

VP-Chaining in Oriya

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Abstract

VP-chaining in Oriya (an Indo-Aryan language spoken in Orissa, India) is argued to be left-recursive VP-adjunction in c-structure with a corresponding f-structure displaying recursive embedding under the attribute ADJUNCT (for 'chain-adjunct'). Under VP-chaining 'subject sharing' is obligatory and analyzable in terms of functional control ('token sharing'), 'object sharing' is not only optional but in addition, does not require case or GF uniformity, and can skip an intervening intransitive verb. It is therefore argued that 'object sharing' is a form of anaphoric control ('reference sharing'). Passivization under VP-chaining needs to apply to all verbs in the VP-chain. The uniformity of diathesis pattern is accounted for via the adoption of an LFG architecture (from Butt, Dalrymple and Frank 1997) according to which c-structure maps directly to a (rgument) structure, and a-structure in turn to f-structure. This analysis allows us to 'drive' all the aspects of VP-chaining mentioned (apart from object sharing) from an annotation of c-structure rules.

VP-Chaining in Oriya*

Introduction

It is often suggested that Serial Verb Constructions (SVC) originate from paratactic constructions (e.g., Payne (1985), Foley and Olson (1985), Andrews & Manning (1999)). The relation between coordination and verb serialization seems particularly obvious for VP-chaining in the Indo-Aryan language Oriya, where a series of VPs describes a series of consecutive events. However, VP-chains in Oriya possess properties unlike those of coordination. First of all, under VP-chaining, there is an asymmetry in the morphology of the verbs involved, not expected to appear in coordination: A final finite verb combines with a series of dependent verb-forms, as in (1) (here and throughout, we highlight the verbs of the sequence by underscore):

- (1) Raajaa maachha-Te kiN-i keLaa-i bhaaj-i khaa-il-aa
Raajaa fish-a buy-dM clean-dM fry-dM eat- PAST 3rd, sg
'Having bought, cleaned and fried a fish, Raajaa ate it.'

The verb forms *kiNi*, *KeLaai* and *bhaaji* are here marked as non-finite, dependent verbs by the suffix *-i* (glossed as 'd(ependent) M(arker)'),¹ while the last verb *khaailaa* is finite and marked for tense and agreement.

Secondly, NP-extraction out of one of the conjuncts is grammatical, violating the across-the-board constraint (otherwise valid in Oriya; together with the other island constraints). In (2) the NP *maachha* ('fish') has been extracted out of the first VP headed by the verb *bhaaj* ('fry').

- (2) sei maachha-Ti-ku mun bhaaj-i bhaata raandh-i bhaata o maachha khaa-il-i
that fish-Def-Acc I fry-dM rice cook-dM rice and fish eat-Past1st,sg
'It was that fish I fried, then (I) cooked the rice and ate the rice and the fish.'

Finally, unlike under coordination, the non-finite VPs can be fronted together, leaving the tensed verb behind, as in (3):

* The authors would like to thank Kalyanamalini Sahoo with whom they published an earlier paper on argument sharing, also based on Oriya (Beermann et.al. 2001). Kalyani is a native speaker of Oriya, and without her help also this paper would not have been possible. We further would like to thank the participants of the Spring 2001 seminar on 'Verb Serialization' at the Linguistic Department at Stanford University, and in particular Joan Bresnan, who took the time to discuss with us an early version of this paper. We also would like to thank Miriam Butt for discussion and Mary Dalrymple for carefully reading through this paper. The discussions we had have provided us with new and interesting insights on control, referential binding and complex verbal constructions. Not all of these ideas could be integrated in the present version of this paper. Errors and misunderstandings found in the text are the authors' responsibility alone.

¹ The suffix *-i* is in form identical to the perfective marker. That these two morphemes are different in meaning can be seen by the following example taken from Sahoo (2001):

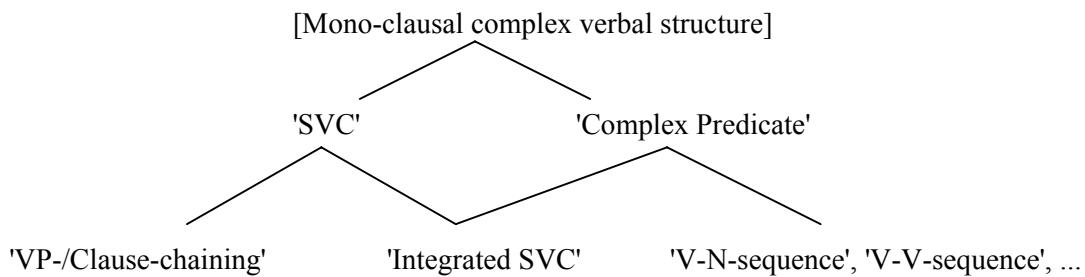
- (i) se has-i has-i katha kah-u-th-il-aa
he laugh-dM laugh-dM tale talk-PROG-PAST-3rd,sg
'He was laughing and talking.'

The verb 'laugh' is duplicated, to express the progressive aspect, while the dM *-i*, pertinent to VP-chaining, is maintained.

