Analyzing Bangla Serial Verb Constructions at Syntax-Semantics Interface

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1 Introduction

Multi-verb constructions in which verbs are grouped together in a sequence, are productive phenomena in most South Asian languages. Bangla (Bengali; Indo-Aryan) is a diverse and rich language that tends to employ verbs in multiple succession to create certain expressions. Such multi-verb constructions can be differentiated into two types- Complex Predicates, where the second or last verb is semantically bleached, and Serial Verb Constructions (can be abbreviated as SVCs), where each of the verbs has their original semantic interpretation intact. In this paper, we will discuss the latter construction where each of the subsequent verbs denotes a full event. The verbs that are denoting these single events in the SVCs, are again termed as Serial Verbs.

Serial Verb Construction as defined by Collins (1997:462) is '…a succession of verbs and their complements (if any) with one subject and one tense value that is not separated by any overt marker of coordination or subordination.' Owing to this definition of Collins, here is an example of Bangla SVC:

(1) *rina pizza* ***khe-ye*** ***ber-iech-ilo.***
Rina.NOM pizza eat-PERF go out-PERF-PST.3p
'After eating the pizza, Rina had gone out.'

As the example suggests, each of the verbs i.e. '*kheye*' (eat) and '*beriechilo*' (go out), in the Serial Verb Construction of Bangla, denotes an independent and full event. Karmakar (2010) has stated SVCs in Bangla are disituational (situations being synonymous to events) construals by drawing inferences from such constructions where each situation denotes an independently ordered event. The entailment pattern of an SVC can account for the independent nature of the events denoted by each verb in the successive sequence. So, the sentence in (1) entails-

- Rina had eaten the pizza (first event denoted by the verb '*kheye*').
- Rina had gone out (second event denoted by the verb '*beriechilo*').

As stated in Basu & Wilbur (2010), in an SVC in Bangla, the individual events may or may not have intervening noun phrases between them, but they essentially share the same subject. They also have their tense and agreement marked only on the final verb. Basu & Wilbur (2010) have also shown that the final verb in an SVC can be a complex predicate. We propose that the non-finite verbs (which essentially appear before the final finite verb) in the SVCs, can also be a complex predicate.

(2) *rina* ***ranna kor-e*** *ghum-alo.* (V_1: N+V (CP))
Rina.NOM cook do-PERF sleep-PST.3p
'Rina slept after cooking.'

(3) *rina bajar* ***ser-e*** ***niy-e*** *phir-lo.* (V_1: V+V (CP))
Rina.NOM shopping complete-PERF take-PERF return-PST.3p
'Rina returned after completing the shopping.'

In the second and third examples, we see that the non-final non-finite verbal pairs are, in fact, complex predicates. The verbal pair '*ranna kore*' is a noun-verb complex predicate where '*kore*' is a light verb (semantically bleached) and the verbal pair '*sere niye*' is a verb-verb complex predicate where '*niye*' is a light verb (also, semantically bleached).

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There have been many other terminologies to represent such multi-verb constructions universally. Bangla (among other South Asian languages) Serial Verb Constructions have been previously assumed under the term 'conjunctive participle' due to the conjoined semantics of the verbs and the non-finite nature of the non-final verbs. But here, we try to look at such constructions in light of cross-linguistic evidence and compare it to the SVCs available from a typological point of view. We follow the footsteps taken by Jayaseelan (2004) in general while representing the syntax of such constructions in Bangla and give a semantic analysis accounting for the conjunction-like nature of the verbal sequences where each of the verbs denotes a single, independent event.

This paper aims to give analyses of these SVCs in Bangla, both syntactically and semantically. Section 2 of this paper shows the empirical data taken from the language, sections 3 and 4 discuss the syntax of the Serial Verb Constructions, and sections 5 and 6 discuss the semantics of these constructions. Section 7 talks about the restrictions seen in the formation of SVCs in Bangla. And the last section concludes the paper.

2 Empirical ground

Bangla SVCs can be of many different types based on their transitivity. Below is a table for the different types of verbs and their combinations with each other according to their transitivity in a Serial Verb Construction.

V_1 / V_2	Intransitive	Transitive	Ditransitive
Intransitive	✓	✓	✓
Transitive	✓	✓	✓
Ditransitive	✓	✓	✓

Table 1: Combinations of different types of Serial Verbs in Bangla

This table is similar to the Malayalam verbal valency combinations discussed in Jayaseelan (2004). Now, some of the examples of SVCs (with respect to transitivity) in Bangla are:

(4) *rina* ***hnet-e*** ***phir-lo***. (V_1-intrans, V_2-intrans)
Rina.NOM walk-PERF return-PST.3p
'Rina returned by walking.'

