ASP} nodes are

1. Rolle proposes that aspectual enclitics are in fact the clausal Asp head itself, or a copy of this head. We depart from his analysis for reasons of simplicity, though it would not affect anything if we adopted it.

appended to the verb complex in the morphological derivation, *v* remains the label of the complex head (this point is relevant for prosodification, in the next section).

We have thus derived a double-marking pattern, which is attested in the event that a heavy object intervenes between the verbs in an SVC, e.g. (5).² However, this leaves unexplained the single-marking pattern, in which multiple verbs and light pronouns in an SVC cluster together, and the whole complex is bookended by a single proclitic and a single enclitic as in (4). Rolle (2019) views this alternation as unexplainable in a serial model of morphology: it requires the morphology to ‘know’ whether or not the verbs and object pronouns will cluster—something which is undetermined at the point of VI. However, while Rolle’s solution to the problem is to abandon serial morphology altogether, we propose an alternative: serial morphology should be maintained, and the single/double-marking alternation should be accounted for at the syntax-prosody interface.

4 Proposal: Parallel prosodification

Our basic idea is that the single/double-marking alternation emerges when two inviolable constraints come into conflict. On the one hand, adjacent verbs in SVCs must cluster together into a single prosodic word (PWd). This is enforced with a constraint *SERIALIZE*. On the other hand, there is an *absolute* ban on *repeated* inflectional material within the same PWd (*Kinyalolo’s Constraint*, a.k.a. KINYALOLO). When *SERIALIZE* and KINYALOLO conflict, the only way of satisfying both—the least worst option—is to cluster the adjacent verbs into a single prosodic word, and delete one set of inflectional markers.

In this section we first discuss our basic approach to the syntax-prosody interface, which, unlike the morphological module, we *do* take to be parallel in nature rather than serial (section 4.1). We then consider obligatory prosodic verb-clustering in Degema SVCs, and how it is enforced at the syntax-prosody mapping by *SERIALIZE* (section 4.2). Following that we consider the ban on repeated inflectional material within a single PWd, enforced by KINYALOLO (section 4.3). Finally, we show how these constraints together derive the single/double-marking alternation (section 4.4).

4.1 The syntax-prosody interface

We assume that prosodic structure is a level of representation separate from syntactic structure. Prosodic structures are composed of hierarchically-organized constituents bearing prosodic category labels, such as a *phonological word* (PWd) or *phonological phrase* (PPh)—see Selkirk (1981), Beckman and Pierrehumbert (1986), Nespor and Vogel (1986), among others. We assume that the prosodic structure of a given phrase is built according to the principles of Match Theory (Selkirk 2009, 2011), which falls in the family of *indirect reference* theories of the syntax-prosody interface. Such theories hold that prosodic structure is the result of a negotiation between several competing pressures, and following Selkirk (1996, 2000, 2009, 2011), Truckenbrodt (1995, 1999), among others, we model this interaction in Optimality Theory (OT, Prince and Smolensky 1993).

2. Rolle (2019:15) and Rolle and Kari (2016:147) describe one context in which the verbs in an SVC can bear different agreement proclitics, shown in (i). Here, the proclitic on the first verb must be Set 2 and the one on the second verb must be Set 1, and they show up regardless of the presence of an intervening heavy object. Furthermore, the aspect enclitic (if present) fails to be copied onto the second verb, and the resulting clause is interpreted idiomatically as having imperfective aspect (habitual or present continuous). We assume that these SVCs must have a somewhat different morphological derivation from typical SVCs, not least because they do not show the single/double-marking alternation discussed here, and together with Rolle (2019) we set them aside.

(i) eni [e- dúw -n] óyi [mẹ- tá]
 we 1PL.SET2-follow-FAC him/her 1PL.SET1-go
 ‘We are going with him.’

(14b)

One kind of pressure is for prosodic structure to be isomorphic to syntactic structure. This pressure is embodied in the Match constraints, which enforce correspondence between syntactic categories and prosodic categories. For the purposes of this paper, we make use only of MATCH WORD, which enforces a mapping between syntactic heads (X^0 s, which may have complex internal structure) and PWds. Another kind of pressure is for prosodic structure to satisfy independent well-formedness conditions, which do not make reference to input syntactic structure, embodied by constraints enforcing, among other things, binary-branching (e.g. Ghini 1993, Inkelas and Zec 1995, Elfner 2012), equal weight between prosodic sisters (e.g. Myrberg 2013) and non-recursion (e.g. Selkirk 1996, 2000).