- (3) haata dho-i bhaata khaa-i mun skul-ku ga-li
 hand wash rice eat I school-PP go- PAST 1st sg
 ‘Having washed my hand and eaten rice, I went to school.’

VP-chaining in Oriya resembles in many respects what has been called 'Clause-chaining' in the context of the West-African languages (e.g., Osam 1994). For Akan in particular, Osam contrasts clause-chaining with 'Integrated SVCs', a dichotomy also recognized for many other languages, and properties of which are summarized by Kroeger (2001). Both constructions are commonly categorized as SVCs, and we follow this convention here; at the same time, 'Integrated SVCs' seem to fall under the notion 'Complex Predicates' as commonly used, which suggests a rough typology of notions as depicted in figure 1:

Figure 1. *Rough typology of notions referring to mono-clausal complex verbal structures*

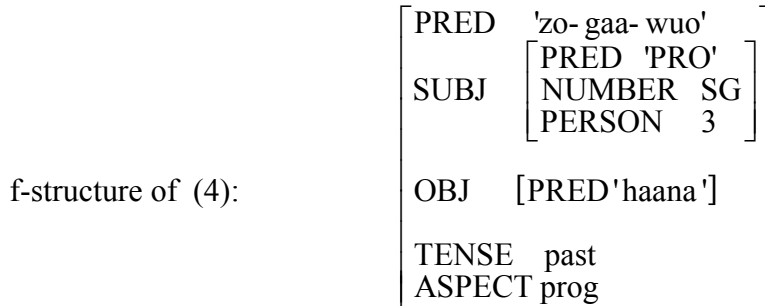


The variant of SVCs that has received the main attention in the LFG literature is one instantiating 'Integrated SVCs'. This type is discussed by Niño (1997) and Bodomo(1997) for Dagaare. Niño, as summarized by Sells (2001), suggests that multiple verbal predicate constructions are analyzable in terms of multiple c-structure exponents of one complex predicate nucleus. The idea is that a nucleus of the type 'pred₁- ...-pred_n' is formed by a process called 'composition of predicates' (cf. Alsina (1993, 1997), Butt (1993, 1995, 1997)). (4) gives a Dagaare example of an Integrated SVC, taken from Bodomo (1997), and the f-structure in figure 2 illustrates the basic idea of predicate composition:

- (4) 0 da zo-ro gε-rε wuo-ro la haane.
 3sg PAST run-IMPERF go-IMPERF collect-IMPERF FACT berries
*He/she was always running there collecting berries.*²

² Different from at least one of the meanings suggested by the English gloss of (4) given by Bodomo(1997) where she collects berries after having run, the f-structure shown in figure 2 suggests as PRED value a 'runningly' performed collecting event of berries. This is also the meaning suggested by the gloss given by Niño (1997) for the same example. The verbs *zo* and *gaa* are interpreted as semantically modifying the collecting event.

Figure 2. 'Predicate Composition' illustrated with an example from Dagaare (Bodomo (1997))



Building on data from Oriya, the intention of this paper is to clearer distinguish VP-chaining/Clause chaining from Integrated SVCs/complex predicate formation, and in particular to present an analysis which allows multiple verbal predicates to enter into a mono-clausal structure without necessarily forming a complex predicate nucleus.

Following T. Mohanan (1997) in her analysis of Hindi, we will assume that Oriya VP-chains involve a combination of independent predicates, associated with a single-headed mono-clausal c-structure. Employing the formalism suggested by Butt, Dalrymple and Frank (1997) and earlier work by Kaplan (1995), we will argue for a representation of VP-chains that is factored out over three parallel representations. We would like to argue that, at a-structure and f-structure, VP-chains build a structure of independent predicates, which corresponds at c-structure to a series of adjuncts that modify a single finite verbal head. Following Butt et al., a-structure is directly projected from c-structure nodes via a so-called α -function which allows us to directly construct diathesis alternations from morpho-syntactic information.

The patterns of argument sharing that are characteristic of VP-chains, will be represented at f-structure. For subject sharing we will have to extend the notion of 'functional control', from a lexically-induced concept (Bresnan 2001) to a constructionally-induced concept. Object sharing, on the other hand, will be described in terms of anaphoric control (Bresnan 1982a, 2001, Dalrymple 2001), thus accounting for the different properties of subject and object sharing.

Figure 3 schematically indicates the c-structure adjunction configuration assumed, and figure 4 the corresponding representations in a- and f-structure. Again following Butt et al., we describe the correspondence between a-structure and f-structure in terms of the λ -function:

Figure 3. Schematic c-structure representing VP-Chains as a recursive process of left adjunction.

