

**Composition of Compound Verbs in Bangla**

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## Abstract

The present paper develops a constraint-based mechanism within HPSG framework for composing Indo-Aryan compound verb (CV) constructions with special focus on Bangla CV sequences. Both the member verbs (V1 and V2) in a CV structure are semantically contentful. The combinatorial well-formedness of a CV structure depends on the semantic compatibility between V1 and V2. Therefore the paper proposes that the unification of the two Vs take place at the level of semantics. The V1 and not the V2 (as is generally assumed in case of Complex Predicate composition) selects a V2 and a *semantic principle of compounding* is postulated that constrains the unification. The semantic information associated with the resultant CV sequence (the value of RESTR in HPSG formalism) is not a summation of that of V1 and V2. On the contrary the paper presents evidence to show that both Vs contribute their share in making the semantic structure of CV sequence. The paper also presents a proposal as to how the value of the RESTR of CV sequences will be built from that of its constituent members.

# Composition of Compound Verbs in Bangla

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## 1. Introduction

This paper proposes a constraint-based mechanism within HPSG framework for composing Indo-Aryan compound verb (CV) constructions with special focus on Bangla<sup>1</sup> CV sequences.

The Bangla CV sequence is a two-member construction in which the first member (V1) chooses between the conjunctive participial form *-e* and the infinitive form *-te* and the second member (V2) bears the inflection. For simplicity it is normal to consider finite examples:

1. *pakhi-Ta<sup>2</sup> uR-e gE-lo* ‘The bird flew away’  
bird-classifier fly-cp go-3p pt
2. *buRo lok-Ta mor-te boS-eche* ‘The old man is about to die’  
old man-cl die-inf sit-3p pr pft

CV constructions in Indo-Aryan languages are commonly described as a kind of complex predicate<sup>3</sup> (see Butt (1995), Verma ed. (1993) for references). Such an analysis seems to be motivated by the following considerations:

1. These constructions are multi-headed<sup>4</sup>.
2. They behave as a monoclausal unit in their response to various syntactic mechanisms such as passivization, agreement and so on.

Complex predicates are generally taken to be constructed compositionally<sup>5</sup> in unification-based grammar. Hinrichs and Nakazawa (1990), for example, introduced *argument composition mechanism* that accounts for the composition of German ‘verb + auxiliary’

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<sup>1</sup> Bangla (popularly known as Bengali) is an Indo-Aryan language spoken in Bangladesh and at Eastern Zone in India.

<sup>2</sup> cp: conjunctive participial      inf: infinitive      ft: future      pt: past      pft: perfect  
gen: genitive      acc: accusative      pl: plural      caus: causative      cl: classifier

<sup>3</sup> The preverb-V constructs found in Hungarian, German and Russian, restructuring verbs in Italian, verb-auxiliary units in French and other Romance languages are also included in the repertoire of CP.

<sup>4</sup> Sells (1997) has defined *complex predicates* as multi-headed; they are composed of more than one grammatical element (either morphemes or words), each of which contributes part of information ordinarily associated with a head.

<sup>5</sup> *Compositionality* in Fregean sense

complex predicate in HPSG framework<sup>6</sup>. The proposal states that a complex predicate arises when a functional head subcategorizes for a predicative word (i.e., the main verb) and its arguments. In this system the unification of the two heads is accomplished at the level of syntax and the semantic information associated to the constituents is assigned no role to play in the unification.

This paper proposes that the unification of V1 and V2 in Indo-Aryan languages is constrained by the following *semantic principle of compounding* (provisional version):

- (A) The semantic content of a V2 structure-shares<sup>7</sup> with (a part of) the content of the V1 that selects the V2.

The idea is that the unification of V1 and V2 takes place at the semantic level.

This principle is a variant of *content sharing mechanism* that has been advocated by Weschler (1996) and Davis (2000) in relation to oblique argument, particularly PP complements of predicators, in English.

The semantic principle stated in (A) is based on the following observation:

1. The combinatorial well-formedness of a CV structure depends on the semantic compatibility between V1 and V2.
2. The composition of CV sequences is not triggered by the requirement that V1 and their dependents saturate or satisfy V2's unsaturated subcategorization frame or argument structure.
3. On the contrary, CV sequences are lexical variant of their V1 counterpart because they denote an extended or modified version of meaning originally associated to the corresponding V1.

The paper is divided into following sub-sections. The salient features of CV sequences are described in section 2. Section 3 presents a brief sketch of Head driven phrase structure grammar (HPSG) as presented in Bendor, Sag and Wawsow (1999) with some proposed modification in the semantic structure associated with a lexical sign. Section 4 computes the value of RESTR of a CV construction. Finally section 5 develops the *semantic principle of compounding*.

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<sup>6</sup>Since then scholars have widely implemented this mechanism for the composition of complex predicates in different languages such as German and Dutch verb cluster of main verb and auxiliary or modal (Bouma and Noord (1998)), Italian Restructuring verb (Monachesi (1998)), Korean verb-auxiliary cluster (Chung (1998)).

<sup>7</sup> Structure sharing is a pervasive use of unification in HPSG. This refers to situations in which the value of two or more attributes is token-identical and it is indicated by identically-numbered tags in attribute-value matrix (AVM) (Davis 2000).

## 2. Indo-Aryan CV Sequence and their Characteristic Features

When a V1 combines with a V2 in order to form a CV sequence, the unification builds both syntactic and semantic structure of the resultant construction. Following are some salient features of the Indo-Aryan CV sequences.