A third kind of pressure is for prosodic structure to satisfy certain prosodic desiderata which make reference to properties of syntactic structure (or at least to the terminal nodes in syntactic structure) *other* than simple constituency relations. Recent examples include constraints enforcing the idiosyncratic prosodic requirements of particular morphemes (e.g. the SUBCAT constraint employed by Bennett et al. 2018 and Tyler 2019), and constraints requiring certain syntactic dependencies to be reflected in prosodic phrasing (e.g. Clemens’s ARGUMENT- ϕ (2014, 2019), or Henderson’s COMPLEMENT- ϕ (2012)).³

The crucial constraints in our account of the single/double-marking alternation in Degema—SERIALIZE and KINYALOLO—are both of this latter variety, in that they require reference to syntactic and prosodic structure but are *not* about enforcing isomorphy between the two. Both constraints are independently motivated in both a typological and theoretical perspective. We provide an overview of these motivations next, noting that introducing the first constraint in particular into current formal theories is long overdue.

4.2 SERIALIZE

In section 2.2 we saw that single-marking SVCs form a single prosodic unit of some kind, while double-marking SVCs do not have this property. What we would like to highlight is the fact that this kind of clustering is very common in a typological perspective, being essentially the norm for *contiguous* SVCs (i.e. SVCs where the verbs are not interrupted by other constituents). Consider SVCs in Khwe (Khoisan). Like Degema, Khwe allows both contiguous SVCs, where the verbs are adjacent as in (9a), and *non-contiguous* SVCs, where the verbs are separated by some intervening (non-inflectional) elements as in (9b).

- (9) a. tí [ɛ̀gì-é yaá-à-gòdè]_{SVC}
 1SG be.late-II come-I-FUT
 ‘I will come later.’ (Kilian-Hatz 2006:113)
- b. tí t`ĩyá [[càcà á kx`áa-a] [kx`-óxò à kx`ó-ro] [txóró-è-tè]]_{SVC}
 1SG standing beer OBJ drink-II meat OBJ eat-II dance-I-PRES
 ‘In standing position I am drinking beer, eating meat, and dancing.’

The contiguous SVC in (9a) can be determined to be a single intonation unit, from Kilian-Hatz’s generalization that “the lexical elements of most [SVCs] maintain their internal tone melody, but the first word takes the main stress which is realized as a downdrift on the verbs following the V1 [first verb]” (Kilian-Hatz 2006:121). The non-contiguous SVC in (9b), by contrast, would have to consist of multiple intonation units, as per her generalization that SVCs “do not form such an intonation unit if the verbs have different objects preceding their corresponding verb; in these cases, every verb takes its own stress and the verb phrases may be separated by a short pause” (ibid.).

As another example of a pattern where clustering is dependent on the verbs being contiguous, Ingram (2006) states, of SVCs in Dumo, that “phonologically, all non-contiguous SVCs consist of verbs that are

3. As Clemens (2019) notes, the idea that selectional relations are projected in some way into prosodic structure is also a key part of Selkirk’s (1984) *Sense Unit Condition* and, more recently, Richards’s (2016) notion of *Selectional Contiguity*.

realized as separate phonological words (where a phonological word is defined by the presence of a single word-level primary stress). Amongst contiguous SVCs, however, SVCs are treated as single phonological words with respect to stress assignment.”

In overview articles of SVCs, Aikhenvald (2006:7) remarks that “a serial verb construction has the intonational properties of a monoverbal clause, and not of a sequence of clauses”, and Dixon (2006:339) states that an SVC “is like a single predicate in prosodic properties [...] an SVC generally constitutes one intonation group; and, in most cases, no pause is possible in the middle of an SVC”. Haspelmath (2016:308) concludes, “I have not come across any work that contradicts [Aikhenvald’s generalization], so I am assuming that this is true of all SVCs”.⁴

Given that phonological clustering seems to be a common property of SVCs crosslinguistically, we tentatively propose that this effect is the result of a high-ranked syntax-prosody interface constraint SERIALIZE, motivated by the typological perspective. SERIALIZE penalizes output prosodic structures in which adjacent *v* nodes (in an asymmetric *c*-command relation) in an input fail to form a single prosodic word, and is defined formally in (10).⁵

(10) SERIALIZE

Assign one violation for every pair of adjacent *v* heads, where one asymmetrically *c*-commands the other, that do not form a single PWd.

