Word formation in syntax: Japanese verb-verb compounding and grammatical information spreading

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Abstract

Japanese has four related verb-verb compound constructions. One is purely lexical, but the other three (‘syntactic compounds’) showing varying degrees of syntactic independence. The syntactic compounds are classified into three types by the properties of the second verb (V2). I call them the unaccusative, the transitive and the serial verb type respectively.

This thesis analyses the structural relations between two verbs within Andrews and Manning’s (1999) *information spreading* in Lexical Functional Grammar. An unaccusative V2 takes an event theme as a sole argument, which turns out to be a sentential subject, namely the subj(ect) of V2 is the embedded V1 clause. V2 in transitive type takes an agent and an event theme that are mapped onto a subj and an xcomp (complement clause introduced by the first verb (V1)) respectively. Serial verb type is challenging for LFG. Since V1 and V2 share a subj and an obj(ect), two predicates seem to become a single predicate in syntax as assumed in Matsumoto (1996). I assume that V1 and V2 of the serial verb type are placed under the V node (the whole compound) in c-structure. Since information spreading allows more flexible grammatical information sharing among c-structure nodes by dividing the information into natural classes, V1 shares only grammatical relation with its mother V, while V2 shares more information. Further, I define V1 as a semantic argument of V2, which becomes a pseudo-complement ARG that semantically contributes to the proposition introduced by V2 but is not a clausal nucleus in f-structure. Thus, V1 and V2 do not constitute a single predicate in the serial verb type, rather V2 takes two core verbal arguments mapped onto a subj and an obj and one non-core argument (V1) mapped onto a pseudo-complement ARG, and the ARG only shares grammatical relations with the whole compound.
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Abbreviations

ACC  accusative
ARG  pseudo-complement
ASP  aspect
COMP complementiser
DAT  dative
FOC  focus
FUT  future
GEN  genitive
GF   grammatical function
HON  honorific
IMP  imperative
LOC  locative
NEG  negative
NOM  nominative
PASS passive
OBJ  object
Q    interrogative
SUBJ subject
TOP  topic
VN   verbal noun
XCOMP open complement
1 Introduction

In recent morphological and syntactic theories, complex predicates have attracted much attention as found in Alsina et al. (1997). Complex predicates are roughly defined as multiple-headed predicates. Thus, unlike the case where a clause introduced by one predicate functions as a complement of the other predicate, two predicates shares grammatical relations, SUBJ and OBJ for example, and the complex predicate normally represents a single event. Reflecting this view, many studies in Lexical Functional Grammar (LFG) assume that argument structures of two or more predicates are fused so that they turn out to be a composite argument structure although each predicate still occupies an independent terminal node in the c(onstituent)-structure, namely surface phrase structure (Alsina 1996, Butt 1995). This means, for instance, two predicates X and Y in the c-structure are mapped onto a single, i.e. mono-clausal, PRED ‘X-Y’ in the corresponding f(unctional)-structure.

Andrews and Manning (1999) argue against this way of handling complex predicate formation in syntax. Although they accept and adopt the basic concept of ‘predicate composition’ and strongly support the independence of c-structure configurations from those of f-structure, they point out the conceptual difficulties of Alsina and Butt’s mechanism to attain them. Since PRED values can never unify under standard LFG assumption, Alsina and Butt re-interpret ‘↑=↓’ as the sharing of all attributes except PRED (Alsina (1996) uses ‘↑=H↓’ for this sharing). However, the mechanism to trigger predicate composition, i.e. ‘X-Y’ formation in f-structure, is unclear in the case of Butt, or requires a significant departure from the standard LFG theoretical assumptions in the case of Alsina’s ‘↑=H↓’ and the sister PRED composition function ‘F’. Further, they claim that serial verb constructions, which are found in Tariana and Miskitu for instance, are problematic for Alsina’s (1997) claim that “two complete predicates cannot be composed” in that in face two complete verbs form a complex predicate in those constructions.

To realise predicate composition without violating the theoretical assumptions of LFG, Andrews and Manning propose information spreading approach to complex predicate, which allows more flexible grammatical information sharing among c-structure nodes by dividing it into natural classes. Further, they introduce ‘pseudo-complement’ which is a semantic verbal argument and occupies a terminal node in c-structure, but is not a independent clause nucleus in f-structure. They call it ARG. With this architecture, complex predicates are well-captured. That is, one predicate X is a pseudo-complement of the other predicate Y and shares only restricted grammatical infor-

\footnote{For the detailed discussion on this point see Andrews and Manning (1999:Ch.2).}
mation with Y, such as grammatical relations SUBJ, OBJ.

This paper adds cross-linguistic support to information spreading approach to complex predicates. The data analysed are verb-verb compounds in Japanese. As shown in the next section, Japanese has very productive verb-verb compounding formation in syntax. The close examinations have shown that the structural relation between two verbs differs among compounds. I shall show how to capture such structural relations within LFG. Interestingly, one type of the compounds suggests that it behave like serial verb constructions and two verbs form a complex predicate. After introducing the basic compounding formation in question in section 2, the previous analyses within GB and LFG frameworks are summarised in section 3. Section 4 is the proposal within information spreading and Section 5 is conclusions.

2 The basics

It has been reported that Japanese has two types of verb-verb compounds (VVCs): lexical and syntactic (Kageyama 1989, 1993, 1999). Lexical VVCs are created in the lexicon (or lexeme formation in Aronoff’s (1994) term) and inserted into syntax as one lexical entry, whereas syntactic VVCs are formed in syntax, namely two lexical items occupy the distinctive syntactic V nodes and they are combined in syntax. I list some of them in (1):

(1) a. Lexical VVCs

   b. Syntactic VVCs

Some evidence of this distinction comes from the fact that the operations that are thought to occur in syntax are applicable to syntactic VVCs, but not to lexical VVCs. 2 Honorification o-V1-ni nari-V2, for example, can apply only to syntactic VVCs:

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2As discussed in the subsequent sections, the applicability of each test presented here changes among various types of the syntactic VVCs since the degrees of syntactic depen-
Another argument comes from the fact that V1 in the syntactic VVCs can be replaced by verbal proform *soo shi* (infinitive form of *soo suru*) ‘do so’ whereas it is impossible for the lexical VVCs as shown in (3):

(3) a. *Taroo-ga* bin-o nage-sute-ta-no-o mite, *Jiroo-mo*  
Tar-o-NOM bottle-ACC throw-abandon-PAST-COMP-ACC saw Jiroo-too  
soo-shi-sute-ta.  
so-do-abandon-PAST  
‘Seeing Taro throwing away the bottle, Jiro did so too’

b. *Takeshi-ga* dezaat-o tabe-hajime-ta-no-o mite, *Naomi-mo*  
Takeshi-NOM dessert-ACC eat-start-PAST-COMP-ACC saw Naomi-too  
soo-shi-hajimeta.  
so-do-start  
‘Seeing Takeshi beginning to eat the dessert, Naomi did so too’

Further, verbal noun (VN) + light verb *shi* (infinitive form of *suru*) can be used as V1 in the syntactic VVCs but not in the lexical VVCs:

(4) a. nage-komu → * tookyuu-shi-komu  
throw-insert throw(VN)-do-insert  
‘throw into’
b. uchi-korosu → * shageki-shi-korosu
   shoot-kill       shoot(VN)-do-kill
   ‘shoot to death’

c. kaki-hajimeru → kijutsu-shi-hajimeru
   write-start     description(VN)-do-start
   ‘start writing’

d. dashi-wasueru → tokan-shi-wasueru
   post-forget     post(VN)-do-forget
   ‘forget to post’

All of the arguments above suggest that two verbs of the syntactic VVCs are separable whereas those of the lexical VVCs are not. Since two verbs of the syntactic VVCs are combined in syntax, honorification can occur between V1 and V2, and V1 can be replaced by other elements such as verbal proform and VN + light verb. In the case of the lexical VVCs, however, none of those operations is possible, because two verbs are combined and lexicalised in the lexicon. They behave as one lexical entry and do not allow to be separated in syntax. This structural difference between the lexical and syntactic VVCs causes the further differences. The lexical VVCs have conventional and idiomatic meanings, while the syntactic VVCs are semantically transparent, i.e. compositional. As Kageyama (1993:78) notes, lexical VVC *nomi-aruku* (drink-walk) indicates that what is drunk is alcohol, whereas syntactic VVC *nomi-hajimeru* (drink-start) can take any kinds of objects such as water, juice etc. Moreover, the productivity of each VVC is different. V2 in the syntactic VVCs can be combined with various V1 if the combination is semantically interpretable. But the productivity of the lexical VVCs is limited because of their idiomaticity.

This paper focuses on the syntactic VVCs. Their formation in syntax sheds light on the internal structures of complex predicates. Before introducing my analysis, let us look at two previous studies on this sort of VVCs, Government and Binding (GB) based analysis (Kageyama 1993) and LFG analysis (Matsumoto 1996) in the next section.

3 Derivational and non-derivational approaches

3.1 Kageyama (1993)

Kageyama (1993:Ch.4) tries to account for syntactic VVCs in the spirit of GB. He argues that this type of VVCs is formed in D-structure and behaves
as one word in S-structure. Kageyama classifies syntactic VVCs according to their different behaviours in D-structure.