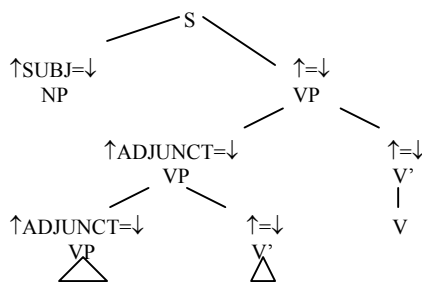
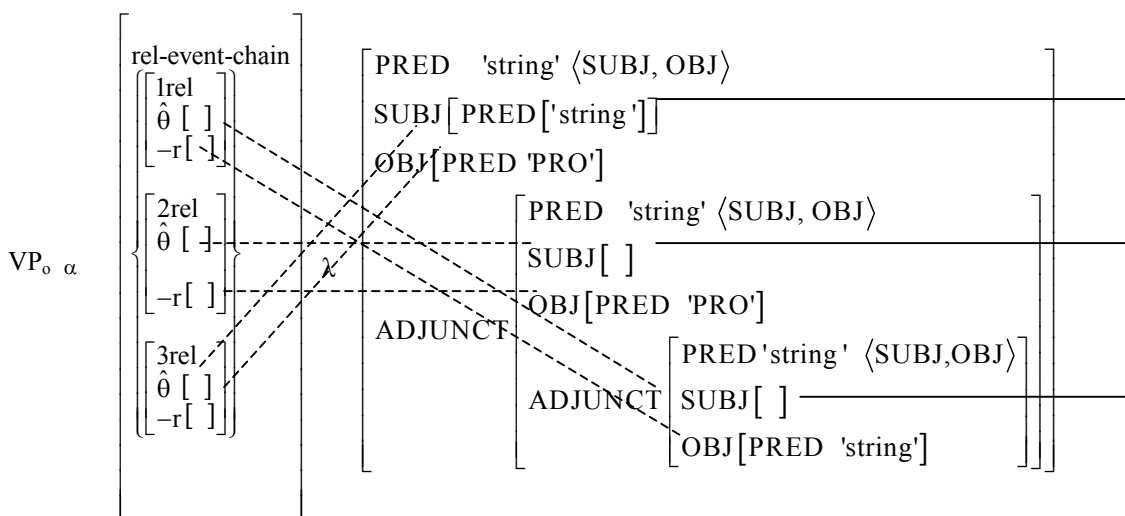


Figure 4. Schematic representation of a VP-chain of three transitive verbs with subject- and object-sharing.



(A-structure will reflect not only the argument structures associated with each predication, but also the temporal relationships between the events expressed by the predications. In figure 4, the label 'rel-event-chain' refers to this aspect of the representation, and as a notational convenience, we use the label '1rel' on the predication representing the temporally first event, '2rel' the temporally second, and so forth. See (20) below for an approximation to a more adequate representation of this feature of the semantics).

Details of these proposals will be developed in the following. We first provide the most crucial data.

2. Main data

Subject sharing

Subject sharing is obligatory in VP-chaining. Moreover the serialization of two predicates, one requiring a dative subject, the other a nominative subject, is ungrammatical, as the contrast between the grammatical *coordination* in (5) and the ungrammatical *serialization* in (6) shows:

(5) mote jara he-uchh-i aau mun ousadha khaa-u-chh-i
 I-DAT fever happen-PROG-AUX-1st,sg and I medicine eat-PROG-AUX-1st,sg
 'I am suffering from fever and I eat medicine.'

(6) * mote jara ho-i ousadha khaa-il-i.
 I fever happen-dM medicine eat-PAST-1st,sg.
 'Having had fever I took medicine.'

Object sharing

Different from subject sharing, object sharing under VP-chaining is optional. That is to say that each verb in the sequence maintains its independent object domain, as illustrated in (3), repeated, (7) and (8) below. In the VP-chain (3) none of the objects are shared. In (7) the verb

de ('give') is preceded by both of its objects, of which the indirect object (given in italic) is a shared object relative to the following two verbs. The first one of those following verbs, the verb *ne* ('take'), is separately modified by a PP, while the final verb *khuaa* ('feed') selects its direct object independently.

- (3) **haata** dho-i **bhaata** khaa-i mun skul-ku ga-l-i
 hand wash rice eat I school-PP go- PAST 1st sg
 'Having washed my hand and eaten rice, I went to school.'

- (7) mun **gariba** **pilaaTi-ku** **lugaa** de-i **hotellku** ne-i **piThaa** khuaa-il-i
 I poor child-DAT cloth give-dM hotel take-dM pancake feed-PAST-1st,sg
 'Having given the child clothes, taking him to a hotel, I fed him pancake.'

(8) illustrates that adverbs need not take scope over the whole sentence, but may well modify chained verbs individually:³

- (8) **bilei-Taa** **aakhi** **pichhuLaake** **maachhabhajaa-Taa** ne-i
 cat-the an eyeblink's time fish cutlet-the take-dM
baaDipaTa-ku jaa-i **bhaari** **majaare** khaa-il-aa
 backyard go-dM happily eat-PAST-3rd,sg
 'Having taken the fish cutlet in an eyeblink's time, the cat went to the backyard and ate it happily.'