### 2.a Semantics of the CV structure is modification or extension of that of its V1 counterpart

Consider a verbal root *Sajano* ‘decorate’. It participates in following CV constructions:

*Sajiye deoya* ‘decorate for other’s benefit’

3. *ritu rOma-r ghOr Saj-iyē di-l-o*  
Ritu Rama-gen room decorate-cp give-3 pt  
‘Ritu decorated Ramaa’s room’

*Sajiye neoya* ‘decorate and the result is directed toward the actor’

4. *age nīje-r ghOr Saj-iyē ni-i /?dii, tarpOr tomar-Ta Saj-iyē de-bo*  
First self-gen room decorate-cp take-1 pr then your-cl decorate-cp give-3ft  
‘Let me first decorate my room, then I will do yours’

*Sajiye phEla* ‘draw shows the actor’s capability’

5. *kOyēkghOnTa-r moddhe ritu ghOr-Ta Saj-iyē phel-l-o*  
few hours-gen within Ritu room-cl decorate-cp drop-3 pt  
‘Ritu managed to decorate the room within few hours (showing Ritu’s ability)’

*Sajiye aSa* ‘decorate with connotation of moving towards speech location’

6. *ritu rOma-r ghOr-Ta Saj-iyē e-l-o* ‘Ritu decorated the room’  
Ritu Ramaa-gen room-cl decorate-cp come-3 pt

As is evident from sentences through (7)-(10), all CV sequences have retained the lexical meaning of the V1 *Sajano*.

### 2.b Semantics of V2

Every V2 has an independent occurrence in the language. When they occupy the position of V2 in a CV construction, the verb undergoes a semantic loss. Hook has taken an extreme position and states that V2s becomes lexically empty. He describes the

phenomenon as *grammaticalization*<sup>8</sup> (Hook 1974:94-97). Others have conferred a semi-lexical status to V2s<sup>9</sup>. They argue that V2 has a different status from that of the auxiliary because it is not as grammaticalized as the auxiliaries. Butt assumes that the light verb use of a verbal item and its use as a full verb should be identified as a case of lexical polysemy and not grammaticalization. The present work assumes that V2s are contentful constituents.

## 2.c The Number of V2 is fixed in a language

V2 is selected from a closed set of verbs. Scholars have made the observation that the frequency of occurrence of compound verb varies from one language to another within the Indo-Aryan subgroup of languages. The attestation of the compound verb is most frequent in Hindi-Urdu (Hook 1974), while it is very rare in Kashmiri (Kaul 1985). Bangla occupies the third position in the scale of frequency. Hook has conducted a contrastive typological study between the *compound-verb-rich* languages such as Hindi-Urdu and *compound-verb-poor* languages such as Marathi and concludes that the occurrence of CV sequences in *compound-verb-rich* languages have acquired a grammatical significance. In languages like Marathi the absence of the V2 has no conventional interpretation on which the hearer can rely on. In Hindi-Urdu, on the other hand, the presence of the V2, even where it is redundant, has become an obligatory marker of perfectivity. Its absence has come correspondingly closer to having a conventional interpretation of imperfectivity.

Bangla has 16 V2s. They are:

<i>aSa</i> ‘come’	<i>dāRa</i> ‘stand’	<i>rakha</i> ‘keep’	<i>ana</i> ‘bring’
<i>deoya</i> ‘give’	<i>pOra</i> ‘fall’	<i>paTha</i> ‘send’	<i>bERano</i> ‘roam’
<i>neoya</i> ‘take’	<i>tola</i> ‘lift’	<i>bOSa</i> ‘sit’	<i>oTha</i> ‘rise’
<i>jaoya</i> ‘go’	<i>chaRa</i> ‘leave’	<i>phEla</i> ‘drop’	<i>mOra</i> ‘die’

V2s add subtle semantic nuances to the overall meaning of CV sequences. The usage of each V2 in a CV sequence is illustrated in (7b). The sentences in (7a) contain the full verb counterpart of the V2s.

- 7a. *ritu ghOre e-l-o* ‘Ritu appeared in the room’  
 Ritu room-cp come-3 pt
- b. *Sondhe ho-ye e-l-o* ‘The evening approached’  
 evening become-cp come-3 pt

The meaning of the V1 *hOoya* is ‘become’. Therefore the sentence *Sondhe* ‘evening’ *holo* ‘become-3 pt’ entails that ‘it is already dark’. The CV sequence in the sentence

<sup>8</sup> Sarkar (1975) elucidates Porizka’s perception of grammaticalization – a stripping off of the main dictionary meaning from the vector verb in order to reduce them to the role of ‘aspective’.

<sup>9</sup> There is a great deal of discussion available in the literature regarding the semantics of V2. Following are some references related to the works on Indo-Aryan Compound verb structure: Hook (1974), Sarkar (1975), Dasgupta(1989), Abbi(1991,1992), Bashir(1992), Mohanty (1992), Butt(1995).

(7b), however, implies that ‘the evening is approaching’. Therefore the semantics of V2 *aSa* ‘come’ is ‘approaching towards the accomplishment of the event denoted by the V1’.