In order for SERIALIZE to make its effects felt in the prosodic output, it must outrank MATCH WORD, the constraint responsible for enforcing a one-to-one correspondence between syntactic terminals and PWds (see Selkirk 2011). The tableau in (11) shows how a simple two-verb SVC is realized as a single PWd at the syntax-prosody interface. Note that the *v* heads will be internally complex—this detail is not shown here.

(11)

	$v^0 v^0$	SERIALIZE	MATCH WORD
a.	$[v v]_{PWd}$		**
b.	$[v]_{PWd} [v]_{PWd}$	*!	

The tableau in (12) shows how SERIALIZE has no effect when a two-verb SVC is intervened by a heavy element.

(12)

	$v^0 N^0 v^0$	SERIALIZE	MATCH WORD
a.	$[v]_{PWd} [N]_{PWd} [v]_{PWd}$		
b.	$[v N v]_{PWd}$		*!***

We do not deny that SERIALIZE is essentially a simple formalization of a descriptive statement like ‘adjacent verbs in SVCs cluster into prosodic units’. One might wonder if this prosodic property of SVCs could be derived from their morphosyntactic properties without reference to a specialized constraint, but it is not obvious how this idea would work. One cannot appeal to syntactic constituency, since verbs in SVCs are not generally considered to form a syntactic constituent (see §3.1). Nor can one appeal to (purely) prosodic well-formedness constraints, since prosodic clustering in SVCs requires reference to the syntactic category *V*, and does not apply to, for instance, *Ns*. Whether SERIALIZE can be deconstructed or derived is a question which we hope additional work can answer.⁶

4. Nicholas Rolle (p.c.) notes an exception: in SVCs in Kalabari (Ijo), adjacent verbs do *not* form a prosodic unit, even though other adjacent lexical categories in this language *do* cluster into a single unit (Harry and Hyman 2014). This pattern is generable in our system through varying the constraint ranking: MATCH WORD \gg SERIALIZE.

5. The *c*-command condition ensures that SERIALIZE does not force adjacent verbs in covert coordination structures to serialize (Rolle 2019:§A3.2), since the *c*-command relation would not hold.

6. It is not necessary to invoke SERIALIZE to account for all instances of prosodic clustering in SVCs cross-linguistically: if the verbs in an SVC syntactically incorporate into a single complex head (e.g. †Hoan in Collins 2002), then their prosodic constituency will follow from their syntactic constituency (by MATCH WORD or similar).

We now move on to the second syntax-prosody interface constraint necessary to derive the Degema pattern.

4.3 Kinyalolo's Constraint

We propose that there is an inviolable constraint active in Degema which bans repeated inflectional morphemes within a single prosodic word. This has been termed *Kinyalolo's Constraint* in much previous work (see Kinyalolo 1992, Carstens 2003, 2005, Henderson 2011, Baker 2010, 2012, Baker and Kramer 2016, Alok and Baker 2018; see also an informal proposal by Hale et al. 1991:267).

Kinyalolo's Constraint is motivated by patterns like those in (13), from KiLega. Here, the number of overt agreement morphemes in a clause tracks the number of verb(-like) words, with each verb(-like) word having one and only one subject agreement morpheme.

- (13) a. Mikoko **z-á-bézág-á** **zí-se** **z-á-sínz-u-a**.
 4.sheep 4.AGR-A-be-FV 4.AGR-about.to 4.AGR-ASP2-slaughter-PASS-FV
 'Sheep were about to be slaughtered.' (KiLega, Carstens 2005:254)
- b. Masungá **má-kilí** **m-á-yík-u-á**.
 6.yam 6.AGR-be.still 6.AGR-ASP2-cook-PASS-FV
 'The yams are still being cooked.' (KiLega, Carstens 2005:253)
- c. *pro* **Mú-ná-kúbul-íl-é** mázi.
 IPL.AGR-MOD-pour-ASP-FV 6.water
 'You could have poured water.' (KiLega, Carstens 2005:255)

Carstens (2005), following a pioneering analysis by Kinyalolo (1992), argues that multiple heads within the functional spine of a KiLega clause agree with the subject (e.g. T, Asp1, Mod, Asp2 and others). In her analysis, when the functional spine is realized as several different morpho-phonological words, as in (13a), then the agreement morphemes mostly show up unhindered. But when the functional spine of a clause is lexicalized into fewer words, as in (13b), or just a single word as in (13c), all but the outermost subject-agreement morphemes are 'suppressed' by Kinyalolo's Constraint. Alok and Baker (2018) provide the definition in (14).

- (14) Kinyalolo's Constraint (Alok and Baker 2018:(21))
 In a word (phonologically defined), AGR on one head is silent if and only if its features are predictable from AGR on another head.