In short, in the construction at hand, each verb occurs inside the VP structure that it is normally associated with, possibly sharing one or two of its objects⁴ with other verbs in the VP-chain.⁵ Important is that object sharing can obtain even when the shared object realizes different grammatical functions relative to the verbs in the sharing sequence. The shared argument 'child' in (7) is an indirect object relative to the first and third verb, but a direct object relative to the second. In (9) below, the shared object *ghaa* ('wound') is a direct object relative to the first verb *dho* ('wash') and as such it is suffixed by the objective case marker *-ku*. Relative to the second verb *lage* ('apply') it serves in an oblique function. It indicates the location to which

³ When they do take scope over the whole sentence, adverbs may occur either sentence initially, as in (i), or in a sentence internal position, as in (ii):

(i) **kaali** **raati-re** mun **maachha-Te** kiN-i keLaa-i bhaaj-i khaa-il-i
 yesterday night-PP I fish-a buy-dM clean-dM fry-dM eat- PAST 1st sg
 'Last night, having bought, cleaned and fried a fish, I ate it.'

(ii) mun **tarakarri-Taa-ku** **aaji** **sakaaLe** **frizru** **baahaara** **kar-i** **garam** **kar-i** **khaa-il-i**.
 I curry-DEF-CASE today morning fridge out do-dM hot do-dM eat-PAST-1st,sg
 'This morning, having taken the curry out of the fridge, I heated it and ate it.'

⁴ An example of two shared objects is given in (i):

(i) mun **mak-ku,** **saaDi-Taa** dekhaa-i de-li
 I mother sari-the show-dM, give-Past 1st,sg
 'Having shown my mother the sari and gave it to somebody else/her.'

⁵ Object sharing is not necessarily sequence initial as the following example shows:

(i) **subaasa** **sakaaLu** uTh-i **jaLakhiaa** khaa-i **bilaru** jaa-i **TamaaTo** **toL-i** **bikk-il-aa**
 Subas morning-PP wake up breakfast eat farm go tomato pluck sell-PAST-3rd,sg
 'Having got up in the morning, Subas had breakfast, went to the farm, plucked tomato, and sold them.'

For discussion see Beermann, Sahoo and Hellan (2001)

the medicine is applied. If overtly realized it would therefore be marked by the post-position *-re*.

- (9)
 mun ghaa-Thaa-ku dho-i ousadha lage-i byaandaze ka-li.
 I wound-DEF-CASE wash-dM medicine apply-dM bandage do-PAST-1st,sg

In summary, shared objects can be functionally and morphologically distinct, while shared subjects need to be also morphologically identical.

Finally, object arguments can be shared across intransitive verbs, as illustrated by (8) above, while, in most cases, they cannot be shared across a transitive verb, as indicated in (10) below:

- (10) #mun aambaTaa ne-i bhaata khaa-i kaaT-i khaa-il-i
 I mango-the take-dM rice eat-dM cut-dM eat- PAST 1st sg
 ‘Having taken the mango, I ate rice, then cut the mango and ate it.’ [intended meaning]

Passivization

An intriguing property of VP-chains is that under passivization, *all* verbs of the sequence have to passivize. Since passivization does generally not apply to intransitives, 'chain passivization' becomes impossible when one of the verbs in the sequence is intransitive; hence, e.g., (8) cannot be passivized. (11) illustrates a grammatical passivization:

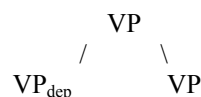
- (11) maachha-Ti bhaj-aa jaa-i khi-aa-ga-laa
 fish-the fry-PRTP go-Dm eat-PRTP-go-PAST.3rd
 ‘Having been fried, the fish was eaten

Notice that the passive is expressed by adding the ‘light-verb’ *jibaa* ‘to go’. When associated with the finite verb, *jibaa* is realized as a suffix that is followed by the number/person inflection, while when associated with the dependent verb forms, it is perceived (and written) as an independent word suffixed by the dependent marker, a difference that we will ignore in the following.

3. The Analysis

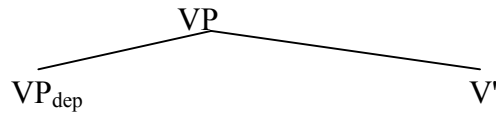
3.1. The ADJUNCT status of the dependent VP

As indicated in figure 3, the series of VPs is conceived as a binary left-branching structure, with the dependent VP in each case adjoined to the matrix V', giving the constellation in figure 5 as the recursive minimal tree configuration in c-structure:⁶



is to forestall structures where VP_{deps} originate under the rightmost VP - we assume strict left-recursive-ness of the VP-chain construction.

Figure 5.



Through annotation as indicated in the phrase structure rule in (12), the functional status of VP_{dep} is that of a *chain-adjunct* relative to the head V' (for convenience, we here and throughout write only ADJUNCT as the f-structure attribute label, since no other types of adjuncts will be discussed):

$$(12) \quad VP \quad \rightarrow \quad \begin{array}{c} VP_{dep} \\ \uparrow ADJUNCT = \downarrow \end{array} \quad \begin{array}{c} V' \\ \uparrow = \downarrow \end{array}$$

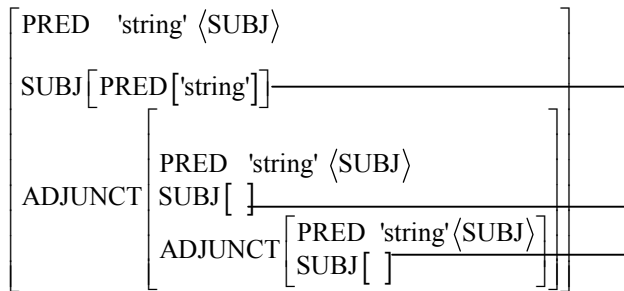
Chain-adjuncts are headed by dependent verbs. A dependent verb is one of the many lexically induced verb forms of Oriya (for a discussion of Oriya verb morphology, see Sahoo 2001). A skeletal lexical entry for dependent verbs is given in figure 6:

Figure 6.