- 8a. *ritu rOma-ke Ek-Ta boi di-l-o* ‘Ritu gave Ramaa a book’  
 Ritu Ramaa-dat one-cl book give-3 pt
- b. *ritu jOn-ke EkTa baRi khu`j-e dilo* ‘Ritu found a house form John’  
 Ritu John-dat one-cl house search-cp give-3 pt

The independent occurrence of V1 *deoya* ‘give’ implies that the agent hands over a concrete object to the recipient. When *deoya* occurs as a V2, the literal sense of giving is lost. In stead the V2 suggests a sense of ‘doing something for others’. In the sentence (12b), the actor gives some information (about a house in this case) to the beneficiary *rOma*. No actual ‘change of possession’ is involved here.

- 9a. *ritu Tebil theke boi-Ta nilo* ‘Ritu took the book from the table’  
 Ritu table from book-cl take-3 pt
- b. *ami age bole nii, tarpOr tomar pala*  
 I first say-cp take-1 pr then your turn  
 ‘Let me say first, then comes your turn’

Similarly the lexical meaning of *neoya* ‘take’ is not retained in (9a). The semantics of the V2 *neoya* is ‘to do something for one’s own benefit.’

- 10a. *ritu baRi gE-l-o* ‘Ritu went home’  
 Ritu home go-3 pt
- b. *tak theke poRe glasTa bheMe gElo* ‘The glass broke fell down from  
 shelf from fall-cp glass-cl break-cp go-3 pt the shelf and broke’

The lexical meaning of *jaoya* (an allomorphic variation of *gE*) is ‘go’. The V2 *jaoya* is polysemous in nature. In fact other V2s also (such as *deoya* ‘give’, *aSa* ‘come’) involve polysemy. This paper does not have the scope to discuss polysemy of V2s in detail. When V2 *jaoya* occurs with V1s, one variant of *jaoya* implies ‘the perfectivity of action’ as shown in (10b).

- 11a. *gach theke phOl poR-l-o* ‘The fruit fell down from the tree’  
 tree from fruit drop-3 pt
- b. *ritu ghum-iyē poR-l-o* ‘Ritu fell asleep’  
 Ritu sleep-cp fall-3 pt

The lexical meaning of the full-verb *pORa* is ‘fall down’. The CV sequences having *pORa* as their V2 member indicates ‘an entity involved in an event denoted by the V1 and there is a suddenness (unpreparedness) involved in the activity specified’. For example, the sentence in (11b) implies ‘it happened that *ritu* slept’.

- 12a. *ritu maTi theke boi-Ta tul-l-o* ‘Ritu lifted the book from the floor’  
 Ritu floor from book-cl lift-3 pt
- b. *ribhu aSor jom-iyē tullo* ‘Ritu warmed up the party’  
 Ribhu party warm up lift-3 pt

The verb *tola* means ‘lift’. When it occurs in a CV sequence, the resultant predicate entails ‘an attainment (a sense of time span also included)’. For example, the sentence in (12b) suggests that the agent *ribhu* achieved what he aspired for, namely he was engaged in warming up the people present in the party and a time came when he could successfully do it.

- 13a. *Tren dOSTay sTeSOon theke char-l-o* ‘The train left the station at ten’  
 train ten-cl-loc station from leave-3 pt
- b. *lok-Ta amar kach theke pācSo Taka ni-ye char-l-o*  
 man-cl mine near from five hundred rupees take-cp leave-3 pt  
 ‘The man did not give up before he managed to extort five hundred rupees from me’

The lexical meaning of *chaRa* is ‘leave’. The sense imported by the V2 *chaRa* indicates persuasiveness on the part of the agent. The agent withdraws from the action denoted by the V1 only after he or she attains the goal.

- 14a. *ritu Tebiler opor boiTa rakh-l-o* ‘Ritu kept the book on the table’  
 Ritu table-gen on book-cl keep-3 pt
- b. *ritu SOb kaj kor-e rakh-l-o* ‘Ritu completed all her work in advance’  
 Ritu all work do-cp keep-3 pt

The V2 *rakha* ‘keep’ in (14b) indicates the action denoted by the V1 is completed in advance. The CV construction presents the semantics of resultative aspect.

- 15a. *ritu rOmake boiTa paTha-l-o* ‘Ritu sent the book to Ramaa’  
 Ritu Ramaa-dat book-cl send-3 pt
- b. *ritu rOmake Deke paTha-l-o* ‘Ritu summoned Ramaa’  
 Ritu Ramaa-dat call-cp send-3 pt

The lexical meaning of *paThano* is ‘send’. It causativizes the resultant construction when occurred with a V1. For example, the meaning of V1 *Daka* is ‘call’. *Deke paThano* in (15b) implies that the agent *ritu* does not call *rOma* directly. Instead she employs someone to call *rOma*.

- 16a. *ritu cheare boS-l-o* ‘Ritu sat on the chair’  
 Ritu chair-loc sit-3 pt



- b. *ritu Sobar majhe kOtha-Ta bol-e boS-l-o*  
 Ritu all-gen among word-cl say-cp sit-3 pt  
 ‘Ritu broke the secret unexpectedly amidst all (implying she should not have done that)’

When the verb *bOSa* ‘sit’ occupies the V2 position in a CV sequence the resultant structure implies that the agent has done something that he or she is not expected to do. A sense of dejection is implied in the meaning of the CV construction. For example, in (16b), the agent *ritu* ‘unexpectedly says something amidst all and she should not have done so’.

- 17a. *ritu hat theke boi-Ta phel-l-o* ‘Ritu dropped the book from her hand’  
 Ritu hand from book-cl drop-3 pt
- b. *ritu kOyek ghOnTa-r moddhe kajTa kor-e phel-l-o*  
 Ritu few hour-gen within work-cl do-cp drop-3 pt  
 ‘Ritu finished her work within few hours (showing her ability)’

The lexical meaning of the verb *phEla* is ‘drop’. When it occurs as a V2 in (17b), the CV sequence suggests the ability of the agent *ritu* ‘in completing her work within few hours’. The V2 adds a sense of perfectivity to the meaning of the CV sequence.