The fact that (14) makes reference to both a prosodic category (PWd) and a (morpho)-syntactic category (AGR) means that it can *only* apply at the syntax-prosody interface. It cannot apply straightforwardly to an un-phonologized morphological representation, nor can it be applied to a post-morphosyntactic phonological representation.

Degema clearly adheres to Kinyalolo's Constraint. When verbs in an SVC are clustered into a single PWd, there is a single agreement proclitic and a single aspectual enclitic for the entire PWd (i.e. single-marking). When verbs in an SVC form separate PWds, each verb has its own agreement proclitic and aspectual enclitic (i.e. double-marking).

To enforce Kinyalolo's Constraint in Degema, we adopt the spirit of (14), although it requires some adaptation for use in an OT framework. As currently stated, it contains both a 'constraint' (no word-internal repetition of AGR morphemes) and its repair (delete an AGR morpheme). Only the (true) 'constraint' part can be encoded as an OT constraint: KINYALOLO is defined in (15).

(15) KINYALOLO

Assign one violation for every PWd that contains multiple featurally-identical AGR nodes.

In order to allow deletion of redundant word-internal AGR nodes (in Degema, these are $\text{Agr}_{\text{SUBJ}}^0$ and $\text{Agr}_{\text{ASP}}^0$ nodes inserted on v heads), KINYALOLO must outrank whatever faithfulness constraint or constraints enforces the realization of these nodes in the output—we employ a constraint $\text{MAX}(\text{AGR})$. The effect of the $\text{KINYALOLO} \gg \text{MAX}(\text{AGR})$ ranking is illustrated in the tableau in (16).

(16)

	$[\text{x}^0 \dots \text{AGR}_{[i]} \dots \text{AGR}_{[i]} \dots]$	KINYALOLO	MAX(AGR)
a.	$[\dots \text{AGR}_{[i]} \dots]_{\text{PWd}}$		*
b.	$[\dots \text{AGR}_{[i]} \dots \text{AGR}_{[i]} \dots]_{\text{PWd}}$	*!	

So we have seen that in Degema SVCs, adjacent verbs and light object pronouns always form a single PWd (section 4.2), and in this section we have also seen that Kinyalolo’s Constraint is scrupulously obeyed. We propose that these two inviolable syntax-prosody mapping constraints derive the single- vs. double-marking patterns in Degema, without recourse to parallel computation in the morphology.

4.4 Deriving single vs. double-marking at the syntax-prosody interface

SERIALIZE forces adjacent v ’s to cluster into a single PWd, and KINYALOLO bars PWd-internal repeated functional material. Together, these will allow us to derive the distribution of the single- vs. double-marking alternation in Degema SVCs.

The basic idea is that both constraints are inviolable, but by creating the large, multiple- v -spanning PWds necessitated by SERIALIZE, the resulting PWds will often contain multiple identical inflectional morphemes (agreement proclitics and aspectual enclitics). If these were represented in the phonological output, the result would violate KINYALOLO, so in order to keep both constraints satisfied, all but one PWd-internal instance of each clitic goes unrealized.

The tableau in (17) illustrates an input that leads to a single-marking output. Because nothing intervenes between the two v ’s, SERIALIZE forces them into a single PWd, and KINYALOLO necessitates the deletion of redundant PWd-internal morphology.

(17)

	$[v \text{ Agr}_{\text{SUBJ}}\text{-V-Agr}_{\text{ASP}}] [v \text{ Agr}_{\text{SUBJ}}\text{-V-Agr}_{\text{ASP}}]$	KINYALOLO	SERIALIZE	MAX(AGR)	MATCH WORD
a.	$[\text{Agr}_{\text{SUBJ}}\text{-V V-Agr}_{\text{ASP}}]_{\text{PWd}}$			**	*...
b.	$[\text{Agr}_{\text{SUBJ}}\text{-V-Agr}_{\text{ASP}}]_{\text{PWd}} [\text{Agr}_{\text{SUBJ}}\text{-V-Agr}_{\text{ASP}}]_{\text{PWd}}$		*!		
c.	$[\text{Agr}_{\text{SUBJ}}\text{-V-Agr}_{\text{ASP}} \text{ Agr}_{\text{SUBJ}}\text{-V-Agr}_{\text{ASP}}]_{\text{PWd}}$	*!			*...

When there *is* intervening material, SERIALIZE does not demand that the v ’s in an SVC form a single PWd, because they are not adjacent. This is shown in (18).