Firstly he proposes the distinction between the unaccusative type and the transitive type, attributing the properties of the whole VVCs to those of V2. He points out that V2 in the unaccusative type does not require an agent, taking only an event theme, whereas V2 in the transitive types requires an agent as well as a theme. This contrast can be found in the following examples (Kageyama 1993:140-1):

    accident-NOM happen-set-PAST
    ‘An accident was about to happen.’

b. Kane-ga nari-kake-ta.
    bell-NOM ring-set-PAST
    ‘The bell was about to ring.’

    bonze-NOM New Year’s eve-GEN bell-ACC ring-finish-PAST
    ‘The bonze finished ringing the bell notifying the New Year.’

b.*Joya-no kane-ga nari-oe-ta.
    New Year’s eve-GEN bell-NOM ring-finish-PAST
    ‘The bell notifying the New Year finished ringing.’

In (5), the subjects *jiko ‘accident’ and *kane ‘bell’ are not agents. What both sentences suggest is that the event described by the V1 predicates is about to occur (kakeru). For example, (5b) indicates that the ringing event of the bell was about to come. This means that V2 kakeru ‘set’ takes an event theme represented by V1 as a sole argument. Thus, Kageyama calls this type of VVCs “unaccusative.” V2 in (6), on the other hand, requires an agent. (6a) suggests that the bonze finished the event of his ringing the bell. (6b) where non-agentive NP *joya-no kane ‘New Year’s bell’ is the subject is ungrammatical, since it does not satisfy the argument structure requirement. In other words, V2 oeru ‘finish’ takes two arguments, an agent and an event theme, so Kageyama calls it “transitive.”

Some verbs such as tsuzukeru ‘continue’ and hajimeru ‘start’ can be both types as shown in (7):

(7) a. Bukka-ga agari-tsuzuke-ta.
    price-NOM rise-continue-PAST
    ‘Prices continued to rise.’
b. Gooru-made hashiri-tsuzuke-ro!
    goal-till run-continue-IMP
    ‘Continue to run to the goal!’

Since *bukka* ‘price’ is not agentive, V2 *tsuzukeru* is unaccusative in (7a), that is it takes one argument describing the event of price rising. (7b), on the other hand, is imperative, so V2 requires an agent, the hearer in this case. This suggests that *tsuzukeru* in (7b) is transitive. Thus, (7b) represents the command that the hearer should continue the event of his/her running.

Kageyama further divides the transitive VVCs into two types: the VP complement type and the V’ complement type. The motivation behind this distinction comes from the different behaviours in what Nishigauchi (1993) calls long-distant passive. Let us look at the following contrast (Kageyama 1993:144-5):

(8) a.*Daijina kooen-ga kiki-sokonaw-are-ta.
    important lecture-NOM listen-damage-PASS-PAST
    ‘The important lecture was missed listening.’

b.*Man’nenhitsu-ga tsukai-kir-are-te-inai.
    foutain pen-NOM use-finish-PASS-PAST-NEG
    ‘The fountain pen is not finished using.’

(9) a. Kono hon-wa itsumademo yomi-tsuzuker-are-ru-daro.
    this book-TOP forever read-continue-PASS-FUT-perhaps
    ‘This book may be continued to be read forever.’

b. Tankoo-ga hori-tsukus-are-ta.
    coal mine-NOM dig-exhaust-PASS-PAST
    ‘The coal mine was dug out thoroughly.’

Although both (8) and (9) are transitive type, VVCs in (9) can be passivised while those in (8) cannot. To explain this difference in passivisation, Kageyama notes that V2 in (9) imposes some semantic restrictions on the patient/theme argument of V1. *Koozan-o hori-tsukusu* ‘dig out the coal mine thoroughly’, for example, does not mean the event of digging the coal mine is exhaustive, but the coal mine is exhausted by the digging event. In other words, *koozan* ‘coal mine’ is the object both for V1 *horu* ‘dig’ and V2 *tsukusu* ‘exhaust.’ VVCs in (8) do not involve such relations. What is damaged or missed in (8a) is not the important lecture but the event of listening.
to the lecture. Hence, Kageyama assumes that the patient/theme argument in (9) type VVCs receives two \(\theta\)-roles from V1 and V2 respectively, whereas that in (8) receives only one \(\theta\)-role from V1. However, assigning two \(\theta\)-roles to one argument apparently violates \(\theta\)-criterion. Thus, Kageyama adds the following revision to \(\theta\)-criterion (Kageyama 1993:155)\(^3\):

(10) \(\theta\)-criterion (revised)
    If multiple predicates function as one complex predicate, their arguments are allowed to be multiple \(\theta\)-marked by each predicate. [my translation—RO]

Kageyama proposes the following two types of transitive VVCs to differentiate between (8) type and (9) type:

(11) Transitive VP complement type
    a. Taro-o-wa daijina kooen-o kiki-sokone-ta.
       Taro-TOP important lecture-ACC listen-damage-PAST
       ‘Taro missed the chance of listening to the important lecture.’
    b. 

    \[
    \begin{array}{c}
    \text{VP} \\
    \text{NP} \\
    \text{Taro-ga} \\
    \text{VP} \\
    \text{V'} \\
    \text{V2} \\
    \text{NP} \\
    \text{V'} \\
    \text{sokone-ta} \\
    \text{PRO, NP} \\
    \text{daijina kooen-o kiki} \\
    \text{V1}
    \end{array}
    \]

(12) Transitive V' complement type
       miner-NOM coal mine-ACC dig-exhaust-PAST
       ‘The miners dug out the coal mine thoroughly.’

\(^3\)Kageyama also notes that double \(\theta\)-marking is made possible by Baker’s (1989) idea that the \(\theta\)-marking of internal argument is done within the projection of V'.
The difference between those two structures is whether the complement of V2 is VP or V′. Since θ-assignment is a local operation, the matrix verb V2 can assign θ-role to the object NP in (12) but not in (11). Those structures explain the difference in passivisation. Since the transitive VP complement type (11) contains PRO in its complement, the object NP, *daijina kooen*, cannot raise according to Relativised Minimality (Rizzi 1990), namely PRO blocks the raising of *daijina kooen*. Such blocking does not occur in the transitive V′ complement type, so that it allows passivisation.

Compared with the transitive types, Kageyama assumes the following structure for the unaccusative type:

(13) **Unaccusative type**

   bell-NOM ring-set
   ‘The bell is about to ring.’

b. 

In (13), V2 *kakeru* takes a VP complement, which represents the event described by V1 predicate, and within the VP complement another unaccusative verb *naru* takes a theme NP *kane*. Of course V1 can be any types of verb such as unergative and transitive where the Spec of the embedded VP
is occupied by the agent NP of V1. The important point in this unaccusative type structure is that it lacks the external argument, i.e. the leftmost NP in (13b).

Assuming those three types of VVCs, other two puzzling phenomena can be explained. Firstly, the place of subject honorification maker differs among three types. The unaccusative type and the VP complement type take \( o-V1-ni\ nari-V2 \) form, not \( *o-V1V2-ni\ naru \), whereas the \( V' \) complement type shows the opposite behaviour as in (14-16):

(14) a. Shachoo-wa kaisha-no keihi-o o-tsukai-ni nari-sugiru.
CEO-TOP company-GEN expense-ACC HON-spend-DAT become-exceed
'The CEO spends the company’s expenses too much.'

b. *Shachoo-wa kaisha-no keihi-o o-tsukai-sugi-ni naru.
CEO-TOP company-GEN expense-ACC HON-spend-exceed-DAT become

Yamada-teacher-TOP dinner-ACC HON-eat-DAT become-damage-PAST
'Mr Yamada missed the chance to eat dinner.'

Yamada-teacher-TOP dinner-ACC HON-eat-damage-DAT become-PAST

Tanaka-teacher-TOP phone-ACC HON-ring-DAT become-forget-PAST
'Mr Tanaka forgot to ring.'

Tanaka-teacher-TOP phone-ACC HON-ring-forget-DAT become-PAST

Subject honorification is thought to be an operation occurring from the embedded clause to the matrix clause in a cyclic manner. The unaccusative type (14) and the VP complement type (15) contain a subject in their V1 projection (PRO in the case of the VP complement type), so the predicate V1 is given an honorific marker. The \( V' \) complement type (16), on the hand, does not have a subject in its complement \( V' \) projected from V1, so that honorification does not apply in this complement. Since the higher VP containing the subject governs both V1 and V2, an honorific marker is attached to this whole V1V2 compound.
The second puzzling phenomenon is scopal ambiguity of adverbials. In GB, adverbs are thought to be placed outside VP, so Kageyama’s proposed structures predict that the unaccusative and the VP complement types have a scopal ambiguity depending on whether the adverb takes the scope over the lower VP, i.e. V1, or the higher VP, i.e. the whole VVC. The V′ complement type, on the other hand, does not produce such an ambiguity. Those are schematised as follows:

(17) a. \( [\text{VP} [\text{ADV} [\text{VP} . . . V1]] V2] \)

b. \( [\text{ADV} [\text{VP} . . . [\text{VP/V′} . . . V1]] V2] \)

The unaccusative and the VP complement type can take both (17a,b) scopes, while the V′ complement type can only take (17b) scope.