- 18a. *ritu baRi theke SondeS en-eche* ‘Ritu has brought sweets from home’  
 Ritu house from sweets bring-3 pr pft
- b. *ritu ghOrdor pray guchiye en-eche*  
 Ritu house almost put (things) in order bring-3 pr pft  
 ‘Ritu has almost put things in order in the house’

The V2 *ana*, like the other V2 *aSa* ‘come’ (exemplified in (7)), implies that the event specified by the V1 is approaching to its completion. In (18b), the agent *ritu* is about to complete her task of putting things in order in the house.

- 19a. *chele-ra maThe bERa-cche* ‘The boys are roaming around in the field’  
 boys-pl field-loc roam-3 pr cont
- ritu ghur-e bERa-y* ‘Ritu strolls about idly’  
 Ritu loiter-cp wander about- 3 pr

When the verb *bERano* ‘wander about’ occupies the V2 position in a CV sequence it adds a sense of iterativity to the action of the V1, which is carried out by the agent in different location as a part of the agent’s habitual make-up.

- 20a. *ritu gache uTh-l-o* ‘Ritu climbed the tree’  
 Ritu tree-loc climb-3 pt
- b. *ritu hOThat heS-e uTh-l-o* ‘Ritu suddenly burst into laughter’  
 Ritu suddenly laugh-cp rise-3 pt

The lexical meaning of the verb *oTha* is rise. Its V2 counterpart imports an aspectual meaning of inception to the overall meaning of the CV sequence.

- 21a. *chele-Ta benc-er opor dāRa-lo*  
 boy-cl bench-gen on stand-3 pt  
 ‘The boy stood on the bench’
- b. *bEpar-Ta khub joTil hoy-e dāra-lo*  
 matter-cl very complex be-cp stand-3 pt  
 ‘The matter turned out to be very serious’

The V2 *dāRano* contributes the meaning of coming ‘to the state of V1 and remain in such a state.’ A sense of inchoation is involved in the meaning of the CV sequence.

- 22a. *lok-Ta [na khete peye] morlo* ‘The man died out of hunger’  
 man-cl not eat-inf get-cp die-3 pt
- b. *ma Sarajibon SonSar-er jonne kheTe mor-l-en*  
 mother whole life family-gen for work hard-cp die-3 pt  
 ‘Mother worked the whole of her life for the family in vain’

The meaning of the verb *mOra* is ‘die’. When it occurs as a V2, it contributes a sense of futility to the meaning of the CV sequence. For example, the agent *ma* ‘mother’ in (22b) works the whole of her life for her family. The CV sequence *kheTe mOra* implies that she did not gain anything in return. There is sense of futility implied in the usage of this CV construction.

## 2.d Semantic Compatibility

A V1 does not combine with any V2. The combinatorial well-formedness depends on the semantic compatibility between the two Vs. This is illustrated in the following examples:

1. The V2 *bERano* ‘wander about’ entails that the event denoted by the V1 occurs iteratively (discussed above). The agent actively participates in the event. *meyeTa* ‘the girl’ in (23a), for example, is an active participant in the event of *nec-e bERano*. The verb *Soya* ‘sleep’, on the other hand, is a stative predicate. A state cannot be meaningfully iterated. Therefore the V1 *Soya* is not semantically compatible with V2 *bERano* as shown in (23b):

- 23a. *meye-Ta Saradin nec-e bEra-cche*  
 girl-cl whole day dance-cp roam-3 pr cont  
 ‘The girl is dancing around the whole day’
- b. \**meye-Ta Saradin Su-ye bEra-cche*  
 girl-cl whole day lie down-cp roam-3 pr cont

2. The V2 *deoya* ‘give’ suggests that the action denoted by the V1 needs to be non-self-directional as in (24a):

24a. *ami ritu-ke EkTa Sari kin-e di-l-am* ‘I bought Ritu a sari’  
I Ritu-dat one sari buy-cp give-1 pt

*rituke* cannot be substituted for *nijeke* ‘self’ to mean ‘I bought a sari for myself’ as in (24b):

24b. \**ami nijeke EkTa Sari kin-e di-l-am*

The following sentence is also not legitimate:

24c. \**ami Onek kichu jen-e di-l-am*  
I many things know-cp give-1 pt

Since *jana* ‘act of knowing’ ought to be self-directional, this verb does not select V2 *deoya*.

3. The V2 *mOra* ‘die’ expresses a sense of futility as in (25a):

25a. *tumi Ojothai cēciye mor-cho, keu tomar kOtha Sun-b-e na*  
you in vain shout-cp die-2 pr cont nobody your word hear-3 ft not  
‘You are shouting in vain, nobody will hear you’

The compound sequence *jite mOra* ‘win-cp die’ in (25b) is meaningless unless one really wants to use it in a metaphoric sense.

25b. \*?*meyeTi khelay jite morlo*  
girl-cl game win-cp die-3 pt

The above discussion has made the following observation explicit:

1. V2s are semantically contentful.
2. The semantics of a CV sequence is an extension or modification of that of the V1 counterpart.