Phrase Structure:	$VP_{dep} \rightarrow$...	V_{dep}
Lexicon:	'string':	V	($\uparrow PRED$) = 'string'
	- i :		($\uparrow V-FORM$) = dep

Through recursion of (12), the embeddings of chain-adjuncts inside of other chain-adjuncts is obtained. The c-structure induced by (12) corresponds to the schematic f-structure (showing one recursion) illustrated in figure 7:

Figure 7.



3.2. Subject sharing

Expanding phrase structure rule (12), we now can induce subject sharing as follows:

$$(13) \quad VP \quad \rightarrow \quad \begin{array}{c} VP \\ \uparrow SUBJECT = \downarrow SUBJECT \\ \dots \end{array} \quad \begin{array}{c} V' \\ \uparrow = \downarrow \end{array}$$

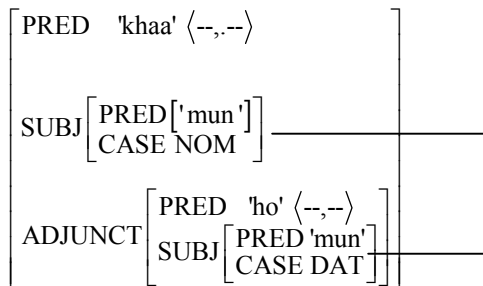
The control equation in (13) establishes identity of the subject of the matrix clause and the subject of the chain-adjunct, that is to say that just *one* syntactic item serves as the carrier of the argument realization of the 'subject-prone' argument of both verbs (and thus, by the recursion of (13), all verbs in the VP sequence). In the SVC literature, this is often referred to as 'token-sharing' (i.e., many verbs sharing one token item for a certain argument realization), as opposed to 'reference sharing', which is the situation where many syntactic items are co-referential.

In the LFG literature, 'token-sharing' corresponds to 'functional control'. An example is the case of English raising constructions, where the same item is an argument relative to both the matrix verb (e.g. 'seem' or 'believe') and the SUBJ of an XCOMP. Since the same f-structure function obtains relative to both matrix and embedded verb (i.e., SUBJ), morphological restrictions imposed by either of the verbs need to be observed by both. A crucial difference between English-type functional control and VP-chaining type functional control is that in the English case, functional control is induced lexically, being tied to the selection of a predicate complement or XCOMP by the matrix verb (see for further discussion Bresnan (2001)); under VP-chaining, in contrast, the verbs do not stand in a complementation relation, but instead form independent predication nuclei. We therefore have to introduce the control equation given in (13) as a constructional constraint.

Given structure-sharing of the subject function, the ungrammaticality of examples such as (6), repeated, follows from general constraints on unification, as indicated in figure 8:

- (6) * mote jara ho-i ousadha khaa-il-i.
 I fever happen medicine eat-PAST-1st,sg.
 'Having had fever I took medicine.'

Figure 8. *Partial f-structure for (6):*



3.3. Object sharing

Suppose one were considering a rule for object sharing that corresponds to the functional control pattern that we have discussed for subject sharing. We would then attempt to apply the pattern in (13) to object sharing, as indicated in (14):

- (14) VP → VP V'
 ↑OBJECT = ↓OBJECT ↑=↓

Such a rule, inducing token-sharing or functional control for objects, would *not* be adequate for VP-chaining, for the following reasons:

- a) As seen earlier, not all VPs in a VP-chaining need to have object(s) (cf. (8));
- b) as seen in (3) and (7), it is not required that transitive verbs in consecutive VPs share their object;
- c) as seen in (8), a sharing effect can 'skip' an intermediate intransitive verb;
- d) even when there is sharing of objects between two VPs, the argument-realization functions of the two verbs may realize the argument in question under distinct attributes, such as *direct* vs. *indirect* object, or object vs. object of preposition, as in (9).

It thus seems problematic to construe object sharing in these constructions as functional control and thus align it with subject sharing. Instead, we suggest construing object sharing as *reference sharing* or, following standard terminology, *anaphoric control*. Under anaphoric control, the 'covert' items are null-pronominals, of the type found in 'pro-drop' constructions, represented as PRED 'PRO' in figure 4. This construal is corroborated by two circumstances. The first is that the 'pro-drop' is pervasively attested in Oriya (Sahoo 2001) and related languages (e.g., Hindi (T.Mohanan 1994)). Secondly, pronominals may appear as part of the object sharing pattern, as illustrated in (15):

(15)
 mun maachha-Te_i bhaaj-i **taaku_i** baaDipaTaku ne-i (*taaku) khaai-li
 I fish-a fry-dM. it-ACC backyard take-dM it-ACC eat-Past 1st,sg

Such occurrences of overt pronominals are restricted in various ways. (15) shows that an overt pronominal may appear only *once* relative to the sharing of an object referent. Even so, the open pronoun in (15) it is clearly disfavored (Sahoo p.c.). Moreover, other types of occurrences of open bound pronouns are restricted to where they resolve possible ambiguity, such as in (16) below:

(16)
 mun mak-ku_i saaDi-Taa dekhaa-i kaani silei kar-i (taaku_i) de-li
 I mother sari-the show-dM, seam stitch do-dM her give-Past 1st,sg
 'Having shown my mother the sari, I stiched its seam and gave it to somebody else (her).'