(18)

	$[v \text{ Agr}_{\text{SUBJ}}\text{-V-Agr}_{\text{ASP}}] \text{ N } [v \text{ Agr}_{\text{SUBJ}}\text{-V-Agr}_{\text{ASP}}]$	KINYALOLO	SERIALIZE	MAX(AGR)	MATCH WORD
a.	$[\text{Agr}_{\text{SUBJ}}\text{-V-Agr}_{\text{ASP}}]_{\text{PWd}} [\text{N}]_{\text{PWd}} [\text{Agr}_{\text{SUBJ}}\text{-V-Agr}_{\text{ASP}}]_{\text{PWd}}$				
b.	$[\text{Agr}_{\text{SUBJ}}\text{-V N V-Agr}_{\text{ASP}}]_{\text{PWd}}$			*!*	*...
c.	$[\text{Agr}_{\text{SUBJ}}\text{-V-Agr}_{\text{ASP}} \text{ N Agr}_{\text{SUBJ}}\text{-V-Agr}_{\text{ASP}}]_{\text{PWd}}$	*!			*...

Before moving on to our evaluation of Rolle’s ‘OT-DM’ analysis of the Degema pattern, we address two outstanding questions relating to our analysis. Firstly (§4.4.1), when deriving the double-marking pattern, why is it the *outermost* clitics that are retained, with the inner clitics being deleted? Why not delete the outermost clitics and retain the inner ones? Secondly (§4.4.2), what happens to the light object pronouns, which show up internally to the SVC?

4.4.1 Retaining the outermost clitics

Here we sketch an account of why it is the leftmost proclitic and the rightmost enclitic that survive in a single-marked SVC, rather than SVC-medial proclitics and enclitics. Our account relies crucially on the notion that Vocabulary Items may be *pre-specified* to integrate into prosodic structures in particular ways (Inkelas 1989, Inkelas and Zec 1990, Bennett et al. 2018, Zec 2005, Tyler 2019). The intuition is essentially that proclitics are pre-specified to sit at the left edge of a PWd and that enclitics are pre-specified to sit at the right edge of a prosodic word. Therefore by retaining the outermost clitics, the clitics' prosodic pre-specifications are most easily satisfied. By contrast if SVC-medial clitics were retained instead, *either* they would have to simply sit in the middle of the SVC-spanning PWd, violating their prosodic pre-specification, *or* some complex PWd-within-PWd structure would have to be constructed. Both options are less optimal than simply retaining the outer clitics rather than the inner clitics.

For reasons of space we do not provide the explicit implementation. Following Bennett et al. (2018) and Tyler (2019), we simply assume that the agreement clitics have prosodic subcategorization frames, which are enforced at the syntax-prosody interface by an inviolable constraint SUBCAT. We do not claim that this is the only theoretical option that would account for why the outer clitics are retained in single-marking environments rather than SVC-internal clitics. We simply claim that it is one plausible option.⁷ Rolle (2019) achieves a similar goal using ALIGN constraints, as we will see in section 5.2.

4.4.2 Light object pronouns

Monosyllabic object pronouns in Degema always show up internally to the verb/SVC complex. When there is just one verb, the light object pronoun will appear between the verb stem and the aspectual enclitic, as in (19a). With an SVC, it may show up between the verb and the final aspectual enclitic, as in (19b) or between two SVC-internal verbs, as in (19c)—this depends on whether it is the object of the first or second verb (see Kari 2003).

- (19) a. [o- kótú wɔ̌ -ōn]
 3SG.SET2-call you-FAC
 ‘He/she called you.’ (5b)
- b. Breno [o- sóm fíyé wɔ̌ -ōn]
 Breno 3SG.SET2-be.good be.more.than you-FAC
 ‘Breno is handsomer than you.’ (Kari 2003:281)
- c. Breno [o- dúw mé tǎ -ān]
 Breno 3SG.SET2-follow me go-FAC
 ‘Breno went with me.’ (7b)/(10b)

Rolle (2019) proposes that light object pronouns incorporate into the verb constituent by a process of Local Dislocation (LD). This accounts for both the fact that they precede the aspectual enclitic and the fact that they do *not* induce the double-marking pattern. We broadly follow this part of his analysis, in that we assume that light object pronouns incorporate into the *v*+V complex head that selects them.