Every V1 has an associated *base* or *frame*, which is the specification of an unmarked<sup>10</sup> event type. Combination of the V1 with a V2 focuses part of the event. Speaker’s choice

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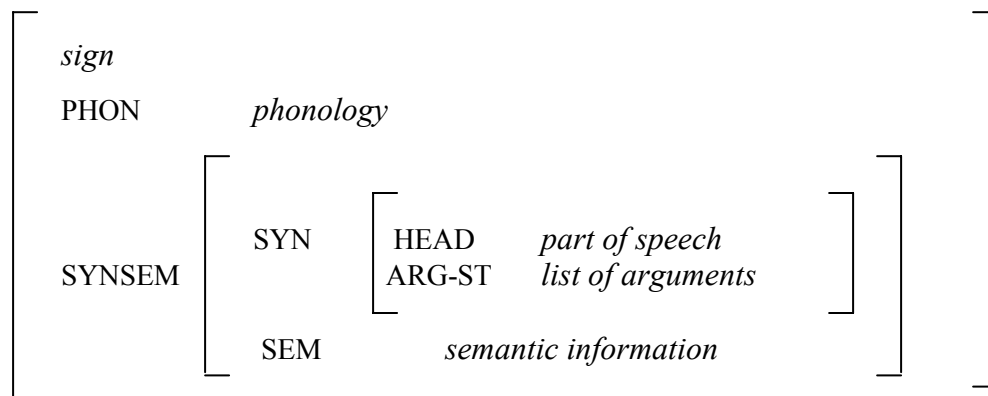
<sup>10</sup>Carlota Smith talks about *markedness and aspectual choice* in her book entitled ‘The Parameter of Aspect’. Speaker uses conventional event types and aspect information in a predictable way; that is the way these events and aspects are meant to be used in the discourse. Smith calls it unmarked choice of the speaker. A Speaker makes marked aspectual choices or event type choice to convey emphasis of some kind and also for various pragmatic reasons.

and context in the discourse determine the focus. Compound verb construction is a lexical means to express the situation in focus linguistically.

### 3. Attribute-Value Matrix in HPSG

When a V1 combines with a V2 in order to form a CV sequence, the unification builds both syntactic and semantic structure of the resultant construction. In HPSG grammar, every linguistic sign, be it a lexical item or a bigger constituent such as phrase, is a structured complex of phonological, syntactic, semantic, discourse and other phrase-structural information. I am primarily concerned here with the syntactic and semantic component of verbal and compound verb signs.

The formal device underlying the representation of signs in HPSG are *typed feature structures* (Carpenter 1992). A feature structure is presented as an *attribute-value matrix* (AVM). SYN and SEM are two attributes within an AVM that contain the relevant syntactic and semantic information related to a sign. In figure 1, the position of SYN and SEM within a lexical sign is illustrated:



**Figure: 1**

The value of HEAD contains categorical information and ARG-ST states subcategorization property of a verbal lexical entry.

The value of SEM contains semantic information. The semantic information associated with a verb is traditionally assumed to express the lexical meaning of the verb. Lexical meaning is “a linguistically relevant subset of relations among participants in the event or state denoted by a predicator, extracted from the large number of facts about its meaning”.

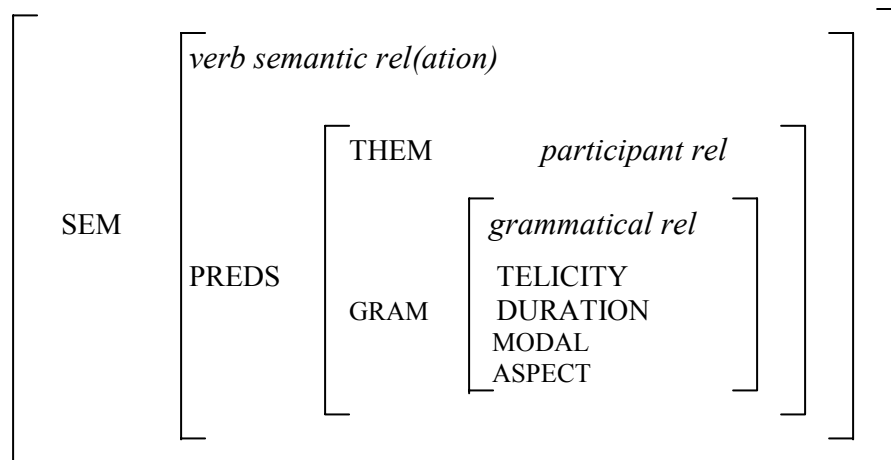
Vendler’s classification of verbs into accomplishment, achievement, activity and stative effectively includes aspectual notions such as *duration* and *endpoints of events* as integrated part to the semantics of verbs. Carlota Smith defines *aspect* in the following

way: Aspect traditionally refers to the presentation of events through grammaticized viewpoints<sup>11</sup> such as *perfective* and *imperfective*. Viewpoint gives the receiver a full (*perfective*) or partial (*imperfective*) view of a situation. In recent studies, theory of aspect is not perceived as an entirely grammaticized concept. The concept is broadened to include various situation types. Situation types are lexico-semantic property associated with verb constellations at the basic level. Verbs are assigned an intrinsic aspectual value in the lexicon. The intrinsic value of a verb is determined by its value in a minimal verb constellation with obligatory arguments. Minimal constellations have the minimal number of countable arguments that the verb in question allows.