3.2 Matsumoto (1996)

Matsumoto (1996:Ch.7) analyses Japanese syntactic VVCs within LFG. He, like Kageyama, reaches the conclusion that there are three types in the syntactic VVCs. With the assumption of parallel levels of linguistic structures of LFG, Matsumoto classifies this type of VVCs by mono- or bi-clausality both in a(rgument)-structure and f(unctional)-structure. Let us look at his proposed structures for each type (Matsumoto 1996:175-6,187):

(18) **Type I**

a. Jon-ga kono hon-o
John-NOM this book-ACC
yomi-owat-ta.
read-cease-PAST
‘John ceased to read this book.’

b. \[
\begin{array}{c}
\text{REL} \\
\text{EVENT} \\
\text{AGENT} \\
\text{PATIENT}
\end{array}
\begin{array}{c}
\text{‘cease(EVENT)’} \\
\text{‘read(AGENT, PATIENT)’} \\
\text{‘John’} \\
\text{‘this book’}
\end{array}
\]
(19) **Type II**

    John-NOM book-ACC read-begin-PAST
    ‘John began to read a book.’

b. [REL ‘initiate⟨AGENT, SUBEVENT⟩’]
   [AGENT [REL ‘John’]
   [SUBEVENT [AGENT [ ]
   [PATIENT [REL ‘book’]]]]

c. [PRED ‘initiate-reading⟨SUBJ, OBJ⟩’]
   [SUBJ [PRED ‘John’]]
   [OBJ [PRED ‘book’]]

(20) **Type III**

    I-TOP there-FOC go-be.reluctant-PAST
    ‘I was reluctant to go there.’

b. [REL ‘be reluctant⟨EXPERIENCER, EVENT⟩’]
   [EXPERIENCER [REL ‘I’]
   [EVENT [AGENT [ ]
   [GOAL [REL ‘there’]]]]
The classification is similar to Kageyama’s. Type I corresponds to the unaccusative type, Type II to the transitive V′ complement type and Type III to the transitive VP complement type. Matsumoto shows how his proposed structures account for the different behaviours of each type, most of which are covered in Kageyama’s analysis. Let us look at them briefly.

The first argument is passivisation. Matsumoto claims that passivisation of the whole VVC is possible for Type II but not for Type I and III. It is natural that Type I does not allow passivisation of the whole VVC since V2 is an unaccusative verb and only takes one theme argument. The contrast between type II and III is shown in (8) and (9) in Kageyama’s examples. In Matsumoto’s framework, this contrast is explained by their difference in a-structures and mapping to f-structures. He assumes that EVENT is semantically independent of the situation described by the matrix predicate, so that it is mapped onto an independent f-structure, namely XCOMP. In this case, passivisation of the whole VVC is impossible. SUBEVENT, on the other hand, is semantically interwoven with the situation described by the matrix predicate, so that SUBEVENT and the matrix predicate are mapped onto a single predicate in f-structure, “initiate-reading” in (19c). This case allows passivisation of the whole VVC.

On the contrary, Matsumoto claims that passivisation of V1 is possible for Type I and III but not for Type II (Matsumoto 1996:178,187). 4

(21) a. Sono machi-ga koogeki-s-are-owat-ta. (Type I)
   the city-NOM attack(VN)-do-PASS-finish-PAST
   ‘The city stopped being attacked.’

   b.*Sono machi-ga koogeki-s-are-oe-ta. (Type II)
   the city-NOM attack(VN)-do-PASS-finish-PAST
   ‘The city stopped being attacked.’ (intended)

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4As Kageyama (1993:165-7) notes, the possibility of V1 passivisation in Type III varies among the speakers. He concludes that it comes from the different lexical properties of V2 for each speaker. I will discuss this issue in the next section.
c. Jon-wa  Biru-ni-wa  but-are-kane-ta.  
John-TOP Bill-by-FOC  beat-PASS-be.reluctant-PAST
‘John was reluctant to be beaten by Bill.’

Since Type I and III have a full syntactic complement introduced by V1, i.e. XCOMP, there is no restriction on passivisation within that complement. V1 in Type II, on the other hand, does not have a full syntactic complement, that is, it is a part of a single PRED. Further it needs an agent triggering the event intentionally. Since passivisation is an operation of suppression of the agent, the passivisation of V1 is impossible.

As shown in (14-16), Type I and III take o-V1-ni nari-V2 form for subject honorification, whereas Type II takes o-V1V2-ni naru form. To explain this contrast, Matsumoto assumes that honorific marking can be placed only on a unit that constitutes one PRED in f-structure. Since V1 and V2 constitute a single PRED in Type II, honorific marking is placed on the whole VVC. In the case of Type I and III, V1 alone constitutes single PRED, so that honorific marker is placed onto V1. However, his proposed principle allows only V2 in Type I and III to be given honorific marking, which is impossible. Hence, it is better to assume that honorific marker is placed onto the most embedded PRED.

I mentioned the scopal ambiguity of adverbials in the previous section. Matsumoto shows the following examples (Matsumoto 1996:181-2).

(22) a. Yuushoku-wa goji-to rokuji-no aida-ni tabe-rare-hajime-ta.  
supper-TOP five-and six-GEN middle-LOC eat-PASS-begin-PAST
‘Supper was started between 5 and 6.’  
‘The habit (situation) of eating supper between 5 and 6 began.’

b. Yuushoku-wa goji-to rokuji-no aida-ni tabe-hajime-rare-ta.  
supper-TOP five-and six-GEN middle-LOC eat-begin-PASS-PAST
‘Supper was started between 5 and 6.’  
*‘The eating of supper between 5 and 6 was begun.’

Type I (22a) allows the adverbial goji-to rokuji-no aida-ni ‘between 5 and 6’ to modify either V1 taberu ‘eat’ or the whole VVC, so that a scopal ambiguity arises as indicated in the translations. In Type II (22b), however, the adverbial cannot modify only V1 taberu ‘eat’, so that the scopal ambiguity does not arise. Similarly, Type III allows adverbials to modify only V1 as shown in (23) (Matsumoto 1996:188):
(23) Jon-wa {Marii-to-isshoni / ichi-nichi oki-ni / sude-de} -wa
John-TOP Mary-with-together / every other day / with bare hand -FOC
iki-kane-ta.
go-be.reluctant-PAST
‘John was reluctant to go {with Mary/every other day/without any
gift}.’

In (23), adverbials placed in braces modify only V1 *iku* ‘go’.
Matsumoto claims that such ambiguities can be captured in his proposed
structures. Since Type I and III have an independent f-structure XCOMP
for V1, adverbials that is mapped onto f-structure ADJUNCT can be placed
within XCOMP or the matrix clause. This causes a scopal ambiguity. V1 in
Type II does not have an independent PRE, so that adverbials only take
the wider scope over the whole VVC.

Lastly, he argues that verbal anaphora (proform) *soo suru* ‘do so’ can
replace V1 in Type I and III but not in Type II (Matsumoto 1996:184,188):

that painting-TOP they-by repair(vn)-do-PASS-continue-ASP
Kono hekiga-mo soo-s-are-tsuzukete-iru. (Type I)
this painting-too soo-do-PASS-continue-ASP
‘That mural painting has continued to be repaired by them. So has
this painting.’

that painting-TOP they-by repair(vn)-do-continue-PASS-ASP
??Kono hekiga-mo soo-shi-tsuzuke-rarete-iru. (Type II)
this painting-too soo-do-continue-PASS-ASP
‘That mural painting has continued to be repaired by them. So has
this painting.’ (intended)

c. Boku-wa sono koto-o ii-kane-ta.
I-TOP the thing-ACC say-be.reluctant-PAST
Marii-mo soo shi- kane-ta rashii. (Type III)
Mary-too so do- be.reluctant-PAST seem
‘I was reluctant to say it. It seems that Mary was reluctant to do
so, too.’

In Matsumoto’s f-structures, V1 in Type II is a part of PRE whereas V1
in Type I and III has their own PREs and introduces independent clause
xcomps. Hence, only Type I and III allow V1 to be replaced by verbal proform.

Although Matsumoto shows good evidence to support his proposed structures, his analysis has some conceptual difficulties. Firstly, he assumes the raising structure for Type I which involves functional control. English raising verbs like seem, believe have an athematic argument and an event theme and they are mapped onto subj and xcomp respectively by Lexical Mapping Theory. That subj is linked with one of the grammatical functions within the xcomp. However, as Kageyama noted, V2 in this type of Japanese VVC is an unaccusative verb that takes only one theme argument. It is unclear how to realise the matrix subj mapping without any argument to be mapped.

Secondly, Matsumoto’s Type II structure fails to capture the difference between lexical and syntactic VVCs. Similar to Alsina’s (1996, 1997) Romance causative and Butt’s (1995) Hindi/Urdu permissive analyses, Matsumoto assumes that arguments of two verbs are fused in the “syntactic” level and function as a single pred in f-structure as shown in (19). However, V1 and V2 in some lexical VVCs such as utai-ageru (sing-complete) ‘sing up’ are combined in the lexicon by argument fusion and inserted into syntax as one lexical entry, which is schematised as follows:

\[(25) \text{utai} < \text{Ag} \text{Th} >+ \text{ageru} < \text{Ag Event} > \]
\[\rightarrow \text{utai-ageru} < \text{Ag} < \text{Ag Th} >> \]
\[\rightarrow \text{‘utai-ageru} < \text{SUBJ, OBJ}\text{’} \]

Ignoring the representational differences, this structure is exactly the same as the a-structure in (19b) which Matsumoto proposes as syntactic Type II VVCs. Hence, Matsumoto’s proposing Type II structure cannot differentiate the syntactic VVCs from the lexical VVCs like (25).