(5) *arani* *chor-ta-ke* ***dour-e*** ***dhor–ech-ilo.*** (V_1-intrans, V_2-trans)
Arani.NOM thief-CL-ACC run-PERF catch-PERF-PST.3p
'Arani caught the thief by running.'

(6) *rina* *pizza* ***khe-ye*** ***ber-iech-ilo.*** (V_1-trans, V_2-intrans)
Rina.NOM pizza eat-PERF go out-PERF-PST.3p
'After eating the pizza, Rina had gone out.'

(7) *rina* *khabar-ta* ***kin-e*** ***kha-be***. (V_1-trans, V_2-trans)
Rina.NOM food-CL buy-PERF eat-FUT.3p
'After buying the food, Rina will eat it.'

(8) *ami* *arani-ke* *golap* ***kin-e*** ***di-lam***. (V_1-trans, V_2-ditrans)
I.NOM arani-DAT rose buy-PERF give-PST.3p
'I gave a rose to Arani after buying it.'

(9) *rina* *amake* *khabar-ta* ***di-ye*** ***khe-lo***. (V_1-ditrans, V_2-trans)
Rina.NOM I.ACC food-CL give-PERF eat-PST.3p
'After giving me (some of) the food, Rina ate it.'

(10) *rina* *arani-ke* *khabar-ta* ***dour-e*** ***di-lo***. (V_1-intrans, V_2-ditrans)
Rina.NOM Arani-DAT food-CL run-PERF give-PST.3p
'Running, Rina gave the food to Arani.'

(11) *amra* *arani-ke* *boi-ta* ***di-ye*** ***phir-chhi***. (V_1-ditrans, V_2-intrans)
We.NOM arani-DAT book-CL give-PERF return-PROG.PRES.3p
'We returned after giving the book to Arani.'

(12) *arani rina –ke chithi **likh-e** **path-alo**.* (V_1-ditrans, V_2-ditrans)
Arani.NOM Rina-DAT letter write-PERF send-PST.3p
'Arani sent the letter to Rina after writing it.'

The above table and dataset are restricted to only two consecutive verbal sequences. But the serial verbs in the SVCs of Bangla can be of n numbers (as long as the speaker can construct it), as there can be more than two verbs in a serial verb construction where each of the verbs denotes a single event. Example as followed:

(13) *arani mach **dhor-e** **dhu-ye** **ket-e** **redh-e** **kha-be.***
Arani.NOM fish catch-PERF wash-PERF cut-PERF cook-PERF eat-FUT.3p
'Arani will eat the fish after catching, washing, cutting, and cooking it.'

Here, the verbs '*dhore*', '*dhuye*', '*kete*', '*redhe*' are the non-final non-finite verbs where each of them represents an independent event such as catching, washing, cutting, cooking respectively, and the final verb '*khabe*' is finite and represents the event of eating which carries the tense, and agreement marker with it.

In the next section, we delve deeper into the syntactic structures of the Serial Verb Constructions.

3 The syntax of SVCs

There have been quite a few numbers of proposed syntactic structures to account for the SVCs cross-linguistically. Baker (1989) has given an analysis favoring the 'internal argument sharing' phenomenon which gives a ternary branching syntactic tree. Collins (1997) gives an analysis of SVCs that involves an empty category 'pro' which is governed by the object of the first verb. This analysis of Collins does not violate the one-to-one relation between the θ-role and their respective arguments. For Bangla SVCs, Basu & Wilbur (2010) have also presented an analysis with respect to an event-based syntactic framework. But it neither gives an explanation for the sentences where the verbs in the SVC have the same number of arguments (see examples (4), (7), and (12) above), nor does it provide a structure explaining such instances where there are more than two events in the SVC.

So, we adopt the syntactic framework provided by Jayaseelan (2004) that licenses a 'serial verb clause' in an SVC in Malayalam which is an adjunct, non-finite, PRO controlled, and is similar to the English absolutive constructions. Also, the serial verb construction in Malayalam has a pro in the direct object position of the final finite VP (when the verbs have seemingly the same direct object), and the indirect object is in the spec of the final finite VP (when the verbs have seemingly the same dative argument).

In the next subsection, we give some of the explanations behind adopting the same framework for Bangla as that of Jayaseelan (2004) has for Malayalam.

3.1 *Adjunct nature of the SV clause* It is a well-known fact that adjuncts are strong islands that do not allow extraction out of them due to the *Adjunct Condition* (Cattell, 1976; Huang, 1982; among others). The adjunct status of the non-finite 'serial verb clause' in Bangla can be attested by the restricted extraction of the wh-words from the adjunct island. In Bangla, if we try to extract or move the wh- particle '*ki*' from the non-finite 'serial verb clause', it results in ungrammaticality:

(14) *rina [ki **khe-ye]** **ber-iech-ilo**?*
Rina.NOM what eat -PERF go out-PERF-PST.3p
Lit: 'What did Rina eat before she had gone out?'