In our model the semantic structure includes two features, THEM(ATIC) and GRAM(MATICAL) within SEM. The value of THEM contains lexical semantic relation that include proto-role attributes<sup>12</sup> whose values denote the participants in a situation denoted by that lexical semantic relation. The objective is to construct a set of linking constraints that maps the arguments<sup>13</sup> of a verbal predicate to the values within its THEM feature.

The value of GRAM are information related to *telicity, duration, stativity, modal information such as approaching, futility, self-directedness, non-self directedness, dejection* etc., aspectual information like *perfectivity, imperfectivity, inceptive, inchoative* and so on.

The THEM and GRAM features are presented as attributes of PREDS in the following feature structure:



**Figure: 2**

Within HPSG, the semantic structure of a phrase is built up from that of its constituents. To do that Pollard and Sag (1994), Bendor, Sag and Wawsow (1999) have introduced a

<sup>11</sup> Carlota Smith has used the term in her two-component theory of aspect.

<sup>12</sup> Proto-role attributes are defined in terms of lexical entailments very similar to Dowty's *proto-role agent* and *proto-role patient* theory.

<sup>13</sup>

feature RESTR inside SEM. The value of RESTR for a lexical sign specifies the semantic restrictions applicable to that sign. The *semantic compositionality principle* implements the following constraint:

In any well-formed phrase structure, the mother's RESTR value is the sum of the RESTR value of its daughters.

The *semantic compositionality principle* licenses the value of RESTR to percolate up in its entirety to its mother node.

Interestingly when the member V1 and V2 participate in *compounding*, the semantics of the resultant CV structure is not necessarily a summation of its constituent Vs. The next section illustrates this fact with examples taken from Bangla CV constructions. We will see that the value of RESTR of a CV sequence inherits information partly from both the constituent Vs.

Our grammar formally postulates two separate features PREDS and RESTR. The value of PREDS represents the semantic relation type associated with the verbal lexeme. The value of RESTR for a simple verb inherits the value of PREDS as a whole. The next section explains how the value of RESTR is made up for a CV sequence.

The following figure presents a second version of the AVM of semantics of a verbal lexeme:

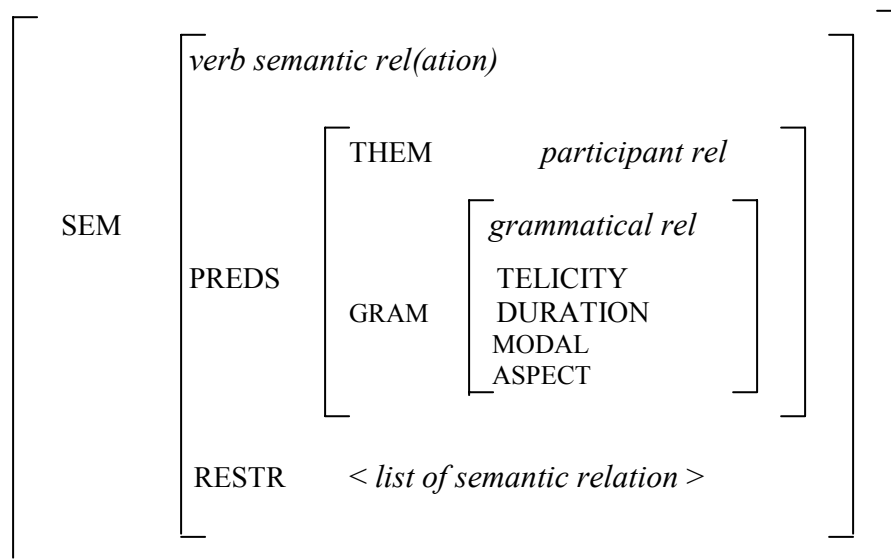


Figure: 3

#### 4. The Value of RESTR of a CV Constituent

The previous section notes that the semantics of the resultant CV cluster is not a summation of that of the constituent member verbs. To illustrate this I present here two instances from Bangla:

a. The V2 *ana* ‘bring’ is associated with a *compounding mechanism* that results in an *atelic* event type. When the telic V1s such as *SeS kOra* ‘finish’ (see (25a)) select V2 *ana*, the event type of the resultant CV sequence *SeS kore ana* ‘about to finish’ becomes *atelic* as in (25c):

25a. *ritu Ekdiner moddhe lekhaTa SeS kor-eche*  
Ritu one day-gen in writing-cl finish do-3 pr pft  
‘Ritu finished the writing within one day’

b. \**ritu Ekdiner moddhe lekhaTa SeS kore en-eche*

c. *ritu lekhaTa pray* (almost) *SeS kore en-eche* (bring-3 pr pft)  
‘Ritu has almost finished up the writing’

*moddhe*-PP occurs in the environment of a predicate that presents telic event. As the data shown above, this post-positional phrase is permitted in (25a), but not in (25b).