Matsumoto’s proposed single pred for Type II causes a further problem. As shown in section 1, V1 in syntactic VVCs can be replaced by VN + light verb (suru). V1 can be replaced by VN-o + suru as well. For example, yomi in yomi-hajimeru (read-begin) ‘begin to read’ can be replaced by dokusho-o-shi (reading(VN-ACC)-do), so that the whole compound becomes dokusho-o-shi-hajimeru. VN-o light verb construction itself is a large issue to discuss, but Matsumoto (1996:Ch.4) assumes that VN-o light verb constructions have a bi-clausal f-structure. This means that a part of a single pred should be replaced by bi-clausal f-structure, which is quite problematic in the framework.
4 The analysis

4.1 Information spreading

Andrews and Manning (1993, 1999) propose a new approach to complex predicates in LFG, called information spreading. One of the notable feature of Classic LFG found in Bresnan (1982) is strong separation between c(onstituent)-structure, i.e. surface phrase structure, and f-structure. These two structures are linked by $\phi$ mapping. However, as Andrews and Manning note, this mapping is too simple. In particular, headship relation of f-structure is realised by functional equation $\uparrow=\downarrow$ that makes every grammatical information shared between mother and daughter. The result is that hierarchical relations in c-structure are flattened in f-structure. Andrews (1983) points out the scopal problems of adjectives this flattening operation causes. In short, “it (Classic LFG $\phi$ mapping) is not flexible enough, and does not provide a sufficiently general concept of headship” (Andrews and Manning 1999:5). We want some kinds of grammatical information to be shared between mother and daughter, but other kinds of information not to be shared, so that grammatical information can spread in various ways and some hierarchical relations are reflected in f-structure.

To attain those purposes, Andrews and Manning (1999) propose two mechanisms. Firstly, they divide grammatical information into five natural classes as shown in (26):

\begin{enumerate}
  \item $\kappa$: X-bar categories like N, V, etc.
  \item $\beta$: for the BAR attribute(s) or equivalent in X-bar theory.
  \item $\rho$: Grammatical Relations (SUBJ, OBJ, ADJUNCT, \ldots).
  \item $\alpha$: Argument-structure related attributes (LCS, ARG, TERMS).
  \item $\mu$: Morphosyntactic features (GEND, NUM, TENSE, etc.)
\end{enumerate}

They assume that those sets are a fixed inventory supplied by UG. Further, they allow each class of information to be shared among c-structure nodes by positive restriction. For example, $f_\rho = g_\rho$ means $f$ and $g$ share the set of grammatic features $\rho$. They formalise the following equation (Andrews and Manning 1999:14):

\begin{equation}
\text{Restricted Equality:}
\end{equation}

\begin{equation}
\text{Where } \alpha, \kappa, \ldots \text{ are sets of attributes (restricted projections),}
\end{equation}
According to this equation, \( ↑ = \{κ, ρ, µ\} \downarrow \) means that mother and daughter share the sets of information \( κ, ρ \) and \( µ \) i.e. syntactic category, grammatical relations and morphosyntactic features. But we use abbreviated notation omitting up and down arrows like \( '=' = \{κ, ρ, µ\} \) for this mother and daughter sharing.  

Another change from Classic LFG is displacement of \text{PRED}. Andrews and Manning introduce two attributes \text{LCS} (Lexical Conceptual Structure) and \text{TERMS} instead of \text{PRED}. LCS, as known in Lexical Semantics (Jackendoff 1990, Levin and Rappaport Hovav 1995 and many others), is some kind of semantic metalanguage representation and \text{TERMS} is a list of term, i.e. core, arguments. In this paper, I do not pursue full detailed descriptions of LCS, but rather I use abbreviated representations of LCS to avoid the complication.

4.2 A proposal

4.2.1 C-structure and feature structure

To accommodate the phenomena observed in the previous section, I propose three distinct c-structures and corresponding feature structures for each type of syntactic VVCs. Firstly, I propose the following Phrase Structure (PS) rules:

\[
\begin{align*}
(28) \text{a. } & S \rightarrow \text{NP* V} \\
& \quad \text{GF} = \{ρ, α, µ\}

de & = f(α, κ, \ldots) = g(α, κ, \ldots)
\end{align*}
\]

I assume the exocentric phrase structure for Japanese, so that non-projected \( S \) dominates \( \text{NP and V. GF} \) (grammatical function) in Japanese is thought to be largely determined by particle, not word order (dependent-marking in the sense of Bresnan (2001:111). See Ohara (2000:Ch.3) for the detailed description.

\[\text{17}\]
discussion on the roles of particles in Japanese within LFG). I suppose that a verb also plays an important role to determine the embeddedness of NPs, which will be demonstrated in the annotated phrase structures below. As indicated in (28b), V further dominates S or V and another V, which captures the syntactic VVCs in question. It is possible to claim that some functional projection FP dominates S and XP having DF (discourse function TOP or FOC) is placed in Spec-FP like (29) (Bresnan 2001:114):

![Diagram](image)

But since pursuing such phrase structure variations is beyond the purpose of this paper, I leave it for future research.

Now, let us look at the c-structure for the unaccusative type (Type I in Matsumoto’s):

(30)  

Unaccusative type

a. Kooshitsu-ga  
royal family-NOM  
zeikin-o tsukai-sugiru.  
tax-ACC spend-exceed  
‘The royal family too much spends tax.’

earthquake-NOM happen-be.possible  
‘An earthquake may happens.’
According to (28a), three constituents, two NPs and V, are placed under the topmost S. Since these two NPs have grammatical relations with V1 in the embedded clause, their GFS are SUBJ SUBJ and SUBJ OBJ respectively. This embeddedness of GFS are determined by the V following two NPs. By (28b) this V has two daughters, S and V (=V2). The mother V shares the sets of information κ, ρ, α and µ with the daughter V2. The sentential subject S is projected from V (=V1) following (28a). This c-structure produces the following feature structure by constructing the sharing information:

\[
(31) \begin{bmatrix}
\text{LCS} & \text{[Become(Over(X))]} \\
\text{TENSE} & \text{PRES} \\
\text{SUBJ} & \text{[Spend(Y,Z)]} \\
\text{OBJ} & \text{[Thing royal family]} \\
\end{bmatrix}
\]

As discussed in section 3, V2 appearing in this type is unaccusative, so that it takes only a sentential theme as indicated by TERMS ⟨X⟩. This argument functions as sentential SUBJ, so that within SUBJ another sentence introduced by V1 is embedded.
The next one is the transitive type (Kageyama’s transitive VP complement type and Matsumoto’s Type III): 6:

(32)  

**Transitive type**

   Mary-NOM John-DAT kiss-do-damage-PAST
   ‘Mary missed the chance to kiss John.’

b. Sushi-to tempura, dochira-o taberu-ka kime-kane-ta.
   sushi-or tempura which-ACC eat-Q decide-be.reluctant-PAST
   ‘Sushi or tempura, I couldn’t decide which to eat.’

c. 

\[
\begin{array}{c}
\text{SUBJ} \\
\downarrow \\
\text{Marii-ga} \\
\end{array} \quad \begin{array}{c}
\text{XCOMP} \\
\downarrow \\
\text{Jon-ni} \\
\end{array} \quad \begin{array}{c}
\text{OBJ} \\
\downarrow \\
\text{kiss-shi} \\
\end{array} \\
= \{\rho, \alpha, \mu\}
\]

\[
\begin{array}{c}
\text{SUBJ} \\
\downarrow \\
\text{Marii-ga} \\
\end{array} \quad \begin{array}{c}
\text{XCOMP} \\
\downarrow \\
\text{S} \\
\end{array} \quad \begin{array}{c}
\text{OBJ} \\
\downarrow \\
\text{Jon-ni} \\
\end{array} \\
= \{\kappa, \rho, \alpha, \mu\}
\]

\[
\begin{array}{c}
\text{S} \\
\downarrow \\
\text{V2} \\
\end{array} \\
= \{\rho, \alpha, \mu\}
\]

\[
\text{sokonat-ta}
\]

d. 

\[
\begin{array}{c}
\text{LCS} \quad [\text{Miss}(X,Y)] \\
\text{TERMS} \quad \langle X, Y \rangle \\
\text{TENSE} \quad \text{PAST} \\
\hline
\text{SUBJ} \quad \begin{array}{c}
\text{LCS} \\
\text{TERMS} \\
\langle \text{Mary} \rangle \\
\end{array} \\
\text{XCOMP} \quad \begin{array}{c}
\text{LCS} \\
\text{TERMS} \\
\langle X, Z \rangle \\
\text{SUBJ} \\
\end{array} \\
\text{OBJ} \quad \begin{array}{c}
\text{LCS} \\
\text{TERMS} \\
\langle \text{John} \rangle \\
\end{array} \\
\end{array}
\]

\[\text{\textsuperscript{6}kisu-suru ‘kiss’ in (32a) can be regarded as VN (kisu) + light verb (suru). But I treat it as a single verb here to avoid the complication. Even if it is analysed as VN + light verb, it does not affect the current argument.}\]
As shown in (32c), two NPs, the matrix subject NP and the embedded object NP, are sisters under S on the surface structure, i.e. c-structure level. The head V has two daughter, V2 and the embedded S projected from V1. This c-structure produces the feature structure of this type as in (32d). In this type, V2 takes an agent and an event theme described by V1. Hence, the resulting feature structure is basically the same as Matsumoto’s containing xcomp and functional control, which is defined by the functional equation \( (↑\text{xcomp subj})=(↑\text{subj}) \). The matrix clause in (32d) says that Mary \((=X)\) missed the event \((=Y)\). The embedded clause xcomp describes the event, that is she \((=X)\) kissed John \((=Z)\).