(15) ***ki**$_i$* *Rina **[t**$_i$ **khe-ye]** **ber-iech-ilo**?*
what Rina.NOM eat-PERF go out-PERF-PST.3p
Intended: 'What did Rina eat before she had gone out?'

So, it is evident from the ungrammatical sentence in (15), that the SV clause or Serial Verb clause is an adjunct.

3.2 *Non-finiteness of the SV clause* We have seen in the previous section how the proposed serial verb clause is an adjunct. Now we will see that it is a clause that is non-finite in nature. It is only with the non-finite verbs (which are embedded in the SV clause) in Bangla, we can have pre-verbal negation (Simpson & Syed 2014).

(16) *rina [pizza **na** khe-ye] ber-olo.*

Rina.NOM pizza neg eat-PERF go out-PST.3p
'Rina went out without eating pizza.'

The finite verbs (embedded in the finite matrix clauses), on the other hand, have post-verbal negation.

(17) *rina beroye* ***ni****.*
Rina.NOM go out.3p PERF.PST.NEG
'Rina didn't go out.'

When both of the sentences are combined with a pre-verbal and post-verbal negation to a non-finite and finite verb respectively, we get (18) which is actually an affirmative sentence.

(18) *rina [pizza* ***na*** *khe-ye] beroye* ***ni****.*
Rina pizza neg eat-PERF go out.3p PERF.PST.NEG
Lit:'Rina didn't go out not eating the pizza.'/ 'Rina went out eating the pizza.'

The sentences in (16) and then in (18), clearly show that the SV clause is non-finite as the embedded verb has a pre-verbal negation attached to it.

3.3 *PRO control in the SV clause* The serial verb clause must have a subject to satisfy the EPP rule. As we have seen in the previous examples (see section 2), SVCs in all of the cases, have at least one of their arguments shared- mainly the subjects. So, how can we account for this subject sharing phenomenon in Bangla SVCs? Jayaseelan (2004) for his Malayalam SVCs, has assumed that the non-finite SV clauses have PRO which is controlled by the matrix subject.

(19) *ñaan*$_i$ oru maanga$_j$ [PRO$_{i,*j}$ wiiNu] peRukk-i
I one mango fall pick-up-PST
'Falling, I picked up the mango.' [Jayaseelan 2004]

We propose that Bangla non-finite SV clauses are similarly PRO controlled by the matrix subjects.

(20) *arani [bhat* ***khe-ye]*** ***bos-lo.***
Arani.NOM rice eat-PERF sit-PST.3p
'After eating the rice, Arani sat down.'

(21) ****arani***$_i$ *[****se***$_i$ *bhat* ***khe-ye]*** ***bos-lo.***
Arani.NOM he rice eat-PERF sit-PST.3p
Int: 'After eating the rice, Arani sat down.'

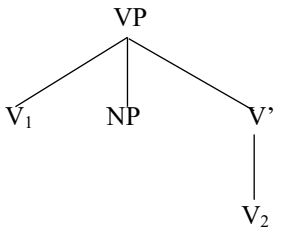
(22) *arani*$_i$ *[*PRO$_i$ *bhat* ***khe-ye]*** ***bos-lo.***
Arani.NOM rice eat-PERF sit-PST.3p
'After eating the rice, Arani sat down.'

In example (20), we can see that the SV clause does not have a subject. If what we have is indeed a non-finite adjunct clause (as we have proved in the previous sections), then it can either have a null pro or be PRO controlled by the matrix subject. In example (21), as we can see, the empty subject position in the SV clause cannot have a pronominal as it cannot be substituted with an overt pronoun. Doing so makes the utterance sound odd and hence is ungrammatical. Only PRO control by the matrix subject can occur as a controlled PRO cannot be substituted with an overt pronoun. Example (22) is the proposed assumption that we make for such sentences following Jayaseelan (2004), by introducing a PRO which is controlled by the subject of the matrix clause.

3.4 *On the internal argument sharing phenomenon* Among the many assumptions made for the argument sharing phenomenon for the SVCs of various languages, some have been accepted widely and some have been criticized for their proposed structures. One of the most important proposed structures made earlier in the literature has been proposed by Baker. This assumes that in an SVC, the verbs which have the same transitivity, are argued to have their internal arguments shared (Baker 1989). The argument that is shared will be generated in the

complement position of the V_1 while the unshared one will be in the complement position of the verb which assigns its theta role. Here is the structure of it (according to Baker, 1989):