However, we do not take a view on whether this incorporation is morphological (i.e. lexically-arbitrary, via LD) or prosodic (driven by interface considerations, cf. Bennett et al. 2016), since it would not make a difference for our analysis. If morphological, then pronoun incorporation moves a pronoun inside a complex *v* node, rendering it irrelevant for the computation of the single vs. double-marking pattern. If prosodic, then

7. It is notable that, to our knowledge, in all previous instances in which Kinyalolo's Constraint has been invoked, the surviving AGR morpheme is at the edge of the prosodic/morphological word (e.g. (13c)).

pronoun incorporation is calculated in parallel with the computation of single- vs. double-marking, but does not affect it. Our more substantive disagreements with OT-DM are discussed next.

5 Against OT-DM

In OT-DM, inflection is understood as a morphological well-formedness condition: verbs must have agreement marking—in Degema, this is satisfied by the agreement proclitics and aspect enclitics. The claim of OT-DM is that in general, the system prefers to perform marking only once; double marking is a repair strategy which applies when single marking is too costly.

5.1 Assumptions

As mentioned earlier, OT-DM assumes the three post-syntactic operations Dissociated Node Insertion, Local Dislocation and Vocabulary Insertion. These operations are regulated by OT constraints but can ostensibly apply freely. For example, no single constraint triggers DNI but one faithfulness constraint and two markedness constraints regulate it:

- (20) a. DEP-IO(NODE)
Penalize insertion of dissociated nodes (AGR).
b. *AGR_{ASP}
Violation for each aspect marker formed by agreement.
c. *AGR_{SBJ}
Violation for each subject agreement (all are formed by agreement).

DNI is invoked in order to insert subject Agr nodes (clitics) and copy Asp to the second verb of an SVC; LD is required in order to incorporate light pronouns (D_σ) into the verbal constituent, lower Asp onto V, and form clustered SVCs; and VI is required by hypothesis.

On this view, there are two different triggers for LD (Rolle 2019:21):

- (21) a. Prosodically motivated: $(V)+(D_\sigma) = (V D_\sigma)$.
b. Morphologically motivated: $(V1)+(V2) = (V1 V2)$.

Each morphological word (MWD) is labeled according to the “prosodically strong morpheme” inside of it, where MWDs are the highest projection of an X^0 (potentially in a complex head; Embick and Noyer 2001, Bobaljik and Harley 2017). For v and V , the label is $\{V\}$. For D , the label is $\{D\}$.

OT-DM implements 15 markedness and “mapping” constraints in three C(onstraint)-Strata, plus the labeling mechanism just mentioned. We will not recap all constraints here, mentioning instead the most relevant ones as we reproduce schematic OT-DM derivations.

5.2 Derivations: Single verbs

The most relevant candidates are repeated in each of the examples below; see the original paper for full tableaux and a thorough discussion of possible candidates and combinatorial typologies. Candidate and Tableau numbers correspond to those in Rolle (2019).

The placement of clitics in relation to a single verb is regulated by two ALIGN constraints (Tableau 2); the same can be said in the current proposal.

- (22) a. ALIGN-AGR_{SBJ}-L
Subject clitics are proclitics: left edge of a MWD.
- b. ALIGN-ASP-R
Aspect clitics are enclitics: right edge of a MWD (does not apply to aspect markers formed by agreement).

(23)

[V]	ALIGN-ASP-R	DEP-IO(NODE)
a/1. AGR _{SBJ} -V-Asp		*
b/2. AGR _{SBJ} -Asp-V	*!	*
c/3. AGR _{SBJ} -V-Asp-AGR _{ASP}	*!	**

With one verb and one D_σ , the pronoun is too light to form its own prosodic word (24c), hence cannot form its own morphological word, and is therefore incorporated into a different MWD (25a). The prosodic difference between a light and heavy pronoun is extrinsic to the tableau (Tableau 3).

- (24) MWD = PRWD
Incorporate clitics and D_σ into a surrounding word.

(25)

[V D_σ]	MWD=PWD	ALIGN-ASP-R	DEP-IO(NODE)
a/1. (AGR _{SBJ} -V- D_σ -Asp){V}			*
b/3. (AGR _{SBJ} -V-Asp- D_σ){V}		*!	*
c/8. (AGR _{SBJ} -V-Asp){V} (D_σ){D}	*!		*

With one verb and one $D_{\sigma\sigma}$, the prosodically heavy argument must project its own morphological word/label, hence it does not incorporate (Tableau 4).

- (26) a. MWD_{LABEL}
All morphological words are labeled with the category of the prosodically strong morpheme in the word.
- b. *COMPLEXMWD_{LABEL}
Only one label per morphological word.