The last one is what I call serial verb type (Kageyama’s transitive V’ complement type and Matsumoto’s Type II). This type is a kind of resultatives, that is, the event represented by V1 causes the object to result in the state described in V2. This resultative property can be found in LCS of (33d).

(33) Serial verb type

   Steve Parish-NOM Ayers Rock-GEN picture-ACC photo-renew-PAST
   ‘Steve Parish renewed the picture of Ayers Rock by photographing it again.’

b. Pinku Furoido-no fan-ga kaijoo-o ume-tsukushi-ta.
   Pink Floyd-GEN fan-NOM hall-ACC occupy-exhaust-PAST
   ‘The fans of Pink Floyd filled the hall thoroughly.’

c. \[
\begin{array}{c}
S \\
/ \\
\text{SUBJ} \\
\text{NP} \\
\text{Styiibu Parishu-ga} \\
\text{OBJ} \\
\text{NP} \\
\text{Eaazu Rokku-no} \\
\text{shashin-o} \\
\text{ARG} \\
\text{V} \\
\{\rho, \alpha, \mu\} \\
\text{V1} \\
\{\kappa, \rho, \alpha, \mu\} \\
\text{V2} \\
\text{tori} \\
\text{naoshi-ta}
\end{array}
\]
d. \[
\text{LCS} \begin{bmatrix}
\text{[Cause}(X, \text{Become}(New(Y)))\text{By}(\text{Again}(\text{Photo}(X, Y)))]
\end{bmatrix}
\]
\[
\text{TERMS} \langle X, Y \rangle
\]
\[
\text{TENSE} \text{PAST}
\]
\[
\text{SUBJ} \begin{bmatrix}
\text{LCS} \begin{bmatrix}
\text{[Thing Steve Parish]}^X
\end{bmatrix}
\text{TERMS} \langle \ \rangle
\end{bmatrix}
\]
\[
\text{OBJ} \begin{bmatrix}
\text{LCS} \begin{bmatrix}
\text{[Thing picture of Ayers Rock]}^Y
\end{bmatrix}
\text{TERMS} \langle \ \rangle
\end{bmatrix}
\]
\[
\text{ARG} \begin{bmatrix}
\text{LCS} Z
\text{TERMS} \langle X, Y \rangle
\end{bmatrix}
\]

ARG is one of the features of the α-projection. Since V1 is a pseudo-complement and in some sense is an argument of V2, V1 is given the \(\text{ARG} = \{p\}\) states that V1 shares the information of grammatical relation with its mother. I define a constraint equation \((\uparrow \text{ARG TERMS}) = c(\uparrow \text{TERMS})\) which makes the \text{TERMS} value of V1 the same as that of V2. This constraint is imposed on V1 by V2. Moreover, V2 can access the semantics of V1 through ARG, so that the LCS of V1 contributes to the LCS of the whole VVC. Interestingly, the resulting structures in (33) look like one kind of serial verb construction in that two verbs V1 and V2 are placed just below the V, and one functions as the pseudo-complement, not true complement like transitive type, of the other. In other words, unlike Matsumoto’s single \text{PRED} analysis, this feature structure preserves some degree of independence of V1 as ARG.

A piece of evidence that OBJ in the serial verb type is the object of V2 comes from the case marking. Some verbs in Japanese can take \(ni\) marked (dative) object as well as \(o\) marked (accusative) object (34a). However, when such verbs are used as V1 in the serial verb VVC type and the V2 can take only accusative \(o\)-marked object (34b), the object is obligatorily accusative marked (34c).

As Sadakane and Koizumi (1995) argues, \(ni\) is classified into dative case marker and postposition, and the predicate (verb or adjective) taking \(ni\) marked NP as an argument determines which category \(ni\) is fit into. Following their classification, I use only case marking \(ni\) examples here.

Among my informants, western dialect speakers tend to accept \(ni\) marked example in (34c), though standard Japanese speakers including myself do not accept it. However, even western dialect speakers prefer \(o\) marked example.

\[\text{\footnote{As Sadakane and Koizumi (1995) argues, \(ni\) is classified into dative case marker and postposition, and the predicate (verb or adjective) taking \(ni\) marked NP as an argument determines which category \(ni\) is fit into. Following their classification, I use only case marking \(ni\) examples here.}}\]

\[\text{\footnote{Among my informants, western dialect speakers tend to accept \(ni\) marked example in (34c), though standard Japanese speakers including myself do not accept it. However, even western dialect speakers prefer \(o\) marked example.}}\]
(34) a. Watashi-wa nihonjuu-no yama -o/ni nobot-ta.
   I-TOP throughout Japan-GEN mountain -ACC/DAT climb-PAST
   ‘I climbed the mountains throughout Japan.’

   b. Watashi-wa mondai-no kaiketsu-tameni zenryoku -o/*ni
      solusion-GEN in order to whole energy -ACC/DAT
      exhaust-PAST
      ‘I did my best to solve the problem.’

   c. Watashi-wa nihonjuu-no yama -o/*ni subete nobori-
      I-TOP throughout Japan-GEN mountain -ACC/DAT all climb-
      exhaust-PAST
      ‘I climbed all the mountains in Japan.’

Even if the verb can only take ni marked object, the object NP should be
marked by accusative o when the verb is used as V1 in the serial verb type
as shown in (35). Presumably this is because V2 is the head of the VVC.

(35) a. Watashi-wa Dizunii Rando-de Supeesu Maunten -ni/*o not-ta.
      I-TOP Disneyland-LOC Space Mountain -DAT/ACC ride-PAST
      ‘I rode Space Mountain at Disneyland.’

   b. Watashi-wa Tookyoo Dizunii Rando-ni aru norimono -o/*ni subete
      Tokyo Disneyland-LAND be ride-on -ACC/DAT all
      ride-exhaust-PAST
      ‘I rode all the ride-ons in Tokyo Disneyland.’

This contrast becomes clearer compared with the case where the same V1 is
used in the transitive type VVC as in (36):

(36) a. Shushoo-ga karoo-de kenkoo -o/*ni sokone-ta.
      Prime Minister-NOM overwork-by health -ACC/DAT damage-PAST
      ‘Prime Minister impaired his health by overwork.’

   b. Akutenkoo-no-tame Harii-wa Fujisan -ni/*o nobori-sokone-
      bad weather-GEN-due to Harry-TOP Mt Fuji -DAT/ACC climb-damage-
      PAST
      ‘Harry lost a chance to climb Mt Fuji due to the bad weather.’
(36b, c) are examples of the transitive type VVCs. Although V2
sokonaru ‘damage’ alone does not allow a dative marked object as in
(36a), Fujisan ‘Mt Fuji’ and Supeesu Maunten ‘Space Mountain’ are dative
marked. Thus, they are the objects of V1 noboru ‘climb’ and noru ‘ride’ not
V2 sokonaru ‘damage’. V2 only takes an event theme described by V1 as
shown in (32c).

Matsumoto (1996:194-5) presents two examples as criticism of Kageyama’s
analysis. He claims that naosu ‘renew, redo’ and oeru ‘finish’ can take an
intransitive V1 as in (37) 9:

(37) a. Boku-wa ne-naoshi-ta.
    I-TOP sleep-redo-PAST
    ‘I slept again (to cure the undesirable effect of previous sleeping).’

b. Pooru-wa saigo made hashiri-oe-ta.
    Paul-TOP end as.far.as run-finishi-PAST
    ‘Paul finished running to the end.’

Those examples seem to be problematic to my analysis as well, since they
could violate the constraint equation (\(\uparrow \text{ARG TERMS})=\lambda_\text{c}(\uparrow \text{TERMS})\). However,
I suspect that (37a) is an example of the lexical VVCs since neru ‘sleep’
cannot be replaced by VN (shuushin ‘sleeping’) + suru, namely *shuushinn-
shi-naosu.

Thus, ne-naosu in this example is a single lexical entry. Moreover, as
Matsumoto mentions, ne-naosu indicates that one sleeps in order to cure the
undesirable effect of previous sleeping, not just re-do sleeping. This means
that it acquires some degree of idiomaticity that is one of the properties of
lexical VVCs as mentioned in section 2.

The other example (37b) is a serial verb type. However, as suggested by
saigo made ‘to the end’, when hashiru ‘run’ is used in this type of VVC, it
requires a goal argument. Interestingly, Kageyama (1993:154) points out the
following contrast in passivisation:

(38) a. Zen’in-ga marason koosu-o hashit-ta.
    everyone-NOM marathon course-ACC run-PAST
    ‘Everyone ran on the marathon course.’