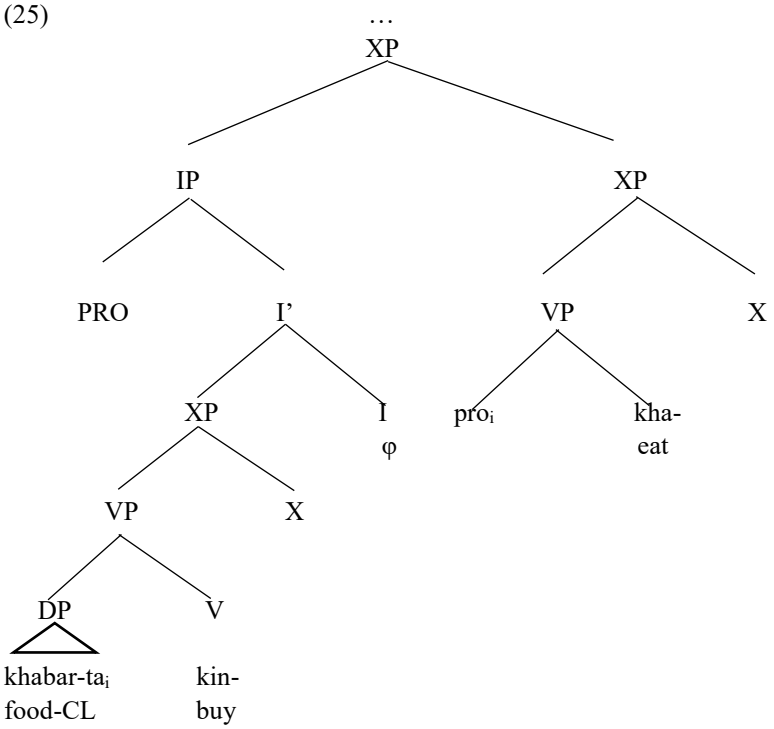
(23)



We do not adopt this view for Bangla SVCs. Following Jayaseelan (2004), we also argue for a pro (pronominal, not a variable) in the direct object position of the finite transitive VP and in the dative argument position of the non-finite ditransitive VP. This satisfies the unique or one-to-one theta role assignment criteria of each of the verbs in the SVC and gives an alternative to the argument sharing analysis of Baker. Here is the proposed syntactic structure (25) (following Jayaseelan), where both of the verbs seemingly have the same arguments as we can see in example (24):

(24) *rina khabar-ta* ***kin-e*** ***kha-be***. (V_1-trans, V_2-trans)
Rina.NOM food-CL buy-PERF eat-FUT.3p
'After buying the food, Rina will eat it.'

(25)



This syntactic tree is a little different than Jayaseelan's (2004). The XP is a maximal projection of a specific category which we will discuss later in section 4. We will only focus on the introduction of pro (which is co-indexed with the direct object of the non-finite VP) in the complement position of the finite VP. In the example, the direct object '*khabar-ta*' seems to be the shared argument of both the verb '*kine*' ('buy') and '*khabe*' ('eat'). But as the proposed syntactic tree suggests, the nominal phrase '*khabar-ta*' which is in the complement position of the non-finite verb '*kine*', is co-indexed with the pro that is in the complement position of the finite verb '*khabe*'.

This claim can be supported as Bangla, like most other South Asian languages, is a pro-drop language (Butt 2001) and can license null pronominal arguments in any position. The presence of 'pro' in the finite matrix clause can be further strengthened by the *spelling out* of the pro with a pronominal.

(26) *rina khabar-ta **kin-e** **kha-be**.* (V_1-trans, V_2-trans)
Rina.NOM food-CL buy-PERF eat-FUT.3p
'After buying the food, Rina will eat it.'

(27) *rina khabar$_i$* ***kin-e*** *seta$_i$* ***kha-be***.
Rina.NOM food buy-PERF it eat-FUT.3p
'Rina will buy the food and eat it.'

(28) **rina seta$_i$* ***kin-e*** *khabar$_i$* ***kha-be***.
Rina.NOM it buy-PERF food eat-FUT.3p
'Rina will buy it and eat the food.'

In *the* last example (28), we can see that the non-finite V_1 cannot take a pronoun that is co-indexed with the direct object of the V_2, but the V_2 can as seen in example (27). This gives an alternative to the argument sharing analysis of Baker. So, when the verbs in the SVC seem to share their internal arguments, we argue, following Jayaseelan, that it is not a case of argument sharing. Rather, there is a null pro in the seemingly shared internal argument position of the finite VP in a sentence like that in (26). Also, this pro is in the complement position of the finite VP, as spelling out of the pro in that position seems grammatical (see example (27)) and seems ungrammatical (see example (28)) in the direct object (or complement) position of the non-finite VP.

In the next section, we will now give a name for the XP that is in (25) and draw a complete syntactic tree for a Serial Verb Construction in Bangla.