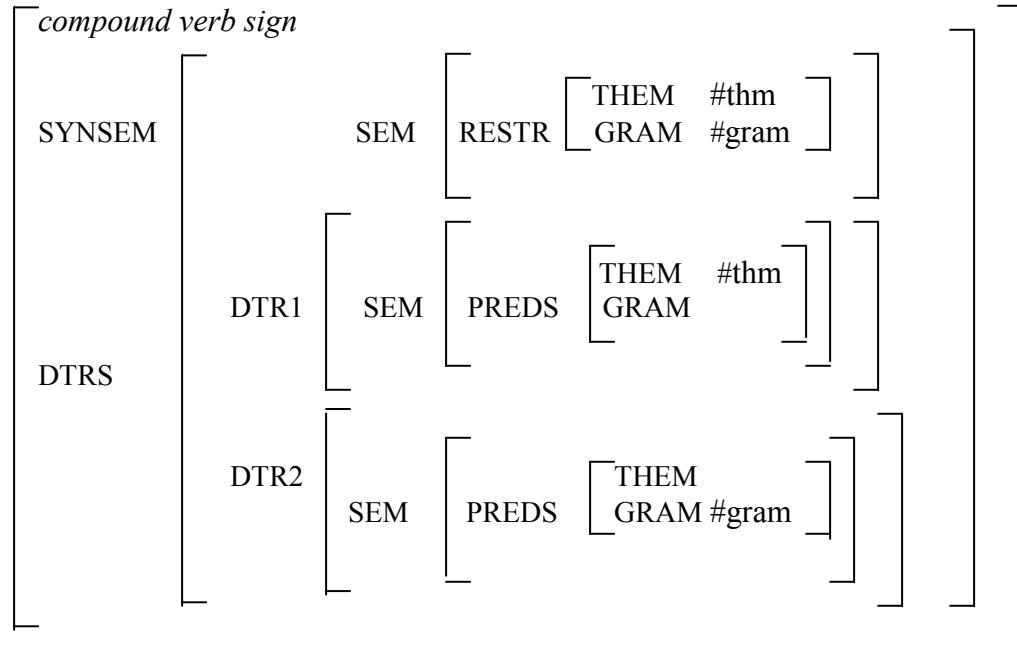
b. *āka* ‘draw’ is a *durative* verb. Therefore it is compatible with *adverb of duration* as shown in (26a).

26a. *ritu EkghOnTa dhore chobi āk-l-o* ‘Ritu drew the picture for one hour’  
Ritu one hour for picture draw-3 pt

The V2 *phEla*, on the other hand, is associated with a non-durative event type. When the verb *āka* selects the V2 *phEla* ‘drop’, the resultant CV becomes non-durative and therefore they do not occur any more in the context of *adverb of duration* as is evident in the following sentence:

26b. \**ritu EkghOnTa dhore chobiTa ēke phello*

The following structural description captures the role of V2 in modifying part of semantics of V1 and the RESTR of the CV sequence inherits both from V1 (DTR1) and V2 (DTR2):



**Figure: 4**

As the lexical rule composes the CV structure, SEM | PREDS | THEM value of V1 and SEM | PREDS | GRAM value of V2 are copied in the RESTR of the resultant predicate. The value of RESTR remains unspecified in the verb lexeme in our grammar. If a verb does not participate in CV composition, the entire SEM | PREDS value is copied in SEM | RESTR. Otherwise, the compound verb composition determines the RESTR value as described above.

## 5. The Semantic Principle of Compounding

The *semantic principle of compounding* stated in (A) is repeated here:

- (A) The semantic content of a V2 is structure-shared with (a part of) the content of the V1 that selects the V2.

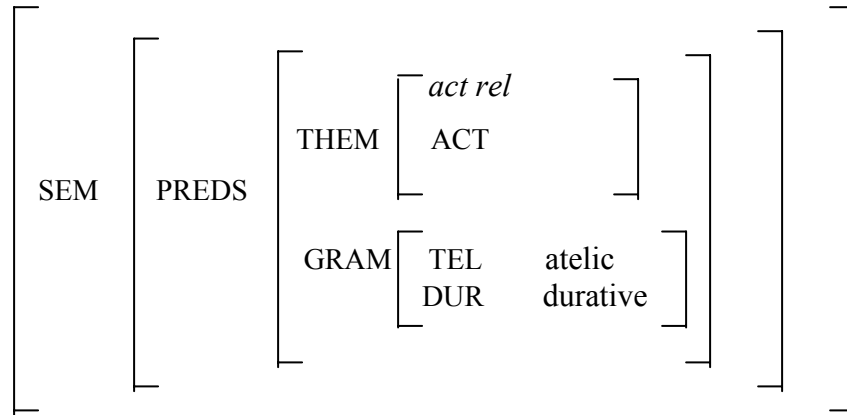
In the previous section we have seen that the two Vs participate in *compounding* even when the grammatical information (the value of SEM | PREDS | GRAM) associated to each of them mismatches.

Therefore, the principle stated in (A) is required to be more specific. The revised version of *semantic principle of compounding* constrains the unification to be accomplished at the level of SEM | PREDS | THEM:



(A') The value of SEM | PREDS | THEM feature of a V2 structure-shares with either the entire SEM | PREDS | THEM value of V1 or a subpart of it.

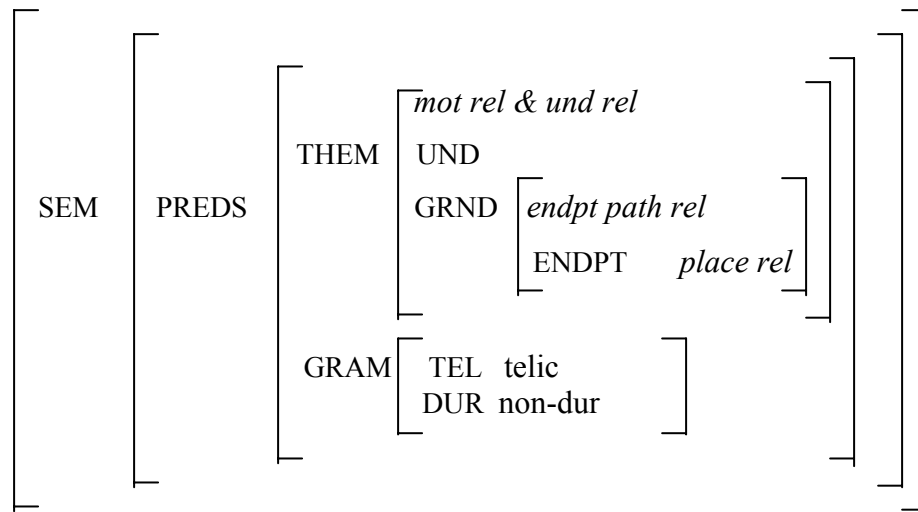
For example, the verbal predicate *haSa* 'laugh' selects V2 *phEla* 'drop', *neoya* 'take'. The semantic structure of *haSa* requires an ACTOR:



**Figure: 5**

The semantics of both *phEla* and *neoa* also belong to the type of *act rel*. Therefore the unification of *haSa* with *phEla* and *neoa* are licensed by the principle of A'.

Now consider the verb *Dhoke* 'enter'. This is an inherently directed motion verb and the subject experiences motion and therefore mapped to the role UND:



**Figure: 6**

The verb *Dhoka* selects the V2 *pORa* ‘fall’ and *Dhuke pORa* ‘manage to enter suddenly’ is a legitimate CV sequence. The argument of the monadic V1s that select V2 *pORa* is a participant that bears entailment associated to the proto-role UND. The semantics of V2 *pORa* is also a subtype of *und rel*. In case of the V1 *Dhoka* the SEM | PREDS | THEM value of V2 *pORa* structure-shares with a sub-part of SEM | PREDS | THEM of V1 *Dhoka* and the CV sequence *Dhuke pORa* is generated.

A feature VECTOR is introduced inside the SYN of every V1. The value of SEM | PREDS | THEM of the V2 inside VECTOR of a V1 is stipulated to be the subtype of the whole or a subpart of the value of SEM | PREDS | THEM of V1. The following figure represents the SYNSEM feature for the V1 *haSa* ‘laugh’:

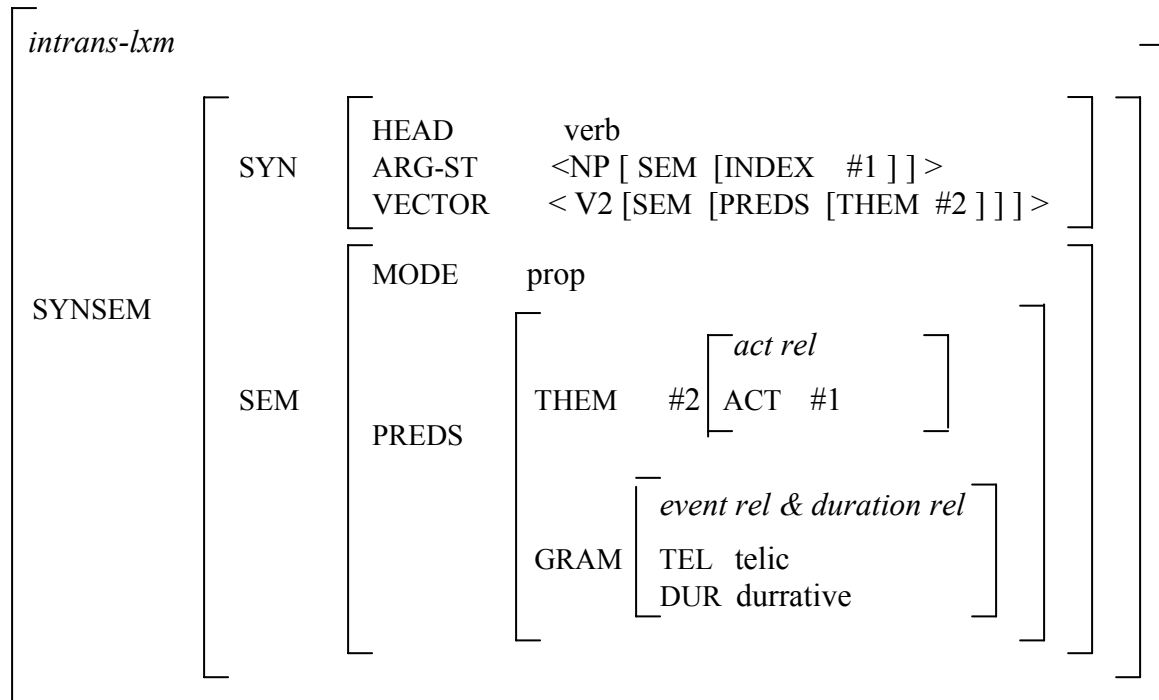


Figure: 7

Along with the *head-complement rule* and the *head-specifier rule* (Bendor, Sag and Wawsow (1999)), our model adds one more grammatical rule. I call it *compounding rule*. This rule is a syntactic schema that requires the V2 to be realized as a sister of the V1. This rule passes the values of ARG-ST up to the mother node. That implies that the entire argument structure of V1 becomes the argument structure of the resultant CV sequence. The present *compounding mechanism* is assuming that the value of ARG-ST of a CV sequence and its V1 counterpart is identical.

## 6. Conclusion

This paper has presented a mechanism for the unification of the two V constituents that results in construction of compound verb structure in Indo-Aryan languages. The unification of the two Vs is designed to take place at the level of semantics because the well-formedness of a resultant CV sequence depends on the semantic compatibility between the two Vs.

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