9I change Matsumoto’s gloss for naosu in (37a). Although he glosses it as ‘cure’, naosu
meaning ‘cure’ is described by a different Chinese character (kanji) from that in ne-naosu.
b.*Marason koosu-ga hashir-are-ta.
  marathon course-NOM run-PASS-PAST
  ‘The marathon course was run.’

    everyone-NOM marathon course-ACC run-finish-PAST
    ‘Everyone finished running the marathon course.’

b.?Marason koosu-ga hashiri-oer-are-ta.
  marathon course-NOM run-finish-PASS-PAST
  ‘The marathon course was finished running over.’

Although hashiru alone cannot be passivised as in (38), the goal argument can be subject by passivisation of the VVC when hashiru is used as V1 in the serial verb type VVC as in (39). It suggests that this VVC has two arguments that are mapped onto two distinct gf in the feature structure. Since I assume the constraint equation (↑arg terms)=c(↑terms), goal is a core argument when hashiru is used in the serial verb type VVCs. Thus, Matsumoto’s example does not raise any problems for my analysis.  

4.2.2 Passivisation

In the following sections, I will examine how my proposed structures accommodate the distinctive behaviours of each type of VVCs. The first phenomenon is passivisation. As observed in Kageyama (1993) and Matsumoto (1996), the whole VVC of the serial verb type can be passivised whereas that of the other two types cannot.

Andrews and Manning (1999) do not try to formalise the linking theory in detail. I also assume only the basic linking here, that is the first argument of TERMS lists is mapped onto SUBJ and the second argument is mapped onto OBJ. In LFG, passivisation is thought to be an operation in argument-structure where the highest (θ) argument is suppressed, so that it does not link to a grammatical relation (Bresnan and Zaenen 1990). Andrews and Manning (1999:52) formalise this operation within information spreading as follows:

(40) (↑term first)=null

10 Of course, we need to formalise the linking theory more precisely, to define which gf this goal argument is mapped onto in feature structure.
The impossibility of passivisation of V2 in the unaccusative type is easily explained by its TERMS list. Since V2 in the unaccusative type has only one argument \( X \) in its TERMS list as shown in (31), it is impossible to suppress this argument.

It is also impossible for V2 in the transitive type to be passivised. If the top term of V2 is suppressed, the second argument is mapped onto SUBJ. Let us see what this operation does for the feature structure.

(41) a.*Jon-ga (Marii-ni) kisu-shi-sokoner-are-ta.
Jon-NOM Mary-by kiss-do-damage-PASS-PAST
‘John is missed the chance to kiss (by Mary).’

b. 
\[
\begin{pmatrix}
\text{LCS} & [\text{Miss}(X,Y)] \\
\text{TERMS} & \langle \text{Null}^Y, Y \rangle \\
\text{TENSE} & \text{PAST} \\
\text{VOICE} & \text{PASS} \\
\text{SUBJ} & \begin{pmatrix}
\text{LCS} & [\text{Kiss}(X,Z)] \\
\text{TERMS} & \langle X, Z \rangle \\
\text{VOICE} & \text{ACTIVE} \\
\text{OBJ} & \begin{pmatrix}
\text{LCS} & [\text{Thing John}] \\
\text{TERMS} & \langle \rangle \\
\end{pmatrix}
\end{pmatrix}
\end{pmatrix}
\]

Within the sentential SUBJ, V1 introduces an independent clause and has an independent TERMS list. So even if the top term in the matrix clause is suppressed, V1’s TERMS value is still \( \langle X,Y \rangle \). This means that V1 requires \( X \) argument as its SUBJ, which is realised by the functional equation \( (\uparrow \text{xcomp subj}) = (\uparrow \text{subj}) \). However, since \( X \) is suppressed in the matrix clause, the embedded clause cannot find it. It violates completeness condition. Hence, the passivisation of the whole VVC of this type produces ungrammaticality of the sentence.

The serial verb type, on the contrary, allows V2 to be passivised. Look at the resulting feature structure first:

(42) a. Eaazu Rokku-no shashin-ga (Sutyiibu Parishu-ni-yotte) tori-
Ayers Rock-GEN picture-NOM Steve Parish-by photograph-
naos-are-ta.
renew-PASS-PAST

26
‘A picture of Ayers Rock was renewed by being photographed (by Steve Parish) again.’

\[
\begin{align*}
\text{LCS} & \quad \left[ \text{Cause}(X, \text{Become}(\text{New}(Y))) \text{By}(\text{Again}(\text{Photo}(X, Y))) \right] \\
\text{TENSE} & \quad \text{PAST} \\
\text{VOICE} & \quad \text{PASS} \\
\text{SUBJ} & \quad \left[ \text{LCS} \quad \left[ \text{Thing picture of Ayers Rock} \right] \right] \\
\text{ARG} & \quad \left[ \text{LCS} \quad \left[ \text{Terms } \langle \text{Null } X, Y \rangle \right] \right] \\
\end{align*}
\]

Since V2 is passivised, the TERMS list becomes \( \langle \text{Null}^X, Y \rangle \). Because of that, the second argument turns out to be SUBJ. The constraint equation \( (↑\text{ARG TERMS})=c(↑\text{TERMS}) \) makes ARG’s TERMS list become \( \langle \text{Null}^X, Y \rangle \) as well. Since ARG also shares \( \rho \) projection, i.e. grammatical relations, the second argument of TERMS list also becomes SUBJ of ARG. One possible problem here is VOICE, one of the morphosyntactic features. Since V1 is not received a passive marking, it is unclear what value the VOICE of ARG has. The straightforward solution is to assume that V2 in this type imposes a constraint equation \( (↑\text{ARG VOICE})=c(↑\text{VOICE}) \) as well as the constraint on TERMS. Since ARG is a pseudo-complement, namely a semantic argument of V2 clause, it seems natural that V2 imposes on such constraints on it. However, this constraint fails to explain the ungrammaticality of the following example:

(43)*Eaazu Rokku-no shashin-ga (Sutyibbu Parishu-ni-yotte) tor-
Ayers Rock-GEN picture-NOM Steve Parish-by photograph-
are-naos-are-ta.
PASS-renew-PASS-PAST
‘A picture of Ayers Rock was renewed by being photographed (by Steve Parish) again.’

(43) is an example where both V1 and V2 are passivised. This sentence does not violate any constraint equations, that is V1’s TERMS list and VOICE value are the same as V2’s because of the passivisation of V1 despite the ungrammaticality.
In fact, what we see in a V2 passive sentence is a mismatch between form and function, namely V1 is active in form but passive in meaning. We can find a way to account for this form and function mismatch by adopting Sadler and Spencer’s (2001) concept of m(orphological)-feature and s(yntactic)-feature distinction. Sadler and Spencer claim the necessity for distinguishing m-features determining form of the word from s-features determining function of the word in syntax, and analyse Latin deponent verbs like *locutus/a est* (present perfect form of ‘I speak’) and semi-deponent verbs like *gavisus/a est* (present perfect form of ‘I rejoice’) that are passive in form and active in meaning (function). Adopting this idea, we can suppose that V2, regardless of its m-voice value, selects a morphologically active form of V1, namely m-voice value of V1 is active (I use a representation like $(\uparrow \text{arg voice})_t = c \text{ active}$ for m-feature specification), and s-VOICE value both for the matrix clause and ARG is determined by V2’s s-VOICE value.

I summarise the lexical specification of m-features and s-features of V2 related here (‘X $\Leftarrow$ Y’ means ‘s-feature Y is realised as m-feature X’):

(44) a. *naosu*:

\[
(\uparrow \text{voice})=\text{active}
\]
\[
(\uparrow \text{arg voice})_t = c \text{ active}
\]
\[
(\uparrow \text{arg vform})_t = c \text{ inf}
\]

$\Leftarrow (\uparrow \text{VOICE}) = \text{ACTIVE}
\]
\[
(\uparrow \text{ARG VOICE})_t = c (\uparrow \text{VOICE})
\]

b. *naos-areru*:

\[
(\uparrow \text{voice})=\text{passive}
\]
\[
(\uparrow \text{arg voice})_t = c \text{ active}
\]
\[
(\uparrow \text{arg vform})_t = c \text{ inf}
\]

$\Leftarrow (\uparrow \text{VOICE}) = \text{PASSIVE}
\]
\[
(\uparrow \text{ARG VOICE})_t = c (\uparrow \text{VOICE})
\]

Those equations capture the passivisation of the serial verb type VVC by distinguishing form (m-feature) from function (s-feature). With the division between m-features and s-feature, I assume that $\mu$-projection (morphosyntactic features) in information spreading concerns only s-features (TENSE, ASPECT, VOICE etc.), so that form-related m-features (tense, aspect, voice, vform, case etc.) do not appear in the feature structure. How to connect form and function, i.e. the linking between m-structure and feature structure, is outlined in Spencer (2001), Sadler and Spencer (2001:88-92) adopting Stump’s (2001) Paradigm Function Morphology.