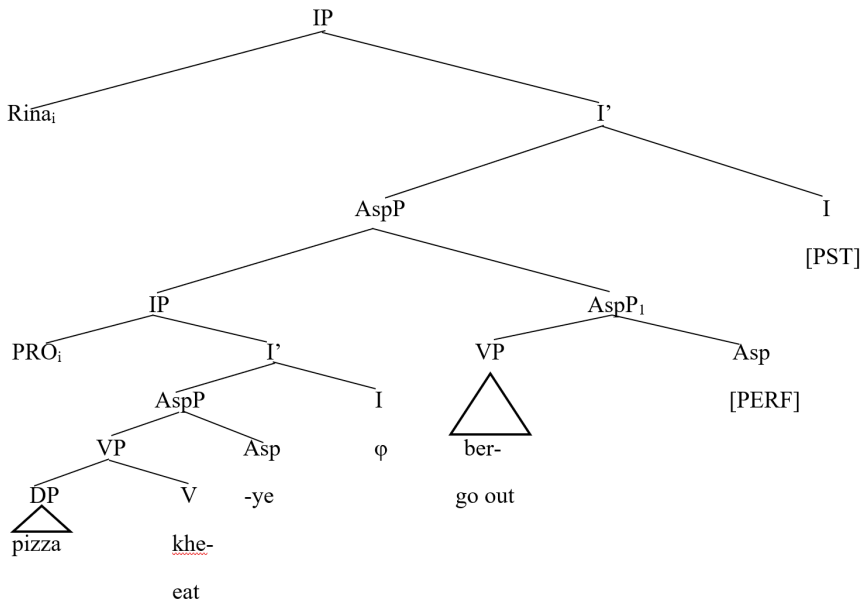
4 Syntactic analysis

We have hinted at a syntactic structure for the Bangla SVCs in the previous section. To present a syntactic analysis for the Bangla SVCs, I modify the framework given by Jayaseelan (2004) to fit our language by-

- introducing an aspect phrase to account for the occurrence of the events encoded in the non-finite verbs which have a '*–ye/-e*' morphology (see any of the examples from (4)-(13)). This aspect phrase denotes the unknown XP introduced in the previous section 3.4.
- left adjoining the non-finite IP clause to the AspP, not to the VP (as suggested for Malayalam by Jayaseelan, 2004).

Here, we give the syntactic tree for an SVC in Bangla:

(29) *rina pizza* ***khe-ye*** ***ber-iech-ilo.***
Rina.NOM pizza eat-PERF go out-PERF-PST.3p
'After eating the pizza, Rina had gone out.'



In the above tree structure, we have left adjoined the non-finite IP to the AspP. The embedded IP is tenseless as an SV clause is non-finite. The matrix IP on the other hand is marked with tense, which is *past* here. The non-finite verb has the '*-ye*' marker which encodes perfective aspect. The 'serial verb clause' in Bangla (as shown in this syntactic structure) has the non-finite V_1 *'khe-ye'* which is transitive and takes a direct object '*pizza*' which is in the complement position of that verb. The intransitive V_2 of the finite clause or the matrix clause quite naturally takes no object. Following Jayaseelan's analysis for Malayalam SVCs, we had also proposed that the non-finite clause is, in fact, PRO controlled by the subject of the matrix clause. The subject *'Rina'* is generated under the VP of the matrix clause which is then moved to the Spec, IP to satisfy the EPP rule for the matrix IP. This syntactic analysis can be extended to any other types of serial verb constructions in Bangla with any type of combinatorial verbs (with respect to their transitivity).

Now that we have our syntactic structure at hand, we move towards the proposed semantics of it in the next section.

5 Semantics of SVCs

Before we give an elaborate description of how to construct the semantics of the SVCs of Bangla, let's discuss some of the important topics related to the formation of the semantics of such constructions.

5.1 *Tense and Aspect* It has been discussed in various pieces of literature concerning tense and aspect of a sentence, tense relates reference time to speech time, whereas aspect relates event time to reference time. Here, we give an outline of this:

Speech time (S): The time of the utterance.
Reference time (R): The time to which the utterance refers.
Event time (E): The time at which the event occurs.

Time here is regarded as a stretch of temporal intervals. Reichenbach (1947) first elaborated on the abstract concept of reference time while discussing the perfect constructions in English. There are two types of aspects:

- Lexical aspect, which is concerned with the inherent temporal properties of the verbs.
- Viewpoint aspect, which is concerned with how we view a certain event or eventuality grammatically.

For our purpose, let's focus on the viewpoint aspect in general. Klein (1994) claims that the viewpoint aspect specifies a link between event time and reference time. Viewpoint aspects can further be divided into two types:

- Perfective (looking at the event from the outside) and,
- Imperfective (looking at the event from the inside) [Comrie, 1976; Smith, 1997]

These two types of viewpoint aspects can be explained through the logical containment relation:

(31)

a. Perfective aspect

$E \subseteq R$

Fig: 1

Fig: 2

b. Imperfective aspect

$R \subseteq E$

Fig: 3

Here, figure 1 and figure 2 represent that in a perfective aspect, the event time must be included in the reference time, whereas figure 3 represents that in an imperfective aspect, event time must include reference time or the reference time must be included in the event time.