(27)

[V $D_{\sigma\sigma}$]	MWD(LABEL)	*COMPLEXMWD(LABEL)	DEP-IO(NODE)
a/1. (AGR _{SBJ} -V-Asp){V} ($D_{\sigma\sigma}$){D}			*
b/5. (AGR _{SBJ} -V- $D_{\sigma\sigma}$ -Asp){V},{D},{Asp}		*!	*
c/6. (AGR _{SBJ} -V- $D_{\sigma\sigma}$ -Asp){V}	*!		*

5.3 Derivations: SVCs

Serial Verb Constructions start off similarly to single verb constructions. With no internal argument, single marking applies in order to avoid the sprouting of too many dissociated nodes (Tableau 5):

	$[v_1+V_1 [v_2+V_2]]$	ALIGN-ASP-R	DEP-IO(NODE)
(28)	a/1. (AGR _{SBJ} -V1-V2-Asp) _{V}		*
	b/2. (AGR _{SBJ} -V1-Asp) _{V} (AGR _{SBJ} -V2-AGR _{ASP}) _{V}		**!*

With two verbs and one light D_σ , the pronoun must incorporate like in (25). Candidate (30d) which incorporates V2 over D_σ violates the linearization constraint (29) since it disrupts the original order V1-DP-V2 (Tableau 6):

- (29) LINEARITYMAP-IO:LEX
Hierarchical order of lexical constituents is reflected in the linear order.

(30)

	$[v_1+V_1 [D_\sigma \text{ V1 } [v_2+V_2]]]$	MWD=PWD	LINMAP-IO:LEX	DEP-IO(NODE)
Ⓔ	a/1. (AGR _{SBJ} -V1- D_σ -V2-Asp) _{V}			*
	b/2. (AGR _{SBJ} -V1- D_σ -Asp) _{V} (AGR _{SBJ} -V1-AGR _{ASP}) _{V}			**!*
	c/38. (AGR _{SBJ} -V1-Asp) _{V} (D_σ) _{D} (AGR _{SBJ} -V1-AGR _{ASP}) _{V}	*!		***
	d/40. (AGR _{SBJ} -V1-V2-Asp) _{V} (D_σ) _{D}	*!	**	*

Finally, double marking applies for $D_{\sigma\sigma}$ in an SVC. What rules out single marking with the pronoun in situ (31b) is again the linearization constraint (Tableau 7):

(31)

	$[v_1+V_1 [D_{\sigma\sigma} \text{ V1 } [v_2+V_2]]]$	MWD(LABEL)	LINMAP-IO:LEX	DEP-IO(NODE)
Ⓔ	a/1. (AGR _{SBJ} -V1-Asp) _{V} ($D_{\sigma\sigma}$) _{D} (AGR _{SBJ} -V1-AGR _{ASP}) _{V}			***
	b/2. (AGR _{SBJ} -V1-V2-Asp) _{V} ($D_{\sigma\sigma}$) _{D}		*!*	*
	c/26. (AGR _{SBJ} -V1- $D_{\sigma\sigma}$ -V2-Asp) _{V}	*!		*

5.4 Discussion

OT-DM computes morphological operations (e.g. Agr node insertion) and prosodification (e.g. mapping to prosodic words) in parallel, with morphological and prosodic constraints interwoven. The main contribution of the OT-DM account, as applied to Degema, is to cast the single/double-marking distinction as part of a conspiracy to reduce multiple exponence of clitics. Single-marking is preferred because each clitic is exponed only once. But for this to happen, adjacent verbs in an SVC need to be corralled into a single ‘morphological word’ (MWd), with each MWd serving as a host for a proclitic-enclitic pair. Double-marking arises when no single MWd can be formed from the verbs in the SVC (because of the intervening DP), thus forcing two distinct MWds to be formed, each of which then carries its own proclitic-enclitic pair. The distinction between light and heavy intervening material is encoded extrinsically to the constraints, just as in our account.

The OT-DM account relies on a stipulation that single-marking in an SVC is the default and double-marking (insertion) the exception. However, our (equally-stipulated) assumption that each verb in an SVC sprouts its own Agr nodes, which may be deleted during prosodification, does *not* lead to the conclusion that parallel computation is necessary wholesale, only that specific morphemes are marked for prosodic status – a conclusion the field has already reached (Section 4.1). When studies of different phenomena have compared insertion with deletion, the conclusion seems to be that it is best to model a doubled element in the

syntax and then delete it at PF; see Barbiers (2014) on focus particles in Dutch and Gouskova (To appear) on prepositions in Russian.⁸

Rolle (2019) is careful to rule out possible candidates in the individual derivations. Empirically, his proposal seems sound. Our objection to it rests on a number of conceptual considerations. From the most specific to the most general, we take issue with (i) prosodic verb-clustering being dependent on a conspiracy to reduce multiple exponence of agreement morphemes, (ii) the labeling mechanism necessary to match up prosodic words with morphological words, and (iii) the parallel rather than serial computation of morphology. We go through these in turn.