In (16), a non-overt second reference to 'mother' may obtain, but cannot be controlled by the indirect object in the first VP-adjunct, due to the intervention of a transitive chain-adjunct. To enforce co-reference with the remote indirect object, an open pronoun has to appear. Such cases of pronominal disambiguation underline the pronominal nature of the object sharing phenomenon in VP-chaining.⁷

Notice that (16) seems to violate the constraints on object sharing across transitive verbs illustrated in (10). The direct object relative to *de* ('give') is understood as 'sari', although the complex verb *silei ka-i* ('stitch') takes *kaani* ('seam') as its direct object. Crucially, (16) doesn't mean that the speaker gave the seam. What enables 'sari' here to be the shared object is that it is the understood possessor of the intervening potential antecedent 'seam'; that is, (16) is only grammatical under the interpretation where it is the seam of the shown sari that has been stitched. Thus, 'sari' here can serve as shared object across a VP containing a second possible shared object, because it is understood in a whole-part/possessor-possessee relationship to this

⁷ A question naturally arising at this point is then, given the presence of null-anaphora as something which needs to be addressed by the grammar of Oriya anyway, whether anything more specific needs to be added to that account with regard to VP-chaining. Constraints like those mentioned in connection with (15) might suggest that it does, but discussing this goes far beyond the scope of this paper.

intervening object and thus ‘kept on stack’ as the antecedent for the non-overt pronominal object of the verb *de*.

In sum, the occurrence of *taaku* in (16) indicates that although open pronouns are disfavored, they appear in VP-chains for disambiguation purposes to exclude arbitrary anaphoric control. Secondly, shared objects can survive intervening possible antecedents if referentially kept available. Both of these observations consolidate the general point namely that object sharing is a matter of null-pronominal anaphora, as indicated in figure 4.

It is beyond the scope of this paper to fully spell-out the mechanism of anaphoric object sharing in VP-chains. As a typological conjecture, however, it may be suggested that a possible characteristic of VP-chaining, as opposed to 'Integrated SVCs', is that object sharing in VP-chaining is a matter of anaphoric control, and not token sharing, whereas for Integrated SVCs, object sharing may be construed as structure sharing (alias functional control, or ‘token-sharing’).⁸

4. Uniformity of diathesis marking

We finally turn to passivization under VP-chaining. Recall that all verbs in the VP-chain need to passivize, and that intransitive verbs do not passivize; hence, passivization cannot apply across intransitive verbs. This makes the passive of (8) ungrammatical. Passivization marginally applies to shared objects that fulfill different object functions relative to the individual verbs. The passivization of (7), shown below as (17), therefore seems only marginally acceptable:

- (17) ?? *pilaaTi-ku* lugaa di-aa-jaa-i hotell-ku ni-aa-jaa-i
 child-DAT cloth give-PRTP go-dM hotel take-PRTP-go-dM
 piThaa khu-aa- ga-l-aa
 pita feed-PRTP-go-PAST-3sg
 ‘The child having gotten cloth, been taken to a hotel, was fed pita.’

Notice that in (17), the passivized NP *pilaa* ('child') is marked for objective case by the morpheme *-ku*. Constructions with an objective case marked subject seem to correspond to the passivization of secondary objects.⁹ For (17) this means that *pilaa*, although the direct object relative to the verb *ni* ('take'), is passivized as secondary object, a function that it holds only relative to the first and the last verb of the VP-chain.

Here we will concentrate on the basic passivization pattern, illustrated in (18) and (19) below:

- (18) 'active'
 mun maachha-Te bhaaj-i khaa-il-i
 I fish-a fry-dM eat- PAST 1st sg
 ‘Having fried the fish, I ate it.’

- (19) 'passive'
 maachha-Ti bhaj-aa jaa-i khi-aa-ga-laa
 fish-the fry-PRTP-go-dM eat-PRTP-go-PAST.3rd
 ‘Having been fried, the fish was eaten.’

⁸ See, e.g., Agyeman (2002).

⁹ These are, according to Sahoo (p.c.), traditionally referred to as 'periphrastic passives'.

In order to illustrate the constraints that will allow us to state the properties of VP-chain-passivization, we adopt now a somewhat more elaborated correspondence architecture than employed so far. Following Butt et al., we will use the following notation:

Argument structure of mother node: $\hat{*}\alpha$
 Argument structure of current node: $*\alpha$

Functional structure of mother node: $\hat{*}\alpha\lambda$
 Functional structure of current node: $*\alpha\lambda$

The ϕ -function which defines the relationship between c-structure nodes and f-structures is in Butt et al defined as the composition of the α - and λ -function. Since we do not want to take a stand as to whether all information in c-structure relevant for the construction of f-structure is actually preserved across a-structure, we leave open the possibility that an independent function mediates between c- and f-structure. Its result will have to unify with the output of the α - and λ -function; we call it (likewise) ϕ , and represent it using the standard arrow notation.