5.2 *Tense and aspect in Bangla SVCs* Now that we have an idea of what tense and aspect are, we propose that the *'-ye/-e'* morphology of the non-finite verb in the SV clause in Bangla (which we have proposed in the syntactic structure in section 4) encodes the perfective viewpoint aspect.

(32) *rina pizza* ***khe-ye*** ***ber-iech-ilo.***
Rina.NOM pizza eat-PERF go out-PERF-PST.3p
'Rina had gone out after eating pizza.'

It can be interpreted from the above example that only after the completion of the event of eating, Rina had gone out. It can never be the case that Rina had gone out but did not finish eating the pizza before going out. The entailment test (Bhatt & Pancheva, 2005) can support this further:

(33) Rina ate pizza before going out.
⊨ The pizza was finished.

From example (32), we see that the event of eating is included in the reference time which is the temporal interval from which we are 'viewing' or looking at the occurring event. Now, the finite verb which encoded the second event (event of going out) has the tense morphology marked on it. The reference time of the sequence of events in the SVCs of Bangla is always the same, i.e. the temporal interval to which the utterance refers must be the same. It is never the case that the last event of the SVC is in the past whereas the first or previous events are in the future or present. Another important thing that we must remember is, although the non-finite verbs in these Bangla SVCs are always marked with the perfective viewpoint aspect (denoted by the '*-ye/-e*' morphology), the finite verbs may have different viewpoint aspects marked on them (can be either perfective or imperfective, cf. example (4)-(13)).

Now let's move forward to build a step-by-step semantic composition in the next section, couched within the formalism of event semantics.