Next, let us look at the passivisation of V1. Again the unaccusative type is straightforward. Since V1 introduces an independent clause within the matrix SUBJ, this clause is passivised as shown in (45):

\[\text{I am grateful to Andrew Spencer for this point.}\]
(45) a. Zeikin-ga (kooshitsu-ni-yotte) tsukaw-are-sugiru.
tax-NOM royal family-by spend-PASS-exceed
'Tax is spent too much (by the royal family).'

b. $\begin{array}{l}
\text{LCS} \quad [\text{Become}(\text{Over}(X))] \\
\text{TERMS} \quad \langle X \rangle \\
\text{A TENSE} \quad \text{PRES} \\
\text{VOICE} \quad \text{ACTIVE} \\
\text{SUBJ} \quad \begin{array}{l}
[\text{LCS} \quad [\text{Spend}(Y,Z)] \\
\text{TERMS} \quad \langle \text{Null}^Y, Z \rangle \\
\text{VOICE} \quad \text{PASS} \\
\text{SUBJ} \quad \begin{array}{l}
\text{LCS} \quad [\text{Thing tax}] \\
\text{TERMS} \quad \langle \ angle \\
\end{array}
\end{array}
\end{array}$

In the case of the transitive type, the story is more complicated. As Kageyama (1993:165-7) discusses, there are many cases where the passivisation of V1 turns out to be ungrammatical in this type of VVCs. However, it is related to the semantic change the alternation causes. Unlike the unaccusative type, the semantic value of non-passive VVCs and V1-passive VVCs is different in the transitive type. Consider the following feature structure of the V1-passive sentence:

John-NOM Mary-by kiss-do-PASS-damage-PAST
'John missed the chance to be kissed (by Mary).'

b. $\begin{array}{l}
\text{LCS} \quad [\text{Miss}(Z,Y)] \\
\text{TERMS} \quad \langle Z, Y \rangle \\
\text{TENSE} \quad \text{PAST} \\
\text{VOICE} \quad \text{ACTIVE} \\
\text{SUBJ} \quad \begin{array}{l}
\text{LCS} \quad [\text{Thing John}] \\
\text{TERMS} \quad \langle \ angle \\
\end{array}^Z \\
\text{XCOMP} \quad \begin{array}{l}
\text{LCS} \quad [\text{Kiss}(X,Z)] \\
\text{TERMS} \quad \langle \text{Null}^X, Z \rangle \\
\text{VOICE} \quad \text{PASS} \\
\text{SUBJ} \quad [ \ ] \\
\end{array}^Y
\end{array}$
Compared with (32d), (46b) has the different LCS for the whole sentence. In (32d), ‘Mary’ missed the event that she kissed John. In (46b), however, it is ‘John’ who missed the event. That is, the controller of the event changes. This contrast can be found in English control constructions as in (47):

(47) a. Mary tried to kiss John.

b. John tried to be kissed by Mary.

Mary tried the event that she kissed John in (47a), that is Mary is a trier. However, if the embedded clause is passivised, the subject of the matrix clause is also changed, namely the trier is John in (47b).

In the transitive type, V1 introduces xcomp, so that it is possible to passivise this clause. However, since functional equation (↑xcomp subj)=(↑subj) defines that xcomp’s subj as identical to the matrix subj, the matrix subj also changes according to the change of xcomp’s subj. That is why the semantic value of each sentence turns out to be different. The subject NP is an agent or an experiencer in both xcomp and the matrix clause in the non-passive sentence. In the passive sentence, however, the subject NP is a patient in xcomp but an agent or an experiencer in the matrix clause. It indicates that the non-passive sentence and the passive sentence are not exchangeable with keeping their semantic values equal. In other words, they are different sentence having distinctive structures. Hence, some sentences that are grammatical in non-passive can be ungrammatical or semantically odd when V1 is passivised as in (48c,d) while both are acceptable in some cases like (48a,b):

    zoo-keeper-NOM busy-because elephant-DAT feed-ACC give-miss-PAST
    ‘The zoo-keeper missed the chance to feed the elephant, because he was busy.’

b. Zoo-ga esa-o atae-are-sobire-te, kanashisouni tatte-ita.
    elephant-NOM feed-ACC give-PASS-miss-PAST sadly stand-PAST
    ‘The elephant missed the change to be fed and was standing sadly.’

    Naomi-TOP parents-to letter-ACC post-miss-PAST
    ‘Naomi missed the chance to post the letter to her parents.’

d.*Ryoshin-eno tegami-ga das-are-sobire-ta.
    parents-to letter-NOM post-PASS-miss-PAST
    ‘The letter to the parents missed to be posted.’
Although both (48b,d) are V1-passive sentences, only (48b) is acceptable. The reason for the unacceptability of (48d) is the oddity that the letter is the agent or experiencer of missing the event. In the case of (48b), it is relatively interpretable that the elephant is the agent or experiencer of missing the event that he/she is being fed.

The serial verb type does not allow its V1 to be passivised as shown in (49):

(49) a. *Eaazu Rokku-no shashin-ga (Sutyiibu Parishu-ni-yotte) tor-
Ayers Rock-GEN picture-NOM Steve Parish-by photograph-
are-naoshi-ta.
PASS-renew-PAST
‘A picture of Ayers Rock was taken (by Steve Parish) again.’

hall-NOM Pink Floyd-GEN fan-by occupy-PASS-exhaust-PAST
‘The hall was filled with fans of Pink Floyd.’

As I defined in (44), V2 puts the form constraint on V1, namely (↑arg voice)=c active. Since V1 passive sentences in (49) violate this constraint, they are ungrammatical.

### 4.2.3 Subject honorification

Another phenomenon where three types show the different behaviours is subject honorification. I summarise Kageyama (1993) and Matsumoto’s (1996) discussions as follows 12:

(50) a. Unaccusative type and Transitive type
\[ o-V1-ni nari-V2 \]
\[ \ast o-V1V2-ni naru \]

b. Serial verb type
\[ \ast o-V1-ni nari-V2 \]
\[ o-V1V2-ni naru \]

12The serial verb type seems to show some degree of the lexical integrity here. Kageyama (2001) proposes the category level Word+ (“Word Plus”) for phrase-like prefixed or compounded words as the intersection of words and phrases. So it is possible to argue that the V node domination V1 and V2 in the serial verb type is this Word+ level, i.e. V+. Another possibility is Sadler and Arnold’s (1994) “small construction.” I leave this issue as an open question.
To account for those differences in information spreading, I postulate the following subject honorification rule:

(51) **Subject honorification rule**

Honification markers are placed on the V node in the c-structure corresponding to the most embedded clause containing SUBJ in the feature structure.

Since the markers honorify the action of subject, it is conceptually plausible to define the honorification marking by existence of SUBJ within feature structure.

Let us consider how this rule works in my proposed c- and feature structures for each type. Firstly, only V1 receives honorific markings in the unaccusative type:

(52) Shachoo-ga kaisha-no keihi-o o-tsukai-ni nari-sugiru.
CEO-NOM company-GEN expense-ACC HON-spend-DAT become-exceed
‘The CEO spends the company’s expenses too much.’

The c-structure with abbreviated feature structures for (52) is as follows:

(53)
Here, the most embedded clause containing subj in the feature structure is the V1 node. Although the feature structure of the V2 node also has subj, it contains the feature structure of V1 (strictly speaking S above V1, so that cat is not v) as indicated by the arrow, so it is less embedded. According to subject honorification rule (51), V1 tsukai receives honorific marking. It produces the correct form.

Similar to the unaccusative type, only V1 receives honorific marking in the transitive type. Consider the tree with abbreviated feature structures again:

    Yamada-teacher-NOM dinner-ACC HON-eat-DAT become-damage-PAST
    ‘Mr Yamada missed the chance to eat dinner.’

As shown in the feature structures in (54), the most embedded clause containing subj is xcomp introduced by V1. Thus, this V1 taberu receives honorification markers again in the transitive type VVCs.

The serial verb type shows the opposite behaviour in honorification, namely the whole VVC is honorific marked. Let us look at a part of the feature structure trees as well in this type:
Tanaka-teacher-NOM HON-letter-ACC HON-post-forget-DAT become-PAST
‘Mr T anaka forgot to post the letter.’

b. LCS [Cause(X,Become(Forgotten(Y)))]
   By(Not(Post(X,Y)))
TERMS ⟨X,Y⟩
TENSE PAST
CAT V
SUBJ [“Mr Tanaka”]^X
OBJ [“letter”]^Y
ARG [ ]

In (55b), ARG introduced by V1 does not contain SUBJ within it. Although it shares ρ projection with its mother, ARG is one of the α projection and a semantic argument of V2, not an independent clause. Hence, it is dependent on V2 clause and does not have grammatical relations within ARG. The candidates for honorification marking are V2 and its mother node, i.e. the topmost V. Subject honorification rule (51) fails to determine which verb is to be marked. Thus, I postulate the revised subject honorification rule as follows:

(56) Subject honorification rule (revised)
Honorific markers are placed on the highest V node in the c-structure corresponding to the most embedded clause containing SUBJ in the feature structure.

I redefine ‘the highest V node’ instead of ‘the V node’ in this revised rule. According to this revised subject honorification rule, the topmost V, i.e. the
whole VVC, receives honorific markers, which is correct in the serial verb type.

It is still unclear how to justify status of ‘the highest in the c-structure’ in the definition. It may be related to the property of ARG. Since ARG is a pseudo-complement of V2 clause, it might be undesirable if it is separated from V2 by honorific marking on V2.