First, the account of verb-clustering in SVCs is parochial: as we have discussed, many if not most SVCs crosslinguistically occur in the absence of agreement or clitics (Aikhenvald and Dixon 2006). The typological literature indicates that in languages with “contiguous” SVCs (SVCs with no or minimal material permitted to intervene between the verbs), the SVC will very frequently form a single prosodic unit. So if verbs may cluster together in SVCs regardless of agreement marking, an “anti-clitic” conspiracy such as that of OT-DM cannot be a general explanation for clustering. Rather, the theory needs to allow verbs to cluster together; we have proposed one way of integrating this “clustering” into our formal theories using SERIALIZE. Degema is of particular interest because the light/heavy distinction poses an added complication. However, it can be treated separately from the general question of clustering. How agreement interacts with this clustering, and in particular how pronouns of different prosodic weight further interact with agreement, are important questions which do not bear directly on the clustering mechanism itself. Our serial analysis, in which morphology feeds prosody but not vice versa, is therefore maximally general as it captures all SVCs including the Degema data, rather than being tailored to the particulars of a single language.

Second, the OT-DM account requires morphological words as representations distinct from prosodic words and syntactic heads, as well as an associated mechanism for labelling them. While the notion of a morphological word is not new, it has so far only been implicated in the calculation of contextual allomorphy (Bobaljik and Harley 2017, Choi and Harley 2019). Its relevance for prosodic calculation needs to be argued for more convincingly, given that a less controversial alternative can be formulated. Within OT-DM these mechanisms serve the single purpose of preventing verbs from prosodically clustering with nouns, a matter our own account encodes using standard diacritics.

Thirdly, it has been noted in various ways (from Pullum and Zwicky 1986 to Embick 2010) that morphosyntax and phonology are calculated separately. Embick (2010) in particular defends this kind of view against OT accounts which interleave morphology and phonology, or rank phonology over morphology; see McCarthy (2008) and Wolf (2008) for a few such theories, and Kalin (2018) and Kastner (2019) for rebuttals in additional domains. OT-DM does not reexamine the existing work. While this is understandable given the scope of what such an undertaking would look like, it means that there are no new arguments for why the established conclusion should be revisited. Within the OT-DM architecture, then, we might expect to find arbitrary interactions such as a distinction between single marking and double marking which depends on an arbitrary morphosyntactic feature, for example single marking on singular NPs and double marking on plural NPs. This constraint is easy to encode: ‘PWD=PLURAL’, on a par with (24). But if morphosyntax is dissociated from prosody, this kind of constraint no longer fits naturally in the architecture.⁹

8. An “insertion” analysis could be maintained within the general approach presented here, without recourse to the parallel architecture of OT-DM. One would need to assume that the output of the morphology gives just one Agr_{SUBJ} node and just one Agr_{ASP} node in an SVC, and reinterpret Kinyalolo’s Constraint as enforcing a one-to-one correspondence between agreement morphemes and verbs capable of bearing agreement.

9. Granted, SERIALIZE could also be written so as only to apply to plural nouns. The claim we wish to advance is that SVCs seem to form a robust crosslinguistic phenomenon, and so are worthy of their own constraint, while leaving open the possibility that future work will be able to derive this constraint from independent principles.

6 Conclusion

This brief contribution had two goals: to argue against a parallel morphology-prosody model of the grammar, and to make the case for a formal implementation of clustering in SVCs (SERIALIZE). In order to understand the Degema patterns, we have proposed what could be seen as a cross-modular Duke of York effect: clitics are inserted in one module and removed in the next. Since the clitics are not always deleted, it is not a “global” Duke of York derivation of the kind which applies within one module.

While we have argued against the OT-DM architecture in general and its application to Degema in particular, we hope that it is clear how our own proposal can be falsified: what one would need to show is that verb clustering is a conspiracy, rather than the outcome of a single constraint. In fact, we hope this paper will serve as impetus to further study SERIALIZE and KINYALOLO, be it as holistic constraints or interactions between other constraints. Rolle (2019) showed what such an undertaking could look like. We contended here that his findings actually make the case not for a parallelist OT-DM model but for the ongoing study of serialization and deletion.

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