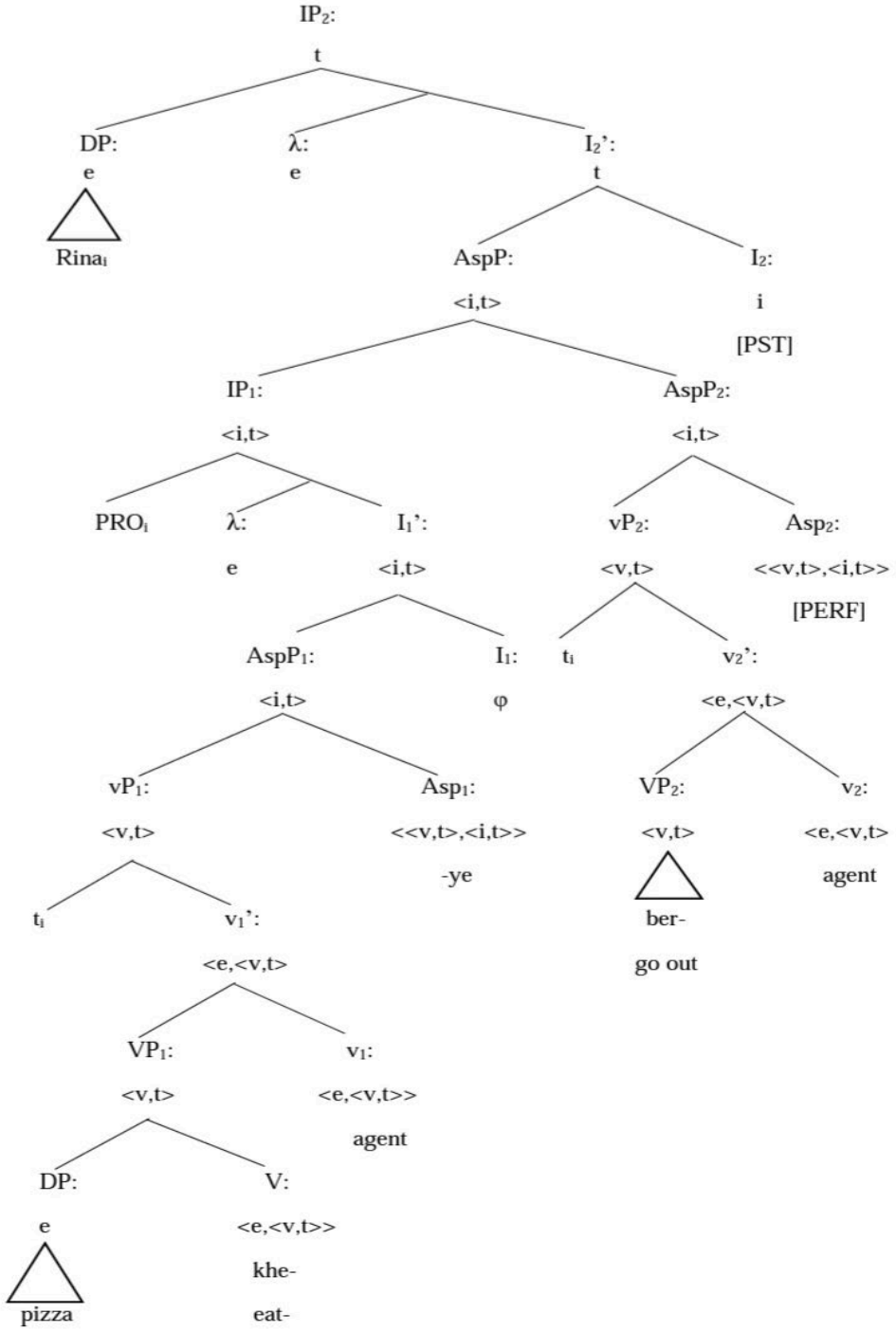
6 Towards a semantic composition

We adopt Kratzer's (1996) event semantics approach to account for the semantics of the Bangla verbs. Under this particular formalism, only the internal arguments are included in the verbal donations and the external arguments get introduced by a separate functional head. To account for these external arguments of the verbs, Kratzer has introduced a VoiceP (equivalent to vP) where the agent DP is in the spec of VoiceP. The Voice head gets combined with VP by *Event Identification* (Kratzer, 1996). On the other hand, the internal argument gets combined with the V itself by *Functional Application*.

The semantics for perfective viewpoint aspect (Bhatt & Pancheva, 2005) is: $\mathbf{\lambda P_{<v,t>}\lambda t_i.\exists e[\tau(e)\subseteq t \wedge P(e)]}$ where P is the *property of events* and τ is the *temporal trace function* which maps events to the running time of the event or the temporal interval corresponding to the existence of that event. Reference time is supposed to contain event time if every moment included in the reference time is also included in the event time. This perfective aspect is slotted at the Asp head of AspP which is then dominated by IP. The semantics for past is: **ιt[t < now]** (cf. Champollion & Coppock 2021) where past denotes the *definite temporal interval* that precedes the speech time ('now'). Again, this gets applied at the I head of the IP node. The syntactic type for 't' is i.

Following these conventions and semantic interpretations, we will now compute the semantic interpretation of an SVC in Bangla. Here is the LF composition for the sentence in (32):

(34)



In the above LF structure, it is shown that the non-finite SV clause has the first verb of the SVC which denotes the event of eating (e_1). Following Kratzer (1996), we combine vP_1+V_1 via *Event Identification* (vP is the substituted phrase of VoiceP). The non-finite vP has this semantic interpretation: $[[vP]]^g$ = **λe_1. Agent (e_1, g(t)) ∧ Eat (e_1, pi)** of type <v,t> where g(t) is the semantic interpretation of trace t and has the syntactic type e.

Now, as we have proposed earlier, '*-ye/-e*' has perfective semantics. So, the perfective semantics of '*–ye*' in the sentence will be: $[[Asp_1]]^g$ = **$\lambda P.\lambda t.\exists e_1$ [$\tau(e_1) \subseteq t \wedge P(e_1)$]** which has the syntactic type <<v,t>,<i,t>> and it is composed with the vP via *Functional Application*. Next, $[[AspP_1]]^g$ = **$\lambda t.\exists e_1$ [$\tau(e_1) \subseteq t \wedge$ Agent (e_1, g(t)) ∧ Eat (e_1, pi)]** which has the syntactic type <i,t>.

As we can see in the LF structure, the non-finite IP clause is tenseless (the I head in the tree has the value φ). So $[[IP_1]]^g$ = **$\lambda t.\exists e_1$ [$\tau(e_1) \subseteq t \wedge$ Agent (e_1, r) ∧ Eat (e_1, pi)]** which is of <i,t> syntactic type. As the SV clause is

PRO controlled by the subject of the matrix clause, g(t) which is the semantic interpretation for trace t, has been substituted by the value **r** (logical interpretation for the individual *Rina*) in the interpretation of the IP_1 node. There is also a **λ** binder for movement which binds the trace. This tenseless IP_1 then gets combined with the matrix $AspP_2$ via *Predicate Conjunction*. We arrive at $AspP_2$ by combining vP_2 and Asp_2 head via *Functional Application*. The vP_2 of the matrix clause is compositionally derived by the *Event Identification and Functional Application*, like that of the non-finite SV clause. Here also, $[[vP_2]]^g$ = **λe₂. Agent (e₂, g(t)) ∧ Go out (e₂)** of syntactic type <v,t>**.** The Asp_2 head also has the perfective semantics: **λP.λt.∃e₂ [τ(e₂)⊆t ∧ P(e₂)]** of syntactic type <<v,t>,<i.t>>. Now, $[[AspP_2]]^g$ = **λt.∃e₂ [τ(e₂)⊆t ∧ Agent (e₂, g(t)) ∧ Go out (e₂)]** which is of type <i,t>.