4.2.4 Scope of adverbials

As noted in section 3, the unaccusative and transitive type allow adverbials to take the scope over V1 or the whole VVC, whereas serial verb type only allows the latter. Although Matsumoto attributes this difference to the mono- and bi-clausality in f-structure, the story is not so straightforward. Look at the following examples (I use the notations [Adv[V1V2]] when adverbials take the scope over the whole VVC and [Adv[V1V2]] when adverbials take the scope over only V1):

(57) a. Sono rikujoo senshu-ga bitaminzai-o shocchuu nomi-sugiru.
    ‘The athlete often takes vitamin pills too much.’ [Adv[V1V2]]
    ‘The athlete’s frequent taking vitamin pills is excessive.’ [Adv[V1V2]]

b. Sono rikujoo senshu-ga shocchuu bitaminzai-o nomi-sugiru.
    ‘The athlete often takes vitamin pills too much.’ [Adv[V1V2]]
    *‘The athlete’s frequent taking vitamin pills is excessive.’ [Adv[V1V2]]

(58) a. Samu-wa karate kyooshitsu-ni teikitekini iki-sokone-ta.
    ‘Sam missed the karate class regularly.’ [Adv[V1V2]]
    ‘Sam failed the regular attendance of the karate class.’ [Adv[V1V2]]

b. Samu-wa teikitekini karate kyooshitsu-ni iki-sokone-ta.
    ‘Sam missed the karate class regularly.’ [Adv[V1V2]]
    *‘Sam failed the regular attendance of the karate class.’ [Adv[V1V2]]

(57) is the unaccusative and (58) is the transitive VVC type. The sentences have two readings when adverbials are placed immediately before V1
as indicated in (57a) and (58a). However, when the adverbials are placed in other positions, only one reading, i.e. the wider scope reading, is available. Hence, in addition to the f-structure (feature structure in information spreading) differences of each type, which Matsumoto relies on, we need to consider the c-structure differences to account for this phenomenon at least in Japanese (see Andrews and Manning (1999:55) for Catalan case).

In the case of the serial verb type, only the wide scope reading is available regardless the position of adverbials:

(59) Sono shinbun kisha-wa kiji-o subayaku kaki-naoshi-ta.

Sono shinbun kisha-wa subayaku kiji-o kaki-naoshi-ta.

'Subayaku, the newspaper reporter rewrote the article quickly.' [Adv[V1V1]]

'Subayaku, the newspaper reporter re-did the quick rewrite of the article.' [Adv[V1]V2]

The adverbial is placed just before V1 in the first sentence of (59). Nevertheless, the scopal ambiguity does not arise.

To capture those behaviours of each type of VVC, I propose that adverbials in Japanese are adjoined to S and take the scope over the sister V. This is schematised as follows:

(60) S

\[ \ldots \text{ADJUNCT} \ldots = \{\rho, \alpha, \mu\} \]

\[ \text{XP} \]

\[ \text{V} \]

From the configuration of (60), S becomes a clause introduced by V in the feature structure. Since XP is a sister of the V, it takes the scope over the V. This means that the XP functions as ADJUNCT of the clause in the feature structure.

Let us consider how this principle works to account for the scopal differences of each type of VVCs. According to my proposing c-structures,

---

13Some speakers are able to take the narrow scope readings when the adverbials are placed between the subject NP and the object NP. I suspect that it is due to a pragmatic reason. The semantic relation of adverbials shocchuu and teikitekini with V1 nomu and iku is stronger or more natural than that with V2 sugiru and sokoneru, that is shocchuu nomu and teikitekini iku sound collocationally more comfortable than shocchuu sugiru and teikitekini sokoneru. In the case that adverbials are placed in the front of the sentence, only the wide scope reading is available for every informant.
the unaccusative and transitive type have the same possibility of adverbial positions as shown in (61) (I assume the case where V1 is transitive):

\[(61)\]

\[
\begin{array}{c}
S \\
\text{XP}_1 \quad \text{NP} \quad \text{XP}_2 \quad \text{NP} \quad \text{XP}_3 \quad \text{V} \\
\text{S} \quad \text{V2} \\
\text{XP}_4 \quad \text{V1}
\end{array}
\]

In (61), four positions (XP\(_1\) to XP\(_4\)) are available for adverbials. If an adverbial is one of XP\(_1\), XP\(_2\) and XP\(_3\), it takes the scope over the sister V, namely the whole VVC. If it is XP\(_4\), it takes the scope over the V1. This structure explains the scopal ambiguity shown in (57a) and (58a). When an adverbial appears immediately before V1, there are two possibilities, XP\(_3\) and XP\(_4\), in the configuration (61). Thus, if it is XP\(_3\) the wide scope reading arises. If it is XP\(_4\) the narrow scope arises. It is obvious that when the adverbial is either XP\(_1\) or XP\(_2\), it can only take the wider scope, which explains (57b) and (58b). I present the c- and feature structures of (57a) here\(^\text{14}\):

\[(62)\] a.

\[
\begin{array}{c}
\text{S} \\
\text{SUBJ} \quad \text{SUBJ} \\
\text{NP} \quad \\
\text{sono rikujoo} \\
\text{senshu-ga} \\
\text{SUBJ OBJ} \\
\text{NP} \\
\text{bitaminzai-o} \\
\text{ADJUNCT} \\
\text{Adv} \\
\text{shocchuu} \\
\text{V} \\
\text{SUBJ} = \{\rho, \alpha, \mu\} \\
\text{S} \\
\text{V2} \\
\text{= \{\kappa, \rho, \alpha, \mu\}} \\
\text{S} \\
\text{V1} \\
\text{= \{\rho, \alpha, \mu\}} \\
\text{V1} \\
\text{= \{\kappa, \rho, \alpha, \mu\}} \\
\text{sugiru} \\
\text{nomi}
\end{array}
\]

\(^{14}\)I do not examine the internal structure of ADJUNCT in detail here. I suppose that ADJUNCTs just contribute to the LCS they modify.
b. \[
\begin{align*}
\text{LCS} & \quad [\mathit{Often}(\mathit{Become}(\mathit{Over}(X)))] \\
\text{TERMS} & \quad \langle X \rangle \\
\text{TENSE} & \quad \text{PRES} \\
\text{LCS} & \quad \text{Terms} \quad [\mathit{Take}(Y,Z)] \\
\text{TERMS} & \quad \langle Y,Z \rangle \\
\text{SUBJ} & \quad \text{LCS} \\
\text{TERMS} & \quad \langle \rangle \\
\text{DEF} & \quad + \\
\text{OBJ} & \quad \text{LCS} \\
\text{TERMS} & \quad \langle \rangle \\
\text{DEF} & \quad - \\
\text{ADJUNCT} & \quad \left\{ \begin{array}{l}
\text{LCS} \\
\text{TERMS} \quad \langle \rangle \\
\end{array} \right. \\
\end{align*}
\]
b. \[
\begin{array}{l}
\text{LCS } \{ \text{Become}(\text{Over}(X)) \} \\
\text{TERMS } \{ X \} \\
\text{TENSE } \text{PRES} \\
\text{LCS } \{ \text{Often}(\text{Take}(Y,Z)) \} \\
\text{TERMS } \{ Y, Z \} \\
\text{SUBJ } \{ \text{Thing}\text{athlete} \} \\
\text{DEF } + \\
\text{OBJ } \{ \text{Thing}\text{vitamin pills} \} \\
\text{DEF } - \\
\text{ADJUNCT } \{ \text{LCS } \{ W \} \} \\
\text{TERMS } \{ \} \\
\end{array}
\]

The impossibility of the narrow scope of the serial verb type is also explained in my analysis. Since it does not have S under the compounding V node in the c-structure, adverbials cannot have a scope just over the V1 as shown in (64).

(64) \[
\begin{array}{c}
\text{S} \\
\text{XP}_1 \text{ NP} \text{ XP}_2 \text{ NP} \text{ XP}_3 \text{ V} \\
\text{V}_1 \text{ V}_2
\end{array}
\]

Every available position for adverbials is under the top S, so that they always take the scope over the V, i.e. the whole VVC.

5 Concluding remarks

Throughout this paper, I have shown that the structural relations between V1 and V2 in Japanese VVCs differ depending on the properties of V2. The first two types, i.e. the unaccusative and the transitive, are no problem for Classic LFG. The serial verb type, however, is difficult to capture. Although Matsumoto (1996), following Alsina and Butt, assumes that two verbs are
mapped onto a single PRED ‘V1-V2’ in f-structure, his analysis fails to account for the distinction between lexical and syntactic compounding formation. Moreover, V1 in the serial verb type can be VN-o-suru, which is thought to have a bi-clausal structure. It is unclear how to realise this bi-clausal structure within a single PRED.

Andrews and Manning (1999) point out the conceptual difficulties found in a single PRED analysis of complex predicates, and propose a new approach to complex predicates, information spreading. By allowing flexible grammatical information sharing among c-structure nodes and assuming pseudo-complement as one type of α-projection, they succeed in accounting for Romance causatives. And importantly, serial verb constructions where two complete predicates are serialised are also well-explained. I argue that the third type of Japanese VVCs behave like serial verb constructions (so that I name it serial verb type). Both V1 and V2 are complete predicates and, unlike the other two types, V1 does not hold a true complement relation with V2. But rather, the clause introduced by V1 is a pseudo-complement, so that it is a semantic argument of V2 and only shares grammatical relations with the whole compound. The different behaviours among three types in passivisation, subject honorification and scope of adverbials are explained by my proposing structures. Further, the pseudo-complement analysis of the serial verb type solves the problems found in Matsumoto’s (1996) analysis. This analysis of Japanese syntactic verb-verb compounding adds cross-linguistic support to Andrews and Manning’s proposal to complex predicate formation in syntax.
References