We accommodate (18) through a set of annotated phrase structure rules. (In accordance with what was just said, we use the standard up/down arrows for the c-structure-to-f-structure correspondence function.)

Figure 9. Annotated phrase structure rules and lexicon accommodating (18)

PS (1)	$S \rightarrow$	NP $\uparrow \text{SUBJ} = \downarrow$	VP $\uparrow = \downarrow$
PS (2)	$VP \rightarrow$	VP_{dep} $\uparrow \text{SUBJ} = \downarrow \text{SUBJ}$ $\lambda(\hat{*}\alpha \hat{\theta}) = \text{SUBJ} \wedge \lambda(*\alpha \hat{\theta}) = \text{SUBJ} \quad \vee$ $\lambda(\hat{*}\alpha \hat{\theta}) = \text{NULL} \wedge \lambda(*\alpha \hat{\theta}) = \text{NULL}$	V' $\uparrow = \downarrow$
PS (3)	$V' \rightarrow$	V $\uparrow = \downarrow$	

Lexicon

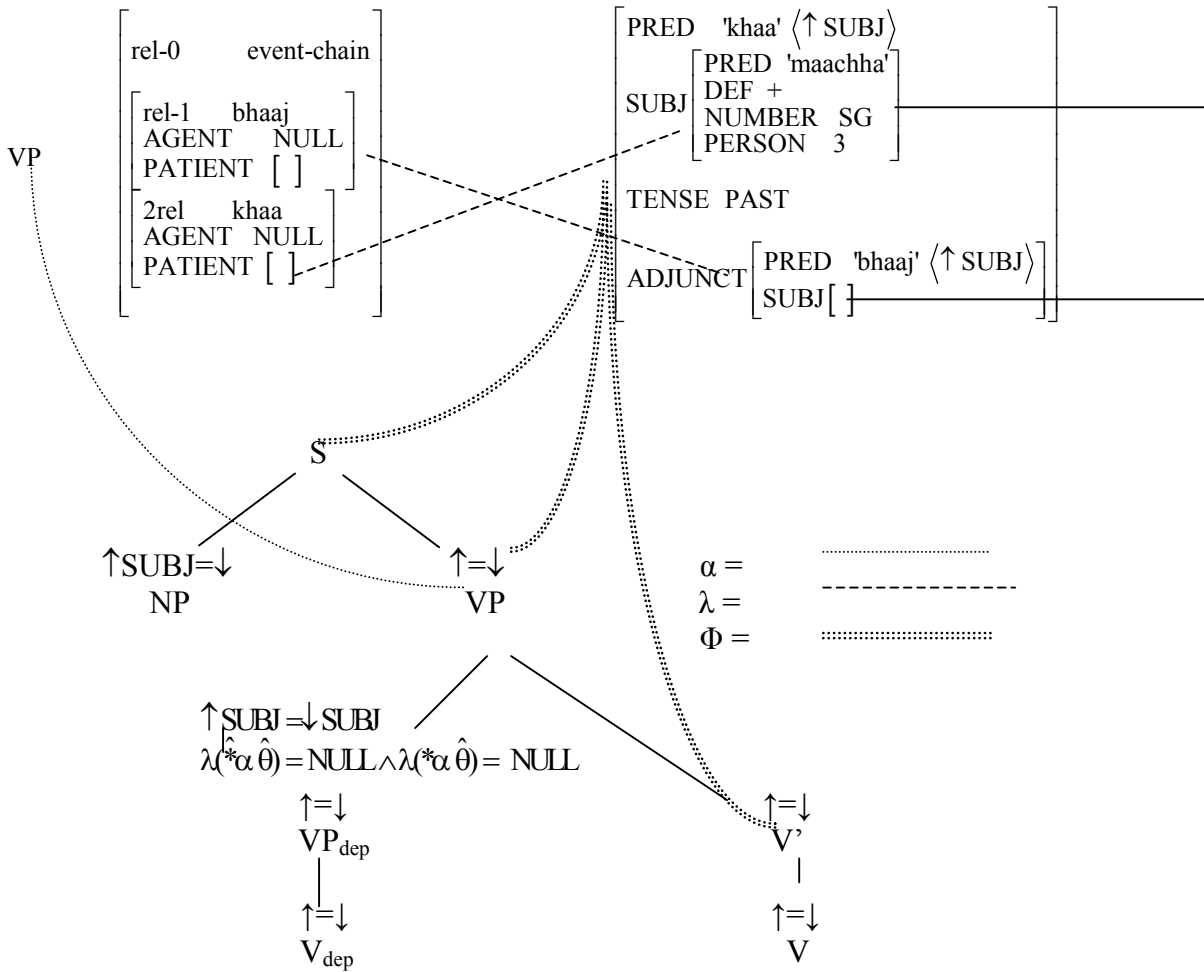
L(1): khi-aa-ga-laa: V	(↑ PRED) = 'khaa ' (↑ TENSE) = PAST (↑ SUBJ PERSON) = 3 (↑ SUBJ NUMBER) = SG * α [$\hat{\theta}$]) = NULL λ (* α [-r]) = SUBJ
L(2): bhaj-aa jaa-i: V	(↑ PRED) = 'bhaaj ' (* α [$\hat{\theta}$]) = NULL λ (* α [-r]) = SUBJ (↑ V-FORM) = dep
L(3): maachha-Ti	(↑ PRED) = 'maachha ' (↑ DEF) = +