Now to arrive at the AspP, we combine IP_1 and $AspP_2$ via *Predicate Conjunction*. Here, $[[AspP]]^g$ = **λt.∃e₁ [τ(e₁)⊆t ∧ Agent (e₁, r) ∧ Eat (e₁, pi)] ∧ ∃e₂ [τ(e₂)⊆t ∧ Agent (e₂, g(t)) ∧ Go out (e₂)]** which is of syntactic type <i,t>. The I_2 head (in the matrix clause) has the value [PST] and has the semantic interpretation: **ιt'[t'<now]** of syntactic type i. So now, $[[I_2']]^g$ = **∃e₁ ∃e₂ [τ(e₁)⊆ ιt'[t'<now] ∧ Agent (e₁, r) ∧ Eat (e₁, pi)] ∧ [τ(e₂)⊆ ιt'[t'<now] ∧ Agent (e₂, g(t)) ∧ Go out (e₂)]** (by putting the value for t (which is the reference time)). At last, we compositionally derive the semantic interpretation of IP_2 by again combining I_2' and the lambda binder for the movement of the subject DP and substituting g(t) with **r** (logical interpretation for the subject *Rina*). Now at the end, $[[IP_2]]^g$ = **∃e₁ ∃e₂ [τ(e₁)⊆ιt'[t'<now] ∧ Agent (e₁, r) ∧ Eat (e₁, pi)] ∧ [τ(e₂)⊆ιt'[t'<now] ∧ Agent (e₂,r) ∧ Go out (e₂)]** of syntactic type t.

This logical interpretation of the matrix IP (here, IP_2) clearly shows that the agent of both the events is *Rina* which supports the subject sharing feature of Bangla SVCs. Also, as the SV clause is non-finite, it has the unsaturated type <i,t> which gets passed onto the later nodes of the tree. The tense (and agreement) is always marked on the final verb in the SVCs of Bangla which is in the matrix clause. The tense of a sentence denotes the relation between reference time and speech time which is *past* here. Also, the semantic interpretation of the matrix IP shows that both of the events have occurred in the past which is what we see in the example (32).

This derivation for the sentence in (32) shows how we can arrive at a fully comprehensive semantic interpretation of an SVC in Bangla and how it can be extended to other types of SVCs also. In the next section, we will show that not any random types of verbal combinations can represent an SVC in Bangla.

7 Restrictions on Serial Verb Construction formation

There are restrictions on the formation of SVCs in Bangla. There cannot be an SVC in Bangla where the verbs cannot have a natural sequence of order- i.e., the verbs in an SVC must denote events that are sequential and logically follows one after the other.

(35) *rina mach-ta* ***ket-e*** ***radh-be***.
Rina.NOM fish-CL cut-PERF cook-FUT.3p
'Rina will cook the fish after cutting it.'

(36) *??rina mach-ta* ***ket-e*** ***har-alo.***
Rina.NOM fish-CL cut-PERF loose-PST.3p
'Rina lost the fish after cutting it.'

The sentence in (35) is a grammatical Serial Verb Construction in the language as the event of cutting ('*kete*') and event of cooking ('*radhbe*') are in such a sequence that they generally follow one another. But, the second example does not sound quite right. This is because the events of cutting (again, '*kete*') and losing ('*haralo*') do not naturally denote a sequence of events that follow one another.

8 Conclusion

The analyses that have been done to account for the SVCs in Bangla so far had two aims-

- providing a comprehensible syntactic analysis (following Jayaseelan, 2004) and,
- providing a compositional analysis of the events denoted in the SVCs via formal semantics.

Serial Verb Constructions in Bangla are prevalent linguistic phenomena that have not been a part of the discussion largely except a few ones (Basu & Wilbur, 2010; Karmakar, 2010). Here in this paper, we have tried to give a little different approach from the previous ones. Through the syntactic analysis following Jayaseelan (2004), we have adopted the non-finite, adjunct nature of the SV clause for a Serial Verb Construction in Bangla.

This analysis gives us enough evidence to extend the discussion on the 'internal argument sharing' nature of the SVCs in Bangla with a supposed pro in the complement position of the finite VP when the verbs in the SVC are transitive and pro in the indirect object position of the non-finite VP when the verbs are ditransitive in the SVC. In the later sections, we have shown through the semantic composition how the verbs and their meanings can be derived perfectly, supporting the sequence of the events and the shared subject nature of the SVCs in Bangla. The semantic composition gives us insight into the conjunction-like nature of the events denoted by the serial verbs in the SVCs. This paper also discusses how it is not possible to form an SVC where the verbs do not follow each other in a logical sequence.

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