Crucial is here the rule PS(2), which demands, for each generation of a chain-VP, that this VP have the same diathesis value as the mother VP. Diathesis value is represented as follows: in active voice, the highest thematic role ($\hat{\theta}$) is realized as SUBJECT, in passive voice, it is realized as NULL (or 'oblique', an option we leave out here, for perspicuity). The rule PS(2) thus states that either both VPs have a SUBJECT realization of $\hat{\theta}$, or they both have a NULL realization of it. Such an equivalence between diathesis value and $\hat{\theta}$ -realization seems defensible in the case of Oriya, and possibly universally.

Phrase Structure Rules (1)-(3) and lexical entries (1)-(3) in figure 9, along with a tacit assumption to the effect that a [-r] PATIENT is realized as SUBJ in passive, generate the overall correspondence architecture shown in figure 10:

Figure 10. Correspondence architecture for example (18):

maachha-Ti bhaj-aa jaa-i khi-aa-ga-laa
 fish-the fry-PRTP-go-dM eat-PRTP-go-PAST.3rd
 'Having been fried, the fish was eaten'



Notice that we do not exclude asymmetrical passivization, as exemplified in (17). While the suppression of the highest thematic role is enforced constructionally, we have left the mapping to subject of a passive verb open.

Another specification left out in the above is one representing the temporal order between the events/situations described by the VPs. What is needed is the construction of a set of precedence specifications for *pairs of VPs/situations*, schematically as follows (again, as specifications *added* to those stated so far for the constellation in question):

$$\begin{array}{lcl}
(20) & VP & \rightarrow & VP & & V' \\
& & & * \alpha \text{ SIT-INDEX} = n & & \hat{*} \alpha \text{ SIT-INDEX} = m \\
& & & & & \widehat{\alpha} \text{ SIT-INDEX} = * \alpha \text{ SIT-INDEX} \\
& & & & & \hat{*} \alpha \text{ PRECEDENCE-SET } \{ \dots, n < m \} \\
& & & \dots\dots\dots & & \dots\dots\dots
\end{array}$$

That is, going up the tree from left, at each syntactic 'chain-juncture' point, the event/situation expressed by the left daughter VP is entered as temporally preceding ('<') the event expressed by the matrix V', this specification being added to a set accumulated as one goes from one matrix verb to a next matrix verb up.

While details of the latter representation will need to be further developed, it instantiates a common feature of the analyses of the various phenomena treated (apart from object sharing), namely that they 'drive' all aspects of VP-chaining from annotations of the c-structure rule inducing VP-embedding (here distributed over (12), (13), PS(2) in figure 9, and (20)), in tandem with lexical specifications as induced by these annotations.

5. Possible distinguishing properties of VP-chaining as opposed to Integrated SVCs

Although our focus has been exclusively on VP-chaining, and exclusively on how they are manifest in Oriya, it is not unreasonable at the end to offer some speculations as to how VP-chaining may stand apart from the heterogeneous family of construction types that we have tentatively labelled 'Integrated SVCs' (ISVCs). Among the properties of VP-chaining now described, at least three of them may seem good candidates for serving as factors distinguishing VP-chaining from ISVCs, not only in Oriya, but perhaps cross-linguistically:

- (i) VP-chains have recursive embeddings of adjuncts in f-structure, whereas in accordance with the view exemplified in figure 2, ISVCs presumably have a flat f-structure.
- (ii) While both types display subject sharing as token sharing, object sharing in VP-chains is a matter of anaphoric control, whereas in ISVCs, it may well be a matter of functional control, possibly induced by a schema like (14).
- (iii) Semantically, the VPs in VP-chaining express distinct situations, ordered by temporal precedence (or status as 'prior given'). Although the semantics of ISVCs is not uniform, often it may be possible to see the verbs as situationally interleaving, describing the same situation but with each verb specifying a distinct aspect of it. (In this respect, a PRED value representation like 'zo-gaa-wuo' in figure (4) may perhaps be interpreted as an *event-type unification* of the event types expressed by 'zo', 'gaa' and 'wuo' - cf. Butt (1997) for a proposal in this direction.)

In addition to the features of VP-chaining constructions just mentioned, the 'passivize-all-or-no-verbs' phenomenon addressed in section 4 has been seen as lending itself to an architecture of an LFG grammar where c-structure projects to a-structure and a-structure to f-structure, in accordance with a proposal by Butt et. al. (1997). How this phenomenon, and our proposed way of dealing with it, places itself in a typological perspective, is not a matter we can comment further on here.

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